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MESSAGE FROM THE CO-HOSTING PARTNER ICOPH 2017

On behalf of Taylor's University, it is an honour to welcome delegates to the 3rd International Conference on Public Health (ICOPH) with the theme, "Strengthening the Public Health Infrastructure towards Healthy Communities". A role in public health is vital for increasing life expectancy, however, it is rarely thought of until a crisis catches our attention.

Over the years, health initiatives and management for global communities are increasingly recognised as an important component for the overall wellness of human beings. Public health is constantly evolving in response to the needs of the population around the world. Initiatives like clean air, water policies and vaccinations keep people healthy and safe by preventing injury and disease.

Hospital based treatment may be more apparent to many; community based health initiatives need to be given more emphasis to increase the awareness of the health professionals, and also the public of their valuable role in a healthy population. It is necessary to remove various cultural, social and logistical barriers to enhance knowledge about healthcare needs, closing the gap in health disparities within countries.

At Taylor's University, we emphasise the advancement of knowledge through research and are happy to contribute to its dissemination through scientific conferences. More importantly, research outcomes should lead to action and guide programme development, followed by the delivery of health services. In line with the new strategic plan, we look to increase our capacity and affinity in the area of research and building commercial success, and to be recognised as the leading international university ranked in the top 100 universities in Asia by year 2022.

I sincerely hope the 3rd ICOPH 2017 will facilitate the exchange of research findings, opinions and views on issues related to Public Health among healthcare professionals and

academicians from different parts of the world and different health care systems. May the participants today gain valuable experience and put into good use what is learnt.

Prof. Michael Driscoll
Vice Chancellor & President Taylor's University
Malaysia

MESSAGE FROM CONFERENCE CO-CHAIR- ICOPH 2017

It gives me great pleasure to welcome all of you to this 3rd International Conference on Public Health in Kuala Lumpur, Malaysia. This is the 3rd time this conference is being organised by TIIKM and the theme of the conference is 'Strengthening the public health infra-structure towards healthy communities. "First of all let me thank you all for attending this conference and secondly I would like to thank all the local academic partners and all universities and is particular the Ministry of Health Malaysia for providing support for the conference. Globally public health is no longer dominated by infectious diseases instead it is being dominated by chronic diseases such as heart disease, diabetes, cancer, and mental-health conditions, which require continuous treatment although polio and HIV are still with us. At the same time, newly emerging diseases such as Zika and Ebola epidemics are making headlines and these pose challenges to global health security in the future.

Also war, civil unrest, and acts of terrorism can hinder progress in all aspects of global development, including health, education, and gender equality. Extreme weather and rising sea levels, temperatures, and carbon dioxide levels could usher in a wide variety of human health effects. We as public health professionals need to address some of these issues and influence our policy makers to act. It is important to consider how our actions today will be viewed by our future generations' decades from now.

This year we have received about 600 abstracts for the conference and we are happy of the tremendous response we have received. I am sure that you all will deliberate on some of these important issues in the next few days. Finally let me take this opportunity to thank all the plenary speakers and also the members of the organising committee for the excellent preparations and arrangements for this conference and you the participants who have made

this conference happen. Hope you all will have good conference for the next few days and also enjoy the beauty of Kuala Lumpur and Malaysia

Thank You

Prof. Dr. Hematram Yadav
Department of Community Medicine
MAHSA University
Kuala Lumpur
Malaysia

MESSAGE FROM CONFERENCE CO-CHAIR- ICOPH 2017

A very warm welcome (*selamat datang*) to all speakers and delegates to Kuala Lumpur, Malaysia and to our Third International Conference on Public Health 2017 (ICOPH 2017), 27-29 July 2017, organized by The International Institute of Knowledge Management (TIIKM). The third conference follows on the highly successful first and second conference in 2015 and 2016, respectively, in Colombo, Sri Lanka. The theme of the first conference was "promoting global health through equitable access to health system" that took cognizance of new advances and research results in the areas of global health and health systems. The theme of the second conference was "bridging the gap between research and policy and creating a global platform to discuss evidence based health policies and interventions in public health." In the third conference, we will address the very important and pertinent issue of "**Strengthening the Public Health Infrastructure towards Healthy Communities**."

The Sustainable Development Goals (SDGs), officially known as "Transforming Our World: the 2030 Agenda for Sustainable Development" is a set of 17 "Global Goals" with 169 targets that was officially sanctioned by the United Nations on 25-27 September 2015 as a successor to the Millennium Development Goals (MDGs). The SDGs build on the principles agreed upon under a United Nation resolution, popularly known as The Future We Want. It is a non-binding document released following the Rio+20 Conference in 2012 in Rio de Janeiro, Brazil.

The 17 global goals are: (1) No Poverty; (2) Zero Hunger; (3) Good Health and Wellbeing; (4) Quality Education; (5) Gender Equality; (6) Clean Water and Sanitation; (7) Affordable and Clean Energy; (8) Decent Work and Economic Growth; (9) Industry, Innovation and Infrastructure; (10) Reduced Inequality; (11) Sustainable Cities and Communities; (12)

Responsible Consumption and Production; (13) Climate Action; (14) Life Below Water; (15) Life on Land; (16) Peace, Justice and Strong Institutions; and (17) Partnerships for the Goals. Indeed, the ICOPH 2017 theme of "Strengthening the Public Health Infrastructure towards Healthy Communities" certainly echoes with most of the 17 SDGs.

Implementation of the SDGs has already started worldwide. It is no easy task, however. In each country, the goals must be translated into national legislation. Poor countries need the support of rich countries, and coordination at the international level is crucial. The SDGs is very ambitious, and there are many obstacles. It would be a great opportunity for ICOPH 2017 to deliberate on some of these obstacles and pave the way ahead.

I would like to take this opportunity to thank all speakers and delegates for making time and effort to attend and actively participate in this international conference. A very sincere thanks to the Organizing Committee and Scientific Committee members for all the help and all sponsors and participating organizations for supporting the conference. I hope that the conference will forge new alliances in research, development and training that will be beneficial to us all.

Sincerely,

Prof. Dr. Rusli Bin Nordin
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PARTICIPATION OF FARMER HOUSEHOLD NON-CONTRIBUTION ASSISTANCE RECIPIENT IN THE NATIONAL HEALTH INSURANCE PROGRAMME IN INDONESIA

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Abstract: Indonesia has set the achievement of Universal Health Coverage in 2019. Community participation in the national health insurance programme is the key to success, especially independent community groups (non-beneficiaries) in premium payments. Participation of farmer household non-contribution assistance recipient in the national health insurance programme is very low. Therefore, this study aims to analyze the factors that influence the participation of farmer households non- contribution assistance recipient in Jember District (agricultural center in East Java, Indonesia). This research used quantitative analytical method with observational approach. The independent variables of the study consist of the level of knowledge, the need on health insurance, the ability to pay the premium. Dependent variable was participation in health insurance programme. Data analysis using logistic regression. The results showed that the level of knowledge has a significant influence on the willingness of respondents to participate in the programme NHI with Odds ratio of 0.214. The need for health insurance also has a significant influence on the willingness of the respondents to participate in the NHI programme with the Odds ratio of 0.077.

Keywords: participation, farmer household, health insurance

Introduction

The Government of Indonesia has set the achievement of Universal Health Coverage (UHC) in 2019 through a National Health Insurance (NHI) Programme. UHC's target was that all Indonesians have fair access to quality, promotive, preventive, curative and rehabilitative services, at an affordable cost. This was in accordance with the concept of UHC according to WHO (2005) that universal coverage contains two core elements, namely: (1) Access to fair and quality health services for every citizen; And (2) Financial risk protection when citizens use health services (Bump, J.B., 2010). This ideal condition will be achieved if all the people of Indonesia have been registered as participant peogram national health insurance (Fengler W. et. all. 2008).

The membership in NHI programme is divided into 2 (two), ie the participants of the Contribution Assistance Recipient (PBI) and Non-Contribution Assistance Recipient (non PBI). PBI participants include people who are classified as poor and disadvantaged people whose premium payment are borne by the government (central and local government) with sources of state budget (APBN) and local budget (APBD) funds. Non-PBI participants include wage earners and their families, as well as non-workers and their families. Contribution payments for non-PBI participants are borne by individuals and employers in accordance with the provisions (Government Regulation No. 86 of 2013). So the challenge of participation is non PBI participants in which participants have to pay premiums independently.

Most Indonesians work as farmers. Jember Regency as a center of agriculture and plantation in East Java has a population with a lot of farmers' profession. Based on the results of the agricultural census of Jember Regency in 2013 by Central Bureau of Statistics Jember, obtained the number of household farming business

as much as 325,062 households. Silo, Wuluhan, and Sumberbaru are the sub-districts with the highest number of farm households. Based on the results of interviews with the Head of Marketing Unit BPJS Jember health obtained information that until the beginning of 2015 the participation of farmers (not farm laborers) is still very little. Number of informal sector workers (including non-PBI farmers) who registered as many as 76,603 people or 4.6% of the total participants. Therefore this study aims to examine the factors of low participation of farmers in the health insurance programme by analyzing the factors of knowledge, ability to pay the premium, the need on health insurance for the willingness to be a participant of health insurance.

Research Methods

The type of this study was observational analytic research, where researchers did observation, interview and filling questionnaires and make measurements on several variables that are being studied without providing intervention to the object of research. Based on the timing of the implementation, this study included cross sectional, since data on the dependent and independent variables were obtained at a certain time. The unit of analysis in this study was the household with the respondent head of the family or family members who have information about the family and contributed in family decision making as much as 90 respondents.

Results and Discussion

Knowledge of respondents

Knowledge of respondents in this study is used to identify the extent to which the adequacy of information owned by respondents that can influence the decision to become an independent participant health insurance. Knowledge of respondents is divided into 4 (four) aspects of the assessment, namely knowledge of the existence of health insurance programmes, knowledge of registration procedures as participants, knowledge of the mechanism of payment of contributions (premiums), and knowledge of mechanisms of utilization of health insurance. Distribution of respondents based on their knowledge as follows:

Table 1 Distribution of Respondents by Their Knowledge

No.	Questions	Knowledge				Total
		Know		Unknown		
		∑	%	∑	%	
1	The existence of a health insurance programme	40	44,4	50	55,6	90
2	Registration procedure as a participant	8	20,0	32	80,0	40
3	The mechanism of payment of premium	9	22,5	31	77,5	40
4	mekanisme pemanfaatan jaminan kesehatan	8	20,0	32	80,0	40

Knowledge of respondents about the existence of health insurance programme was quite low, where 50 respondents (55,6%) did not know existence of policy about national health insurance. Whereas from 40 respondents who known the existence of health insurance programme, it was known that knowledge of respondent about registration procedure as participant still very low (80% did not know). Knowledge of respondents on the aspect of premium payment mechanism was also low, where 77.5% of respondents did not know. While on the mechanism of utilization of service guarantee, only 20% of respondents known it.

Ability to Pay (ATP)

ATP describes the ability of respondents in paying NHI programme dues adjusted to the prevailing premium amount. The ability to pay was identified by calculating family income and family expenditure in 1 month (for food, non essential food, and non food). This calculation is predictive as measured by the ability of

respondents to generate income from various sources and used to finance various family needs. The following is the amount of rupiah in accordance with the financial components managed in the respondent's family:

Table 2 ***Average Revenue and Expenditure of Respondents***

Components		The amount (rupiah)
Average family income (per month)	:	Rp 2.491.661,-
Average family expenditure (per month) :		
Average food expenditure	:	Rp 882.464,-
Average non-essential food expenditure	:	Rp 224.270,-
Average non-food expenditure	:	Rp 1.077.904,-
Average cigarette and betel expenditure	:	Rp 277.243,-

If referring to the Ministry of Health (2001) guidelines, the ability to pay the community can be done with the formula approach of 5% of total expenditure. So in this study used the approach to predict ability to pay premium respondents.

Needs On Health Insurance

Needs are dynamic and tend to continue to grow with time. For economists, necessity is something of an evaluative and normative sense, which has an underlying object (Hosseinpoor A R, 2013). Meanwhile, the need is the desire to obtain certain satisfiers for a deeper need. Needs in this study more on personal need which is the assessment of respondents to the need or not with the existence of health insurance by the government. With the personal need is expected to improve the willing attitude to be a participant of the NHI programme. Based on the research results obtained information as follows:

Table 3 Distribution of Respondents According to Needs, Attitudes and Participation of Respondents

Variables	Category	∑	%
Needs on NHI	Need	62	68,9
	Not Need	28	31,1
Willingness to participate	Willing	28	31,1
	Unwilling	62	68,9
Participation of Respondents	Registered	7	7,8
	Not registered yet	83	92,2

From the above table it is known that the personal need of respondents to the health insurance is greater (68.9%) than the unnecessary (31.1%). It's just that the need for health insurance is not directly proportional to the willingness of respondents to become participants of the NHI programme. The number of respondents who are not willing to be a participant of NHI programme (68.9%) is more than willing (31.1%). This is also indicated by the low number of respondents who have registered themselves as participants of the NHI programme.

Willingness to Be a NHI Participant

This low requirement is also related to the low effort of respondents in finding the necessary information, so that only 40% of respondents know the existence of NHI programme. Perceptions of respondents to these needs also affect the attitude to be willing or not to be a participant of NHI. This willingness will underlie the

decision to engage in real activities of registration as a participant. This description can be seen from the respondent's answer as follows :

Table 4 Distribution of Respondents According to Willingness to Pay and Participation

Willingness to Pay	Participation of Respondents		Total
	Registered	Not Registered Yet	
Willing	6 (85,7%)	22 (26,5%)	28 (31,1%)
Unwilling	1 (14,3%)	61 (73,5%)	62 (68,9%)
Total	7 (100%)	83 (100%)	90 (100%)

Descriptively illustrated that based on observed data, from 7 respondents who have registered having tendency to have willing attitude (85,7%) than unwilling (14,3%). While in the group of respondents who have not list, from 83 respondents there are 16.5% are willing, while 73.5% said not willing. So that the respondents who have not registered has a tendency to not willing to register themselves as participants of the NHI programme.

Multiple Logistic Regression Analysis

Researchers chose to use multiple logistic regression analysis as a mathematical model because of the relationship of some independent variables with one dichotomy (binary) dependent variable. Through several stages of data processing obtained **output 1** as follows :

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.795	.228	12.189	1	.000	.452

From the output 1 above it can be seen that Step 0 gives information when the equation model only inserts the constants (independent variables have not been inserted) hence the value of significant constants to be inserted into the model (sig value <0.05).

Output 2 is the Omnibus Test of Model Coefficients used for the test of overalls with the following results :

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	22.796	3	.000
	Block	22.796	3	.000
	Model	22.796	3	.000
Step 2[a]	Step	-.781	1	.377
	Block	22.015	2	.000
	Model	22.015	2	.000

a. A negative Chi-squares value indicates that the Chi-squares value has decreased from the previous step.

Value of sig < 0,05, so there is at least 1 variable that significantly affects the dependent variable, so the model can be used for further analysis. **Output 3** is Hosmer and Lemeshow Test used to test statistically there is or not significant difference between model with observation value so that model have fit with data or this test can be used for goodness of fit.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	5.503	8	.703
2	.538	2	.764

With a significance level of 5% found that the logistic regression model has been quite able to explain the data / fit model. (value of sig > 0,05). Output 4 is the Summary Model: Nagelkerke value R^2 = 0.098 which can be interpreted as R^2 on multiple linear regression.

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	88.802[a]	.224	.315
2	89.583[b]	.217	.305

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

b. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

It means that willingness to be NHI participants which can be explained by independent variable in this research is only 30,5%, while 69,5% is influenced by other variable has not been studied. Output 5 is to formulate the equations based on the following variables in the equation :

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Knowledge	-1.446	.543	7.095	1	.008	.235	.081	.682
	Willingness	-2.830	.912	9.635	1	.002	.059	.010	.352
	ATP	.000	.000	.800	1	.371	1.000	1.000	1.000
	Constant	.322	.460	.488	1	.485	1.379		
Step 2[a]	Knowledge	-1.541	.531	8.441	1	.004	.214	.076	.606
	Willingness	-2.567	.814	9.952	1	.002	.077	.016	.378
	Constant	.532	.397	1.798	1	.180	1.703		

a. Variable(s) entered on step 1: Pengetahuan, Butuh_JK, ATP.

From the output 5 it can be concluded that the significant independent variable that influences the willingness of the response to be a NHI participant is the level of knowledge and needs on health insurance. The variable of knowledge level has a significance value of 0.004 (value sig. <0.05) and the value of Odds Ratio or Exp (B) of 0.214, which means that the possibility / tendency of respondents who do not have knowledge about JKN well to become JKN participants is 0.306 times the respondents Has a good unity about JKN. While the

need for health insurance has a significance value of 0.002 (value sig. <0.05) and the value of Odds ratio or Exp (B) of 0.077, which means that the tendency of respondents who do not feel the need in NHI programme to become NHI participants is 0.077 times the respondents feel the need in NHI programme.

Discussion

The decision-making process of respondents to NHI participants generally consists of several steps, that is : Introduction of needs, information search, alternative evaluation, and post-evaluation of BPJS health service utilization. For the introduction of needs, sufficient information will be required of the existence of NHI programme. If looking back at table 1 it can be seen that from 90 respondents only 40 respondents (44.4%) who know of the health insurance programme. Moreover, from 40 respondents who know, only about 20% of respondents who know the registration procedure as a participant and the mechanism of payment of contributions. This means that the introduction of the product by the respondent is far from perfect. According to Langenbrunner (2009, 2011) that gaps in knowledge needing to be addressed strengthen and reform existing health financing mechanisms and thereby expand health coverage and benefits.

The low knowledge of respondents on rights and obligations in the NHI programme will have an impact on the extent to which the respondent's need for health insurance. Knowledge will encourage the formation of resonden attitude to what he knows. Attitude is one of the presdisposing factors that greatly contribute to the formation of one's behavior, both supportive and inhibiting behavior. From the results of the research obtained information that 68.9% of respondents chose the attitude of not willing to be a participant of the NHI programme. There are 2 (two) reasons that most respondents, ie do not know (35 respondents or 38,9%) and don't have ability to pay (36 respondent or 40%). The reasons for the ignorance of respondents have been much discussed above. But there is one thing that should be studied further that is related to public knowledge about the benefits (benefit) JKN programme. From the results of the study, only 20% know how they utilize health services in this NHI programme. People will find it easier to think with the logic of profit or loss when they register themselves as independent participants. Concerns of getting inappropriate services (disadvantaged) can be an impediment to community participation in the NHI programme. In some studies have linked patient satisfaction with equity in healthcare.

Regarding the ATP of varied respondents, they considered that the premium fee payment multiplied by a number of family members per month is considered burdensome. Reluctance of respondents due to two things, namely the amount of premium and the time of premiums payment. The premium amount has been set between Rp 25,500, - to Rp 59,500 per person per month. If the average number of family members of the insured is 4 persons, then the amount of premium to be paid each month between Rp 102.000, - to Rp 238.000, -. The amount of paying ability is equivalent to 5% of non-food expenditure. These limits are based on health expenditures. Based on the results of the research note that the average non-food expenditure of respondents amounted to Rp 1.634.620, -. This means the ability to pay peasants' premiums is around Rp 81,731 per month. Whereas for the lowest level of premiums only in the programme NHI with the average family member insured 4 people is Rp 102.000, -. So the reason of the inability of respondents in paying a premium is very possible given the ability to pay them is still below the amount of premium payments per family per month. The role of government is needed to cover the deficit of non-PBI paying ability in certain groups, so it is possible that cost sharing between participants and the government. While China has successfully extended the breadth of Health Coverage to the Poor (HCP), its scope (the comprehensiveness of services covered) and depth (the degree of financial risk protection) appear to be insufficient (Wagstaff, A ., et al, 2009, Liang, L. et al, 2013,

The second reason of the ability to pay is the time of payment. Characteristic of a typical farmer is income or income derived primarily from crop yields when harvesting. Cultivated species such as maize, coffee, tobacco which take months to reach the harvest and generate income. So if the rules of late payment of premiums imposed a fine of 2% (two percent) of the total contributions in arrears, then this will incriminate the farmers. Taking into account some of the results of this study, then efforts to increase participation participation RTUP need special socialization to farmer groups or farm cooperatives. Collective payments coordinated by farmer

groups or cooperatives are an alternative solution to offer. So the non-PBI premium will be paid first by the farmer group or cooperative manager, then after the harvest comes the new farmers pay the premium to the farmer group or cooperative. Indonesia remains a comparatively low spender on health, indicates that there will continue to be upward pressure on resources for the health sector in the near future (World Bank, 2008, World Bank, 2009). It analyzes Thailand's experience in health insurance coverage expansion within limited fiscal constraints through various mechanisms to contain costs (Hanvoravongchai, P., 2013).

Conclusions and Suggestions

The decision-making process of the respondents to be a participant of the NHI programme has an obstacle to the fundamental aspect of product introduction. The community has not properly understood the objectives, benefits and mechanisms of the NHI programme. This has an impact on the attitude of respondents who are mostly not willing to be NHI participants although respondents feel the need with the health insurance program. So from the result of multiple logistic regression test, knowledge and requirement variable on health insurance have a significant influence on willingness to become NHI participant. Suggestion to the weak understanding of respondents to the NHI programme, it is necessary socialization and communication media involving the participation of support community leaders or influential parties in the environment. Therefore, coordinating with the parties and providing information NHI programme to community leaders need to take precedence before plunging into the community. As for the limitations of respondents' ability to pay is influenced by the income characteristics of farmers who are very dependent on crops whose timing varies according to the type of planting. Therefore, the policy of monthly premium payment and sanction for the late should be reviewed.

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ANTHROPOMETRIC STUDY IN DEUTERO-MALAY ETHNIC IN SEARCH OF ACCURATE HEIGHT FORMULAS FOR NUTRITIONAL STATUS ASSESSMENT

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Abstract: Nutritional status can be assessed using a person's height. Sometimes it is difficult to quantify for example in bedrest patient or abnormal stature, so it needs an alternative anthropometric measurement, such as height estimation based on long-bones measurement. Little information is available about the accuracy of these measurements, especially in deutero-malay ethnic. The present study aimed to compare accuracy for estimating height from several long-bones lengths to search an accurate anthropometric formula for nutritional status assessment. This study used an observational analytic method with cross sectional approach. The samples are students of Medical Faculty of University of Jember that meet the inclusion and exclusion criteria. Data were analyzed with Kolmogorov-Smirnov test, Pearson Correlation test and linear regression. The method is by measuring height with microtoise and bones length with medline. The result showed strong and positive ($r > 0.5$) correlation between height and length of long-bones, so linear regression can be done. Among ulna, femur, humerus and radius bones, femur formula showed the highest accuracy both in men (r right = 0.904; left =0.906) and women (r right = 0.911; left = 0.900). We conclude that anthropometric formula from estimation of height by length of femur is the most accurate from all formula, thus the most preferable to be used for height estimation in deutero-malay ethnic when assessing nutritional status.

Keywords: anthropometric formulas, height estimation, nutritional status, deutero-malay

Introduction

Measurement of height is very important both for children, adults, and elderly (elderly). This is important because by knowing a person's height, his or her nutritional status can be assessed. Assessment of nutritional status is often done by calculating the body mass index (BMI). BMI is measured by weight ratio (in kilograms) divided by squared height (in meters) (Goon, et al, 2011). Therefore we need accurate height measurement. The usual measurement of height is by measuring from the top of the head (vertex) to the tip of the heel in an upright position or called the stature (Barbosa, et al, 2012). In some cases where height cannot be directly determined, as in the case of individuals with disabilities, we needs an alternative height measurement to asses nutritional status. Disability is the abnormality of limb shape from birth and due to abnormal growth including spinal deformities. In addition also in individuals who have difficulty to stand because of using a wheelchair, neuromuscular weakness and in individuals with amputation conditions. (Goon et al, 2011).

Based on a survey conducted by WHO, the number of people with disabilities worldwide by age 15 years and over in 2013 is 975 million people, or about 19.4% of the total world population, while for under 15 years reaches 190 million people or about 3.8% of the world's total population. Based on WHO (2013) data, 65% of people with disabilities worldwide come from poor and developing countries. Indonesia is one of developing country with a large number of people with disabilities. Indonesia ranks second in Southeast Asia after

Vietnam as a country with a disability number reaching 3.5 million from the total population of Indonesia (WHO, 2013). The number of people with disabilities in Indonesia reaches 1,652,741 people and 67,5% of them are in productive age (18 - 60 years old). Leg disabilities accounts up to 33.75%, while the other 12% have body deformities (BPS, 2013).

Height has an important role in determining nutritional status and hence we required the need for a good height estimators for individuals with disabilities and other conditions that might cause height cannot be determined directly. Therefore, if the estimation of the height is done by using an unsuitable tool it will have an impact on the calculation of energy needs that are not in accordance with nutritional status. It then encourages the development of research on accurate height measurement alternatives. One of the alternative height measurements can be performed on people living on a percutaneous basis (Madden, et al, 2012). The results show that long bones can be used to formulate a high-estimate formula because long bones have a linear relationship with height (Reinhard, et al, 2013). Linear regression formulations derived from one or more body parts may be used for estimation of height (Krishan and Sharma, 2007, Chikhalkar, et al, 2010, Ahmed, 2013). The use of a linear regression formulation to determine an estimation of height based on a particular body part is an accurate method compared to other methods (Tsokos, 2008).

In Indonesia, the Ministry of Health has not established an official alternative method of measuring height in specific conditions (where height cannot be measured directly). One alternative height measurement using long bones is to use the length of the humerus, radius, ulna and femur. Several studies of the effectiveness of bone length of humerus, radius, ulna and femur as high estimators were performed in various age, ethnic, and gender groups (Ilayperuma, et al, 2010, Thumar, et al, 2011, Prasad et al, 2012, Barbosa et al, 2012, Honandar, 2014) with good correlation results. According to Ozaslan (2006), ulna has a better accuracy than the other long bones of the upper extremities. The British Association for Parenteral and Enteral Nutrition recommends the length of the ulna as an alternative to individual height measurements for the assessment of nutritional status. In addition, as an alternative measurement, we may also use the length of the lower extremity bone such as femur. The estimate formula of height by using the length of the bone of the femur percutaneus has the best accuracy when compared with the long bones of other lower extremities (Itsna, 2015).

The use of long bone length as an estimator of height is limited to specific populations, races and environments. Therefore, further testing is required when it is done with different areas, populations, and races. In addition, differences in a person's height is affected by several factors, one of which is gender. The average male height is greater than the female. Therefore, we need to separate the formula of height estimation between men and women (Schell, et al, 1985, Papaloucas, et al, 2008). Research on height measurement alternatives using humerus, radius, ulna and femur length is still rare in Indonesia especially in deutero-malay ethnic and it is still very rare to distinguish by sex. Therefore, the researcher is interested to develop the estimation formula of height by using humerus, radius, ulna and femoral length of bone in each gender.

Methods

This research used observational analytical method with a cross sectional approach and consecutive sampling technique. This study was conducted at the Faculty of Medicine, University of Jember in November 2016. The study population is 3rd and 4th year students of Faculty of Medicine, University of Jember with the age of more than 21 years old. Slovin formula used to calculate the sample size in this study to obtain representative sample and more definite or close to the existing population (Sugiyono, 2010). Based on a population of 102 persons with an error rate set to 5% or 0.05, then the minimum sample size in this study is 81.2 (rounded to 82). This research involving 88 subjects who fulfilled the inclusion criteria of being able to stand upright, including in the deutero-malay ethnic (Javanese, Sundanese, Madurese, Balinese, Acehnese, Minangkabau, Lampung, Makasar, Bugis, Manado and Minahasa tribes) and willing to sign informed consent, as well as the exclusion criteria of having a history of fractures on the upper and lower extremities.

The method used is measuring height from vertex to heel by using microtoise capacity of 200 cm. Then measure the length of the humerus bone from the major tuberosity to the lateral epicondyle, the radius length of the radius from the radii cap until the Styloideus radii processus, the ulna length from the tip of the elbow (olecranon process) to the middle of the protruding bone at the wrist (styloid process) and the border of the femur is determined by palpation and then measured from the femoral major trochanter to the lateral condyle of the femur using a 150 cm tape measure capacity.

The data obtained were analyzed using IBM SPSS Statistics software version 20.0. The test was Kolmogorov Smirnov normality test. Because the result of normality test p> 0,05 (normal distributed data) then Pearson Correlation test was done. After that, the Linear Regression test was done to determine the approximate formulation of height. This research has got permission of ethical clearance from ethics commission of Medical Faculty of Jember University.

Results and Discussions

Total number of female respondents (65.9%) is more than the number of male respondents (34.1%). It is because of the limitation of the total population that the number between men and women have a large difference. In the results of the study, the average height in men is 167.58 cm, higher than the female height of 156.99 cm (Table 1). This result is relevant with theory that the comparison of male height to woman is 100 : 90. The difference can also be influenced by male activity factor which tend to be more severe than female (Schell, et al, 1985, Papaloucas, et al, 2008). Therefore, looking for height requires a separate formula between men and women. Respondent age range is between 21 and 23 years with mean of 21.23. From the data obtained the average length of humerus and radius is longer on the right side of both the male and female, while ulna and femur slightly longer on the left side (Table 1).

*Table 1 Descriptive data of deutero-malay ethnic samples in this study.**

Skeletal Element	n	Minimum	Maximum	Mean	Std. Deviation
Male Right:					
Humerus	30	26	33.85	29.9	1.5
Radius	30	19.75	27.65	23.09	1.5
Ulna	30	21	30	26.46	1.94
Femur	30	38.01	46.31	42.08	2.11
Male Left:					
Humerus	30	26	33.85	29.85	1.52
Radius	30	19.75	27.65	22.93	1.49
Ulna	30	21	30	26.53	1.94
Femur	30	37.98	46.11	42.09	2.1
Female Right:					
Humerus	58	24	31.25	27.46	1.69
Radius	58	17.9	24.85	21.03	1.43
Ulna	58	21	28.5	25.43	1.75
Femur	58	33.67	44.34	38.96	2.36
Female Left:					
Humerus	58	24	31.25	27.44	1.69
Radius	58	17.9	24.85	20.98	1.43

Ulna	58	20.8	28.5	25.53	1.81
Femur	58	33.54	44.52	38.97	2.36

*All measurements are reported in centimeters

The regression equation is calculated separately for each side and for each limb dimension as body height = a + bx, where "a" is the regression coefficient of the dependent variable ie height and b is the regression coefficient of the independent variable ie the length of the limb (length Humerus bone and radius bone length) and "x" denotes measurements of limb length or bone calculated (Krishan and Sharma, 2007). r square (r^2) or coefficient of determination is to measure the quality or accuracy of the regression equation that gives the proportion or percentage of total variation in the dependent variable (height) described by the independent variable (long bone length) (Anupriya and Kalpana, 2016). Accuracy of the resulting formula is said to be better if r square is approaching 1 (one). The resulting formula from linear regression can be seen in Table 2.

*Table 2 Regression formula for height estimation of deutero-malay ethnic samples in this study and statistic parameters.**

Skeletal Element	n	Regression Formula	r	r^2
Male Right:				
Humerus	30	71.440 + (3.215 x Right Humerus)	0.862	0.743044
Radius	30	96.173 + (3.092 x Right Radius)	0.828	0.685584
Ulna	30	105.156 + 2.321 (Right Ulna)	0.818	0.669124
Femur	30	68.096 + 2.339 (Right Femur)	0.904	0.817216
Male Left:				
Humerus	30	73.272 + (3.159 x Right Humerus)	0.851	0.724201
Radius	30	95.80 + (3.131 x Radius Left)	0.827	0.683929
Ulna	30	105.190 + 2.313 (Left Ulna)	0.822	0.675684
Femur	30	66.974 + 2.365 (Left Femur)	0.906	0.820836
Female Right:				
Humerus	58	93.782 + (2.300 x Right Humerus)	0.868	0.753424
Radius	58	100.737 + (2.673x Right Radius)	0.852	0.725904
Ulna	58	93.239 + 2.643 (Right Ulna)	0.803	0.644809
Femur	58	94.101 + 1.610 (Right Femur)	0.911	0.829921
Female Left:				
Humerus	58	93.847 + (2.300 x Left Humerus)	0.863	0.744769
Radius	58	101.145 + (2.659 x Left Radius)	0.848	0.719104
Ulna	58	95.386 + 2.549 (Left Ulna)	0.803	0.644809
Femur	58	94.046 + 1.611 (Left Femur)	0.9	0.81

*All regression formulas are in centimeters

The correlation test result showed there is a significant relationship so the linear regression analysis to determine the estimation formula of height based on the length of the humerus, radius, ulna and femur can be done. This is consistent with the theory that long bones with height have a linear relationship (Glesser and Trotter, 1958). That makes a certain bone length can be used to formulate a formula for estimating height by linear regression analysis. Accuracy of anthropometric formula of height based on left femur for male and right femur for female bone length have the best accuracy among all formulas of height estimation obtained

because the value of r and r square are 0.91 and 0.91 or 0.82 and 0.83. It means that the formulas represent 82 and 83 percent of the samples height variance. This is probably because femur contributes directly to height (Nor, et al, 2013) . In addition, based on Anderson's (1993) study on long bone contribution to growth, femur contributes 36% to growth and height in both sexes, while other bones contribute less than 30%.

The estimated height formula generated in this study was compared with the estimation formula of some previous studies. From the results of these analyzes, it turns out the estimative formula of researchers and estimative formula of UGM's Body Anthropology (Kusuma and Yudianto, 2010) shows the results of measurements close to the actual height of respondents. This happens because the age range of research subjects is almost the same. The study subjects from the Anthropology of the Orthodontology were 25 to 30 years old while in this study were 21 to 23 years old. In addition, subjects in anthropological studies have the same racial race with the subject of this study, which is the mastoloid malayan race. This is also in accordance with the research conducted by Akhlaghi, et al (2012) that height is affected by various factors of age, gender, environment, and race of the subjects.

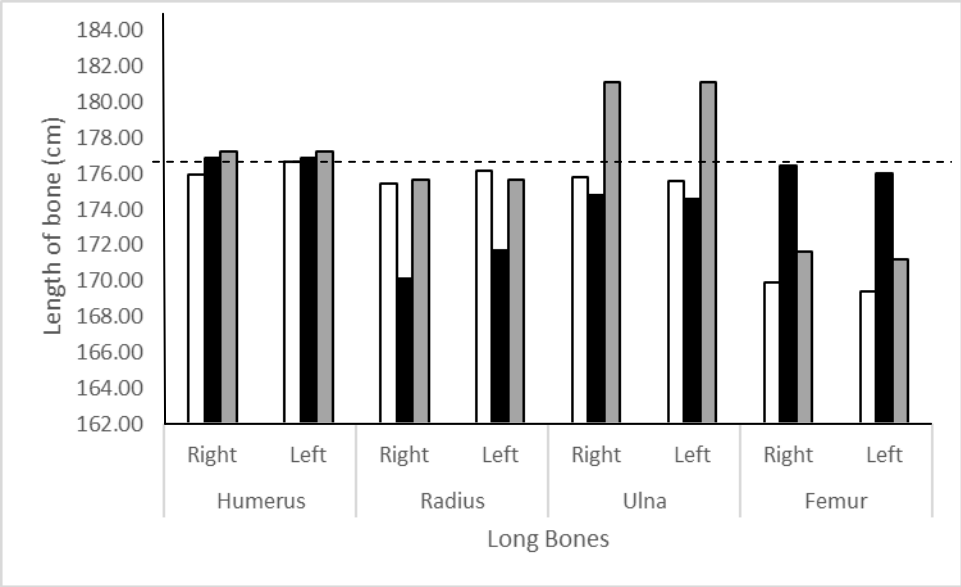

Figure 1 Comparison Between Researchers' Formulas with Some Other Formulas. Measurement based on sample of male height 176.5 cm showed by dash line. White, black and gray bar each represent height estimation using UGM's body anthropology formula, this study formula and Trotter Gleser formula.

From the regression formula obtained then the researcher also tried to test with other existing formulas such as Trotter Gleser's formula (1958). The bone length used in this study is percutaneous, which is still covered in joints, muscles and skin, while the formula to be compared is based on the bone in a dry state, so to insert into the existing formula must first reduce the measurement value of 2.5 cm (Devinson, 2009). Figure 1 showed that the researcher's formula, Trotter Gleser formula, and UGM's Body Anthropology formula have a similarity or close to the actual height of the respondent for humerus length based. This is because the sample of Trotter Gleser's research uses the subject of the mongoloid race and the subject of this study uses a deutero-malay ethnic which is a sub of the mongoloid race so it has a resemblance. As for the formula of UGM's Body Anthropology using research subjects of the Javanese tribe that is part of the deutero-malay ethnic. However, both the formula of Trotter Gleser and UGM's Body Anthropology only conducted research on men, so the formula cannot be set on women.

Formula on other bone length based were slightly different to the actual height, these might be because the differences on calculating dry bone and percutaneous bone and on setting the bone border boundaries measurement on dead and living object (Agnohotri, et al,). In elderly or persons with disabilities, height

measurements cannot be measured precisely. In order to know the height of a subject, we need to use formulas based on several parameters such as knee height, arm length and two arm lengths (Cilik, et al, 2010). The formula in this study can be an alternative of a more precise height measurement because it is designed to be used in living object. Therefore, according to the purpose of this research, our formula is more suitable to be used in height estimation than those other formulas compared above.

The formulas obtained in this study must be used carefully since it can only be used in populations of the same character and age. This estimation formula is tested on Javanese, Madurese, Sundanese and Balinese tribes, so it can be used to represent height estimations formulas in Malayan mongoloid races, especially deutero-malay ethnic of the same age range. This is because the height is influenced by several factors i.e. age, sex, race and residential environment (Barbosa, et al, 2012). To know the accuracy of this formula in other population groups, we need to test the validity first in a more varied population.

Although the researcher has tried maximally to control every step in conducting this research, there were still few limitations in this research. The subjects in this research were still limited to medical faculty students who have homogenous physical activity and narrow age range. In addition, the limitation of this study was the determination of bone-measurement borders that were still done manually, therefore for further research needs to be done with more accurate methods such as X-rays to determine and confirm bone measurement borders. It is also suggested to be done with a bigger population with diverse activities and equal number of gender.

Conclusions

Anthropometric approach such as an indirect height measurement help to assess nutritional status in disabled persons, or where direct method is not possible to be done. Based on the result of data analysis, height estimation formulas based on femur length are the best height estimation formulas and feasible to be applied in deutero-malay ethnic. When comparing with other formulas (UGM's Body Anthropology and Trotter Glesser), according to the purpose of this research, our formula especially the femur length based is the most suitable to be used in height estimation than those other formulas. However, to overcome the limitation of this study, it is suggested to conduct future research with larger number of samples, wider age range and proportioned number of samples between men and women. It is also suggested to add an X-rays examination as a measurement validity confirmation.

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Appendix

*Table 1 Descriptive data of deutero-malay ethnic samples in this study.**

Skeletal Element	n	Minimum	Maximum	Mean	Std. Deviation
Male Right:					
Humerus	30	26	33.85	29.9	1.5
Radius	30	19.75	27.65	23.09	1.5
Ulna	30	21	30	26.46	1.94
Femur	30	38.01	46.31	42.08	2.11
Male Left:					
Humerus	30	26	33.85	29.85	1.52
Radius	30	19.75	27.65	22.93	1.49
Ulna	30	21	30	26.53	1.94
Femur	30	37.98	46.11	42.09	2.1
Female Right:					
Humerus	58	24	31.25	27.46	1.69
Radius	58	17.9	24.85	21.03	1.43
Ulna	58	21	28.5	25.43	1.75
Femur	58	33.67	44.34	38.96	2.36
Female Left:					
Humerus	58	24	31.25	27.44	1.69
Radius	58	17.9	24.85	20.98	1.43
Ulna	58	20.8	28.5	25.53	1.81
Femur	58	33.54	44.52	38.97	2.36

*All measurements are reported in centimeters

*Table 2 Regression formula for height estimation of deutero-malay ethnic samples in this study and statistic parameters.**

Skeletal Element	n	Regression Formula	r	r^2
Male Right:				
Humerus	30	71.440 + (3.215 x Right Humerus)	0.862	0.743044
Radius	30	96.173 + (3.092 x Right Radius)	0.828	0.685584
Ulna	30	105.156 + 2.321 (Right Ulna)	0.818	0.669124
Femur	30	68.096 + 2.339 (Right Femur)	0.904	0.817216
Male Left:				
Humerus	30	73.272 + (3.159 x Right Humerus)	0.851	0.724201
Radius	30	95.80 + (3.131 x Radius Left)	0.827	0.683929
Ulna	30	105.190 + 2.313 (Left Ulna)	0.822	0.675684
Femur	30	66.974 + 2.365 (Left Femur)	0.906	0.820836
Female Right:				
Humerus	58	93.782 + (2.300 x Right Humerus)	0.868	0.753424
Radius	58	100.737 + (2.673x Right Radius)	0.852	0.725904

Ulna	58	93.239 + 2.643 (Right Ulna)	0.803	0.644809
Femur	58	94.101 + 1.610 (Right Femur)	0.911	0.829921
Female Left:				
Humerus	58	93.847 + (2.300 x Left Humerus)	0.863	0.744769
Radius	58	101.145 + (2.659 x Left Radius)	0.848	0.719104
Ulna	58	95.386 + 2.549 (Left Ulna)	0.803	0.644809
Femur	58	94.046 + 1.611 (Left Femur)	0.9	0.81

*All regression formulas are in centimeters

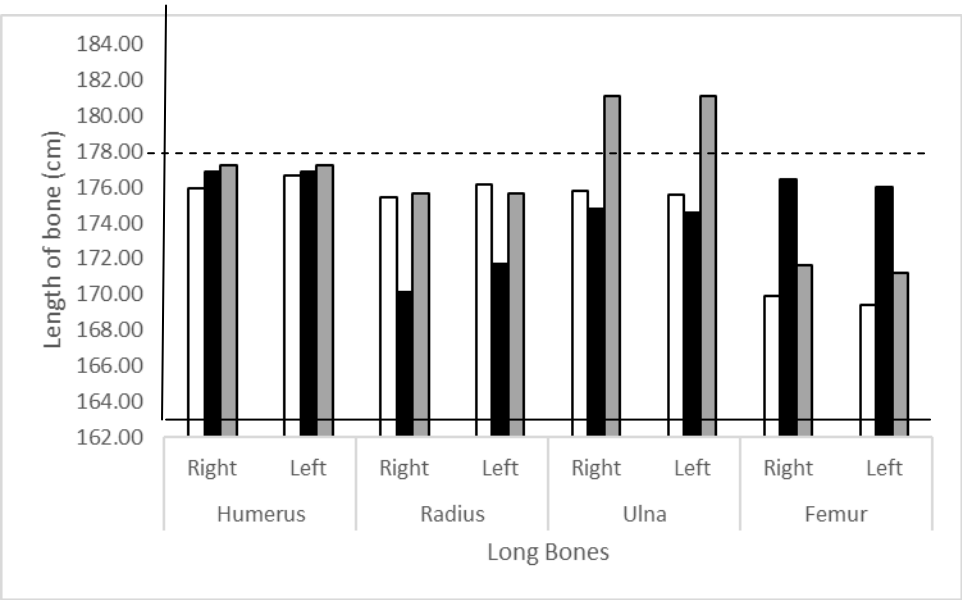

Figure 1 : Comparison between researchers' formulas and some other formulas. Measurement based on sample of male height 176.5 cm showed by dash line. White, black and gray bar each represent height estimation using UGM's body anthropology formula, this study formula and Trotter-Gleser formula

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SOCIO ENVIRONMENTAL FACTORS ASSOCIATED WITH THE SELECTION OF CONTRACEPTIVES IN GADING PUBLIC HEALTH CENTER TAMBAKSARI SURABAYA

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Abstract: Long-term contraception methods have entered into goverment programs to effectively postpone pregnancy, space births and terminate fertility. However, Women of fertile ages(15-49 years old) in Indonesia were still likely to choose short-term contraceptives, especially injectable contraceptive. This research analyzed the social environmental factors relating the selection of contraceptives in Gading Public Health Center Tambaksari Surabaya. This research used analitycal methods with case control study. The sampling technique used simple random sampling to procure cases and controls, and got 42 of each.The variables were socio environmental factors.Data were analyzed using multivariate logistic regression with a level of significance value $\alpha = 0{,}05$. The results showed five significant variables were the role of the spouse (p=0,002), the role of family (p=0,001), the role of health care workers (p=0,011), the role of community leaders (p=0,0018), and the role of print media (p=0,015). Social environmental factors included the role of spouse, health care workers, community leaders and print media associated with the selection of contraceptives in Gading Public Health Center Tambaksari Surabaya. The provision of support and complete information about all types of contraception are important so that the women of fertile ages can choose contraception that suits their needs.

Keywords : family planning, Long-Term Contraception Methods

Introduction

Indonesia is the fourth most populous country in the world.The ever increasing population will cause population probems(Manuaba, et al., 2010). The population of Indonesia in 2014 was 252 million consisting of 125.715 men and 125.450 women. From 2010-2014there was a population growth rate of about 1.40% per year(Central Bureau of Statistics, 2014). High growth rates affect the walfare and quality of life of the population(National Population and Family Planning Agency, 2012).

According to theNational Population and Family Planning Agency (2011), there are two types of contraception based on the duration of effectiveness, namely Long-Term Contraceptive Methods (L-TCM) and Non Long-Term Contraceptive Methods (Non L-TCM). The Government's current program policies are more geared to the use of Long-Term Contraception methods (IUD, Implant, histerectomydan vasectomy). The Government has advocated the L-TCM with the consideration that Non L-TCM is less economical and less efficient than L-CTM. (National Population and Family Planning Agency, 2012).

L-TCM are more effective in terms of budget, provisio of contraceptive tools, failure rate, side effects and complication (National Population and Family Planning Agency, 2012). Winner B, et al. (2012) said using L-TCM is not only saves costs but also allows for fewer visitations to get contraception again. L-TCM also has the advantage of quick return of fertility.

L-TCM has higher levels of effectiveness, but every year the use of non L-TCM in Indonesia increases especially injectable contraceptives. The decline in the number of L-TCM users caused the contraceptive

usage trend in Indonesia to generally still focus on injectable contraceptives (National Population and Family Planning Agency, 2013). In 2013 as many as 48,41% Women of fertile age (14-49 years)in Indonesia used injectable contraceptives, which rose to 53,53% in 2014. Conversely the number of L-TCM users decreased from 16,2% to 11,86 in 2014 (National Population and Family Planning Agency, 2014).

East Java Province is the most populous province in Indonesia (Central Bureau of Statistics, 2010). In 2013 56,17% Women ferile age (14-49 years) in East Java chose injectable contraceptives, a rate which increased to 60,79% in 2014. On other hand, users L-TCM at a rate of 13,22% in 2013 to 10,59% in 2014 (National Population and Family Planning Agency, 2014).

New contraceptive users at the City of Surabaya chose injectable contaceptives at a rate of 47,83%, as compared to 27,64% who chose L-TCM (National Population and Family Planning Agency, 2014). Tambaksari is a subdistrict with the number of new injectable contraceptive users in Surabaya City every year. The records of the activities of family planning services, in 2014 report that out of three public Health Centers in Tambaksari, Gading public Health Center has a highest number of injectable contraceptive users

The use of contraception can be influenced by social environment factors such as role of husband, family, community leaders, health workers and mass media (Asih & Oesman, 2009).Social environmentfactors maybe the reason that L-TCM users in Indonesia is still low. Religious figures are public figures who are usually respected and role model in the community. The fact that there are many religious figures who do not advocate about contraceptives, so that population growth being haigh (Lambelanova & Ramadhan, 2016). In addition, the role of men in the female reproductive (15-49 years of age) decision-making is an important factor in ferlity control, both in developed countries and developing countries (Kabagenyi, et al., 2014).

Methods

This study constitutes observational and analytical research with the aim to analyze the factors that are assosiated with the selection of contraceptionThis research uses a case-control study approach. Large sample research with 84 respondents, is divided into two parts: 42 in a cases of fertile-age women (15-49 years) who use injectable contraceptives and 42 respondents in a controlof fertile-age women (15-49 years) who use L-TCM. The sampling technique use simple random sampling.

This research was conducted in the area of Gading Public Health Center Subdistrict Tambaksari Surabaya in April-December 2015. Source of the research data obtained through primary and secondary data.The primary data collection instrument use a quietionnaire to find out the characteristics and the social environmental factors of respondents.Secondary data was obtained from the ecaluation of implementation of family planning programs of The National Population and Family Planning Agency in 2012-2014 and records from three Public Health Centers are located in the Subdistrict Tambaksari in 2014. The dependent variable is the selection of contrception, i.e., L-TCM and injectable contraceptive and independent variables are social envirinmental factors such as the role of spouse, family, community leaders, health workers and mass media. The data collected are then analyzed using a logistic regression test were.

Results

Characteristics of respondents

The characteristis of the intended respondens are age, eduaction, occupatio and parity.

Table 1 Frequency distribution of respondents based on age education, job status and parity in Gading Health Center, Surabaya Indonesia 2015

Variable	L-TCM		Injection	
	N	%	N	%
1.Age (years old)				
< 30	11	30,6	25	69,4
≥ 30	31	64,8	17	35,4
2.Education				
Low (Elementary school, Middle School)	18	38,3	29	61,7
High (High School, College)	24	64,9	13	35,1
3.Job Status				
Yes	20	40,8	29	59,2
No	22	62,9	13	37,1
4.Parity				
< 3 children	22	37,3	37	61,7
≥ 3 children	20	80.0	5	20,0
Total	42	50,0	42	50,0

Percentage of respondents in the haighest age group age less than 30 years of being in the group of injectable contraceptive users i.e 69,4% compared with a group of L-TCM users i.e 30,6%, this means the majority of respondents in the time reproductively. A majority of respondents who are highly educated are L-TCM users (64,9%), compared to the 35,1% who use injectable contraceptives. Of respondents who are jobless, 62,9% are L-TCM users, compared to 7,1% who use injectable contraceptives. Respondents who have three or more children had the highest percentage of L-TCM use, at 80%, as compared to 20% who were injectable contraceptive users (Table 1).

The socio-environmental factors examined in this research are the role of spouses, the role of family, the role of workers, the role of community leaders and the role of mass media (electronic media and print media)

Role of spouse

The variable role of the spouse shows that most husbands of injectable contraceptive users play a role in the selection of contraception i.e. 63,9% compared to L-CTM users. A Logistic regression test showed levels of significance of the role of the spouse at 0,002 (α=0,05) which means the role of the spouse was associated with the selection of contraceptives in Gading Public Health Center .Tambaksari Surabaya (Table 2).

Role of family

Most family of injectable contraceptive users have no role in the selection of contraception, compared to the families of L-TCM users i.e. 74,4%. A logistic regression test showed levels of significance of the role of family at 0,001 (α=0,05) which means the role of family was associated the selection of contraceptives in Gading Public Health Center .Tambaksari Surabaya (Table 2).

Role of health workers

Most health workers play a role in the selection of contraception of L-TCM users i.e. 59,1% as compared to injectable contraceptive users. A logistic regression test showed levels of significance of the role of health workers at 0,011 (α=0,05) which means the role of health workers was associated with the selection of contraceptives in Gading Public Health Center .Tambaksari Surabaya (Table 2).

Role of community leaders

Most community leaders have no role in the selection of contraception by injectable contraception users, compared to the group of L-TCM users, i.e. 51,4%. A logistic regression test showed levels of significance of the role of community leaders at 0,018 (α=0,05) which means the role of community leaders was associated with the selection of contraceptives in Gading Public Health Center .Tambaksari Surabaya (Table 2).

Role of electronic media

Most electronic media has no role in the selection of contraception by injectable contraception users, as compared to the group of L-TCM users, i.e. 54,5%. A logistic regression test shows the level of significance of the role of the electronic media at 0,836. The significance of value greater than α=0,05 means the role of electronic media is not associated with the selection of contraceptives in Gading Public Health Center.Tambaksari Surabaya (Table 2).

Role of print media

Most print media has no role in the selection of contraception by injectable contraception users, as compared to the group of L-TCM users, i.e 54,5%.A logistic regression test showed levels of significance of the print media at 0,018 (α=0,05), which means the role of print media was associated with the selection the of contraceptives in Gading Public Health Center .Tambaksari Surabaya (Table 2).

Tabel 2: Social environment factors associated with the selection to of contraceptive in Gading Public Health Center Tambaksari Surabaya, 2015

Social environment factors	L-CTM		Injection		Total		*P*	*OR*
	N	%	N	%	N	%		
Role of spouse								
Yes	13	36,1	23	63,9	36	100,0	0,002	0,005
No	29	60,4	19	39,6	48	100,0		
Role of family								
Yes	29	74,4	10	25,6	44	100,0	0.005	12,685
No	24	64,9	13	35,1	37	100,0		
Role of health workers								
Yes	39	59,1	27	40,9	51	100,0	0,011	13,678
No	3	16,7	15	83,3	33	100,0		

Social	L-TCM	Injection	Total

environment factors							P	OR
	N	%	N	%	N	%		
Role of community leaders								
Yes	24	51,1	23	48,9	35	100,0	0,018	7,678
No	18	48,6	19	51,4	49	100,0		
Role of electronic media								
Yes	22	55,0	18	45,0	40	100,0	0,836	0,875
No	20	45,5	24	54,5	44	100,0		
Role of print media								
Yes	39	59,1	27	40,9	66	100,0	0,0 0,016	5,858
No	3	16,7	15	83,3	18	100,0		
Total	42	50,0	42	50,0	84	100,0		

The next step is to calculate the change in Odds Ratio on each of the variables after the variable of electronic media is issued. The result is that there no variables that have a change OR.> 10%. The results of the multivariate analyis show that there are five variables (role of spouse, role of family, role of workers, role of community leaders and role of print media) associated significantly with the selection of contraception. Of these variables, the dominant variable is the role of community leaders.

Table 3 The dominant variable associated with the selection of contraception

Variable	*B*	*P*	*OR*	*95%* CI
Role of spouse	-5,132	0,002	0,006	0,005-0,144
Role of family	2,522	0,001	12,449	3,257-47,585
Role of health workers	2,625	0,011	13,802	1,843-103,367
Role of community leaders	3,580	0,018	35,867	1,868-688,743
Role of print media	1,730	0,015	5,642	1,407-22,626

The role of the spouse has the p value 0,002, which means the respondent spouse who does not support the selection of contraceptives are 0,006 times more likely not to select L-TCM. The role of the family has the p value 0,001, which means when the respondent spouse does not support the selection of contraceptives, the wife is 12,449 times more likely not to select L-TCM. The role of health workers has a value which means 0,011 respondents who do not get information and services from health workers have a 13,082 times greater risk that they will not select L-TCM.

The role of community leaders has a p value of 0,018, which means community leaders who do not support the selection of contraceptive risk are 35,867 times more likely not to select L-TCM. The role of print media has a value which means 0,011 respondents who do not get information from print media have a risk 5,642 times greater of not selecting L-TCM.

Discussion

Environmental factors associated with the selection of contraceptives are :

1. Role of spouse

The results showed there is relationship between the role of spouse and the selection of contraceptives. The role of the partner in the group of respondents who use injectable contraceptives was greater than that of the group of respondents who use L-TCM. The respondents' spouse in this research is the husband. One of the roles of the husband in the family is a motivator. The role of motivator is a form of husband support required in the implementation of the family planning programme. In Indonesia, husband's decisions have an important effect on their wives. If the husband does not allow or support contraceptive use, many wives will not dare to use contraceptives (Harymawan, 2007).

Hartanto (2010) said that contraception is not used by a couple without cooperation and mutual trust. Ideally the husband and wife will together choose the best contaceptive methods, cooperate in dicharging, pay the costs of the contraceptives and pay attention to the directions for use. Mboane & Bhatta (2015) said that the inability of women to discuss the issue of contraception with their husbands is associated with the low rate of use of L-TCM in women aged 15-49 years in developing countries, so the role and influence of husbands needs to be taken into account when developing services and family planning programs to increase the use of of L-TCM in developing countries.

Research shows that respondents who have a spouse who does not play a role in and support the selection of contraception have a 0,006 times greater risk of not selecting L-TCM. There are still many cases of husbands forbidding their wives to use L-TCM such as Intrauerine Devices (IUDs) because they reduce the enjoyment of sexual intercourse (Wiknojosastro, 2005).Husbands are often the decision makers in developing countries, and so the lack of use of L-TCM can be caused by husbands wanting more children. Even women who have higher education degrees and who are well informed are less likely to be using contraception (Mboane & Bhatta, 2015).

2. The role of family

A high level of family support correlates to a high rate of participation of fertile couples in family planning. Through the support of the family as one form of social support, women of fertile age are more inclined to participate in programs of family planning(Astuti, et al., 2000). The results show there is an assosiation between the role of family and the selection of contraception, where the majority of the group of respondents who were L-TCM users have family who played a role in their choosing a method of contraception, as compared to the group of respondents who are injectable contraceptive users. Puspitasari and Burunniyah (2014) concluded that the greater the family support for contraceptives, the greater the number of fertile age women who used contraceptives. Conversely, less family support also correlated to less contraceptive use.

Family is one of the supporting elements in a person's behavior (Notoatmodjo, 2010). The indiviudal who has the support of their family will have a personal sense of control and positive feelings, and that individual will be motivated and take advice from their family (Wahyuni, et al., 2013).

3. The role of the health worker

Health workers have a role in providing health education and advocacy for individuals who have less access to medical services, including contraceptive services. Health workers who counsel women of fertile age may influence these women's decisions: once informed about family planning options, these women can choose the contraceptives that suit their needs (Rural Health Information Hub, 2008). Respondents who do not get support from health workes are at a 13,802 times greater risk that they will not select L-TCM, as compared with respondents who got support from health workers. The lack of support of health workers led to an increase in the number of women of fertile age who did not select L-TCM (Lemani, et al., 2017).

4. The role of community leader

For respondents who are injectable contraceptive users, most community leaders such as field officers, cadres, teachers, religious figures, midwives, private practicioners and village chiefs do not play a role in determining the type of contraceptives they choose to adopt, as compared with repondents who are L-TCM users. The research shows the role of community leaders is associated with the selection of contraceptives in Gading Public Health Center. Tambaksari Surabaya. Respondents who do not get support from community leader are at a 35,867 times greater risk of not selecting L-TCM.

Plano and Olton (1982) argue that the participation of community leaders, namely a set of behavior expected from a person who occupies a particular position within a social group. The participation of committed community has always been played predominantly by community leaders. Community leaders are a factor that can reinforce the occurance of particular behaviors. According to Yuliana (2013), the role of informal leaders or community leaders is very important, especially to influence behavior, to provide behavioral models and to motivate the participation of all citizens in support of the success of programs, including the selection of a method of contraception. In Indonesia, the community leaders determined whether the family planning program that the Government campaigned in the 1970's was successful or not.

5. The role of the mass media

According to Nurudin (2007), the more senses that are used to receive a message, the more internalized it will be and the more knowledge it will spread. Mass media is used to facilitate the dispersal of information regarding the family planning program. Mass media is divided into electronic media and print media. Mass media play a role as a tool in the process of giving information or counselling by health workers.

This study asked whether respondents had ever received information about contraceptives from electronic media (TV and radio) and print media (leaflets, posters, newspapers /magazines). The research shows that the role of electronic media is not associated with the selection of contraceptives in Gading Public Health Center.Tambaksari Surabaya. That role of electronic media is not associated with the selection of contraceptive may be due to the lack of promotion in the form of advertisements on television and radio about family planning and types of contraceptives, resulting in the community not getting information about these topics from electronic media.

Respondents were also asked about print media at the time of the research interviews. The research shows that the role of print media is associated with the selection of contraceptives in Gading Public Health Center Tambaksari Surabaya. Respondents who do not get information from health worker are at risk 5,642 times greater that they will not select L-TCM.Print media in this reasearch, namely leaflets, posters, newspapers and magazines, are simple print props that are easily understood and easily found in the community. Most knowledge is obtained by humans through the sense of sight, as much as 75% (Nurudin, 2007). Mass media such as newspapers can affect users' perception of contraceptives (Bajoga , et al., 2013).

The research shows most respondents who were injectable contraceptive users were more exposed to information about contraceptives through print media rather than electonic media, resulting in print media being more influential than electronic media. According to Straubhaar, J., La Rose, R. and Davenport, R (2011), mass media can affect the knowledge, attitudes, emotions or behaviors of any individual or someone who is exposed to the mass media continuously, which is called the effect of mass media.

Conclusion

The socio-environmental factors associated with contraceptive selection in Gading Public Health Center Tambaksari Surabaya are the role of the spouse, the role of family, the role of health workers, the role of community leaders and the role of print media. The role of community leaders is the most dominant variable associated with contraceptive selection.

Suggestions

Suggestions that can be done include motivating couples who already have two living children to use L-TCM; providing complete information to contraception users; and enhancing the cooperation of community leaders at the field level (the family planning field officer, cadres, teachers, religious leaders, midwives who private practice, andyouth organization).

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DETERMINANTS OF PHYSICAL ACTIVITY IN A COLLEGE STUDENTS' ASSOCIATION OF SOUTH SUMATERA INDONESIA

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Abstract: Although physical activity has significant benefits for health, a lot of Indonesian people were not sufficiently active. Indonesian Ministry of Health reported South Sumatera as one of province which has a lot of insufficiently active people (26,7%). It was higher than the average number of insufficiently active people in Indonesia. Thus, examining the determinants is an important prerequisite for designing effective programs. This study investigated predisposing (knowledge and attitudes), enabling (time and facilities availability), and reinforcing (family, friends, and health professional support) factors determined physical activity for the college students in South Sumatera. This study used cross-sectional design. Data were analyzed for 50 members of the college students' association who completed a questionnaire. Result showed 60% of respondents were sufficiently active. Chi square test revealed that knowledge (p=0,003; OR=8,0), attitudes (p=0,001; OR=21,0), and facilities (p=0,012; OR=6,5) had meaningful relationship with physical activity. There was no relationship between time availability (p= 0,636), family (p= 0,302), friends (p=1,0), and health professional support (p= 0,861) with physical activity. The findings clarified the factors that determined physical activity in the college students' association were knowledge, attitudes, and facilities. These factors may help in the formulation of intervention strategies to make people more physically active.

Keywords: determinants; physical activity; college students

Introduction

Physical activity can be defined as any activity that involves some form of physical exertion and voluntary movements that burn calories, such an activity causes a person's body to work harder than normal (Zourikian et al, 2012). Physical activity has many potential health benefits, including prevention of various diseases (WHO, 2010). Studies have suggested that physical activity is an effective way to prevent incident functional disability (Tak et al, 2013).

In addition to the physical benefits, there are many psychological and social benefits. In general, physical activity help to increase relaxation, improve self-esteem, build positive self-image, partly due to improved muscle tone and appearance, increase levels of hormones called endorphins (which can help improve mood and enhance feelings of well being), and increase feelings of acceptance and belonging to a group of peers (Zourikian et al, 2012).

Although regular physical activity such as walking, cycling, or participating in sports has significant benefits for health, a lot of Indonesian people were not sufficiently active. Indonesian Ministry of Health reported South Sumatera as one of province which has a lot of insufficiently active people (26,7%). It was higher than the average number of insufficiently active people in Indonesia. Thus, examining the determinants is an important prerequisite for designing effective programs.

Because physical activity is a complex behavior determined by diverse factors, behavioral theories and models are used to guide the selection of variables to study (Bauman et al, 2002). Green theory explained

behavior such as reducing intake of dietary fat, engaging in routine physical activity, and obtaining annual mammograms is shaped by predisposing, reinforcing, and enabling factors (Glanz, 2005).

Predisposing factors, which motivate or provide a reason for behavior; they include knowledge, attitudes, cultural beliefs, and readiness to change. Enabling factors, which enable persons to act on their predispositions; these factors include available resources, supportive policies, assistance, and services. Reinforcing factors, which come into play after a behavior has been initiated; they encourage repetition or persistence of behaviors by providing continuing rewards or incentives. Social support, praise, reassurance, and symptom relief might all be considered reinforcing factors (Glanz, 2005).

College or university is a critical period regarding unhealthy changes in energy related behaviors in students (Deliens, et al, 2015). Physical fitness of youth is generally very low. Many college students told that they hardly spend time in playing outdoor games and exercise (Muduli, 2014). It is a critical to have a better understanding of the contributing factors that influence physical activity among students. Relevant policies and effective interventions that focus on modifying these factors could be designed precisely.

Therefore, this study investigated predisposing (knowledge and attitudes), enabling (time and facilities availability), and reinforcing (family, friends, and health professional support) factors determined physical activity for the college students in South Sumatera.

Method

This study was a quantitative research that used cross-sectional design. Cross-sectional is a point time approach that collect all of the information at the same time.

This study used a questionnaire as the instrument of the research. Respondents were active if they do at least 150 minutes of moderate-intensity aerobic physical activity throughout the week or do at least 75 minutes of vigorous-intensity aerobic physical activity throughout the week or an equivalent combination of moderate- and vigorous-intensity activity. Knowledge and attitudes were measured by 10 questions about physical activity. The questionnaire also contains questions that ask whether respondents have the time and facilities to do physical activities. Family, friends, and health professional support were measured by fifteen items that assessed the typical weekly frequency with which family members, friends, and health professional encouraged physical activity, participated in physical activity with them, provided information about physical activity, or told them that physical activity was good for them.

Data were analyzed for all of active member (50 members) of the college students' association who completed a questionnaire. All variables were self-reported. The data analysis was performed in univariate by descriptive statistic and bivariate by chi square analysis. Chi square was employed to examine the bivariate relationships between the independent variables (knowledge, attitudes, time availability, facilities availability, family, friends, and health professional supports) and dependent variables (physical activity).

The odds ratio (OR) and 95% confidence interval (CI) were calculated for each factor. The statistical significance was considered to be $p < 0.05$. To compute the statistics, SPSS for Windows 22.0 (SPSS Inc.) was utilized.

Results

Results showed 60% of respondents were sufficiently active. Chi square test revealed that knowledge (p=0,003; OR=8,0), attitudes (p=0,001; OR=21,0), and facilities (p=0,012; OR=6,5) had meaningful relationship with physical activity. There was no relationship between time availability (p= 0,636), family (p= 0,302), friends (p=1,0), and health professional support (p= 0,861) with physical activity.

Univariate Analysis

Physical Activity

Table 1 The Distributions of Physical Activity Behavior

Physical Activity	n	%
Active	30	60
Inactive	20	40
Total	50	100

Table 1 showed that 60% of the college students were physically active. 40% of students were not sufficiently active.

Knowledge

Table 2 The Distributions of Knowledge about Physical Activity

Knowledge	n	%
Good	24	48
Bad	26	52
Total	50	100

Table 2 showed that almost a half (48%) of the respondents had good knowledge about physical activity.

Attitudes

Table 3 The Distributions of Attitudes about Physical Activity

Attitudes	n	%
Positive	36	72
Negative	14	28
Total	50	100

Table 3 showed that 72% of the college students had positive attitudes about physical activity.

Time Availability

Table 4 The Distributions of Time Availability To Do Physical Activity

Time Availability	n	%
Yes	38	76
No	13	24
Total	50	100

Table 4 showed that only near a quarter (24%) of the college students who did not have time to do physical activity.

Facilities Availability

Table 5 The Distributions of Facilities Availability To Do Physical Activity

Facilities Availability	n	%
Yes	36	72
No	14	28
Total	50	100

Table 5 showed that 72% respondents answered there was facilities that support them to do physical activity.

Family Support

Table 6 The Distributions of Family Support To Do Physical Activity

Family Support	n	%
Yes	48	96
No	2	4
Total	50	100

Table 6 showed that almost all of member of the association (96%) supported by their family to do physical activity.

Friends Support

Table 7 The Distributions of Friends Support To Do Physical Activity

Friends Support	n	%
Yes	46	92
No	4	8
Total	50	100

Table 7 showed that 92% of respondents got support from their friends to do physical activity.

Health Professional Support

Table 8 The Distributions of Health Professional Support To Do Physical Activity

HP Support	N	%
Yes	22	44
No	28	56
Total	50	100

Table 8 showed that 44% of respondents got health professional support to do physical activity.

Bivariate Analysis

Bivariate analysis in this study use Chi Square test. Chi square was employed to examine the bivariate relationships between the independent variables (knowledge, attitudes, time and facilities availability, family, friends, and health professional support) and dependent variables (physical activity).

Table 8 The Relationship between Independent and Dependent Variables

Variables	P value	OR
Knowledge	0,003	8,0
Attitude	0,001	21,0
Time Availability	0,636	1,7
Facilities Availability	0,012	6,5
Family Support	0,302	1,0
Friends Support	1,0	1,5
Health Professional Support	0,861	1,3

Chi square test revealed that knowledge (p=0,003) had meaningful relationship with physical activity. The results showed that the students with good knowledge had more chance to be sufficiently active than the students who had bad knowledge about physical activity.

The analysis presented the significant relationship between attitudes with physical activity (p=0,001). Overall, those who had positive attitudes about physical activity were significantly more likely to be categorized in the sufficiently active group than those who had not. Further, facilities had meaningful relationship with physical activity (p=0,012). The availability of facilities was an important thing to make people more physically active.

On the other hand, there was no relationship between time availability (p= 0,636), family (p= 0,302), friends (p=1,0), and health professional support (p= 0,861) with physical activity.

Discussion

This study conducted at a College Students' Association in South Sumatera, Indonesia where 50 students had participated. Among the 50 participants, 25 were male and 25 were female respondents. The age ranges of the students vary from 18 to 25 years with an average age of 21 year. More than half respondents were sufficiently active (60%).

This study revealed that knowledge about physical activity had meaningful relationship with physical activity (p=0,003; OR=8,0). About 52% of students had bad knowledge about physical activity. Another study declared that lack of student efforts to increase physical activity in supporting an active lifestyle, this is due to lack of knowledge regarding an active lifestyle (Firdaus, 2015).

The analysis presented the significant relationship between attitudes with physical activity (p=0,001). The present study agrees with earlier studies confirming attitudes as the factor that contributed to the lack of physical activity of students (Firdaus, 2015).

Facilities had meaningful relationship with physical activity (p=0,012). The availability of facilities was an important thing to make people more physically active. People with better access to more natural or man-made facilities were 43% more likely to exercise most days of the week, compared to those who did not have such access (Quebec, 2011).

Conclusion

In summary, more than half of the college students' association members were sufficiently active. The findings clarified the factors that determined physical activity in a college students' association of South Sumatera were knowledge, attitudes, and facilities. Therefore, health promotion about physical activity could be a good solution to enhance physical activity behavior among college students. Furthermore, the availability of facilities was an important thing to make people more physically active. These findings factors could be an

information that have public health implications for designing interventions to increase participation in physical activity.

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EVALUATION OF "SIMPLE WEB" DEVELOPMENT BASED ON THE DeLone AND McLean MODEL

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Abstract: The evaluation of Tuberculosis (TB) surveillance system conducted at the Health Office of Gresik Regency, Province of East Java showed that there was less data quality, due to incompatibility or incomplete data input from Primary Health Center (Puskesmas). This situation caused officers at the district health service level had to validate. "Simple Web" is a software that was developed to help validation run easily without the huge cost and effort required. The objective of the study was to evaluate the successful of the development of "Simple Web" based on the DeLone and Mc Lean approach model. The study was conducted on 30 of 37 existing Puskesmas. User satisfaction scores of Information System (IS) success factors based on the DeLone and McLean IS Success Model were used to evaluate IS performance after Simple Web was introduced. Data analysis was done by Path Analysis using Lisrel 8.80 for Student. The result showed that the development of Simple Web got positive appreciation from health officers. The software was secure and easy to operate.The relationships among IS success factors were also analyzed to identify the important factors influencing. Information System has no significant relationship with Use and User Satisfaction. And, Service Quality and Quality System has significant relationship with Use and User Satisfaction.

Keywords: Information System, Simple Web, DeLone and McLean Model

Introduction

Integrated Tuberculosis Information System (ITSS) is web-based application that can be accessed either offline or online. Since 2012, ITSS had been developed to be used by health officers in province or district level. ITSS became parent of information system related with Tuberculosis control program refer to the Guidance of National TB Control and became subsystem of National Health Information System developed by Center of Data and Information Ministry of Health. As parent system in TB control program, ITSS was developed to transfer data with other information system those had been developed before, such as *e-tb manager* for TB Drug Resistance. Besides, the development of ITSS was aimed to facilitate further analyze about the relationship of cases and logistics, case and laboratory, logistic system alert, inventory study, and *capture to capture*. This information system is very useful for TB program officers so the report could be done efficiently, effectively, accurate, and timely.

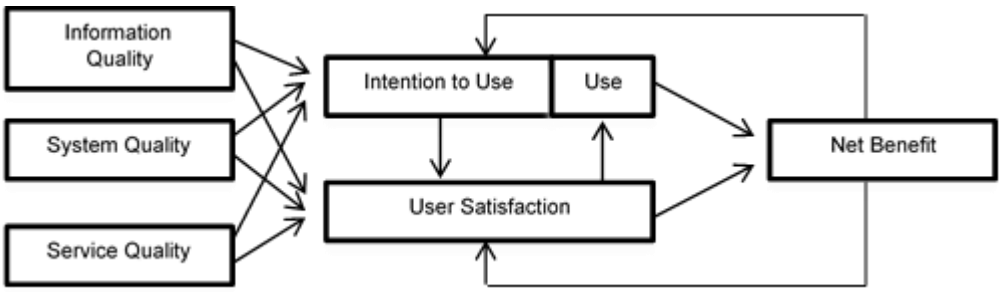
The use of ITSS in Health Office of Gresik Regency is still experiencing obstacles. At each reporting period, TB program officers at the district level must validate data already entered by the Primary Health Center officers. Validation is necessary because there were frequent non-synchronized data of individuals entered by Primary Health Center officers (eg case and suspect data) with aggregate output (eg sputum conversion). The validation process took time, cost, and energy, because the Primary Health Center officers must meet directly with the officers in the district by bringing the data they have or the extracted data that has been entered.

Based on the problems above, "Simple Web" was developed. It is an application system that was expected to facilitate the activities of data validation conducted by TB program officers at the district level. As impact of the application of Simple web in Gresik District Health Office, it is very important to know the sustainability of the implementation of this system. To determine the impact of successful implementation of Simple Web, evaluation is conducted using the success model of information systems developed by DeLone and McLean (2003). The use of DeLone and McLean model is based on the components contained in the model in accordance with the rules in this study. The development of this model was based on the process of causal relation of the elements contained in this model. So the measurement of each element is not counted independently, but as a whole that affects the other.

Methods

This was an evaluation research conducted at the Health Office of Gresik Regency. The research began with conducting training for TB program officers of Primary Health Center about "Simple Web". Primary Health Center officers who attended the training completely became respondents in this study. The number of respondents was 30 people representing 30 of 37 Primary Health Center available.

De Lone and McLean model was used to assess the success of the system that had been developed. Since the introduction in 1992 and updated in 2003, the success model of information systems developed by DeLone and McLean (D & M IS Success Model), has been widely applied in some empirical studies to explain the success of an information system. The DeLone and McLean model (1992) states that the success of the information system can be represented by qualitative characteristics of the information system itself (system quality), the quality of information system output (information quality), the use of the output, the user's response to the information system, the influence of information systems on user habits (individual impact), and its effect on organizational performance (DeLone, W., & McLean, 1992; DeLone, W. & McLean 2003; Wahyuni, 2011). The DeLone and McLean model is illustrated in Figure 1.



Source : (DeLone, W.,& McLean, 2003)

Figure 1. The DeLone and McLean's Model (2003)

According to Figure 1, this model was built from three components, namely system creation, system usage, and impact of system usage (DeLone, W., & McLean, 2003; Falgenti, 2013). The components were arranged in the following order of measurements. First, the information system was made and measured its quality with three dimensions of quality, namely information quality, system quality, and service quality. Second, the information system is used and the experience of this usage is measured by two dimensions, namely usage dimensions and dimensions of user satisfaction. Third, the impact of usage was measured by two dimensions, namely individual impact and organizational impact (net benefit) (Falgenti, 2013). The model in Fig. 1 is adopted in this study as in Figure 2

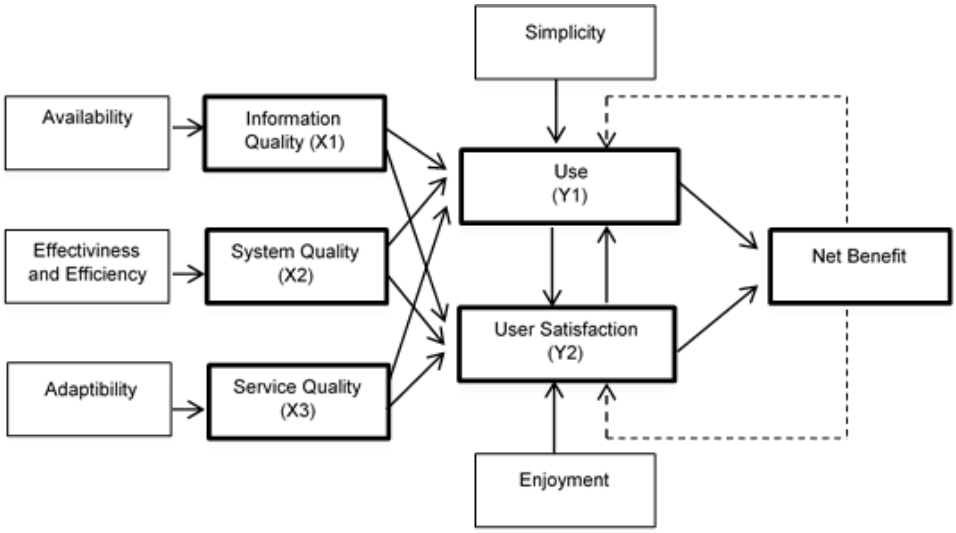


Figure 2. Model adopted from DeLone and McLean model

In accordance with the model in Figure 2, the variables in this research included Information Quality (X1), System Quality (X2), Service Quality (X3), Use (Y1) and User Satisfaction (Y2), each variable had one indicator that was assumed to have influence on the variable. Since there was only one indicator that influenced all variables studied, it was assumed that the indicator represented the variables studied.

The data used were in the form of primary and secondary data. Primary data were obtained from the evaluation to determine the influence of success Information Quality (X1), System Quality (X2), Service Quality (X3) to Use (Y1) and User Satisfaction (Y2) and described the net benefit of Use (Y1) and User Satisfaction (Y2). The instrument used in this research was questionnaire with Likert scale. The categories of the scale were (1) strongly disagree, (2) disagree, (3) agree, and (4) strongly agree (Hendrawati, 2013).

The influence of information system success, service quality, system quality to use and user satisfaction, and the influence of net benefit to use and user satisfaction were tested in order to formulate the best model of the system. Data analysis was done using Path Analysis with the assistance of Lisrel 8.80 for Student.

Result

a. Distribution of Respondents' Assessment

Based on the score of respondents' answers to the items in the questionnaire, it could be concluded respondents' perceptions of each variable researched. The distribution of respondents' perceptions could be seen in table below:

Table 1. Distribution of Respondents' Perceptions

Aspect	Strongly agree		Agree		Disagree		Strongly disagree	
	n	%	n	%	n	%	n	%
Information System	12	40	15	50	3	10	0	0
System Quality	19	63	11	37	0	0	0	0
Service Quality	13	43	16	53	1	4	0	0
Use	12	40	15	50	3	10	0	0
User Statisfication	12	40	18	60	0	0	0	0
Means	14	45	15	50	1	5	0	0

Table 1 showed that if the development of Simple Web in Gresik District Health Office got positive appreciation from the Health Implementation Unit (HIU) officers. The table revealed that in all aspects of the assessment the percentage of officers who declared disagree were mostly 10 percent or less.

b. Structural Model

Here is the path diagram adopted the DeLone and McLean model as the result of analysis.

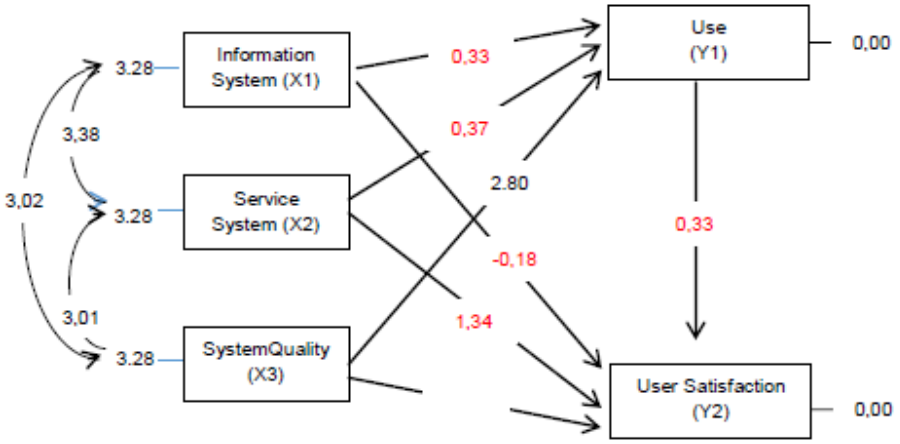


Figure 3. t-values of structural model 1

In Figure 3, structural model 1, we found that there was only one path which had significant effect, that was from System Quality (X3) to Use (Y1) (t-value>1,96), while the other structural coefficients showed non significant effect. So, it needed to be modify the model.

c. Structural Model after modification

After the modification by removing the non significant coefficients from the results of structural model 1 the model became as figure 3 below.

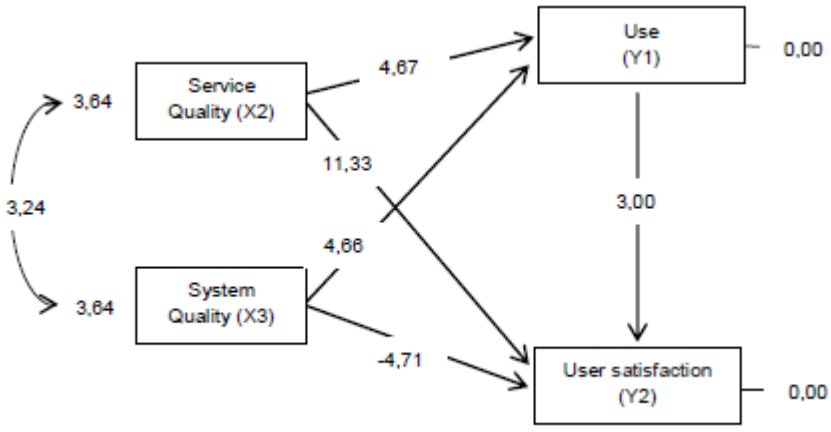


Figure4. t-value of structural model 2

Based on Figure 4 it could be concluded that in the structural model 2 all structural coefficients were significant with positive effects, except one variable had negative effect that was system quality to user satisfaction.

It could be seen that either service quality (X2) or System Quality (X3) had either direct or indirect effect to (Y2) through Use as intervening variable. From the test results can be concluded if service quality and use simultaneously have influence on user satisfaction.

d. The relationship between Use and User satisfaction with Net Benefit

The application of Simple Web to support ITSS in Gresik District Health Office was approved by some respondents (97%). This happened because the system was considered easy to be learned by officers, easy to be operated, easy to be accessed and facilitated the delivery of reports. While the relationship of user satisfaction with net benefit was seen from the percentage of respondents those felt comfortable in operating Simple Web that was 90% of officers felt comfortable with the Simple Web because it did not make additional burden for them.

From the above result it could be concluded that Simple Web could provide benefits for officers and institutions because it was more effective, efficient and could facilitate data validation activities.

Discussion

Effect of Service Quality on Use

From the results of data analysis that had been done was known that the quality of service (Service quality) directly have a positive effect on usage (Use). This could be interpreted that the quality of good service would affect the use of Simple Web. Good system quality could be seen from the measurement of indicators related to the effectiveness and efficiency of an information system (H.Zaied, 2012). If each indicator showed a high level then the user would repurchase the Web Simple in the future. This was related with the results of research conducted by DeLone and McLean (2003) and Fitri (2015) which stated that Service Quality had an influence on Use. This result was different from the research that had been done by Adiyan M (2015) which stated that the quality of the system did not affect positively the satisfaction of user because in the research it was identified if the users (Use) rarely use helpdesk facilities that available in the system when experiencing constraints during the usage.

Service Quality Influence on User Satisfaction

From the analysis that had been done it was known that the quality of service (Service Quality) had positive effect on user satisfaction (User Satisfaction). This indicated that good service quality would affect the increase of user satisfaction. If the quality of service was good then the user would feel comfortable in using Simple Web that would increase the user's satisfaction of the Simple Web.

The results of this study were consistent with the results obtained by DeLone and McLean (2003) who found that service quality could affect user satisfaction (User Satisfaction). Good service quality would make users feel happy, thus increasing user satisfaction.

Effect of System Quality on Use

Based on the above analysis it was known that the quality system (System Quality) have a positive effect on usage (Use). This indicated that the quality of a good Simple Web system would affect the intensity of Simple Web usage. The quality of this good system could be seen from the measurement of indicators used in for the assessment of the quality of the system using 'Simplicity'. If the indicator showed a high level then users would be willing to repurchase Simple Web as a future reporting media (Hana, 2012). This result was in accordance with the results of research conducted by DeLone and Mclean (2003) that System Quality had significant impact on Use. In addition to DeLone and McLean this study was also supported by research

conducted by Seddon (1997) and Cheong (2005). However, there were studies conducted by Groho (2014) which stated that the quality of the system had no effect on the user. This was because in the research the existing system was not useful for them. The difference of the result was happened because in the research done by Groho (2014) the respondents felt whether exist or not the system is, they could still perform the task well.

Information systems that could be regarded as a quality system if it was design to meet the ease of use of the information system. From the results of the assessment most of the respondents considered that Simple Web was easy to be learned, operated, accessed and easy in terms of delivery of reports so it was considered really simplify the performance of the officers, and it could be said that Simple Web was qualified.

Effect of System Quality on User Satisfaction

In the analysis that had been done, system quality had negative direct effect on user satisfaction. This indicated that although the quality of the system (System Quality) was good but user satisfaction (User Satisfaction) in using the Simple Web actually decreased. This could happen because there was lack of socialization to the officers and there still assumption that Simple Web was a difficult tool to use. In addition, officers also felt less practice related to the operation of Simple Web. According to Bulter (1982) practice that was done continuously would produce good skills.

The results of this study were not in line with the research conducted by Hana (2012), Oktaviani (2015), Park J (2009) and Wicaksono (2012) which stated that the quality of the system affected user satisfaction because it assumed that the system had navigation menus that facilitated Users to perform browsing activity, reliability, and speed of loading time and download time.

Influence Use against User Satisfaction

Based on the results of research that had been done it was known that Use had positive effect on User Satisfaction which means if the system was used frequently would increase user satisfaction in using Simple Web. This means, if the use of Simple Web could meet user needs, user satisfaction would also increased, so the system would be sustainable. This statement was in accordance with DeLone and McLean (2003) research which stated that a positive experience of system usage would drive user satisfaction. If the use of the system could meet the needs of users, then user satisfaction will increase and the system will be sustainable (DeLone, W., & McLean, 2003; DeLone, W., & McLean, 1992). Thus, it could be said that Usage (use) was a predictor of the user satisfaction (User Satisfaction) of Simple Web.

The relationship between Use and User Satisfaction against Net Benefit

Use (Usage) and user satisfaction (User Satisfaction) had significant relationship with Net benefit. This was shown from the results of this research that showed, if according to the officer, Simple Web was considered easy to be learned, easy to be used and easy to be understood. From the results of research that had been done, most officers declared it only took a few hours to learn simple web until could practice data upload. According to the officers, by using Simple Web, officer only took less time to access and upload report. But this also depent on the internet connection. With this condition, the development of Simple Web in Gresik District Health Office was deemed appropriate to be able to solve problems related to the ease of data validation. So it was right that this Simple Web was developed in Gresik District Health Office because it had a great relationship either on the use of net benefit or user Satisfaction to net benefit.

Based on the model that had been developed according to Figure 3 it could be seen that the development of the system using the Simple Web was expected to provide great benefits for Gresik district health office. It was also declared by respondents that the existence of this Simple Web could facilitate reporting, because it did not need manual reporting by coming to the Health Office and then copied report to the supervisor by using flash so it could save time so that the productivity of workers increased. This result was in accordance

with the opinion of Triastoto (2015) which stated that if the increase of efficiency of workers was supported by an information system, it would increase worker productivity.

Information systems could have direct effect on a working group (Ishman, 1998; Myers, 1998; William, 2003). The result of this research was in line with the research done by Fitria (2015) that the use of system (use) and the quality of service (user Satisfaction) were related with the benefit.

Conclusion

a. Service Quality and Quality System have significant relation to Use and User Satisfaction
b. Service Quality directly has a positive effect on Use
c. Service Quality indirectly has a positive effect on User Satisfaction
d. Service Quality indirectly has a negative effect on User Satisfaction
e. System Quality directly has a positive effect on Use
f. System Quality directly has a negative effect on User Satisfaction

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THE ASSOCIATION OF ERGONOMIC MISMATCH AND SELF-REPORTED PAIN AMONG STUDENTS OF A COLLEGE IN A PUBLIC UNIVERSITY IN THE PHILIPPINES

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Abstract: The main objective was to determine the association between ergonomic mismatch and self-reported pain among students from a college in a public university in the Philippines. The prevalence of ergonomic mismatch, self-reported pain, and pain qualities were also determined. The dimensions of the representative Auditorium, Wood-and-Metal, and Plastic chairs were compared with the anthropometric measurements taken while the students were sitting on the chairs to assert mismatch. Self-administered questionnaires were used to determine self-reported pain and its quality per body part. Logistic regression was utilized to establish the presence of an association between ergonomic mismatch and self-reported pain while accounting for confounders. All students were mismatched with the Auditorium chair, 88.68% with the Wood-and-Metal chair, and 89.10% with the Plastic chair. Sitting Shoulder Height to Backrest Height and Hip Breadth to Seat Width contributed the highest mismatch for all three chairs, and the most prevalent pain was heaviness in the back and neck. Association was established for the Plastic and Wood-and-Metal chairs, with mismatched students 54% and 29% more likely experiencing pain than matched students, respectively. For the Auditorium chair, association was established with mildly mismatched students 60% more likely to experience pain than severely mismatched students.

Keywords: Ergonomic Mismatch; Self-reported Pain

Introduction

Students spend a considerable number of hours in lecture classes, utilizing the room facilities, such as chairs and desks. As such, school furniture can have a significant effect on the posture condition of students, especially in the regions of the spine, knees, and neck (Da Silva *et al*, 2012). In this regard, furniture becomes an environmental constraint, as the possible postural positions are limited by the dimensions and design of the furniture (Karwowski *et al*, 2003).

Poor posture entails susceptibility to pain in different parts of the body. A seat too high can lead to discomfort in the knees, lower legs, and feet while a seat too low can bring about pain in the shoulders and neck (Grandjean *et al*, 1977). The pain results from prolonged muscle contraction while maintaining an unsupported sitting posture which then leads to the reduction of blood flow and accumulation of waste products in the muscles. Moreover, if developed as a habit, bad posture could lead to chronic conditions such as rheumatic diseases. Finally, posture is also an index of personality as it is one of the elements of nonverbal communication. Good posture suggests confidence, submissiveness, and openness while a bad posture conveys detachment, disinterest and hostility.

Studies have found a substantial degree of mismatch between school furniture and anthropometric measurements. A study in Michigan showed that less than 20% of the participating students have acceptable chair or desk combinations. Most pupils are sitting in chairs with sitting surfaces that are too high or too deep

and at desks that are too high. In the same way, a recent study conducted in Bangladesh showed that both boys and girls used seats and desks which were too high for them. Since these studies conducted among students of different nationalities showed an established trend, the different procurement policy of furnishings and the body dimensions could potentially influence the compatibility on environmental and geographical contexts, hence the need for the execution of similar study in a public university in the Philippines.

Review of Related Literature

Classroom Furniture and Posture

Body posture is associated with school furniture design, particularly in their tendency to spend time in classrooms while leaning over the tablet arms or desks of their chairs. A study by Tirloni *et al* in 2014 investigating the influence of school furniture design and body posture found that 63.6% of students from five Higher Education Institutions in Santa Catarina, Brazil spend more than half of their time in class with their trunks leaning over the tablet arm or the desks of their arm chair. The study also involved comparison between the student's tendency to lean over the desks in chairs with armrests at the opposite side of the desk arm and those without. The study established an association between body posture and current classroom furniture design. 66.3% of students who used chairs without armrests tended to lean their trunks over the desks. On the other hand, 54.5% of those who utilized chairs with armrests did not lean their trunks over the desks.

Related Mismatch Analysis Studies

Several studies involving mismatch analysis of body measurements and chair dimensions have been conducted in various countries. A study on mismatch between furniture and anthropometric measurements of Bangladeshi primary school students evaluated the mismatch between classroom furniture dimension and anthropometric measurement of primary school students to assess the ergonomic orientation of the classrooms. The study found substantial mismatch between anthropometric measurements and school furniture dimensions.

In Ghana, a study on the mismatch in body-chair dimensions and the associated musculoskeletal pain among selected undergraduate students identified a high degree of incompatibility between chair dimensions and anthropometric measures. Mismatch was established between seat height and popliteal height, seat depth and buttock popliteal length, and seat width and hip breadth. Part of the study considered how the students rate the pain they felt from sitting on the chairs for two hours. 90.5% of the sample population attributed their pain to the ill-fitted chairs under study.

Significant mismatch between anthropometric measurements and seat dimensions was also identified among Iranian high school students, particularly for seat height, seat width, and desktop height which exhibited greater levels of mismatch than the other dimensions analyzed. The study took into account the factor of sex, as it concluded that seats were too high for majority of lower grade boys, and were too narrow for most girls. Desk height was also determined to be too low for both sexes. Furthermore, the study stated that conditions of mismatch may lead to discomfort and tend to increase the risk for development of musculoskeletal problems among the students.

Pain Associated with Ergonomics

Back pain is a multi-factorial problem resulting from an interaction of different risk factors, such as age, family clinical history, back pain injury, female sex, time spent watching television, stress, and anxiety. As earlier established, children and adolescents spend a great part of their day time at school where they remain in a sitting position for long periods of time. The sitting posture that they adopt during class might be related to furniture design. If a chair is ill-fitted to the user, it can result to increased stress in spinal structures. Thus, the mismatch of school furniture and the anthropometric characteristics of the students may be related to the

experience of musculoskeletal symptoms. McCulloch and Transfeldt suggest that for children over ten, low backache is due to poor posture or overuse with more serious conditions requiring medical diagnosis and treatment. Children seem to be suffering from postural discomfort in schools.

A mismatch between school furniture and anthropometric characteristics causes some detrimental effects. For example, this mismatch may induce fatigue and discomfort resulting in poor posture habits as well as preventing focused learning. Assunção *et al* found that a greater mismatch between anthropometric measurements (elbow height and desk height) increased the probability of adolescents experiencing upper back pain.

Inappropriate seat and anthropometric measurements in instances where the seats of chairs are too low or too high may also be contributory to pain. Here, there may either be a lack of thigh supports or the seat design may not be able to support their feet on the floor. This may then result to increased pressure on the posterior surface of the knee and back. When there is inadequate support such as in these cases, the students make certain postural adjustments to compensate for the mismatch. These adjustments may result to the accumulation of physical stress, and consequently, pain (Bello & Sepenu, 2013).

Possible Confounders on the Association between Ergonomic Mismatch and Self-Reported Pain

The dimensions of lecture facilities remain fixed through time. However, anthropometric measurements change due to various factors which can possibly affect the relationship between the two variables, leading to mismatch. Similarly, they can have an effect on musculoskeletal pain. Therefore, they are regarded as possible confounders to the relationship between mismatch and pain.

Anthropometric measurements change with age due to normal development. Meanwhile, back pain results from different risk factors including age. The prevalence of benign back pain appears to decrease with increasing age, after a peak in the sixth decade, but that of severe back pain continues to increase with increasing age.

More differences in physical characteristics of males and females are introduced during puberty, such as widening of hips in females. This leads to varying body measurements which can affect mismatch. Moreover, females are reported to have low back pain more often than males due to pain modulation by estrogen.

In the mismatch analysis study in Ghana involving undergraduate students, pain intensities due to the ergonomic mismatch varied among year levels. Those in second year reported the highest pain intensities compared to those in the third and fourth levels. Possible explanations for this may be attributed to tissue adaptation as a result of longer stay in the school environment.

General Objective of the Study

Determine the association between ergonomic mismatch and self-reported pain among third year and fourth year students from a college in a public university in the Philippines

Specific Objectives of the Study

1. Determine the prevalence of mismatch between the dimensions of chairs (Auditorium, Wood-and-Metal, and Plastic) in lecture rooms with the anthropometric measurements of students
    a. Buttock popliteal length to seat depth
    b. Popliteal height to seat height
    c. Thigh clearance to seat-to-desk clearance
    d. Sitting shoulder height to backrest height
    e. Sitting elbow height to desk height

f. Hip breadth to seat width

2. Determine the prevalence of self-reported pain among students with ergonomic "Mismatch" and "Without Mismatch" in the neck, shoulders, arms, back, hips, thighs and legs
3. Describe the qualities of self-reported pain among students with ergonomic "Mismatch" and "Without Mismatch" in the neck, shoulders, arms, back, hips, thighs and legs
4. Determine the association between ergonomic mismatch and self-reported pain in the neck, shoulders, arms, back hips, thighs, and legs

An analytical cross-sectional study design was done to determine the association between exposure to the ergonomic mismatch of the students and the outcome, namely, self-reported pain.

Definition of Major Study Variables

The independent variable in the study is the presence or absence of mismatch in the dimensions of the chairs and the body measurements of the students. Anthropometric measurements of each student were related to the dimensions of the representative chair of each type to identify whether mismatch was present or not.

Ergonomic mismatch refers to a discrepancy between the student's anthropometric measurements and the seat dimensions. For the purpose of this study, a discrepancy established in at least one of the student's anthropometric measure and seat dimension comparison categories is defined as a mismatch. This decision was made with the knowledge that the body conforms and adjusts accordingly when there is postural and positional stress. Table 1 shows the match criteria for the different comparison categories considered in this study.

Table 1. Summary of Match Criteria

Anthropometric Measurement	Seat Dimension	Match Criterion
Popliteal Height (PH)	Seat Height (SH)	$(PH+3)\cos 30° \leq SH \leq (PH+3)\cos 5°$
Buttock Popliteal Length (BPL)	Seat Depth (SD)	$0.80\ BPL \leq SD \leq 0.95\ BPL$
Hip Breadth (HB)	Seat Width (SW)	$1.10\ HB \leq SW \leq 1.30\ HB$
Sitting Elbow Height (SEH)	Desk Height (DH)	$SEH \leq DH \leq SEH + 5$
Sitting Shoulder Height (SSH)	Backrest Height (BH)	$0.60\ SSH \leq BH \leq 0.80\ SSH$
Thigh Clearance (TC)	Seat-to-desk Clearance (SDC)	$(TC+2) < SDC$

Anthropometry refers to the measurements and proportions of the human body. This is an important consideration in ergonomics where the basic principle is to adapt the facilities to the person. Table 2 shows the anthropometric measurements (Biswas, *et* al) accounted for in this study.

Table 2. Anthropometric measurements of students

Anthropometric Measurement	Description
Popliteal Height	Vertical distance from the posterior surface of the knee (popliteal space) to the resting surface of the foot
Buttock Popliteal Length	Horizontal distance from the posterior surface of the buttock to the popliteal space
Hip Breadth	Maximum horizontal distance between the right and left side of the pelvis
Sitting Elbow Height	Vertical distance from the bottom tip of the elbow (olecranon) flexed at 90° to the seat surface
Sitting Shoulder Height	Vertical distance from the acromion process at the shoulder to the seat

Thigh Clearance	Vertical distance from the sitting surface to the highest point of the thickest portion of the thigh

Measuring seat dimensions is an important step in determining mismatch. In the Philippines, school chairs usually have built-in desks. Table 3 shows the seat dimensions (Biswas *et* al) accounted for in this study.

Table 3. Dimensions of the chairs used by the students

Seat Measurement	Description
Seat Height	Vertical distance from the midpoint of the front edge of the seat to the floor
Seat Depth	Minimum horizontal distance from the front edge of the seat to its back edge
Seat Width	Horizontal distance between the right and left edges of the seat
Desk Height	Vertical distance from the top of the seat front edge to the top of the desk front edge
Backrest Height	Vertical distance from the top edge of the backrest to the seat
Seat-to-desk Clearance	Vertical distance from the lowest point of the desk to the top of the seat front edge

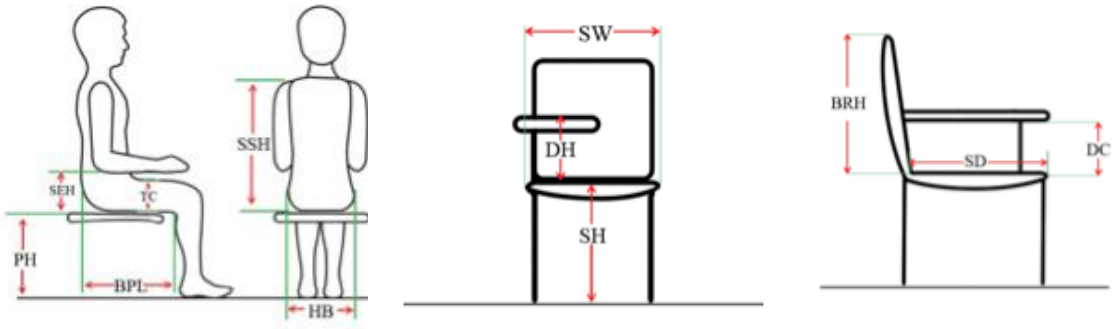

Figure 1 Illustration of the anthropometric and seat measurements considered in the study

The dependent variable in the study is the presence or absence of pain determined through a self-administered questionnaire. Pain is any discomfort related to the muscles, ligaments, and tendons. Pain in at least one of the selected body parts was recorded as having pain. In this study, pain was described further based on its quality:

- Numbness is described as "unfeeling" or "asleep."
- Tingling is described as "pins and needles."
- Cramping is described as "tight" or “firm.”
- Throbbing is described as "pounding" or "pulsing."
- Heaviness is described as "weighty" or "ponderous."

Study Population

The respondents were third year and fourth year students aged 18 to 22 years enrolled for the school year 2016-2017. Age 18-22 years was considered because this is the usual age range of the third year and fourth year students. The investigators were excluded to prevent bias. Moreover, students with pre-existing musculoskeletal conditions were excluded to ensure that the pain reported was due to mismatch.

Method of Data Collection

Representative samples of the Auditorium, Wood-and-Metal, and Plastic chairs were chosen and measured using a self-retractable steel tape measure. After the signing of informed consent forms, the respondents were asked to line up to be measured. They were asked to remove their shoes, sit in an erect position, with their

legs perpendicular to the floor. Anthropometric measurements relative to each chair type were obtained using a retractable steel tape measure, with the help of rulers that ensured proper alignment of the body parts measured. They were recorded in cm. After measuring, questionnaires on the presence of pain in the different body parts, and its quality were administered.

Results of the Study

The study population included 149 third year and fourth year students. From these, 148 complied to participate in the study. 15 from the 148 participants reported to have been diagnosed with musculoskeletal conditions, and were hence excluded. Seven other participants gave no response as to whether or not they have existing musculoskeletal conditions. Therefore, the study population consists of a total of 126 students.

Ergonomic Mismatch

Table 4. *Percentages of Students With and Without Mismatch in Different Chair Types*

	Auditorium (%)		Wood-and-Metal (%)		Plastic (%)	
	Mismatch	Match	Mismatch	Match	Mismatch	Match
BPL to SD	66.67	33.33	22.22	77.78	34.13	65.87
PH to SH	29.37	70.63	8.73	91.27	17.46	82.54
TC to SDC	28.57	71.43	0	100	0	100
SSH to BH	100	0	47.62	52.38	4.76	95.24
SEH to DH	48.41	51.59	29.37	70.63	50	50
HB to SW	96.83	3.17	77.78	22.22	75.4	24.6
TOTAL	**100**	**0**	**89.68**	**10.32**	**88.10**	**11.90**

Table 4 shows that all of the respondents were mismatched with the Auditorium chair. The aspect with the highest mismatch was in the Sitting Shoulder Height to Backrest Height (SSH-to-BH) with 100%. The Wood-and-Metal Chair was found to be mismatched with 89.68% of the respondents. Highest mismatch was between hip breadth and seat width (HB-to-SW). On the other hand, 88.10% of the respondents were mismatched with the Plastic chair. The aspect with the highest mismatch was found to be in the HB-to-SW. No mismatch was found with TC-to-SDC in both the wood-and-metal and the plastic chairs.

Self-Reported Pain

Table 5. *Percentage of Students who Experience Pain in Different Body Parts Using Different Chair Types*

	Auditorium (%)	Wood-and-Metal (%)		Plastic (%)	
	Mismatch	Mismatch	Match	Mismatch	Match
Neck	30.95	56.00	75.00	54.05	66.67
Shoulder	19.05	43.00	41.67	43.24	46.67
Arm	7.94	20.00	50.00	21.62	26.67
Back	30.16	66.00	66.67	54.95	66.67
Hip	10.32	40.00	33.33	24.32	20.00
Thigh	19.05	42.00	58.33	42.34	46.67
Leg	25.40	50.00	58.33	54.95	53.33

As seen in Table 5, pain was most frequently reported in the neck, and least frequently in the arm for the Auditorium chair. For the Wood-and-Metal chair, back pain was the most frequent among those mismatched

while neck pain among those matched. For the Plastic chair, the highest prevalence of self-reported pain was in the leg and back among those mismatched, and in the neck and back among those matched.

Qualities of Pain

Table 6. *Percentages of Pain Quality in Different Body Parts of Students while using the Auditorium Chair*

	Numbing (%)	Tingling (%)	Cramping (%)	Throbbing (%)	Heaviness (%)
Neck	11.11	3.97	10.40	8.73	17.46
Shoulder	2.38	3.17	6.45	3.97	14.29
Arm	0.79	1.59	1.61	1.59	4.76
Back	8.73	9.52	8.00	7.14	15.08
Hip	5.56	0.79	0.80	2.38	4.76
Thigh	9.60	7.94	7.20	0.79	6.35
Leg	9.52	19.20	12.80	3.97	7.94

As shown in Table 6, heaviness was the most prevalent in the neck, shoulder, arm and back, numbing in the hip and thigh, and tingling in the leg for the Auditorium chair.

Table 7. *Percentages of pain quality in different body parts of students while using the Wood-and-Metal Chair*

	Numbing (%)		Tingling (%)		Cramping (%)		Throbbing (%)		Heaviness (%)	
	Mismatch	Match	Mismatch	Match	Mismatch	Match	Mismatch	Match	Mismatch	Match
Neck	25.00	41.67	14.00	8.33	18.00	8.33	14.00	8.33	37.00	50.00
Shoulder	17.00	16.67	4.00	16.67	15.00	16.67	11.00	16.67	33.00	33.33
Arm	8.00	8.33	5.00	16.67	5.00	16.67	3.00	8.33	7.00	33.33
Back	31.00	41.67	16.00	25.00	29.00	33.33	18.00	16.67	43.00	33.33
Hip	22.00	16.67	7.00	16.67	11.00	25.00	4.00	16.67	18.00	8.33
Thigh	28.00	41.67	19.00	25.00	14.00	25.00	6.00	8.33	20.00	33.33
Leg	30.00	25.00	29.00	33.33	26.00	33.33	4.00	25.00	20.00	25.00

In Table 7, it is shown that among those mismatched with the Wood-and-Metal chair, heaviness was the most prevalent in the neck, shoulder and back, and numbing in the arm, hip, thigh and leg. For those matched, heaviness was the most prevalent in the neck, shoulder, and arm, numbing in the back and thigh.

Table 8. Percentages of Pain Quality in Different Body Parts in Students while using the Plastic Chair

	Numbing		Tingling		Cramping		Throbbing		Heaviness	
	Mismatch	Match	Mismatch	Match	Mismatch	Match	Mismatch	Match	Mismatch	Match
Neck	18.92	26.67	8.11	6.67	17.12	13.33	9.91	6.67	38.74	40.00
Shoulder	12.61	6.67	4.50	0	12.61	6.67	8.26	6.67	29.73	33.33
Arm	5.41	6.67	7.21	6.67	4.50	0	0.92	0	10.91	13.33
Back	25.23	26.67	10.81	0	18.02	20.00	11.82	13.33	33.33	20.00
Hip	10.91	13.33	3.64	6.67	5.50	6.67	2.73	7.14	10.09	0

Thigh	24.32	26.67	20.72	20.00	16.22	13.33	8.18	6.67	12.73	20.00
Leg	30.91	28.57	34.55	46.67	26.13	20.00	11.82	6.67	15.32	20.00

Among those mismatched with the Plastic Chair, heaviness was the most prevalent in the neck, shoulder, arm, and back, and numbness in the hip, thigh and leg. The most frequently reported in the neck, shoulder and arm among those who matched was heaviness. For pain reported in the back, hip, and thigh, the most prevalent was numbness. Tingling was the most prevalent in the leg for respondents who matched with the chair.

Association between Ergonomic Mismatch and Self-Reported Pain

To establish the association between ergonomic mismatch and self-reported pain, logistic regression was used. In this analysis, ergonomic mismatch was identified as having a mismatch in at least one of the anthropometric measurements and seat dimensions while pain reported in at least one body part was considered as having pain.

No comparison group could be formed in the Auditorium chair because of the 100% mismatch. To enrich data analysis, the respondents were divided into having "Mild" and "Severe" Mismatch based on the number of mismatched aspects. Mild mismatch was defined as having one to three mismatched aspects, and severe mismatch as having four to six mismatched aspects. Those with severe mismatch were considered as exposed.

Table 9. Screening for Confounders (Auditorium Chair)

	Odds Ratio	p-value	Remarks
Age	1.61	0.048	PROBABLE confounder
Sex	0.973	0.829	NOT a probable confounder
Duration	0.767	0.031	PROBABLE confounder

Unadjusted OR = 0.60

Sex was not a probable confounder to the association of severe ergonomic mismatch and self-reported pain for the Auditorium chair. The p-value for probable confounders is set at less than 0.25. The p-value obtained for sex was greater than 0.25, hence, it was not considered a probable confounder. The p-values of age and duration of use were 0.048 and 0.031 respectively so they were considered probable confounders. The unadjusted Odds Ratio obtained for the association was 0.60.

Table 10. Identifying Specific Confounders (Auditorium Chair)

	OR full	OR reduced	% change	Remarks
Age	0.56	0.557	0.49	NOT a significant confounder
Duration	0.56	0.595	6.28	NOT a significant confounder

Analysis proceeded to the assertion of the significance of age and duration of use. The % change-in-estimate for age and duration of use were 0.49% and 6.28% respectively. Since these values are less than 10%, age and duration of use were not significant confounders and must be removed from the model. The unadjusted Odds Ratio obtained for the association was 0.60. Hence, students with mild mismatch in the Auditorium chair were 60% more likely to report pain in the different body parts than those with severe mismatch.

Table 11. Screening for Confounders (Wood-and-Metal Chair)

	Odds Ratio	p-value	Remarks
Age	0.76	0.506	NOT a probable confounder
Sex	0.75	0.217	PROBABLE confounder
Duration	1.13	0.857	NOT a probable confounder

Unadjusted OR = 0.96

Age and Duration of Use were not probable confounders to the association of ergonomic mismatch and self-reported pain for the Wood-and-Metal chair. The p-values obtained for the two were greater than 0.25, hence, they were not considered probable confounders. The p-value of sex was 0.217, therefore it was considered as a probable confounder. The unadjusted Odds Ratio obtained for the association was 0.96.

Table 12. Identifying Specific Confounders (Wood-and-Metal Chair)

	OR full	OR reduced	% change	Remarks
Sex	1.29	0.96	25.58	SIGNIFICANT confounder

Analysis proceeded to the assertion of the significance of sex. The % change-in-estimate calculated for sex was 25.58%. Since this value is greater than 10%, sex was identified to be a significant confounder and therefore must be retained in the model. In the full model including the exposure, outcome and the confounder, the computed odds ratio was 1.29. Thus, adjusting for the confounding effect of sex, students who were mismatched with the Wood-and-Metal chair were 29% more likely to report pain than those who were matched.

Table 13. Screening for Confounders (Plastic Chair)

	Odds Ratio	p-value	Remarks
Age	0.71	0.351	NOT a probable confounder
Sex	1.04	0.871	NOT a probable confounder
Duration	0.88	0.546	NOT a probable confounder

Unadjusted OR = 1.54

Age, Sex, and Duration of Use were not probable confounders to the association of ergonomic mismatch and self-reported pain for the Plastic chair. The p-value for probable confounders is set at less than 0.25. The p-values obtained were all greater than 0.25, hence, they were not considered probable confounders. The unadjusted Odds Ratio obtained for the association was 1.54. Hence, students who were mismatched with the Plastic chair were 54% more likely to report pain in the different body parts than those who were matched.

Discussion

The three chairs considered in this study were the Auditorium, Wood-and-Metal type, and Plastic types. Each has its own attributes that may have contributed to the occurrence of ergonomic mismatch or self-reported pain. The Auditorium chair has a cushioned sitting surface and backrest that extends at a considerably greater height compared to the other two chairs. It has a foldable seat and a retractable desk. Its sides from the armrest down to the sitting surface are closed with no space for movement of the body. The Wood-and-Metal chair has interspaced wooden planks as backrest. Its rigid seat surface is curved at the front edge. It has a non-retractable desk but includes a space from the armrest down to the sitting surface. Also, it has a compartment below the seat alternatively used as footrest. Lastly, the Plastic chair follows a convex shape as it goes towards the the sitting surface. Similar with the Wood-and-Metal chair, it has a non-retractable desk.

Moreover, it has an armrest on the left side. The chair is made entirely of smooth plastic and has curved edges on all corners.

Ergonomic Mismatch - Auditorium

Results show that 100% of the respondents were ergonomically mismatched with the Auditorium type chair. This was mainly due to the mismatch in the aspect of the SSH-to-BH. Mobility of the trunk and arms is important when sitting, therefore it is recommended that the backrest height be lower than or at most, on the upper edge of the scapula (Agha, 2010). This was violated by the auditorium chair because all the students' scapulae considerably lower than the backrest. This could prevent full extension of the trunk and arms.

A large proportion of mismatch was also observed in the comparison of the HB-to-SW. An optimal seat width must be selected for the chairs to ensure that it will allow for a wide range of hip breadths. SW should be at least 10% (to accommodate hip breadth) and at most 30% (for space economy) larger than the HB (Biswas, *et al*). The seat should be wide enough to allow the student to sit comfortably, but narrow enough to enable the use of the armrests without stretching too far. It was observed that mismatch was due to the seat being too wide for the students, thus tending them to stretch too much or lean to only one side, predisposing them to poor posture.

Ergonomic Mismatch – Wood-and-Metal

Results show that 89.68% of the respondents were ergonomically mismatched with the Wood-and-Metal chair. The aspect with the greatest mismatch was the HB-to-SW at 77.78%. It is important for the seat width to be sufficiently large to accommodate the widest of hips and permit space for various lateral movements. However, it should also be narrow enough to provide adequate support for the body, not causing any major postural adjustments due to the increased space available for movement. Data show that the extensive seat width of the Wood-and-Metal chair was the reason for the mismatch among most of the students.

On the other hand, no mismatch was recorded in the TC-to-SDC. SDC must be greater than TC to permit leg movement. Wood-and-metal chairs have a huge allowance from the seat surface to the lowest point of the desk, giving a lot of area for movement and changes in leg position.

Ergonomic Mismatch – Plastic

Data show that 88.10% of the respondents were ergonomically mismatched with the Plastic chair. Highest mismatch was recorded in the HB-to-SW aspect at 75.4%. Like in the two other chairs, this may be due to the fact that the seat is too wide and does not provide enough support for the body, specifically the hips.

It can be noted that low mismatch was recorded in the SSH-to-BH aspect at 4.76% compared to that of the Auditorium chair and Wood-and-Metal chair where 100% and 47.62% of students were mismatched in this same aspect respectively. No mismatch was also recorded with the TC-to-SDC aspect, same with that of the wood-and metal chair. It was observed that the Plastic chairs leave a lot of room for movement of the legs due to the large SDC that may accommodate thigh clearances of various measurements.

Self-Reported Pain - Auditorium

Based on the data gathered, pain was most frequent in the neck and back among the respondents. This may be because of the limited neck and spine movement brought about by the increased backrest height. This may have hindered the neck and back to move freely, causing pain and discomfort. Back pain may also be due to the poor posture brought about by the high mismatch in the HB-to-SW aspect. The least prevalent pain experienced while sitting on the Auditorium chair was arm pain. The mismatch in the SEH-to-DH was relatively low with 48.41%, thus may have contributed on the low experience of pain in the arm.

Self-Reported Pain – Wood-and-Metal

HB-to-SW and SSH-to-BH were the two aspects with the highest prevalence of mismatch in this chair. Mismatch was due to the seat being too wide for the hips. Together with the fixed desk, these can predispose the students to assume awkward positions for long periods due to the incompatibility of the structure of the chair. This could then lead to pain in various parts of the body.

The highest prevalence of pain for this chair was back pain followed closely by neck pain. Correspondingly, there was a high prevalence of mismatch for SSH-to-BH. Based on the mismatch analysis, the backrest of this chair was too high for the students which may affect their sitting postures, eventually lead to pain. The spine is a complex structure made up of vertebrae, muscles, nerves, and ligaments. The muscles of the spine attach to the neck and extend until the skull, therefore pain experienced in one of these areas could radiate to the rest. Improper posture and body rigidity can cause a tremendous amount of stress and inflammation on the back muscles. Over time, these muscles could become weak and inflexible, leading to pain in the back, neck and head. The high prevalence of mismatch in HB-to-SW along with the high backrest could have forced the respondent to sit in a position leading to poor and unsupported posture because the respondent would have to compensate for the dimensions of the seat. This may also account for the pain experienced in the back and neck because the seat and back surfaces were both highly mismatched and mainly affecting these body parts.

Self-Reported Pain - Plastic

The high prevalence of mismatch in the HB-to-SW was due to the seat being too wide for the hips of the students. This could have led them to slouch towards the desk, leading to pain. At the same time, the wide seat permits movement and adjustment of posture. The user can then change position freely to alleviate the feeling of pain, and this could explain why there was a relatively low prevalence of hip pain despite the high mismatch.

While there was high prevalence of mismatch for SEH-to-DH, there was also a high prevalence of pain in the shoulder. This could be due to the awkward positions the students were subjected to when resting their elbows on the desks that were found to be too high for them. The BPL-to-SD aspect also exhibited high prevalence of mismatch. Highest pain was recorded in the leg and this could be due to the seat being too long. The seat depth should be enough so that the backrest of the seat can support the lumbar spine without compression of the popliteal surface. Non-compliance to this could lead to leg pain due to compression and radiate to the back and the neck because of the connection of the seat depth to the backrest.

For both cases of matched and mismatched measurements, the leg, back and neck were consistently the highest in terms of the presence of pain. The incompatibility of the seat with the hips of the students, and the presence of the fixed desk may have led to pain in different parts of the body especially the back and consequently, the neck.

Qualities of Pain

In general, heaviness was the most prevalent pain quality experienced in the neck, shoulder and arm. The heavy sensation can be attributed to the accumulation of lactic acid in the muscles (Sahlin, 1986) or as a result of many other sensations in the long run. The body parts forced to hold non-neutral positions experience static loading where they constantly exert effort, therefore lactic acid may be accumulated leading to fatigue, or heaviness.

Numbing was commonly reported in the hip and thigh. This is usually caused by nerve impingement occurring when too much pressure is applied by surrounding tissues. External pressure from holding the body in one position for long periods could reduce blood flow in the vessels supplying the nerve. This causes local ischaemia affecting the transmission of action potentials. Moreover, pressure on a nerve root exiting the spine

may cause neck or low back pain. It may also cause pain to radiate from the neck into the shoulder and arm (cervical radiculopathy), or into the leg and foot (lumbar radiculopathy or sciatic nerve pain).

Cramping was reported in the back. External pressure may compress the blood vessels, leading to compromised blood flow. This can cause overexcitement of nerves and involuntary contraction of muscles. This can also occur due to insufficient adenosine triphosphate causing the myosin fibers to not fully detach from actin.

Tingling was the most prevalent in the leg. It is caused by pressure on the nerves as with crossing the legs or lying on one's arm while sleeping. On the other hand, throbbing was the least frequent sensation felt across all three chairs in all body parts. This sensation may have a vascular origin, resulting from physical exertion.

Association between Ergonomic Mismatch and Self-Reported Pain – Auditorium

Students with mild mismatch in the Auditorium chair were 60% more likely to report pain in the different body parts than those with severe mismatch. This is contrary to the common knowledge that a severe mismatch will more likely lead to pain than a mild one. A possible explanation for this is the need for whole body compensation. In the case of the Auditorium chair, the 100% mismatch in the SSH-to-BH may require compensation not only of the back but also of the other body parts to facilitate easier adjustment to the chair.

Considering only the presence of mismatch (100%), it was observed that the prevalence of self-reported pain was relatively lower in the Auditorium chair. This can be explained by the presence of cushion, retractable desk, and armrests. The cushion allows for even weight distribution. It is able to adapt according to the body shape of the user. Furthermore, the presence of retractable desk gives the students extra space for posture adjustment to prevent pain. The armrests in both sides of the chair also provide support to the arms.

Association between Ergonomic Mismatch and Self-Reported Pain – Wood-and-Metal

Sex was a significant confounder to the association between mismatch and pain. Adjusting for its confounding effect, students ergonomically mismatched with the Wood-and-Metal chair were 29% more likely to report pain in the different body parts. However, other factors affecting the presence of self-reported pain may still exist.

First, the wooden seat does not follow the contours of the body. Its rigidity is a source of pressure under the buttocks. This may have led to compression of the hip and butt which results to pain. Second, the backrest does not cover the entire back and is composed of interspaced wooden planks. As a result, students may tend to lean forward with their lower back extended to the space on the backrest. This prolonged stooping position can cause pain. Third, the non-retractable nature of the desk limits movement and posture adjustment. This may hinder the person to compensate properly and mitigate forced adjustments into non-neutral positions. Fourth, the compartment under the seat may have been used as an alternative footrest. However, instead of helping to ease leg discomfort, it may have caused compression of leg muscles as the feet are elevated for prolonged periods.

Association between Ergonomic Mismatch and Self-Reported Pain – Plastic

Students ergonomically mismatched with the Plastic chair were 54% more likely to report pain in the different body parts. This was a stronger association than in the Wood-and-Metal chair, but factors aside from ergonomic mismatch may still be present. The sitting surface is plastic and may contribute to the pressure exerted on the hip and butt area of the students. The smoothness of plastic may also tend the user to slide down to an awkward position. Meanwhile, the seat curvature can cause the thighs to be pressed, leading to compromised blood flow in the legs. It can also cause the legs to be hanging since the distal part of the thigh is higher. The feet are therefore unable to rest completely on the ground, leading to muscle strain. The non-

retractable desk affects the student's motion and posture. In addition to this, the armrest can provide support to the forearm of the user.

Conclusion

All the respondents were mismatched with the Auditorium chair, with 100% mismatch in the SSH-to-BH. Neck pain (30.95%) was the most prevalent while arm pain (7.94%) was the least. The 100% mismatch with the Auditorium chair resulted in the lack of a comparison group so mismatched respondents were further divided into having "Mild" and "Severe" Mismatch based on the number of mismatched aspects. Students with mild mismatch were found to be 0.60 times more likely to report pain than those with severe mismatch.

89.68% of the respondents were mismatched with the Wood-and-Metal chair, with the highest mismatch in the HB-to-SW (77.78%) and none in the TC-to-SDC. Back pain (66%) and neck pain (75%) were the most common for the mismatched and matched students, respectively. Sex was a significant confounder. After adjusting for its effect, it was found that students with mismatch were 1.29 times more likely to report pain than those without.

88.10% of the respondents were mismatched with the Plastic chair, with the highest mismatch in the HB-to-SW (75.4%) and none in the TC-to-SDC. Both the neck and back pain were the most prevalent for those mismatched and matched. No significant confounder was found, thus students with mismatch were 1.54 times more likely to report pain than those without. For the three chairs, heaviness was the most prevalent pain quality in the neck and back, followed by numbness. Tingling was the most common for the leg.

Recommendations

Findings of this study may be considered in acquiring new chairs and desks, especially taking into account the aspects most frequently mismatched. Breaks during long lectures may also be incorporated to allow stretching and postural adjustments. This will improve vascular flow and reduce risk for nerve impingement.

A number of adjustments can be done to improve the quality of future studies. The use of standard measuring equipment can be touched upon to minimize variability in the manner of measuring the students. Several areas not touched on by this study can be considered for future research. The auditorium chair used degrees of mismatch to proceed further in the data analysis, yielding unexpected findings where the mildly mismatched were more likely to report pain than the severely mismatched. This result serves new questions and considerations for tackling the association between ergonomic mismatch and pain anew.

Since the study focused on mismatch between the chairs and respondents, the ergonomic design of the chairs themselves were not analyzed. This may include the presence of cushioning, the material of the chair, and the nature of the desks. Greater insight may be gleaned from analyzing these designs. On a larger scope, studies looking at ergonomics as a system could be pursued. Other factors like lighting, ventilation, relative position of chairs can be studied not only individually but as a system altogether. The study also set the scope of the analysis on pain to presence and absence. A similar form of analysis but with the severity of pain may yield greater understanding on the correlation of pain and ergonomic mismatch. The possibility of using a case-control study design to observe the effects of using specific chair types may also be explored. Other ergonomic mismatch studies that may be done can involve laboratory furnishings which may or may not be limited to the stools, as well as the office furnishings of the faculty and staff.

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BEST PRACTICES TO DECREASE ACUTE RESPIRATORY INFECTIONS IN UNDER FIVE YEARS CHILDREN IN SURABAYA: AN ENVIRONMENTAL HEALTH PERSPECTIVES

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Abstract: Acute respiratory infections (ARIs) are the leading cause of morbidity and mortality from infectious disease worldwide, particularly affecting the youngest and oldest people in low and middle-income nations (WHO, 2014). There were some areas in East Java with ARIs among under five years children is high enough, one of Surabaya with 4,306 cases (Surabaya Health District, 2015). The aim of this research was to describe best practices to decrease acute respiratory infections in under five years children in the primary health care. This research was an observational study with cross sectional design. Research sample was 5 primary health care with highest cases from 2014 to 2015. Data collection were carried out with questionnaire, observation form and analyzed using descriptive method. The result showed that all primary health care have guidance for infection prevention and control measures but not well implemented. There were 3 primary health care have support unit and staff to solve the infection diseases named sanitation clinic unit that responsible for identify diseases, communicate with community, observation housing sanitation, give recomendation to the community, and also do the surveillance for environment based diseases. These guidelines and sanitation clinic unit will contribute to improving health care practices in Indonesia.

Keywords: acute respiratory syndrome, sanitation clinic, environmental health

Introduction

Many factors affect the health (both of the individual and public health), there are environmental, behavioral, health care, and heredity. Optimum Status of health can be achieved when these four factors together have been in optimum conditions (Hendrik L. Blum in Notoatmojo, 2007).

Poor sanitation can cause an environment-based disease, such as: Upper Respiratory Tract Infection (URI), Acute Respiratory Infections (ARIs), diarrhea, malaria, dengue haemorragic fever, tuberculosis, worm infestation and scabies (Achmadi, 2011). Acute respiratory infections (ARIs) are the leading cause of morbidity and mortality from infectious disease worldwide, particularly affecting the youngest and oldest people in low and middle-income nations (WHO, 2014).

Indonesia have higher cases of environment-based disease in some areas, one of area is East Java. The highest environment-based disease among under five years children is ARIs, one of Surabaya with 4,306 cases in 2014 (Surabaya Health District, 2015).

The cases of environment-based disease can't solve only using curative and rehabilitative approach, the result will not be significant. The eradication should also has promotive and preventive approach, which is through life style and habit changing (Ministry of Health, 2003).

Concerning the Implementation of Environmental Health Services in District Health Center (DHC), on Article 2 which reads "Each DHC are obliged to implement Environmental Health Services, which is part of the comprehensive health care provided to patients". According to the regulation, so every DHC to carry out the public health service to the community in the district (Ministry of Health, 2015).

The aim of this research was to describe best practices to decrease acute respiratory infections in under five years children in the primary health care.

Methods

This was an observational study with cross sectional design. Research sample was 5 primary health care with inclusion criteria, such as: highest ARIs cases from 2014 to 2015, have sanitation clinic unit (SCU).

Data collection techniques used are three techniques:

1. Interview to the Head of Primary Health Care, Head of Disease Control and Environmental Health Development Unit, Sanitarian that held responsibility in Community Sanitation.
2. . Observation by performing the direct observation of procedure and implementation of medical services and clinic sanitation.
3. Documentation by collecting the documentation related to the implementation and activities carried out by Sanitarian

The questionnaire was filled by one sanitarian of each primary health care service, as an informants. Primary data including the survey of sanitarian, facility, trans-program and trans-sector activity, and evaluation of sanitation clinic was collected within the questionnaire by sanitation of each primary health care service. Secondary data including number of environment-based disease, client number, and house-visiting activities of sanitation clinic was collected within the available data in each primary health care service.

Data collection were carried out with questionnaire and observation form and analyzed using descriptive method. The ethical approval was obtained from health research ethics committee Faculty of Public Health Airlangga University.

Result and Discussion

Surabaya District have 62 Primary Health Care (PHC), all PHC have guidance for infection prevention and control measures but not well implemented. Less than 10 PHC have support unit to solve the infection diseases named sanitation clinic unit (SCU). But only 3 PHC have SCU complette with staff (called sanitarian), facilities and have been running well. All sanitarians are well-educated, within the degree of Environmental Health Diploma and Bachelor of Public Health. This unit responsible to identify infection diseases, communicate with community, observation housing sanitation, give recomendation to the community, and also do the surveillance for environment based diseases.

Primary health care service pays attention not only in curative and rehabilitative approach, but also in promotive and preventive. Primary health care service has a program dealing environment problem and environment-based disease, which is called sanitation clinic (Ministry of Health, 2003). Sanitation clinic unit have several program such as:

1. Integrated Efforts of Environmental Health

Integrated efforts of environmental health made by Sanitarian in order to improve public health. This effort is done through explanation, consultation and technical assistance of: a) improvement of environmental

sanitation; b) improvement of housing sanitation; and c) improvement of family's behavior become healthy and clean.

2. Disease Eradication

Eradication of the disease is one of the two main strategies in the implementation of the sanitation clinic program (SCP), in addition to the integrated efforts of environmental health, to be able to address the public health problems. This is as stated in white book of Clinic Sanitation (2011) in Santoso (2016) which reads "Clinic sanitation is a tools for the community to address public health problems through integrated efforts of environmental health and disease control with explanation, consultation and technical assistance from the attendant of DHCs".

In this research, there are three activities in disease control: a) Improvement of clean and healthy behavior (example: avoid source of exposure); b) control of infectious diseases history each patients; and c) improvement of disease eradication activities. All of the efforts at the three activities are conducted by explanation, consultation, dan technical assistance.

Implementation of the three activities can be stated if not run properly in accordance with the purpose of the sanitation clinic. It happens because some of the obstacles are faced, both from officials as well as from the patients or clients. Since the SCP conducted to the community, it should be able to reduce the number of patients who indicated disease based on the environment (Santoso, 2016).

According to the observation data showed that from 5 PHC as a sample, only 3 PHC have make good collaboration between Disease Control, Environmental Health Development Unit, and other related unit which needed. The data from medical report has been connected to the SCU and other related unit, so Sanitarian can follow up patient status and give some suggestion to the patient. After patient come to the PHC and diagnosed one of environment based diseases, patient must come to the SCU and discuss with Sanitarian.

The environment based disease cases that record in sanitation clinic can be different in each primary health care service in Surabaya. The highest cases were URI, ARIs, diarrhea, and DBD. The diseases probably caused by the main environment problems in Surabaya: poor ambient air quality, minimum house ventilation, house density, and poor sanitation behavior.

Trans-program activity has been done in all primary health care services. The activity generally associated with several programs: health promotion, nutrition, surveillance, epidemiology, and transmitted-disease eradication. Compared to the research in Dumai that all the 9 primary health care services have done trans-program activity (Suriani, 2009).

The result of the observation data about the sanitation clinic activity showed that the activity has been implemented according to procedure and manual book. Sanitation clinic also provide some flowchart about their program, leaflet about environment based diseases, and documentation of patient's history who ever come to SCU and kind of the treatment.

Patients who diagnosed URI and ARIs should come to SCU, fill some questionnaire related to sanitation as a database and will discuss with Sanitarian. Patients can share about their house and environment condition, personal hygiene behavior, and all potential hazard around their house that probably as a source of pollution. Sanitarian will explain about several causes of the disease from environmental perspective and source of the pollution that can be as a trigger for the disease. Patients who come to the Primary Health Care not only get some medicine but also get some recommendation to make their environment become healthy and clean.

Sanitarian will record all patient data and arrange the date for house-visiting activity. All house of patients will be abserv by Sanitarian to crosscheck with the data, conducted air quality measurement, identify all potential hazard, and explain the risk of patients house condition. The number of house-visiting activity is still under the

expectation. According to all sanitarians, the probable causes are lack of employee and the over burdens for this program.

After house-visitting activity finished, Sanitarian will give some of recommendation for each patients. Recommendation not only related to the patients house and environment but also if patients need advance consultation with another unit in Primary Health Care, such as nutrition unit. Recommendation should be record and share to related unit which needed. From this integrated effort can decrease the number of URI and ARIs diseases in Surabaya.

The accumulation of clients come to sanitation clinic from 2010 to 2012 in all primary health care services in Bukittinggi is still below the expectation. This might because of lack of employee, lack of socialization and promotion of the program itself. Thus, existence of this program to people around hasn't met the expectation yet (Jamarin, 2014).

Every program should follow an integrated direction in some manual books. There are 4 manual books produced by ministry of health for the sake of sanitation clinic: implementation manual book, technical direction, standard operational procedure, and counseling manual book (Iskandar, 2004).

Conclusion and Suggestion

The conclusion of this study is the implementation of clinical Sanitation Clinic Program (SCP) in Surabaya District through integrated efforts of environmental health and efforts to eradicate the disease with explanation, consultation and technical assistance still has not done well. There are still many constraints encountered in SCP implementation. Some of the constraints include number of sanitarian for sanitation clinic program that is still limited.

Sanitation clinic implementation must be observed including ten aspects: sanitarian, facility, budget, manual book, environment-based disease data, client number, house-visiting activities, trans-program and trans-sector activity, and evaluation. By observing sanitation clinic implementation, sanitation clinic could evaluate and be better in reducing environment-based diseases. Primary health care that have successfully impelmented SCP can teach to another Primary health care in Indonesia.

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HEALTH PROMOTION EFFECT ON WOMAN KNOWLEDGE LEVEL ABOUT CERVICAL CANCER AND PAP SMEAR IN PUBLIC HEALTH CENTER KENDAL KEREP MALANG

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Abstract:

Background: Cervical Cancer is the number one of woman killer in Indonesia. Each year, there are 20.928 new cervical cancer new cases in Indonesia. In 2012, there are 747 women in Malang suffering from cervical cancer. Early detection and pre-cervical cancer treatment are necessary to be the priority. One of the methods to distribute the information on early detection is by conducting the health promotion about cervical cancer and pap smear.

Purpose: Knowing the health promotion effect on women knowledge level about cervical cancer and pap smear in public health center Kendal Kerep Malang city.

Method: This study used *quasi experimental one group pretest-posttest design.* There 53 respondents were taken in *total sampling*. The respondents were given the *pretest* questionnaires followed by health consultation and Leaflet, afterwards, the respondents were given the *posttest* questionnaires. Data analysis was performed using paired t-test.

Results: The result of paired t-test showed the value of P questionnaire of 0.000 so it is obtained P value <0,05 indicating that there was difference of influence of health promotion to woman knowledge level about Cervical Cancer and Pap Smear before and after counseling.

Conclusion: There are health promotion effect on women knowledge level on cervical cancer and pap smear in public health center Kendal Kerep Malang city.

Keywords: Health Promotion, Knowledge, Pap Smear

Introduction

Cervical cancer is the most common malignancy in women that occur in the cervix. Based on WHO and ICO data (2012), the incidence of cervical cancer in Indonesia is the most 2nd cancer that occurs in woman at age 15-44 years. Number of new cancer patients who attack the cervical cancer as many as 3814 people. Public Health office of East Java noted the number of cervical cancer patients who undergo outpatient services continues to increase for five years since 2009, reaching 1987 sufferers in 2013. There are seven cities or districts of cervical cancer cases of more than 40 cases per year. Including Malang City.

In Indonesia, the high mortality rate of cervical cancer patients is caused because of patients come late to treatment. More than 70 percent patients come after treatment at an advanced stage. It happened because there are still many women who do not know the disease, especially the prevention efforts (Soekarwo, 2014).

Many factors that affect the high number of incidents of cervical cancer in Malang, one of which is the problem in the effort of cervical cancer examination is the reluctance of the women checked because of embarrassment. Other causes such as doubts about the importance of the examination, lack of knowledge about the importance of the examination, ignorance made during the examination, and fears of pain in the examination. In addition, many people feel burdened by the cost of pap smears that tend to be expensive (Widyawati, 2015).

Based on the factors above, it is necessary an attempt to increase the motivation of women to be more active role follow cervical cancer screening program. One is by providing information with health promotion about the dangers of cervical cancer and the importance of screening for women in the early detection of cervical cancer.

Based on the above background, the researchers are interested to conduct research on "The Influence of Health Promotion on Women Knowledge Level About Cervical Cancer and Pap Smear at Kendal Kerep Health Center of Malang City".

Method

This research uses quasi-experimental research design using Pre test and Post test Group method. This research was conducted at public health center Kendal Kerep Malang on June 2015. Population and samples taken in this research are women who reside in work area of Kendal Kerep Health Center of Malang City with sampling technique using total sampling. The inclusion criteria in the study were women aged 20-60 years old, married, minimum education elementary school and willing to be a respondent. While the exclusion criteria of this study is incomplete sample data, and respondents did not come when data collection is done.

Health promotion in this study using lecture, counseling and question and answer methods conducted by health personnel, in this case is a doctor and using a leaflet about cervical cancer and pap smear.

Knowledge of women assessed include: Understanding of cervical cancer (2 questions), Symptoms of cervical cancer (1 question), Cervical cancer risk factors (2 questions), Early detection of cervical cancer (1 question), Pap smear purpose (1 question) Smear (3 questions). Level of knowledge is divided based on good (score> 8), medium (score 6-8), and less (score <6). Data were analyzed using paired-T test.

Result

From the population of women in the Kendal Kereppublic health center, Blimbing sub-district, Malang city obtained a sample that fulfilled the inclusion criteria of 53 respondents. Data obtained based on the results of questionnaires answers then processed in accordance with the purpose of research to determine the influence of health promotion to the level of knowledge of women about cervical cancer and pap smear at Kendal Kerep Health Center Belimbing District of Malang.

Table 1. Respondent characteristic in Kendal Kerep Public Health Center

	Number	Frekuensi (%)
Age		
< 20 yo	0	0,0
20-30 yo	6	11,3
31-40 yo	10	18,8
> 40 yo	37	69,9
Occupation		
Housewife	13	24,5
Teacher	13	24,5

Professional	16	30,1
Others	11	20,9
Education		
Elementary	9	16,9
Junior HighSchool	4	7,5
Senior HighSchool	15	28,3
Graduate/Diploma	25	47,1

Based on table 1 we can know that the age of majority of respondents> 40 years (69.9%), the work of most respondents in the form of professional personnel (30.1%), and most of the last education respondents graduate or diploma level (47.1%)

Table 2. Responden knowledge level

Knowledge skor	Mean	Standar deviasi
Pre tes		
Pos test	7,85	1.714
	8.85	1.167

Based on Table 2, it can be seen that the knowledge of respondents at the time before the test is medium (score 6-8), and the level of knowledge after the test is good (score> 8). So it can be concluded that there has been an increase in sample knowledge after following health promotion.

Before conducted data analysis using Paired T-Test, then tested normality and homogeneity of data, with result p = 0,200 (p> 0,05). The result of paired T-test can be seen in table 3

Table 3. Paired T-Test Analysis

	Mean	T	df	Sig.(2.tailed)
Pretest-Postest	-1.000	`-6.275	52	.000

Based on table 3 it can be seen that the value of significance is 0,000 (<0,05) so it can be concluded that there is a difference between the influence of health promotion to the level of female knowledge about Cervical Cancer and Pap Smear before and after counseling.

Discussion

In this study obtained most of the sample aged> 40 years (69.9%). The data shows that women who follow the majority counseling are between> 40 years old. It can also affect the process of receiving information on each individual. At the age of 40 assumed a person's ability to capture and remember information is increasing with age (Cahyaningsih et al, 2013).

Based on the work, most of the respondents were employed as entrepreneurs (30.1%). A woman who has a wide range of friends will improve her ability to find the desired information (Yolanda, 2013).

The result of data analysis about the knowledge level of the sample shows that the sample already has good knowledge at the time of pretest. A total of 7.85% of samples belong to good criteria. While at the time of postest the amount increased to 88.5%. With a high knowledge of someone about early detection with either Pap smear then someone will know further the purpose of the importance of early detection of cervical cancer (Montgomery K, 2010). And with limited knowledge then someone will not make early detection of cervical cancer so that greater risk of cervical cancer than those who know and do early detection. Knowledge of

cervical cancer is a new knowledge for those who have never heard and know it. A person's knowledge of a particular object plays a role in how that person makes a decision in action (Carter J, 2010).

According to WHO, one of the behavior change strategies is the provision of information. By providing information about cervical cancer and its danger, knowledge is gained that will affect one's attitude. A positive attitude causes women to behave in accordance with their knowledge, in this case is the participation of women in early detection of cervical cancer (Laras, 2009).

The effectiveness of this health promotion can also be judged by the increase in the number of correct answers and the decline in the number of wrong answers after health promotion is given. A person's knowledge can be influenced by factors such as education and the presence of information exposure (Donati, 2012). In this study, the sample knowledge is influenced by education because some of the sample has taken a high level of education as many as 25 people samples (47.1%) on level undergraduate. And 15 sample people (28,3%) have gone through high school education. The higher the education of a person, the easier they will receive the information and ultimately the knowledge they have will be more and more. A person's level of education can determine the intellectual, understanding, and critical thinking and logical skills of a person in processing information and making decisions in action. But the high level of a person's education without being followed by the willingness of learning, does not guarantee that a person has a good level of knowledge and others who want to learn and increase his knowledge with information even though his low educational background can have good knowledge (Kurniawan, 2008).

From the discussion, it can be stated that health promotion has a significant influence on the level of knowledge of women in Kendal Kerep Health Center Malang. In this case, health promotion conducted in the form of lectures with audio visual aids accompanied by a question and answer session to the presenters and given each leaflet

Conclusion

There are health promotion effect on women knowledge level on cervical cancer and pap smear in public health center Kendal Kerep Malang city.

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"QUALITY OF LIFE OF ELDERLY IN RURAL AREAS OF EAST SIKKIM, INDIA: A CROSS SECTIONAL STUDY"

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Abstract : Ageing being the most emerging demographic phenomenon in the world today, there is an increase in demand for preventive, curative care and rehabilitation services. With the population rising in India, the elderly population is likely to accelerate further in the coming years and therefore there is a need to know the quality of life of elderly and develop mixed strategies to meet their health care needs. Of the total population in Sikkim, around 75.03 % live in the rural areas. With 6.7% of the elderly population in the state,the objective of this study was to find out the quality of life of geriatric population in rural areas of East Sikkim.A cross-sectional study was carried out by visiting the Gram Panchayat Units(GPU's), where elderly people were randomly selected from 18 GPUs out of 53 GPU's in rural areas of east Sikkim. Study included 324 elderly people with age more than or equal to 60 years.World Health Organisation Quality of Life BREF (WHOQOL-BREF) questionnaire was used for assessing the quality of life. Physical health, psychological, social relationships and environmental quality of life in both genders were found to be poor (Mean 39.5±11.26 SD). There was no significant difference between gender and age variables in quality of life. Quality of life is found to be poor in the geriatric population of Sikkim due to the environmental barrier, reduced psychological, social relationships and physical health. Further studies are required to study the overall quality of life of elderly to promote graceful ageing through comprehensive geriatric care.

Introduction

Ageing is a universal process and is the most emerging demographic phenomenon in the world today. [1] India's elderly population has already crossed 100 million during 2011 and is projected to cross 177 million by the year 2025.[2] With the demographic transition in India, the elderly population is likely to accelerate further in the coming years and therefore there is a need to know the quality of life of elderly and develop mixed strategies to meet their health care needs.[3]The World Health Organization defines quality of life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad-ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of the environment.[4]Quality of life (QOL) among elderly is a major area of concern to determine the health status and well-being of the elderly. In India, with the increase in burden of chronic morbidity conditions and ageing population, the quality of life of the elderly population will be affected. A study done by R.S.Rajasi et alto assess the quality of life (QOL) using the World Health Organization QOL (WHOQOL‐BREF) scale and sociodemographic factors affecting QOL of 160 elderly women residing in a community setting in South Kerala. The results found out that QOL was least in the

psychological domain followed by physical and health‐related, social, and environmental domains. They concluded that it is possible to improve the QOL of elderly women by providing financial security, ensuring care, and by enhancing social relationships of elderly women.[5]A community based cross-sectional study was conducted among 300 elderly subjects in urban Puducherry, India by Ganesh Kumar S et al. Quality of Life was assessed by World Health Organization Quality of Life BREF (WHOQOL-BREF) and Activities of Daily Living (ADLs) by Katz ADL scale. The study concluded that QOL score among elderly is average, while social relationship domain of QOL score was found to be low. Health education with regard to activity and environmental changes and increase in social relationship may help in improving the QOL among the elderly population.[6]Sikkim being the smallest state in Northeast India with around 75.03 % of the total population in Sikkim live in the rural areas and with 6.7% of the elderly population in the state, the hilly terrain and steep roads and unfavourable weather conditions contribute to a lot of problems in the elderly.[7]

Many of the studies done on geriatric quality of life in India are either hospital based or primary health care based which has high chance of selection bias as only those elderly who are physically independent could walk up to either of the two for assessment. Therefore, there is a need of community based study in India and Northeast India especially among the elderly population so that the burden of disease conditions is reduced and the accompanying functional disabilities caused by the primary diseases are reduced and the overall quality of life is improved.

Method

After the approval of study from the Institutional Ethics Committee the study was carried within the period of October 2016 to April 2017.This cross-sectional study was done on elderly of 60 years and above who were willing to participate in the study under rural areas of East Sikkim. Rural areas of Sikkim are divided under the gram panchayat units(GPU's) in Sikkim. The study sample was obtained using multistage simple random sampling. In rural areas of east Sikkim, there are 52 GPU's out of which 18 GPU's ($1/3^{rd}$) were randomly selected through random generation and then the list of all the geriatrics were obtained under each GPU. From this list, 18 elderlies in each GPU was selected randomly for the study thus the total sample size was 324. For each part, one house was selected randomly. Starting from this house, every nearest next house was surveyed until 18 subjects were enrolled for the study. After screening the subjects, through house to house visit informed consents were given to the selected elderly who were ready to participate in the study with the explanation that they could withdraw from the study anytime they want to and then a detailed pre-tested socio-demographic assessment was done Data on socio demographic factors included age, gender, income, occupation, marital status, living status, level of education, and type of family. World Health Organisation Quality of Life-BREF (WHOQOL-BREF) questionnaire was used to assess the quality of life in the elderly. This instrument contains four domains namely physical health, psychological, social relationships and environment with a total of 26 questions. Each of these domains were rated on a 5-point Likert scale. As per the WHO guidelines, 25 raw scores for each domain was calculated by adding values of single items and it was then transformed to a score ranging from 0 to 100, where 100 is the highest and 0 is the lowest value. The mean score of each domain, total score and average score were calculated.[8]Statistical Package for the Social Sciences (SPSS) version 20 was used for statistical analysis.

Result

Table 1: Socio-demographic variables

Age group (years)	*n= 324 (%)*
60-69	160 (49.4)
70-79	107 (33)
80 and above	57(17.6)
Gender	
Male	149 (46)
Female	175 (54)
Caste/Ethnicity	
Schedule Caste	33 (8.2)
Schedule Tribes	88 27.2)
Other Backward Classes	92 (28.3)
General	111 (34.3)
Marital Status	
Married	219 (67.6)
Widow	72 (22.2)
Widower	27 (8.3)
Unmarried	6 (1.9)
Religion	
Hindu	171 (52.8)
Buddhist	72 (21.6)
Christian	83 (25.6)
Muslim	0 (0)
Education	
Professional/honor	0 (0)
Graduate/post graduate	1 (0.3)
Intermediate/post high school Dip.	0 (0)
High school certificate	8 (2.5)
Middle school certificate	9 (2.8)
Primary school certificate	54 (16.7)
Illiterate	252(77.8)

A total of 324 subjects ranging from 60 years and above participated in the study with mean age 70.84. Females represented 54% of the study. 22.2% of the participants were widow and 8.3% were widower. 77.8% of the total elderlies were illiterate and 288 (88.9%) study subjects were living in joint families. Majority of the elderly (49.4%) were in the 60-69 years age-group(Table 1). Around 85% of the elderly were farmers.The overall mean (SD) score of QOL was found to be poor, 39.35 ± 11.26. Mean score for environmental domains was the lowest followed by social relationship domain as compared to psychological and physical domains (Table 2). Analysis of variance (ANOVA) was done for socio demographic variables and QOL scores. Among the age groups, 80 years and above had poor QOL as compared to the other two age groups. Females had lower QOL as compared to male and among the marital status group there was no significant difference between the groups as shown in table 3 and table 4.

Discussion

Our study highlighted that overall QOL is poor while environmental domain of QOL showed the lowest score followed by social relationship. This may be due to the roads and transportation problem in hilly rural area. Majority of the elderly were suffering from non-communicable diseases and had a lot of difficulty to perform their daily activities or fetch health support. This study has also revealed a low social relationships domain score which may be due to reduced interactions with their children and grandchildren as majority of the children do not want to adopt farming as their primary profession and so they go to town for jobs which leads to communication gap between them as they do not have time. Whereas in the study done by Syed Q et al they revealed that that majority (68.2%)of elderly had good quality of life whereas only 0.9% had poor and further it was better in males in physical, psychological, social and environmental domains.[9]

Compared to previous studies done in rural area, the current study showed low overall quality of life of elderly people which may be because of chances of selection bias in previous studies which were conducted in Primary health centres (PHC) and therefore only those elderly who are physically independent could walk up to the PHC. A previous study on quality of life in the geriatric population at Wardha, Maharashtra had reported that elders living in rural community had a significantly lower level of QOL in social relationship domain (55.9±2.7) and environmental domain (57.1±3.2) than urban population[10.]

Our study found that age influence the QOL score as older age-group had lesser QOL score.[6]Similarly, we found that education status, type of family and marital status had an influence on the QOL score. Older adults who are with higher levels of schooling had better perceptions of their QOL.There was no significant difference in the QOL scores of caste and religion variables. As per the present study male subjects had a higher mean score in all four domains of QOL compared to female subjects. However, statistically significant difference was observed only for the psychological domain. Barua A et al in their study on Quality of Life (QOL) among geriatric subjects in Karnataka using WHOQOL- BREF had also reported almost similar mean scores for male and female in all four domains without any statistical difference.[11]

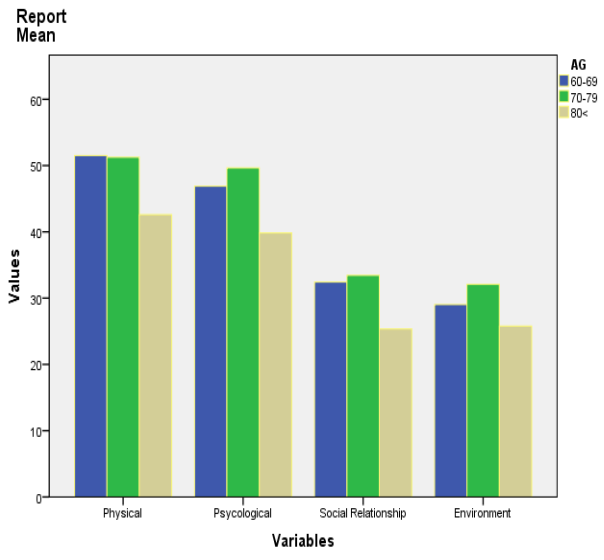
Table 2: WHOQOL-BREF scores

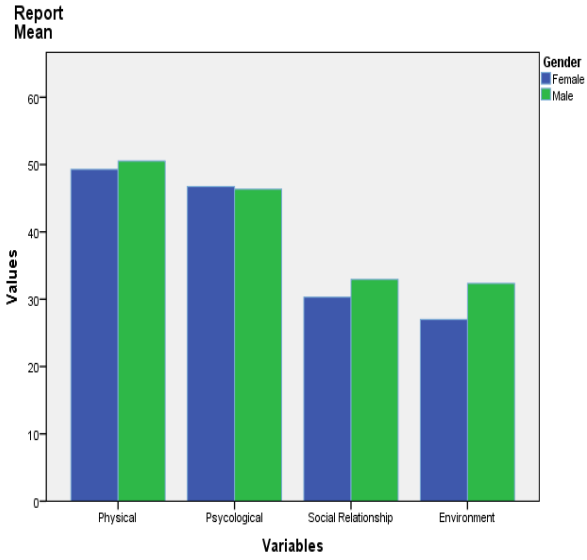
Domains	Mean	Std. Deviation
Physical	49.85	11.862
Psychological	46.55	12.525
Social Relationship	31.52	14.747
Environment	29.46	16.026
Total Score	39.35	11.264

Table 3: Sociodemographic variables and QOL scores

		Mean	Std. Deviation	Source of Variation	df	Mean Square	F	Sig.
Age Group	60-69	39.99	11.75	Between	2	1286.15	10.748	0.000
	70-79	41.54	11.26	Within	321	119.662		
	80<	33.44	7.37					
Gender	Male	40.5	11.24	Between	1	361.532	2.866	0.091
	Female	38.38	11.23	Within	322	126.156		
Religion	Hindu	40.04	11.44	Between	2	136.27	1.068	0.345
	Buddhist	37.7	11.18	Within	319	127.605		
	Christian	39.28	11.08					
Caste	Schedule Caste	39.88	8.13	Between	3	188.355	1.488	0.218
	Schedule Tribe	38.09	11.85	Within	319	126.615		
	Other Backward Class	38.35	10.79					
	General	41.06	11.9					
Marital Status	Married	39.1	11.09	Between	3	17.239	0.135	0.939
	Widow	39.72	11.44	Within	320	127.913		
	Widower	40.15	10.75					
	Unmarried	40.67	19.13					

Table 4: Bar graph of QOL domain score with age group and gender





Conclusion

The overall Quality of Life (QOL) of the elderly was poor in rural areas of East Sikkim, environmental domains with least QOL score followed by social relationships, psychological and physical domains. Environmental barriers can be minimized by improving the transportation accessibility, mobile health care units and elderly friendly public areas which will help in improvement of environmental domain. Peer group recreational activities and social interactions with the elderly are to be implied so that it builds their self-confidence and thereby improve their QOL. Health education and awareness to support elderly in all four domains for a superior quality of life is important. Empowerment of the elderly with respect to improve the degree of independence which will help in increase of psychological domain of QOL as their dependency minimizes. Further, proper trainings and awareness should be given to the government, policy makers and other stakeholders to implement adequate geriatric medical services, improve quality of life and provide psycho-social support to every old age people. Thus, helping every old age people to maintain or improve a functional independent quality of life. Further analytical studies can be done which will help in understanding the association of factors influencing QOL score.

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IMPROVING HIV AIDS SURVEILLANCE SYSTEM IN GUNUNGKIDUL, INDONESIA: FROM PAPER TO WEB-BASED INFORMATION SYSTEM

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Abstract: Despite the availability of web-based HIV/AIDS information system launched by ministry of health (MoH) in 2012, the HIV surveillance data in Gunungkidul district was still collected manually. This often led to incomplete and inaccurate HIV reports. This study aimed to improve HIV/AIDS surveillance in Gunungkidul. This was a two phases study with the first phase was evaluation of the system and followed by improvement of the HIV/AIDS surveillance system. Participants were the district health office (DHO) and public health centers (PHC) surveillance officers. Data were collected using structured interviews. We found VCT/PITC data had not been documented during 2015 in DHO and web-based information system was not used by PHCs because 77% of the surveillance officers were never been trained. In 2016, after the intervention, 77% of the PHC sent VCT/PITC data using web-based information system. Based on the evaluation findings, we trained 30 PHC officers to use web-based HIV/AIDS information system and developed instruction manual. The report showed that during 2016, the number of people tested for HIV was 1768 people including 1536 pregnant women and 19 tuberculosis patients, and 139 people were referred to advanced counseling. Use of web-based information system was able to increase the completeness of VCT/PITC data. DHO should monitor closely the implementation of web-based information system and provide supportive supervision to the PHCs.

Keywords: Surveillance System, HIV/AIDS, Web-based Information System

Introduction

HIV/AIDS becomes a public health issue globally. At the end of 2014, there are about 36.9 million people living with HIV AIDS around the world, with 1.2 million people died from HIV and 2 million people newly infected with HIV (World Health Organization [WHO] 2016). In Indonesia, the reported number of HIV infections was 219,036 people, with the cumulative number of AIDS was 82,968 people, and 14,279 people died in 2016. The estimated AIDS prevalence was 28.3 per 100,000 population in Indonesia and 32.5 per 100,000 population in Yogyakarta Province (Ministry of Health of Indonesia, 2016).

HIV AIDS surveillance system is designed to provide data and information for decision-making. First generation surveillance relied solely on data on AIDS cases and some sentinel studies on HIV prevalence. In 2000, a new strategy named second generation surveillance (SGS) was promoted to tailor surveillance systems to the epidemic state of a country and the main component of SGS is HIV and AIDS case and mortality reporting (World Health Organization [WHO] 2013). Most of this health reporting has been

dominated by paper-based data collection and storage systems that tend to generate incomplete and inaccurate reports (Garrib *et al*. 2008; Makombe *et al*. 2008)

In 2011, the national HIV program developed an application of web-based HIV/AIDS and STDs surveillance system for HIV and AIDS case and mortality reporting. This application had launched nationally in 2012 (Ministry of Health of Indonesia, 2012). But until 2015, data related to HIV AIDS were still collected manually in Gunungkidul District despite the available web-based HIV AIDS information system has launched by MoH since 2012 (Isfandyari & Langi, 2016).

Because of that reasons, a study was conducted to evaluate HIV AIDS surveillance system and to improve HIV AIDS surveillance system in Gunungkidul 2016

Method

This was a descriptive study with evaluation and intervention of HIV AIDS surveillance system.

Evaluation method

The evaluation conducted from May until July 2016. Participants of evaluation were 31 respondents consisted of surveillance officers from Gunungkidul District Health Office and 30 Public Health Centers. Primary data was collected by interview using structured questionnaires and secondary data obtained from HIV AIDS case report of Gunungkidul DHO by 2015. Evaluation variables were reporting function, supporting function, seven attributes of surveillance system such as simplicity, flexibility, data quality, acceptability, representativeness, timeliness, and stability. Data were analyzed descriptively to assess the performance of HIV AIDS surveillance.

Intervention method

The intervention conducted after the evaluation from August until December 2016. The intervention focused on reporting function as the main component of a surveillance system based on the guideline of the second generation of HIV surveillance. The participants for intervention were 30 PHCs surveillance officers. Methods of the intervention were training using the web-based HIV AIDS information system and developing a short guideline book for the PHCs officers. Training began with installing the application to all surveillance officers' laptop in a one-day meeting. The training was conducted during three days. Ten surveillance officers were trained using the HIVAIDS web-based information system each day in Gungungkidul DHO. All surveillance officers got guideline book after the training. The contents of the book are a glance about HIV AIDS surveillance system, a short report of the current situation of HIV AIDS in Gunungkidul, a manual way to install the software application, and the way to do data entry for individual forms of VCT/PITC using the web-based information system.

Result

1. Respondent Characteristics
   There are 31 respondents of evaluation of HIV AIDS surveillance system in Gunungkidul in 2015. The characteristics of the respondent are shown by Table 1.

Table 1. Respondent Characteristics of Evaluation of HIV AIDS Surveillance System in Gunungkidul, Indonesia, 2015.

Respondent Characteristics	Total (n=31)	
	n	%
Age (Average ± SD) 40 years (±7.7 years)		
Age group		
21-30 years	5	16.13
31-40 years	11	35.48
41-50 years	14	45.16
≥ 51 years	1	3.23
Sex		
Male	14	45.16
Female	17	54.84
Education level		
< Bachelor (Diploma)	25	80.64
≥ Bachelor	6	19.36
Length of work (Average ± SD) 3 years (±2 years)		

Table 1 shows the average of respondents' age was 40 years old. Respondents were dominated by 41-50 age group (45.16%) and female (54.16%). Most of the respondents graduated from diploma worked in the average of 3 years.

2. Result of Evaluation

Reporting function

In 2015, data related to HIV AIDS were collected manually (paper-based). We found that VCT/PITC data had not been documented in Gunungkidul DHO. From the interviews, some PHCs stated that they did VCT/PITC procedure but did not fill the individual forms. In addition, some PHCs did VCT/PTC procedure with the individual forms and send the forms to Gunungkidul DHO. But when the evaluation carried out, there was no VCT/PITC data in Gunungkidul. As the result, there were no data related to HIV screening on pregnant women or TB patients in 2015. Interviews showed that there was no cooperation between PHCs officers who had a responsibility in HIV AIDS, tuberculosis and Maternal and Child Health (MCH). There were 214 HIV AIDS cases in Gunungkidul District from 2006 until 2015. Most of HIV AIDS cases in Gunungkidul was reported from Wonosari Hospital (44,86) only five cases (2.33%) were found through Public Health Centers. The source of case reporting is shown in Table 2.

Table 2. Source of HIV AIDS Case Reporting in Gunungkidul District, 2006-2015

Source of HIV AIDS Case Reporting	District/Cities	n	%
Wonosari Hospital	Gunungkidul	96	44,86
Sardjito Hospital	Sleman	37	17,29
Bethesda Hospital	Yogyakarta	23	10,75
Lung Clinic	Yogyakarta	11	5,14
Panti Rapih Hospital	Sleman	10	4,67
Panembahan Senopati Hospital	Bantul	9	4,20
Gedongtengen PHC	Yogyakarta	7	3,27

Muhamadya Hospital	Yogyakarta	2	0.93
Respira Hospital	Bantul	5	2,33
Tanjungsari PHC	Gunungkidul	3	1,40
Patuk I PHC	Gunungkidul	2	0,93
Grasia Hospital	Sleman	2	0,93
Parahita Laboratory	Yogyakarta	2	0,93
Umbulharjo I PHC	Yogyakarta	1	0,47
Prodia Laboratory	Yogyakarta	1	0,47
Mantrijeron PHC	Yogyakarta	1	0,47
Darmais Hospital	Jakarta	1	0,47
Unknown		1	0,47
Total		214	100

Table 2 shows that half of HIV AIDS cases in Gunungkidul District are reported by health facilities outside Gunungkidul District.

- Supporting function

The supporting function such as supporting facilities and trained human resources for HIV AIDS surveillance system in Gunungkidul District can be seen in Figure 1.

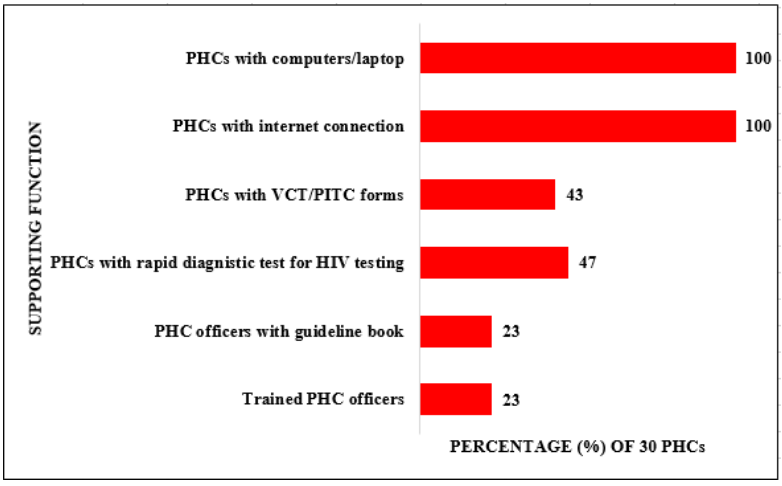

Figure 1. Supporting Function for HIV AIDS Surveillance System in Gunungkidul District 2015

In 2015, seven from 30 PHC surveillance officers (23%) who got training for using web-based HIV AIDS information system and had the guideline book of HIV surveillance system, 14 of 30 PHCs (47%) had rapid diagnostic test for HIV testing and 13 of 30 (43%) PHCs had VCT/PITC forms. All PHCs had an internet connection and computer/laptop.

- Atributes of surveillance system

Simplicity

HIV AIDS surveillance system in Gunungkidul 2015 did not meet the simplicity attribute because most PHC surveillance officers did not understand the main activities of the surveillance system. Most of the PHCs did not give HIV AIDS reports to Gunungkidul DHO especially VCT/PITC data.

Flexibility

HIV AIDS surveillance system in Gunungkidul 2015 did not meet the flexibility attribute because data were still reported with paper-based even though there was a web-based HIV AIDS information system launched nationally since 2012.

Data quality

HIV AIDS surveillance system in Gunungkidul 2015 did not meet the attribute of data quality because there was no VCT/PITC data documented in Gunungkidul DHO in 2015.

Acceptability

HIV AIDS surveillance system in Gunungkidul 2015 did not meet the acceptability attribute. Based on the results of interviews with PHC surveillance officers, it was known that there was the lack of initiatives of key populations to get HIV AIDS testing in PHCs or mobile VCT.

Representativeness

HIV AIDS surveillance system in Gunungkidul 2015 did not meet the attribute of representativeness. Most PHC surveillance officers stated that that HIV AIDS cases found in 2015 were smaller than estimated cases of HIV AIDS in Gunungkidul.

Timeliness

HIV AIDS surveillance system in Gunungkidul 2015 did not meet the attribute of timeliness because most of HIV AIDS cases were delayed to find. There were 63% HIV AIDS cases in Gunungkidul found at the stage of AIDS.

Stability

HIV AIDS surveillance system in Gunungkidul 2015 did not meet the attribute of stability because there were inadequate supporting facilities for program related to HIV AIDS surveillance system in Gunungkidul 2015 and there is no local government regulation to straighten the surveillance activities.

3. Result of Intervention

- Data reporting

After the intervention, at the end of 2016, We found that 23 of 30 PHCs used the web-based HIV AIDS information system for reporting VCT/PITC data. They used the application to report data of people who got HIV testing from January until December 2016 that can be seen in Table 3.

From the application, we found 1768 people had HIV testing and most of them were female (97.11). There were 139 people who referred to the advance counseling for getting the second or the third HIV test to confirm the HIV diagnosis or for getting HIV treatment. There were 1536 pregnant women and 19 Tb patients who got HIV testing during 2016. Data can be directly accessed online using the application by District health office, Province Health Office and Ministry of Health of Indonesia.

Table 3. Monthly Report of VCT/PITC Data from Public Health Center Using Web-based HIV AIDS Information System during 2016.

Public Health Centers	Jan	Feb	Mar	Apr	May	Jun	Jul	Agt	Sep	Oct	Nov	Dec
Panggang I	√	√	√	√	√	-	-	-	-	-	-	-
Panggang II	√	√	√	√	√	√	√	√	√	√	-	-
Purwosari	√	√	-	-	√	√	√	√	-	-	-	-
Palyan	-	-	-	-	-	-	-	-	-	-	-	-
Saptosari	√	√	√	√	√	√	√	√	√	√	√	√
Tepus I	√	√	√	√	√	-	√	√	√	√	-	-
Tepus II	-	-	-	-	-	-	-	-	-	√	√	-
Tanjungsari	-	-	-	√	√	√	√	√	√	√	√	√
Rongkop	-	-	-	√	√	-	-	-	-	-	-	-
Girisubo	√	√	√	√	√	√	√	√	√	√	-	-
Semanu I	-	-	-	-	-	-	-	-	-	√	√	-
Semanu II	-	-	-	-	-	-	-	-	-	-	-	-
Ponjong I	-	-	-	-	-	-	-	-	-	-	-	-
Ponjong II	-	-	-	-	-	-	-	-	-	-	-	-
Karangmojo I	-	-	-	-	-	-	-	-	-	√	√	√
Karangmojo II	-	-	√	-	-	-	-	-	-	-	-	-
Wonosari I	√	√	√	-	√	√	√	√	√	√	√	√
Wonosari II	-	-	-	-	-	-	-	-	-	√	-	-
Playen I	√	√	√	√	√	-	√	√	-	-	-	-
Playen II	√	√	-	-	√	√	√	√	√	√	√	√
Patuk I	-	-	-	-	-	-	-	√	√	√	√	-
Patuk II	-	-	-	-	-	-	-	-	-	-	-	-
Gedangsari I	-	-	-	-	-	-	-	-	-	-	-	-
Gedangsari II	-	-	√	√	√	-	-	-	-	-	-	-
Nglipar I	√	√	√	√	√	√	√	√	√	√	√	√
Nglipar II	√	√	√	√	√	√	√	√	√	√	-	-
Ngawen I	√	√	√	√	√	√	√	√	√	√	√	√
Ngawen II	√	√	√	√	√	√	√	√	√	√	√	-
Semin I	-	√	-	-	√	√	√	√	-	√	√	-
Semin II	-	-	-	-	-	-	-	-	-	-	-	-

- Supporting Function

Supporting function for HIV AIDS surveillance system in Gunungkidul District in 2016 can be seen in Figure 2 which shows the comparison of supporting facilities and trained human resources before and after the intervention of surveillance system in Gunungkidul. After the intervention, all PHCs (100%) had trained officers for using web-based HIV AIDS information system with the guideline book, had the rapid diagnostic test for HIV testing, and had VCT/PITC forms.

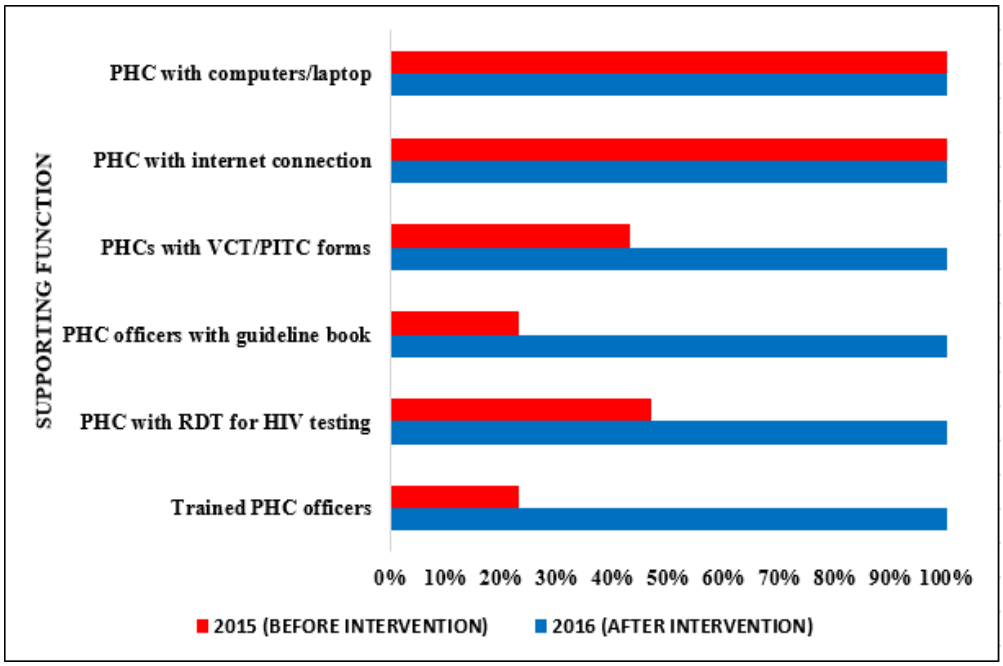

Figure 2. Comparison of Supporting Function Before and After Intervention of HIV AIDS Surveillance System in Gunungkidul District.

Discussion

WHO (2006) defined evaluation as the periodic assessment of the relevance, effectiveness, and impact of activities in the light of the objectives of the surveillance and response systems. The evaluation shows the weakness of HIV AIDS surveillance system in Gunungkidul during 2015, especially in reporting function. HIV AIDS surveillance system in Gunungkidul in 2015 did not meet the attributes of simplicity, flexibility, data quality, acceptability, representativeness, timeliness, and stability. Factors contributing to the weakness of the HIV surveillance system consisted of inadequate facilities (especially guideline book, rapid diagnostic test for HIV testing and VCT/PITC form), lack of trained human resources, and lack of cooperation with other health programs. When data collected with paper-based in 2015, there was no VCT/PITC data documented in Gunungkidul DHO. The previous study showed the continued use of paper-based systems contributes to poor data quality in terms of reliability, availability, timeliness, and completeness of reporting, and compromises health service delivery (Garrib *et al*. 2008; Makombe *et al*. 2008).

After the interventions were given to all surveillance officers in PHCs, VCT/PITC data was documented in Gunungkidul DHO at the end of 2016. Most PHCs used the web-based HIV AIDS information system for reporting VCT/PITC data from January until December 2016. The previous study showed the rapid development of internet technology has changed the way that expert systems can be developed to support data reporting (Duan *et al*. 2005). Haskew *et al*. (2015) described the benefit of using electronic medical record compared to the existing paper record. The study showed that implementation of the cloud-based electronic medical record (EMR) was associated with a significant reduction in missing data. The cloud-based EMR model enables data to be shared across multiple sites in real-time, potentially enhancing access to data at different levels of care. Similar results were also found in this study that showed data can be directly accessed online using the web-based HIV AIDS information system by District health office, Province Health Office and Ministry of Health of Indonesia with their own username and password.

Interviewed with HIV AIDS programmer in Gunungkidul DHO showed that successful intervention or the good results of the intervention was strongly supported by adequate facilities on HIV AIDS program in Gunungkidul in 2016 such as the availability of rapid diagnostic test, VCT/PITC forms, computers/laptop and

good internet connections in all PHCs. The facilities were supported by adequate funding from Global Fund. Gunungkidul DHO has accepted the additional budget for HIV AIDS program from the Global Fund since early 2016. Muhaise & Ejiri (2016) had similar findings that showed the salient success factors for the District Health Information Software Version 2 (DHIS2) for the greater Bushenyi Districts Uganda in the developing country context is the resource supply that involves the supply of computers and modems, electricity/source of power and internet.

There were some obstacles when giving interventions. Some computers were difficult to be installed by the software application and some PHCs officers asked for assistance to DHO in reporting VCT/PITC data using the web-based information system. They did not input the data independently even though they had the guideline book. However, this application entirely depends on the need of internet connection for data reporting.

Conclusion

Inadequate facilities, untrained human resources and no collaboration with other health programs hampered HIV AIDS surveillance system. Manual reporting was an obstacle in documenting HIV AIDS related data (VCT/PITC) in Gunungkidul DHO. Overall, the use of web-based HIV AIDS information system was able to increase the completeness of VCT/PITC data. Gunungkidul DHO should closely monitor the implementation of web-based HIV AIDS information system by providing supportive supervision to all PHCs, should train the new PHC officers and ensure the availability of the facilities especially rapid diagnostic test (RDT) and VCT/PITC forms in all PHCs.

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EVALUATION OF IRON SUPPLEMENTATION PROGRAM FOR PREGNANT WOMEN IN GUNUNGKIDUL, INDONESIA, 2015

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Abstract: Iron supplementation program aims to prevent anemia during pregnancy. Anemia among pregnant women is a risk of miscarriage, premature birth, low birth weight (LBW) and postpartum hemorrhage. The anemia prevalence in Gunungkidul increased from 14.97% in 2014 to 21.88% in 2015. This study aimed to evaluate iron supplementation program for pregnant women in Gunungkidul in 2015. This was a descriptive study involving staff from 30 Public Health Centers (PHC) and Gunungkidul District Health Office (DHO). Data on program resources, planning, implementation and monitoring evaluation were collected using structured questionnaires and checklist sheets. Data on program coverage and anemia prevalence were taken from DHO's reports. There was 62 staff (midwives and nutritionist) working in the program. The number of the estimated pregnant women and iron supplementation needed were calculated at DHO level. Iron supplementation administration was conducted at PHC level, involving midwives, nutritionists, and pharmacists. Iron supplementation coverage was 88.77%, however, the prevalence of anemia was high (21.88%). Furthermore, most midwives and nutritionist could not ascertain whether the administered iron supplementation was actually consumed by pregnant women. Iron supplementation program in Gunungkidul District needs to put efforts to ascertain treatment adherence.

Keywords: Program Evaluation, Iron Supplementation, Anemia, Pregnant Women

Introduction

Anemia is a global public health problem affects one-quarter of the world's population and is concentrated in preschool-aged children and women. Data from World Health Organization of Vitamin and Mineral Nutrition Information System 1993–2005 estimated 42% of pregnant women with anemia worldwide and caused 115,000 maternal deaths per year globally (McLean *et al.* 2009). In Asia, anemia is the second-highest cause of maternal mortality (Sanghvi *et al.* 2010). Anemia among pregnant women is still one of public health problem particularly in developing countries and anemia is still the main nutritional problem during pregnancy in Indonesia that mostly caused by iron deficiency (Ministry of Health of Indonesia, 2015).

Anemia in pregnancy is defined as hemoglobin levels of < 11 g/dl and caused by several conditions such as iron, folate acid, vitamin B12 and vitamin A deficiencies, chronic inflammation, parasitic infections, and inherited disorders (World Health Organization [WHO] 2011). Anemia is the risk of miscarriage, premature birth, low birth weight (LBW) in pregnant women, as well as bleeding before, during and after childbirth (postpartum hemorrhage), which may lead to increase the risk of maternal and infant mortality. Anemia during pregnancy will also increase the risk of stunting in children (Zeng *et al.* 2008). Susanti, 2016). A prior

study also showed that maternal anemia will increase the risk of non-communicable diseases when the child grows up and the risk of LBW in the next generation (Kalaivani, 2009).

Iron supplementation program as a public health intervention in Indonesia has been implemented since the early 1990s as one of the efforts to address the problem of anemia during pregnancy. This is a top-down program funded by government (Ministry of Health of Indonesia, 2015). The prevalence rate of anemia during pregnancy had decreased from 50.9% in 1995 to 40% in 2001 and this was assumed as the impact of the iron supplementation program among pregnant woman in Indonesia (Atmarita, 2005). Previous studies in Indonesia also showed a significant relationship between iron tablet consumption and anemia during pregnancy (Suega, 2002; Nora, 2008; Kusumaningrum, 2010).

Anemia among pregnant women is considered as the health priority in Gunungkidul District. Anemia during pregnancy in this area increased slightly from 2013 to 2014 (14.51% to 14.97%) and then increased significantly to 21.88% in 2015. These figures exceeded were higher than the target of Gunungkidul Medium Term Development Plan in 2015 (10.5%) (Isfandyari & Langi, 2016).

This study aimed to evaluate the iron supplementation program for pregnant women in Gunungkidul District in 2015. Findings from this study will assist program manager to identify implementation bottle necks and to improve the program.

Method

This was a descriptive study which conducted from May until July 2016. This study involved Gunungkidul DHO and 30 PHCs. Study participants were 62 people. They were two programmers from Maternal and Child Health (MCH) Departement and Nutrition Departement of Gunungkidul DHO and 60 PHC officers which consisted of 30 midwives and 30 nutritionists. Data on program resources, planning, implementation and monitoring evaluation were collected using structured questionnaires and checklist sheets. Data on program coverage and anemia prevalence were taken from DHO's reports, particularly MCH & nutrition data of Gunungkidul DHO in 2015. Evaluation variables were input, process, output, and outcome. Input variable was evaluated from human resources and supporting resources. Process variable was evaluated from planning, development, implementation, until monitoring and evaluation of the program. Output variable was assessed from the coverage of iron supplementation for pregnant women in Gunungkidul in 2015 and outcome variable was assessed by the prevalence rate of anemia among pregnant women in Gunungkidul 2015. The program was evaluated by comparing all variables to the guidelines and targets.

Result

Input

Iron supplementation program in Gunungkidul consisted of 62 staff. The staff characteristics are shown in Table 1. The average of staff' age was 43 years old. Most staff were the senior (41-50 years old), female (83.87%), midwives (53.22%) who worked in the average of 12,8 years.

Table 1. Characteristics of Human Resources Related Iron Supplementation Program for Pregnant Women in Gunungkidul District, Indonesia, 2015.

Human resources	Total (n=62)	
	n	%
Age (Average ± SD) 43,42 years (±8,18 years)		
Age group		
21-30 years	6	9.68
31-40 years	15	24.19

41-50 years	28	45.16
≥ 51 years	13	20.97
Sex		
Male	10	16.13
Female	52	83.87
Education level		
D3 Midwifery	32	51.61
D3 Nutritionist	22	35.48
D4 Midwifery	1	1.61
D4 Nutritionist	1	1.61
Bachelor of Public Health	3	4.84
Bachelor of Nutrition	2	3.23
Bachelor (Non-health)	1	1.61
Profession		
Midwives	33	53.22
Nutritionist	25	40.33
Public Health Officer	3	4.84
Other	1	1.61
Length of work (Average ± SD) 12.8 years (±9.1 years)		

Table 2. Supporting Resources of Iron Supplementation Program among Pregnant Women in All Public Health Center in Gunungkidul, Indonesia, 2015

Supporting facilities	Total (n=30)	
	n	%
Guideline book	15	50
Maternal and Child Health (MCH) book	30	100
Minimum Service Standard (MSS) book	25	88.33
MCH-4 sheet (Cohort antenatal care' sheet)	30	100
MCH-10 sheet (Antenatal care registration' sheet)	27	90
Monthly report sheet	21	70
Transportation mean	27	90
Storage for iron supplementation	30	100
Telephone	30	100
Leaflet/pamphlet/brochure related program	38	93.33
Computer/laptop	20	66.67
Public Health Sub-center	30	100
Village Health Center (Poskesdes)	17	56.67
Integrated service post (Posyandu) in Indonesia	30	100

Table 2 shows supporting resources of the program. Half of all PHCs had guideline book (50%), all PHCs had facilities for recording and reporting such as MCH book for pregnant women (100%), cohort antenatal

care' sheet (100%), and most of PHCS had MSS book (88.33%), antenatal care registration' sheet (90%) and monthly report' sheet (70%). Most of the PHCs also had transportation mean (90%), education media related program such as leaflet/pamphlet or brochure (93.33%) and computer/laptop (66.67%), and all PHCs had storage for iron tablets (100%) and telephone (100%). All PHCs had Public Health Sub-center (100%) and Intragated Service Post (100%) as the places to distribute the iron tablets to pregnant women and more than half of PHCs had Village Health Center (56.67).

Process

Iron supplementation program among pregnant women is a top-down program from Ministry of Health of Indonesia. In early 2015, Gunungkidul DHO calculated the approximate amount of iron tablets needed by pregnant women during 2015. The result of this calculation was sent to Yogyakarta Province Health Office. According to their program planning, DHO was required to provide approximately 900,000 iron tablets. However, they only managed to procure approximately 650,000 iron tablets (450,000 iron tablets from the national budget and 200,000 from the local budget). Therefore, there was iron tablet stock out at the end of 2015. This was due to iron tablet stock out from the national level.

In the implementation of the program, most pregnant women obtained 30 iron tablets in the second trimester of pregnancy (43.33%) and obtained 90 iron tablets in the third trimester of pregnancy (86.66%). Midwives always checked the levels of hemoglobin (Hb) of pregnant women before the iron tablets given (93.33%) and after the total 90 iron tablets given (90%). Program implementation required the collaboration of midwives, nutritionists, and pharmacists. All midwives (100%) and most nutritionist (90%) in PHCs also gave counseling to pregnant women after giving the iron tablets. Furthermore, midwives made a record number of iron tablets given to pregnant women in MCH handbook, cohort antenatal care' sheet, and antenatal care registration' sheet.

Monitoring and evaluation of this program were integrated with other nutrition programs. Forms of monitoring were carried out during supervision to PHC to check stock iron tablets remaining and for monitoring the coverage of iron supplementation during the data validation activities. Supervisions conducted in five PHCs and data validation was performed four times during 2015.

Some respondents (38,71%) stated that there were obstacles of iron supplementation program in pregnant woman 2015. The main obstacle was non-adherence of iron tablets consumption because the taste is bitter or fishy. It also caused nausea and vomiting. Most respondents were difficult to ensure whether the iron tablets actually consumed by pregnant women or not.

Output and outcome

The output was the coverage of iron supplementation and the outcome was the prevalence rate of anemia among pregnant women in Gunungkidul in 2015. The coverage of iron supplementation for 30 tablets and total 90 tablets to pregnant women in all PHCs in Gunungkidul in 2015 can be seen in table 3.

Table 3. Coverage of Iron Supplementation Program among Pregnant Women in All Public Health Center in Gunungkidul, Indonesia, 2015

Public health center	Pregnant women	Pregnant women with iron supplementation			
		30 tablets		90 tablets	
		n	%	n	%
Panggang II	191	191	100	171	89.53
Panggang I	138	138	100	116	84.06
Purwosari	299	299	100	251	83.95
Paliyan	379	313	82.59	298	78.63

Saptosari	484	480	99.17	453	93.60
Tepus I	138	136	98.55	113	81.88
Tepus II	244	176	72.13	199	81.56
Tanjung sari	352	352	100	311	88.35
Rongkop	261	209	80.08	234	89.66
Girisubo	263	263	100	217	82.51
Semanu I	413	412	99.76	386	93.46
Semanu II	353	353	100	331	93.77
Ponjong I	423	423	100	403	95.27
Ponjong II	200	154	77.00	156	78.00
Karangmojo I	403	302	74.94	322	79.90
Karangmojo II	329	329	100	255	77.51
Wonosari I	398	298	74.87	376	94.47
Wonosari II	704	624	88.64	633	89.91
Playen I	367	367	100	338	92.10
Playen II	327	327	100	323	98.78
Patuk I	164	164	100	160	97.56
Patuk II	198	198	100	170	85.86
Gedangsari I	252	219	86.90	209	82.94
Gedangsari II	247	247	100	228	92.31
Nglipar I	182	162	89.01	154	84.62
Nglipar II	225	225	100	198	88.00
Ngawen I	275	275	100	266	96.73
Ngawen II	194	191	98.45	174	89.69
Semin I	403	403	100	345	85.61
Semin II	280	280	100	276	98.57
Gunungkidul district	9086	8510	93.66	8066	88.77

Table 3 shows that 17 of 30 PHCs had 100% coverage of iron supplementation for 30 tablets in 2015 and the coverage of iron supplementation of 30 tablets in Gunungkidul District 2015 reached 93.66%. The coverage of iron supplementation for total 90 iron tablets in Gunungkidul District in 2015 was 88.77%. Eleven of 30 PHCs had more than 90% coverage of total 90 iron tablets.

The prevalence rate of anemia among pregnant women in Gunungkidul District 2015 was 21.88%. The comparison between the output (the coverage of iron supplementation for 90 tablets) and outcome (the prevalence rate of anemia) of Iron Supplementation Program in Gunungkidul District can be seen in Figure 1.

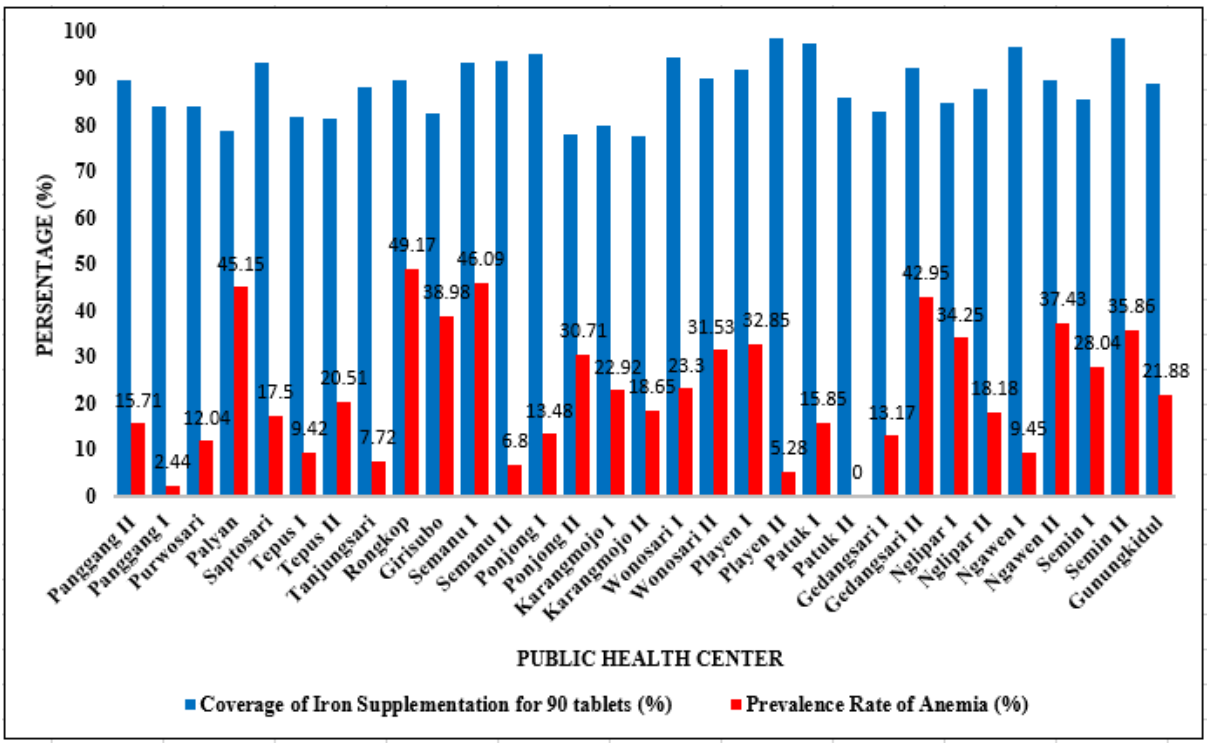

Figure 1. Output and Outcome of Iron Supplementation Program in All Public Health Centers in Gunungkidul, Indonesia, 2015.

Most of the PHCs in Gunungkidul had a high rate of anemia prevalence. Rongkop PHC (49.17%) had the highest anemia prevalence compared to the other PHCs in Gunungkidul in 2015. In another hand, Panggang I PHC (2.44%) had the lowest anemia prevalence among pregnant women. There was 0% of anemia prevalence in Patuk II PHC for they did not measure the hemoglobin concentration of pregnant women during 2015. Figure 2 shows that most PHCs in Gunungkidul District had not only good coverage of iron supplementation but also a high prevalence of anemia.

Discussion

Iron supplementation program was supported by adequate resources in Gunungkidul DHO and most of the PHCs. When there was no stock of iron tablets in DHO at the end of 2015, some PHCs provided the iron tablets using PHC own budget. The output showed the good coverage of iron supplementation both 30 tablets and total 90 tablets in Gunungkidul District. The numbers exceeded the target of minimum service standards of Gunungkidul DHO (90% for 30 iron tablets and 82% for 90 iron tablets). In another hand, outcome showed the high prevalence of anemia among pregnant women in Gunungkidul District in 2015. This number had exceeded the minimum targets of Local Government Medium-term Development Plans (10,5%) and District Health Office (DHO) (15%) in 2015. This study indicated that the good coverage of iron supplementation was not followed by the low anemia prevalence among pregnant women in Gunungkidul District in 2015.

Interviews showed most midwives and nutritionists could not ascertain whether the iron supplementations actually consumed by pregnant women or not. They stated that most pregnant women did not like the taste of the iron tablets because it tasted bitter, fishy, and then caused nausea and vomiting. The interviews also showed that the implementation of iron supplementation was not timely as the guidelines. According to the guideline, the 30 iron tables should be given to pregnant women during the first trimester of pregnancy because of hemoglobin levels in pregnant women decreased in the first trimester (Ministry of Health of

Indonesia, 2015). But most midwives gave the 30 iron tablets at the second trimester of pregnancy. When there was no stock of iron tablets in DHO at the end of 2015, some PHCs provided the iron tablets using PHC own budget.

These findings are in contrast with the previous study that showed iron supplementation during pregnancy was effective to prevent maternal anemia (Peña-Rosas *et al*. 2012). A study in Yogyakarta City showed the iron supplementation for pregnant women was not effective to reduce the anemia prevalence in pregnancy because of the low coverage of iron supplementation in the last five years (Maitri *et al*. 2017). Other study showed that the adherence of iron tablet consumption was the most important factor affecting anemia during pregnancy (Ar & Rahmah, 2010). Direct observation to monitor the administration of iron supplementation improved the adherence of iron tablets consumption among pregnant women (Bilimale *et al*. 2010). Short Message Service (SMS) reminder improved the adherence of iron consumption among pregnant women (Ermiati *et al*. 2017).

In addition, WHO showed that anemia among pregnant women can be caused not only by iron deficiency but also by other deficiencies (folate acid, vitamin B12 and vitamin A deficiencies), chronic inflammation, parasitic infections, and inherited disorders (World Health Organization [WHO] 2011). Another study also showed that food consumption of vegetables and fruits (≥ 30 times/month) was a protective factor against the iron deficiency anemia in pregnant women (Darlina, 2013). In other hands, other study showed that there was no correlation between the consumption of iron tablet with hemoglobin levels (Wara, 2006).

Limitations of this study were not involving the pregnant women as respondents of evaluation.

Conclusion

Input, process and output variables showed a good program performance but outcome indicator showed a high rate of anemia. High coverage of iron supplementation was not followed by the low prevalence of anemia among pregnant women in Gunungkidul District in 2015. Efforts are needed to be put on ensuring the adherence of pregnant women to take all the administered iron supplements. Direct observation of iron tablets consumption during pregnancy should be done. A text message can be used to remind the iron tablet consumption to pregnant women, DHO needs to ensure the iron supply through better logistic planning & budgeting, the guideline books should be distributed to all Health Centers and further researches are needed to analyze the iron consumptions adherence and factors associated with anemia in Gunungkidul.

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EVALUATING BIOSTATISTICAL COMPETENCIES FOR MEDICAL STUDENT: THE BENEFITS OF A BIOSTATISTICS CENTRE DEVELOPMENT

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Abstract: Biostatistics represents a critical methodological skill for medical and health researchers, as statistical methods are increasingly a important part of medical and health research. The need for medical and health researchers to understand the process of statistical investigations and be able to plan statistical inquiry in medical and health related decisions justifies the ongoing integration of biostatistical training into medical institution educational settings. In this respect, Faculty of Medicine University of Muhammadiyah Malang (FMUMM) initiate to develop Biostatistics Center for Medical and Health Research (BCMHR) called MEARS (Medical and Health Research Statistics) for medical student. Thus there exists a need to investigate the difference of biostatistical competencies between medical students who collaborated with MEARS in their research and the others who not collaborated with. A cross sectional study was conducted on 221 medical student in FMUMM. The study subjects were distributed questionnaire which related to the knowledge regarding the practice of biostatistics among the study subjects. The result of medical students who collaborated with MEARS were significantly higher than those who not collaborated with (p = 0,0000). This indicating the benefits of a biostatistics centre development in medical faculty that can help medical student to develop a conceptual understanding of statistical ideas and their applications.

Keywords: biostatistics, Evidence-Based Medicine, research, methodological skill

Introduction

Students in medical and health-related fields as well as medical practitioners need to understand the issues related to the process of planning a scientific study, conducting the study, analysing data and reporting the findings. Medical doctors and health-related professionals are expected to be familiar with statistical thinking and understand the process of statistical investigations. Such familiarization requires a set of knowledge, skills and attitudes in not only analysing the impact of different treatments on patients, but also in applying statistical methods to improve the efficiency and effectiveness of medical and health services. (Bazargan, A., 2006)

Biostatistics represents a critical methodological skill for medical and health researchers, as statistical methods are increasingly a important part of medical and health research. (Enders, F., 2011) This competencies are emphasized in "Standard Kompetensi Dokter Indonesia" (SKDI). In this context, improved statistical knowledge and skills are urgently required. The need for medical and health researchers to understand the process of statistical investigations and be able to plan statistical inquiry in medical and health related decisions justifies the ongoing integration of biostatistical training into medical institution educational settings. (Batra, M., Mudir, G., Subbha, S. D., and Preshant, R., 2014)

Statistics in most literature is reported to be the cause of negative perception (Sami, Waqas, 2010). It is very difficult for a medical professional to understand the statistical concept. (Wadhwa, M., Pulkit, K., and Thanveer, K., 2015) Many physicians likely have increased difficulty today because more complicated statistical methods are being reported in the medical literature. (Windish, D.M., Stephen, J.H., and Michael, L.G., 2007) In this respect, Faculty of Medicine University of Muhammadiyah Malang (FMUMM) initiate to

develop Biostatistics Center for Medical and Health Research (BCMHR) called MEARS (Medical and Health Research Statistics) to help bridging the gap between medical and health sciences researchers and the understanding of biostatistics that could justify the disinterest of medical and health sciences students. We propose that an understanding of student's knowledge about biostatistics provides important elements in the development of enhanced MEARS role in educational strategies leading to better learning outcomes. The main objective of the current study was to assess the biostatistic knowledge of medical students who have been passed the Biostatistics and research methodology module. Furthermore there exists a need to investigate the difference of biostatistical competencies between medical students who collaborated with MEARS in their research and the others who not collaborated with.

Biostatistics and research methodology are taught together in year 2 at FM UMM as a short course of 7 weeks. The objectives of this course are (1) to enable medical students to understand the language and principles of biostatistics and research methodology (2) to teach students to design their own research projects, as well as to be able to critically read and understand scientific papers in medical journals. Thus it covers basic theoretical concepts about research methodology and biostatistics along with hands-on sessions of computer application software. The software includes Statistical Package for Social Sciences (SPSS). In this module emphasis was given to the understanding of concepts rather than carrying out routine statistical computations. The module is composed of formal lectures, computer lab sessions for hands-on exercise, directed self learning sessions, and problem based learning sessions. The sequence of the topics was carefully observed so that research methodology and biostatistics were taught in a parallel manner to enhance the knowledge of the two topics. Several lecture of biostatistics was followed by a hands-on session when applicable. The hands-on sessions are to train students to do basic statistical analyses using computer software. At the end of each week of the module the students undertake a directed self-learning session. The session is a scenario of a common problem that includes topics taught in that specific week, and based on that scenario the students have to answer a number of questions that integrate knowledge of research methodology and biostatistics. Thus, in the same question there may be research methodology and statistical concepts. Problem based learning sessions are meant to integrate other basic science knowledge in the context of research methodology and biostatics.

MEARS is an approach to provide participants with opportunities to understand more deeply than in biostatistic module about the process of formulating a research problem related to a medical and health-related education system; then designing an appropriate statistical investigation to solve the problem. Furthermore, in the MEARS process, participants are provided with opportunities to get hands-on experience more than in biostatistic module in carrying out statistical investigation, including statement of the problem, data collection, data analysis and interpretation of results.

Methods

Participant

The study targeted medical students at FMUMM who have research as final assigment. A total of 221 students, 124 (56.1%) who collaborated with MEARS and 97 (43.9%) who not collaborated with, were targeted in the study.

Instrument and procedure

To develop a questionnaire for this study, the researchers initially reviewed literature pertaining to knowledge of medical students in general, as well as biostatistics in particular. The study subjects were distributed questionnaire that consisted of 20 question which related to the knowledge regarding the practice of biostatistics among the study subjects.

To measure the knowledge of medical students a scale anchored by 1 = correct answer and 0 = wrong answer was developed. The researcher felt the use of such a scale would be relatively easy, and the interpretation of

the results straightforward. As a pilot, the first draft was given to a sample of 30 students to ensure face validity, to assess comprehension of the questionnaire, and to take into consideration any comments provided by the students. The resulting questionnaire had 20 items. Participants were also requested to provide information relating to their sex.

The aim of the study was explained to the students, and they were informed that participation was voluntary and the results would remain anonymous. The questionnaire was administered in Mei 2017 after completion of their research.

Statistical analyses

Data were entered and analyzed using SPSS version 21. Categorical variables were described by frequencies and percentage, and numerical variables with mean and standard deviation. Mann Whitney-test was used to compare the mean domain score for each independent variable. Significance level was set at 0.05.

Results

Table 1 shows the mean and standard deviation of the groups.

Table 1 Characteristics of study sample

Sex	Frequency	Percent
Male	60	27,1
Female	161	72,9

Table 2 Descriptive Test Results

Groups	N	Min	Max	SD
Collaborated with MEARS	124 (56.1%)	20	65	10,92016
Not collaborated with MEARS	97 (43.9%)	5	65	10,21488

The number of participants is 221 and divided into two groups, 124 (56.1%) who collaborated with MEARS and 97 (43.9%) who not collaborated with. First group who collaborated with MEARS doing their research analysis asisstances by the doctors and statistician in MEARS. Second group, analyse their research by them selves. Table 3 Shows the mean and the result from Mann-Whitney-test.

Table 3 Achievement Test Results

Groups	Mean	Mann-Whitney test
Collaborated with MEARS	47,26	p value=0.000
Not collaborated with MEARS	40,77	

The result of medical students who collaborated with MEARS were significantly higher than those who not collaborated with (p = 0,0000). This indicating the benefits of a biostatistics centre development in medical faculty that can help medical student to develop a conceptual understanding of statistical ideas and their

applications. An American study had shown that students' early participation in research activity improve their knowledge and attitude towards research. (Miles, S., Gill, M.P., Louise, S., Le, S., and Sam, J. L.,2010)

Suggestions for improving the research policy for medical student in FM UMM to include working in conjunction with MEARS and incorporating biostatistics into Evidence-based Medicine (EBM) practise and curriculum in order to increase biostatistic competencies. Students in Health sciences faculty and other medical and health professionals also could used MEARS assistances in their analysis to enhance quality of their research.

Medical and health sciences faculty have also become home to biostatistical programs. Here the focus is often on larger clinical trials and large healthcare database settings, different from the laboratory or clinical trials related studies that often predominated in medical centers. Biostatistics as a component of a medical center setting with or without Medical and health sciences faculty reflects a web of inter-related relationships and opportunities; supporting medical center clinical research, nursing related health outcomes research, basic science research and clinical trials oriented research. (Brimacombe, M. B.,2014) This provides many opportunities for real world application as an essential component of biostatistics training that can be offered by MEARS for medical and health professionals.

The biostatistics curriculum in particular is a mixture of theory and application, reflecting the reality of modeling biological and medical phenomenon. This includes the analysis of real world datasets, which makes biostatistics and statistics somewhat unique in the mathematical world. The fitting of theorized mathematical models to data and the use of the resulting expected properties of these models for inference is the central challenge of much biostatistics. This requires exposure on the part of the student to consulting and collaboration, often with clinicians and basic scientists. This type of mentoring is a challenge but necessary to produce a quality biostatistician/researcher at the end of their studies. (Brimacombe, M. B.,2014) Working in conjunction with a statistician can be necessary too. (Huet, Beverley Adams, M. S., and Chul Ahn, PhD, 2009)

The teaching of mathematics has a long and studied history. These tend to focus on basic concepts and mostly undergraduate education. The philosophy of teaching statistics reflects similar considerations and the evaluation of various approaches to the teaching of statistics is an ongoing effort with many problems. (Sami, Waqas, 2010) In this case, Biostatistics and research methodology module in FM UMM is not enough to make medical students mastery biostatistics. Short course durations may prohibit a comprehensive explanation of the topic and may limit the students' participation and/or understanding. Lack of practical exercises and the need for contextual data collection sessions could be the major challenges faced by the students. Actions directed toward these challenges may involve spreading the module over a longer time period with increased time allotted for the module. Introducing data collection sessions and reading experts from published medical articles will provide practical experience and emphasize the role of biostatistics in health care. Other learning methods may involve the use of video films and other visual aids to clarify and reinforce a variety of statistical concepts, motivate the study of a new topic, and to make statistics an interesting and exciting subject. (Daher, A. M., and Farzana, A., 2010) With the aim of contextualize learning about Biostatistics, some new teaching initiatives has been proposed such as problem-based learning (PBL) approach, which uses cases or problems as starting points to learn about a subject and also team-based learning (TBL) which combines individual and small-groups learning in an interesting way. (Paes, Angela Tavares, 2015) Furthermore, biostatistic teaching need to apply spiral curriculum with continuing education.

Such a mixture of theory, practice and applied contextual oriented courses allows the student to blend the designing of mathematical models and their underlying optimality properties with the fitting of these models to biomedical data. Interpreting the actual import of the fitted models is often a joint exercise with both biostatistician and clinician/researcher discussing the relevance and importance of the results. In the context of medical and health areas for example, the need to be fluent in various statistical methodologies and knowledgeable in applications to health related issues is important. (Brimacombe, M. B.,2014)

We recognize several limitations of this study. First, there are no evaluation through hands-on-approach to assess student biostatistic competencies. Second, there was no comparison to the biostatistic competencies of the student at another faculty or institute in a different year. Finally, there were no open comments requested for assessing student perception of MEARS assisstance. However, such open comments require different methods of qualitative analyses.

Conclusions

Biostatistics are important subjects in the medical curriculum and are closely related to health care. Medical students should be able to understand and interpret biostatistics so that they can use these techniques both during training and most importantly at postgraduate stage when they will be treating patients. Working in conjunction with MEARS and incorporating biostatistics into Evidence-based Medicine (EBM) practice and curriculum are suggested in order to increase biostatistic competencies. The goal of MEARS assisstances is to enhance the quality of the research especially in health areas not only for medical student but also for health professional, so it could improve the efficiency and effectiveness of medical and health services.

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Appendix 1 Questionnaire to assess knowledge towards biostatistics

1. A researcher calculates the percentage of female students in a sample from a university. Unit (part) of analysis in this research are:

A. female student

B. gender

C. university

D. percentage

E. A sample

2. The General Social Survey asks respondents to rate their health whether it is categorized as excellent, good, bad and very bad. The measurement levels of the above variables are:

A. nominal

B. Ordinal

C. Interval / ratio

D. Not one of the above

E. There is no answer because the information is not enough

3. In general, ordinal-scale variables are displayed visually with:

A. Cumulative percentage

B. Pie chart

C. Bar chart

D. tabulation

E. Subset

4. There is data as follows: 0, 3, 1, 5, 1. The average obtained is:

A. 1

B. 2

C. 3

D. 5

E. Not one of the answers above

5. Based on the table below:

Tabel 1. Legalities of Cannabis by Sex (in%)

Ganja Opinion	Sex	
	Male	Female
Must Legal	38	30
Not Must Legal	62	70
Total (N)	100	100

The independent variables are:

A. Opinion on the legality of marijuana

B. man

C. gender

D. Must be legal

E. Not one of the answers above

6. Correlation is:

A. The test used to find the influence between the response variable and free

B. The test used to find the relationship between the variables with the output of correlation coefficient

C. The test used to find relationships between variables with comparison output or difference

D. The test used to find the relationship between numerical variables with numerical, numerical with categorical and categorical with categorical

E. The answers b and d are correct

7. The correlation range is:

A. -1

B. 1

C. 0 to 1

D. -1 to 1

E. Not one of the answers above

8. The relationship between smoking behavior (yes and no) with coronary heart disease (CHD) (yes and no) from 2 different sample groups including test:

A. Comparative categorical pairs

B. Pairwise numerical comparability

C. Comparative categorical unpaired

D. Comparative numerical unpaired

E. Not one of the answers above

9. Comparison of TNF alpha levels with atopic dermatitis (yes and no) from 2 different sample groups including test:

A. Comparative categorical pairs

B. Pairwise numerical comparability

C. Comparative categorical unpaired

D. Comparative numerical unpaired

E. Not one of the answers above

10. A total of 10 patients observed their HDL levels in weeks I, week II and week III to see if there was a decrease or increase. Estimated test that can be used is:

A. Comparative categorical pairs with 3 repetitions

B. Numerical comparative paired 3 times repetition

C. Comparative categorical unpaired 3 repetitions

D. Comparative numeric unpaired 3 times repetition

E. Not one of the answers above

11. The statistical tests used for the statement "patients who have high cholesterol will suffer more from hypertension" are:

A. Test t

B. Regression Analysis

C. Pearson Correlation

D. ANOVA

E. Not one of the answers above

12. Assume that two variables have a positive relationship. Which of the following regression equations describes the relationship:

A. $Y = 3.2 + 2.4 X$

B. $Y = -0.45 - 4.1 X$

C. $Y = -1.2 X$

D. $Y = -3.4 - 1.2 X$

E. Y = 0.54

13. There is a regression equation: Y = 3.21 - 6.57 X. The meaning of the equation is:

A. If 1 unit X increases then Y increases by 3.21

B. If 1 unit X increases then Y increases by 6.57

C. If 1 unit X increases then Y decreases by 3.21

D. If 1 unit X increases then Y decreases by 6.57

E. Not one of the answers above

14. The correlation value obtained from a researcher is -0.5. Which of the following statements is true?

A. The variable X describes 25% of the variable diversity of Y

B. The variable X describes -25% of the variable diversity of Y

C. The variable X describes 50% of the variable diversity of Y

D. The variable X describes -50% of the variable diversity of Y

E. The variable X describes -0.5 of the variable diversity of Y

15. One of the uses of regression analysis is:

A. To determine if change X causes a change of Y

B. To estimate Y changes in 1 unit of change X

C. Answers a and b are true

D. To see X and Y relationships

E. Not from one of the answers above

16. Chi Square test is used for:

A. Comparative numerical test paired table 2x2

B. Uncompared numerical comparative test table (> 2) x (> 2)

C. The categorical comparative test is not paired 2x2 table

D. Comparative categorical test pairwise table (> 2) x (> 2)

E. The answers c and d are correct

17. Test alternative chi square for table (> 2) x (> 2) if the condition is not fulfilled is:

A. Merging cells

B. Kruskal Wallis

C. Mann-Whitney

D. Answers a and b are true

E. All answers are correct

18. What is the minimum sample size recommended for experimental research?

A. <10

B. 10-20

C. > 20

D. Not one of the answers above.

19. A researcher wanted to know the relationship between somatic complaint score and social problem score. After the normality test obtained results that the data is not normal. What test should be used?

A. Pearson Correlation

B. Spearman Correlation

C. Chi Square

D. Contingency coefficients

E. Not one of the answers above

20. You want to know the relationship between smoking behavior (smokers and not) with the fertility status of a man (infertile and fertile). The desired output is the proportion ratio. What tests should be used?

A. Chi Square test if conditions are met

B. Fisher test if conditions are not met

C. Spearman Correlation

D. Contingency coefficient

E. Answers a and b are true

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IMPROVEMENT OF LABORATORY SERVICE QUALITY OF OUTPATIENT INSTALLATION AT SEMEN GRESIK HOSPITAL BY QUALITY FUNCTION DEPLOYMENT (QFD) METHOD

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Abstract: A Quality Assessment in a hospital is very important to be done. In 2014, the level of patients' satisfaction in the Outpatient Installation of Semen Gresik Hospital was low with an average reaching 73.75% compared with Hospital Minimum Service Standard i.e. by ≥ 90%. This research aimed to arrange a recommendation of the quality improvement of laboratory services in the Outpatient Installation of Semen Gresik Hospital with *Quality Function Deployment* (QFD) method. This research was an analytic observational research using *Cross Sectional* method in data collection. The research was conducted from April to September 2015. Respondents of this research were patients who received more than twice services at the Outpatient Installation of Semen Gresik Hospital. The final result of this research of *Quality Function Deployment* (QFD) method is House of Quality (HoQ) of Laboratory service in Outpatient Installation of Semen Gresik Hospital. The conclusion of the research was that the first priority of Customers' Needs of Laboratory service was that the result waiting time in laboratory became faster. The recommendation given was to increase supervision role, to evaluate the SOP of the result waiting time, to increase the staff competency, to optimize the existing facilities and to make laboratory direction of outpatient installation.

Keywords: Quality Function Deployment, Laboratory, Outpatient Installation, Customer Service

Introduction

A hospital is a means of public health services which has a very important role in improving public health status. On the other hand, a hospital should be able to provide satisfaction to its customers in order to survive and be able to compete with other hospitals. Azwar (1996) stated that quality is compliance with standards that have been established or in accordance with the requirements. Hospital Minimum Service Standards is a provision for a hospital issued by the Minister of Health of the Republic of Indonesia in the design of government efforts to ensure the quality of hospital services.

The Semen Gresik Hospital is a C-typed private hospital, established since 1995 and has a strategic location in JL. R.A. Kartini 280, Gresik.

Semen Gresik Hospital provides services not only to its employees and families of PT. Semen Gresik but also to employees and family of surrounding companies, insurance participants, the Gresik people and people of surrounding areas. Services provided include basic medical services, medical specialists, supporting services, as well as some subspecialty medical services.

The evaluation result of customers satisfaction of Minimum Service Standards of Outpatient Installation in 2014, based on the evaluation report of the Committee of Patients' Quality and Safety of Semen Gresik Hospital, indicates that in 2014 the customers satisfaction in the Outpatient Installation of Semen Gresik Hospital reached 73.75%, still less than Minimum Service Standards of Hospital of outpatient installation, which had been established by the Minister of Health on Permenkes RI Number 129 Year 2008 about Hospital Minimum Service Standard that is ≥ 90%.

The condition indicated that Semen Gresik Hospital, especially the Outpatient Installation is still lacking or unable to provide services as expected by the patients. Consumers will be satisfied if the reality of service received by consumers is the same with or exceeds their expectations. Satisfaction is one of service quality indicators. The better the quality of service provided to consumers, the more satisfaction that consumers will get. A satisfied customer will re-visit and will potentially be a loyal customer who will recommend to family, friends, relatives and others who need health services to come for treatment, using the services. Loyal customers will have an impact on hospital profitability.

Services that consumers demand is a service which is suitable with consumers' expectations and needs. Quality is an abstract term, which is often translated as the achievement of consumers' needs and expectations. That is why the consumers' expectation is very important in designing a service product. One of methods that can improve the service quality, regarding to consumers' needs and desires, is Quality Function Deployment (QFD).

Quality Function Deployment (QFD) is a process of determining consumers' desires ('what' consumers 'desire') and translating it into service ('how'), so that each functional area can understand and execute it (Heyzer, 2006). The fundamental idea of *Quality Function Deployment* (QFD) is to translate consumers' needs and expectations into the requirements of product or service design (Kusiak, 2007).

The purpose of this research is to arrange a recommendation for improving the quality of medical laboratory support services in the Outpatient Installation of RSSG with *Quality Function Deployment* (QFD) method

Method

This research is an observational analytic research with quantitative approach and uses cross sectional research design. The study was conducted at the Outpatient Installation of Semen Gresik Hospital in April-September 2015. The research population was divided into two groups, namely the external respondents, consisting of the customers of the internal medicine clinic at the Outpatient Installation of Semen Gresik Hospital and the internal respondents, consisting of the team of quality improvement at the Outpatient Installation of Semen Gresik Hospital.

External sample of the research were 50 respondents who were obtained by using the proportional random sampling formula with the inclusion criteria of respondents were patients who had received 2 or more services in the internal medicine clinic in the Outpatient Installation of Semen Gresik Hospital, willing to be respondents and if they were uncooperative, they could be represented by families who took them. The internal respondents were obtained from the entire quality team of Semen Gresik Hospital, amounting to 9 people.

The research variable used was the expectation and fact of the customer service towards the service of the Outpatient Installation of Semen Gresik Hospital and House of Quality. The Variable of *House of Quality* (HoQ) consisted of *Customer's Needs,* IC (*Importance to Customer*), CSP (*Customer Satisfaction Performance*), G (*Goal*), IR (*Improvement Ratio*), RW (*Raw Weight*), NRW (*Net/Normalized Raw Weight*) and Response Technique. Variables used were based on the QFD (*Quality Function Deployment)* method. The research instruments were questionnaires which had been tested for the validity and reliability on 20 respondents and had

been through the ethical study of the research instruments. The research conducted only on the supporting service of medical laboratories of the Outpatient Installation of Semen Gresik Hospital. The analysis of research data used was adapted to some stages to meet the components of each variable to produce quality houses for doctors' services and patients' registrations in the Outpatient Installation of Semen Gresik Hospital.

Results and Discussion

External respondents in the research were patients of outpatient who had come at least twice to the Semen Gresik Hospital. The characteristics of respondents were classified by age, sex, last education and occupation. The results showed that the majority of respondents were 26-35 years old (30 %). Based on sex of external respondents, there are 40% of male respondents and 60% of female respondents. High workload on the respondents has a higher risk of work accidents and higher risk of disease attack. This is because if the high workload is not matched with a good life pattern will have an impact on health. Rosjidi, et al (2014) mentioned that the female sex has a physical condition that is more susceptible to cardiovascular disease because women have high LDL and lack of physical activity.

One indicator of hospital service quality success is customer satisfaction. Kotler (2003) defines satisfaction as the level of one's feelings after comparing performance or results with expectations. Customer satisfaction depends on how far perceived product performance meets customer expectations.

The service of the hospital personnel is an interrelated and independent service system.

Patient service in the outpatient installation (internal medicine clinic) is totally related and cannot be separated with service of medical supporter, in this research is laboratory and radiology. Customers' expectation to the laboratory service with the highest value that was found in sub-service of laboratory test result can be trusted. While, the lowest value of customers' expectation was found in sub-service of result waiting time of laboratory. Before using services of Semen Gresik Hospital laboratories, the customers have already had the perception that the results of laboratory tests can be trusted, but the waiting time of laboratory results is still less rapid.

Customers' assessment to the highest value of laboratories was found in sub-service of complete and sophisticated equipment. While, customers' assessment for laboratory services with the lowest value was found in sub-service of laboratory staff submitting the results in time. Customers assessed that the fact of service provided by Semen Gresik Hospital at laboratory services is averagely met, but the customer assessed that the timing of delivering the results was still not in time.

Table 1 Expectation, Assessment of Service Fact and Customer's Needs of Outpatient Installation Laboratory Service of Semen Gresik Hospital

No	Description	Mean of Expectation (E)	Mean of Assessment (A)	Gap (A-E)	*Customer's Needs*
1	Laboratory officers submit the results in time,	3,4	3,26	-0,14	Yes
2	Waiting time for laboratory results is fast,	3,28	2,88	-0,4	Yes
3	Laboratory officers are skilled in performing the action,	3,38	3,42	0,04	No
4	The results of laboratory tests can be trusted,	3,5	3,52	0,02	No
5	Officers respect the rights and opinions of a patient in sampling to be performed on him,	3,48	3,56	0,08	No

No	Description	Mean of Expectation (E)	Mean of Assessment (A)	Gap (A-E)	*Customer's Needs*
6	The officer gives sufficient time to a patient and his family to communicate,	3,38	3,26	-0,12	No
7	Hospitality and courtesy of laboratory officers in behaving,	3,44	3,46	0,02	No
8	Laboratory officers' clothes are neat and clean, wearing identification,	3,42	3,52	0,1	No
9	Complete and sophisticated equipment,	3,46	3,56	0,1	No
10	Clean and comfortable laboratory examination room,	3,44	3,36	-0,08	Yes
11	Officers give directions on examination or action plans to be done,	3,36	3,36	0	No
12	Laboratory location guidelines are clear,	3,44	3,28	-0,16	Yes
13	Laboratory officers maintain the safety of actions or examinations performed on the patient,	3,44	3,46	0,02	No
14	Laboratory officers maintain the confidentiality of the patient's examination results,	3,48	3,52	0,04	No

Table 1 shows that, on the laboratory service, there is a difference between the expectation achievement to the laboratory service and the service fact assessment with the highest gap value that was found on the sub-service of the fast result waiting time. This result shows that patients have not been satisfied with the service given by the laboratory, so it needs a further effort to meet the needs. A gap has negative value based on the order of gap value and becomes *Customer's Needs* on the laboratory service, if 1) The waiting time of the laboratory result is fast, 2) The direction of the laboratory location is clear, 3) The laboratory officers submit the result in time, 4) The officers give a sufficient time to the patient and the family to make a communication, and 5) The laboratory examination room is clean and comfortable.

Most of the improvement ratio of the laboratory obtained in this research was on Cohen Scale 4 (*very difficult improvement*) that means it needed a very strong effort to improve. Cohen Scale 3 (*difficult improvement*) means it needed a strong effort to improve, it happened in several laboratory services.

The Improvement ratio described the weight or lightness of improvement efforts required by the organization to achieve the consumers' expectations. The magnitude was determined by the Cohen Scale, the greater the scaling value the heavier the hospital's effort to improve service. The improvement ratio was calculated based on the division results between *Goal* (G) and *Customer Satisfaction Performance* (CSP), Goal was the level of customer satisfaction that the organization wanted to achieve the expectations of the consumers. Goal was *expressed on a scale of 1 to 5. Goal in the Outpatient Registration Service obtained through the Group Discussion Forum* (GDF) with the manager and head of the unit incorporated in the Outpatient Installation of Semen Gresik Hospital Quality Team, in which the Goal magnitude was set at number 5 for all service descriptions. The magnitude of goal would affect the magnitude of the *Improvement Ratio* (IR). Hospital management believed that setting goals should be great, so that the achievement of success would be also big or meaningful. In this case, the Semen

Gresik Hospital understood that there was a very big obstacle and it needed a very hard effort to improve the service quality in Semen Gresik Hospital, especially in Outpatient Installation. The highest improvement ratio was found in sub-service of fast laboratory result waiting time. It needed a very hard effort to reach the fast laboratory result waiting time.

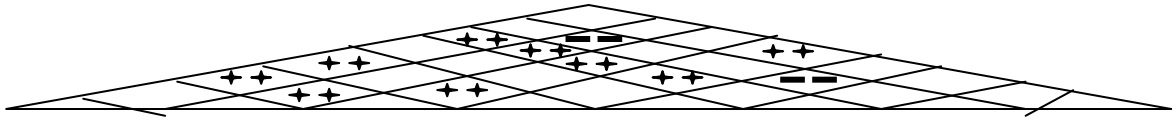
Raw Weight (RW) is the value of data obtained from the multiplication of *Importance to Customer* (IC) with *Improvement Ratio* (IR), while *Normalized Raw Weight* (NRW) is obtained from Raw Weight divided by total Raw Weight on the service. The greater the customer expectation towards a problem the greater weight of the problem will be. The largest net weight or *Normalized Raw Weight* (NRW) in laboratory service research was found in sub-service of fast laboratory result waiting time.

To arrange a *House of Quality* (HoQ) matrix, a technical response arrangement, strong technical response relationships with customer needs (relationships) and technical correlation relationships were required. The arrangement of the technical response of the laboratory services at Semen Gresik Hospital were 1) Optimizing the implementation of *Laboratory Information System* (LIS), 2) evaluating the implementation of the *SOP*, 3) Skill Training, 4) Optimizing the use of laboratory equipment, 5) improving the supervision role, 6) the addition of laboratory officers, 7) The making of direction to Outpatient Installation, and 8) The target of equipment time reparation.

The *Quality Function Deployment* (QFD) method was as a process or structured mechanism for determining customer needs and translating it into relevant technical needs, in which each functional area and level of organization could understand and act. The starting point of *Quality Function Deployment* (QFD) was the customer, as well as knowing the expectations and needs of that customer. From the matrix of *Quality Function Deployment* (QFD) that had been prepared, there was a relationship between Customer's Needs and technical response to the laboratory services in Semen Gresik Hospital with the largest percentage was in a strong relationship, and then followed by a medium and weak relationship. With so many strong and medium relationships, it showed that the technical response being composed was able to answer or meet Customers' Needs.

The roof of the House of Quality matrix is a technical correlation. Laboratory services have 11 relationships and most are strong positive relationships. This means inter-technical responses are mutually supportive. By knowing the technical response that supports and contradicts with other components, it is also known which resources can be used for various functions in an effort to meet customer's needs required by the customer.

HOUSE OF QUALITY OF LABORATORY SERVICE



Picture 1 House of Quality of Laboratory Service

No	Technical Response / *Customer's Needs*	Optimizing the implementation of LIS		Evaluating the implementation of SOP		Improving the officer's competence		Optimizing the use of laboratory equipment		Improving the supervision role		Adding the number of laboratory officers		The making of the direction of Outpatient Installation Laboratory		The target of equipment time reparation		IC	CSP	IR	RW	NRW	Prioritas CN
		A	A*n	B	B*n	C	C*n	D	D*n	E	E*n	F	F*n	G	G*n	H	H*n						
1	Officer submit the result in time	8,44	1,66	6,78	1,33	7,22	1,42	6,78	1,33	5,56	1,09	5,89	1,16	1,67	0,33	6,00	1,18	3,4	3,26	1,53	0,45	0,197	II
2	Result waiting time is fast	6,89	1,59	6,22	1,44	7,44	1,72	7,22	1,67	6,67	1,54	6,78	1,56	1,67	0,38	6,67	1,54	3,28	2,88	1,74	0,53	0,231	I
3	Communication time of patient and family is sufficient	5,89	1,12	6,56	1,25	6,22	1,19	4,56	0,87	5,89	1,12	5,67	1,08	1,11	0,21	2,22	0,42	3,38	3,26	1,48	0,44	0,191	IV
4	Laboratory examination room is clean and comfortable	2,33	0,44	5,67	1,07	3,44	0,65	3,44	0,65	6,44	1,22	4,56	0,86	1,00	0,19	1,89	0,36	3,44	3,36	1,49	0,43	0,189	V

5	Direction to the laboratory is clear	0,67	0,13	2,44	0,47	0,78	0,15	1,33	0,26	3,11	0,60	1,78	0,34	7,67	1,48	0,89	0,17	3,44	3,28	1,52	0,44	0,193	III
	Total of *Relationship*		4,94		5,56		5,13		4,78		5,57		5,01		2,59		3,67						
	Percentage		13,3		14,9		13,8		12,8		15,0		13,4		7,0		9,9						
	Technical Response Priority		V		II		III		VI		I		IV		VIII		VII						

A, B, C, D, E, F, G, H = Strong Value of Customer's Needs and technical response relationship *n = NRW*

The house of quality matrix arranged shows that the priority scale of customer's needs in laboratory services is shown in the dimension of framework of time, which is the fast laboratory result waiting time. It is based on the greatest net worth of weight. The bigger the negative gap between expectation and the assessment of fact customer service on a problem the greater the weight of the problem, and set as the problem priority, since the customer becomes more dissatisfied. The order of priority scale of customer's needs in laboratory services is 1) fast laboratory result waiting time; 2) laboratory officers submit results in time; 3) direction of laboratory location is clear; 4) the officer gives sufficient time to patient and family to communicate; 5) Laboratory examination room is clean and comfortable.

The priority scale of technical response is the key of *Quality Function Deployment* (QFD). This scale lies at the foundation of the House of Quality matrix and describes the relative contribution of the technical response to overall customer satisfaction. The priority scale of the technical response is obtained by summing the result of the multiplication value of the relationship value between the technical response and the net weight of the problem on the customer needs required by the customer. The division result of a technical response to the total value of all technical responses is then multiplied by 100%. The priority is the percentage rank of the management technical response (Cohen, 1995).

The priority of technical response to solve customer needs is 1) increasing the supervision role, 2) evaluating the implementation of SOP, 3) skill training, 4) addition of laboratory officer, 5) optimizing the implementation of *Laboratory Information System* (LIS), 6) optimizing the use of laboratory equipment, 7) Target of repairing equipment, 8) making direction of Outpatient Installation laboratory location.

The result of Focus Group Discussion which was attended by Quality Team of Semen Gresik Hospital as many as 9 people were 1) Improving the role of supervision (customer service) that was delivering information to the patient about the hours of laboratory service result, 2) evaluating the SOP of result waiting time, 3) improving the competence of the officer by dispatching 1 (one) officer to the phlebotomy training, 4) optimizing existing facilities such as *Laboratory Information System* (LIS) and optimizing the use of existing equipment in the laboratory; and 5) making direction of Outpatient Installation laboratory location

Conclusion

The customer need that was immediately met by Semen Gresik Hospital in laboratory services was the fast laboratory result waiting time. Recommendations generated based on FGD and the researcher's study on laboratory services are 1) Placing supervision in the laboratory today as customer services in medical support (laboratory), which will help convey information to the patient about the hours of laboratory service result to avoid miscommunication, 2) Conducting weekly evaluation of laboratory result waiting time, 3) Dispatching a laboratory officer to participate in phlebotomy training, 4) Making a time limit with the information system division about the time of completion of *Laboratory Information System* (LIS) repair which is currently under repair 5) Increasing the volume of laboratory equipment that has the requirements of a certain number of samples for one operation and 6) Producing an outpatient laboratory instruction.

Suggestion

The hospital needs to socialize and discuss the results of this research, both at the top management level, as well as the middle management and the lower management so that the farther steps can be taken in improving the quality of customer service in the Outpatient Installation of Semen Gresik Hospital. The hospital should conduct ongoing evaluations toward the quality of laboratory services at the Outpatient Installation of Semen Gresik Hospital or at other units. Besides, the hospital can also develop a research by using QFD method on other product development services in Semen Gresik Hospital. The research related to QFD method should further incorporate the competitor factor as one of the factors studied.

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SEVEN DIMENSIONS OF LEARNING CULTURE: ENHANCING PUBLIC HEALTH PRACTICE THROUGH FORMAL LEARNING

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Abstract: Continuing Professional Education (CPE) is entering the third era in which education and learning occur in a workplace. The concept of learning in the profession is believed to lead to the improvement of job performance of public health professionals. However, little research has been carried out to gain insight into the motivation to enhance professional development through formal education opportunities in the workplace. This study aims at understanding participation in professional development of public health professionals to enhance their professional development. All data were collected using online survey to public health professionals in the database of The Georgia of Public Health TrainingCenter (GPHTC). The results ofthe study suggests that most public health professionals participated in available formal learning opportunities in their organization to advance in their professions. The type of the formal learning opportunities and the reason for participation was varies depending on the type of organization. In addition, the results of the study also indicate that the participants mostly considered the learning culture in their organization as high at individual, team/group, and organizational level.

Keywords: Public health professionals, Formal learning, Continuing professional education

Introduction

There are many opportunities for public health professionals to engage in learning in the profession. These learning opportunities may be conducted formally by particular organization, but some may be experienced as informal or incidental learning in the workplace. Formal, informal and incidental learning are distinguished based on the degree of control by the learner (Marsick& Watkins, 1990). Formal learning is typically highly structured, a classroom-based, and organized by a particular organization (Marsick& Watkins, 1990).

Formal learning opportunities are commonly organized by organizations or educational providers in the form of education and training to enhance specific skills of public health professionals. These formal learning opportunities may be designed as conferences and seminars organized by professional associations of public health professionals. The seminars, conferences, education and training whichare organized by educational providers or professional associations of public health professionals are identified in this study as the formal forms of Continuing Professional Education (CPE) activities.

The original definition of CPE is any "Educational experiences that assist in the development or enhancement of the knowledge and skills directly related to the individual's professional occupation." (NCHCE, 2013). However, most CPE today has been perceived as "a means to an end for regulating the practice, often in combination with licensing bodies and professionals societies." (Cantor, 2006). Most CPE has been perceived as those formal educational activities that are highly structured in facilitating the information update, re-certification, and re-licensure (Desikan, 2009). In the field of public health, CPE is also commonly perceived as those formal educational programs for public health professionals and mandated for those who wish to maintain their professional certification. Therefore, in this study, the term CPE will be used to describe these formal learning opportunities for public health professionals.

The fact that CPE is an intentional, ongoing and systematic process makes CPE a significant factor in support of the improvement of public health professionals' practice. Despite the advantages offered by CPE, over 60%

of public health professionals did not conduct research or participate in professional development activities due to various reasons (Glascoff, et.al, 2005). The heavy workload, the cost to participate, the lack of administrative support, child care and home responsibilities were some of the barriers resulted in low participation in CPE activities (Bower et.al, 2007; Schweitzer &Krassa, 2010).

The objective of this study is to establish understanding of participation in professional development of public health professionals to enhance their professional development through the following questions:

1. To what extent do the public health professionals participate in formal learning to enhance their professional development?

2. To what extent does perception of a high learning culture relate to high levels participation in formal learning among public health professionals?

Methodology

This study used a cross-sectional and exploratory study design to survey members of the Georgia Public Health Training Center (GPHTC) at the University of Georgia (UGA). All data were collected from December 2013 to February 2014 for an approximately 10-week period of study. Since few studies about the role of the learning culture and participation in professional development of public health professionals were conducted in the past, the data collected for this study were collected for descriptive and exploratory purposes through *Qualtrics* survey site as the medium for data collection. The professional database that was chosen for this study was the database of the Georgia Public Health Training Center (GPHTC). The mission of GPHTC is "to assess the needs and build the capacity of the current and future generation of public health workers in governmental public health, health care organizations, and non-profit organizations for the purpose of advancing and improving the health of Georgia citizens" (GPHTC, 2013). The GPHTC database was chosen to increase the representativeness of the study because GPHTC members are those public health professionals in the state of Georgia that share a common characteristic in terms of competencies and job description.

The online survey was developed by the researchers based on Watkins's formal learning Questionnaires and the short version of the Dimensions of the Learning Organization Questionnaire (DLOQ). DLOQ has grown out from research and practice, and it has been tested and modified through many research studies since 1990 (Marsick& Watkins, 2003). DLOQ has been validated by submitting DLOQ to rigorous critique for meaning, and has used reliability coefficients to identify poorly worded items and low performing items (Marsick& Watkins, 2003). Through this process of validation, items were deleted or revised until coefficient alphas, which is above the recommended 70for each scale, were acceptable (Marsick& Watkins, 2003).

The participants in this study were asked to answer questions in the online survey that took about 10-15 minutes to complete. Once the participants received the study invitation in the recruitment email and read it, they could ignore or self-select as participant in this study by clicking the URL that took them to the online survey. If the URL did not work, participants could copy and paste the link to their browser. By clicking the URL link, the participants were confirming consent to participate in the study that was included in the recruitment email. Participants could then begin to fill the online survey. The participants were instructed to answer the questions as fully and honestly as possible and were not asked to complete the survey again if they had done it before. Once the participant had answered all the online survey questions, the survey thanked the participant.

The researchers pilot tested the survey website on function, readability, and graphics. This pilot test established the length and ease of completion of the survey. The online survey took about 10-15 minutes to complete. After the pilot test of the online survey, the researchers sent the members of the GPHTC a recruitment email to participate in the study. Three separate recruitment emails were sent asking for participation in the study. They were delivered at the beginning of December 2013, at the beginning of January 2014, and at the beginning of February 2014. The researchers explained about the purpose of the

study and the approximate time to complete the online survey. All the data gathered from the online survey were saved in password-protected files on the researchers' personal computer. No paper printed copies of the data were made.

All of the data in this study were gathered using *Qualtrics* and were analyzed using statistical software. The online survey questions were used mainly for descriptive and not for inferential purposes. Thus, the researchers obtained the frequency count and percentages to describe the relationship between the available and participated formal learning opportunities in this study.

Results

The final sample used for analysis consisted of 172 public health professionals in the database of The Georgia of Public Health Training Center (GPHTC). The age of the participants varied between 24 to 74 years old, with both the mean and the median being 47 years old. Most of public health professional who participated in this study identified themselves as female (69.4%), married (70.3%), non-Hispanic (98.1%), White or Caucasian (83%), working in a non-profit institution (90.6%), and with a public health background (77.5%).

The analysis showed that not all participants that identified the availability of formal learning in their organization actually participated in these learning opportunities. 47 participants in this study identified the availability of the formal learning opportunities. In average, 53 participants in this study participated in formal learning. The most identified and participated formal learning opportunities were: 1) Seminars or conferences of-site; and 2) Videotapes or webinars on work-related topics available to view. Table 1 describes the frequencies of the participants that identified the availability of the formal learning opportunities in their organization and those who actually participated in these learning.

Table 1: Formal Learning Opportunities and Actual Participation in Learning

Formal Learning Opportunities In the Last Six Months	Available*		Participated**	
	Freq	%	Freq	%
Seminars or conferences off-site	90	52.3	71	78.9
Videotapes or webinars on work-related topics available to view	85	49.4	68	80
Seminars or conferences offered in-house	80	46.5	56	70
Web-based courses, desk-top learning, or other computer-based instructional materials available	78	45.3	57	73.1
Tuition reimbursement to attend formal university courses	22	12.8	1	4.5

* Total sample: All Participants in the study (172 participants)

**Total Sample: Participants who identified the availability of each learning activity in their organization (different total number of sample for each activity depending on the number shown in the available (*) column)

As showed in table 1, it seems that many of the variables do not have significant correlation when they come to formal learning availability and participation. In this study, the seven dimensions of learning culture 1) Continuous Learning (CL); 2) Dialogue & Inquiry (DI); 3) Team Learning (TL); 4) Establish Systems (ES); 5) Empower People (EP); 6) System Connection (SC); and 7) Strategic Leadership (PL) in the organization do not seem to be correlated with the participation in formal learning (FoP).

Based on table 2, many of these participants stated that formal learning were considered more credible, professional, focused, detailed, comprehensive, and provided the most up to date information about trends and research in public health professions. Participants also stated that they prefer to learn formally because they

were led by the expert in the field when participating in formal professional learning. The other reason that formal learning were more preferable by the participants is because some of these formal learning activities provided with credits that could be used to maintain their professional credentials.

Table 2: Reasons for Participation in Formal Learning Opportunities

Reasons for Participation in Formal Learning Vs. Informal Learning
Credibility and professional delivery of information
Experts are invited in to provide training and networking with peers across the state
Focused, more structured, and well organized presentation
Opportunity to ask the experts questions and to learn from others who may experience similar issues.
Provide the most up to date information on the professional trends and research.
More detailed and comprehensive
Opportunity for continuing education and other credits

Discussion

This study suggested that many of the participants were aware of these learning opportunities in their organization, but many also responded they were not aware of learning activities in their organization. For participants who identified that these learning activities were available in their organization, many of them also stated that they participated in these learning activities in the last six months.

The most common formal learning opportunities that were identified by the participants in this study are seminars or conferences off-site (52.3%). Public health professionals preferred to attend seminars or conferences in order to continue their professional learning, attend professional association annual meeting, and complete home self-study print materials (Davidson, 2008). However, this study also found that despite the high awareness of the availability of seminars or conferences offsite, only 78% total of them actually participated in these conferences or seminars.

There are many reasons for the lack of participation in formal learning opportunities that were identified in previous studies. Two main reasons behind the lack of participation in formal learning opportunities, they were the cost of participation and the heavy workload of public health professionals (Demers &Mamary, 2008). As showed in this study, a low number of participants stated that they were reimbursed to participate in formal learning opportunities. Although most employers reported supporting continuing education, less than two-third of respondents were reimbursed for expenses (Demers &Mamary, 2008). The lack of time, the financial resources, and the administrative support also contributed to the barrier of participating in these formal learning opportunities (Bower et.al, 2007). Several factors acted as deterrents to nurses' participation in continuing professional development, they are: (1) the cost of attending these learning activities; (2) the inability to get time off from work to attend the learning activities; (3) the lack of support for child care; and (4) reasons related to home responsibilities (Schweizer&Krassa, 2010).

As found in this current study, the availability of these formal learning opportunities in the workplace is not a guarantee that the learning process will occur. In regards to the learning culture at the individual, team, and organizational levels, the participants have an overall high perception of the learning culture in their organizations. In order to get a better picture of the perception of learning culture of the participants, a line graph was made to compare the results of this study with the previous study on the dimensions of learning culture. The results are compared based on the seven dimensions of the learning culture as the followings: Create continuous learning opportunities (CL), promote inquiry and dialogue (DI), encourage collaboration and team learning (TL), establish systems to capture and share learning (ES), empower people toward a collective vision (EP), connect the organization to its environment (SC), and provide strategic leadership for learning (PL) (Marsick, 2013).

The line graph compares the result of this study (GAPH) and the pervious study on meta-analysis of data from 28 companies (INTL NORMS) (Dirani, 2013). The organizations'capacity to learn and to change to meet current public health demands in four local public health departments (OPHS) (Watkins et.al, 2009).

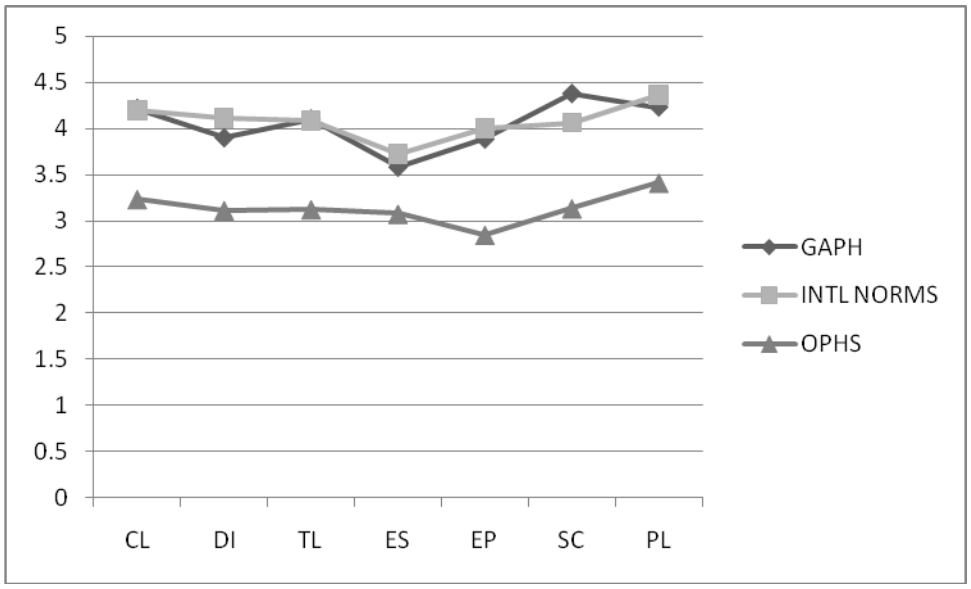

Figure 1. Line Graph of the Perception of the Learning Culture

According to the line graph, the findings of this study are similar to previous study (Dirani, 2013) in which the lowest perception of learning culture was found in the dimensions of *establish systems to capture and share learning* (ES). This information warrants some actions from the organization to improve the systematic methods of performance's feedbacks for public health professionals in order to support their learning. A slightly different result from previous study showed overall lower means than the other two studies (Watkins et.al, 2009). The result might also be the indication that the organization had put some efforts over the years from 2009 to 2014 to support the learning process of public health professionals.

As for the relationship between variables in this study, the results indicate that the availability of formal learning is only slightly related to the dimensions of learning culture and it does not seem to be related to *dialogue and inquiry* (DI) and *establish systems to capture and share learning* (ES). Participation in formal learning activities is not significantly related to having a learning culture. It is also important to bear in mind that the high perception of learning culture and participation in learning activities may not always indicate that the learning process takes place. It is dependent on the individuals involved in these learning activities to take advantages of the knowledge they gain from participating in learning activities to be able to advance in their profession.

Conclusion

This study describes the learning culture and professional development of public health professionals in public health organizations in the State of Georgia. This particular study provides new insight because it illustrates the various types of learning through formal learning opportunities. This study is significant because the results of this study contribute to the existing literature about the experiences of learning among public health professionals in improving their work performance and fostering their professional development.

This study also provides descriptions of the learning culture in public health institutions experienced by public health professionals. Although individual and team learning appear to be a necessary, it is not a sufficient prerequisite in creating a learning culture in the organization. The findings from this study help to develop a planned change to create or maintain the learning culture in public health organizations that are

more conducive to increase the learning at the individual, group/team, and organizational level. The result of this study may also provide leverage for the organization to create a learning culture that facilitates the learning process for professionals in their daily work. These learning processes may come from a variety of activities from formal learning opportunities as described in this study. As suggested by the results of this study, the employer of public health professionals should consider creating a high learning culture in the organization at every level to increase participation in formallearning opportunities.

Future direction and research ideas

Further research is needed to elaborate each item in the formal learning opportunities experienced by professionals to provide a deeper understanding about the challenge and facilitating factors to encourage professional learning in the organization. An in-depth interview may be useful to provide more information about the learning culture at individual, team/group and organizational level to support the learning of public health professionals.

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CORE ADULT TOBACCO SURVEY: BAGUIO CITY, PHILIPPINES 2012

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Abstract: The Core Adult Tobacco Survey (CATS) is developed from the Philippine Global Adult Tobacco Survey (GATS), which was a nationally representative household survey of all non-institutionalized men and women aged 15 years and older. Its main objective is to determine tobacco smoking prevalence at the city level. Baguio City has shown its determination to the anti-smoking campaign but there were no local baseline data to evaluate its effectiveness. There were 100 households included in the study and 162 individual respondents completed the interview. The overall prevalence of current cigarette smoking is 27.2%. The prevalence of second hand exposure at home is 45.1% and at work is 27.2%. Exposure to any cigarette advertising is 34% and exposure to any cigarette promotion is 32.1%. Health warnings on cigarette packages was noticed by 97.7% of the smokers during the past 30 days, but only 60% of them reported that the warnings led them to think about quitting. The prevalence of smoking in the city was almost similar with the prevalence of smoking in the country. This baseline prevalence provides useful information to the policy makers for reviewing policies and program formulation.

Keywords: GATS; CATS; smoking; Baguio City

Introduction

The overwhelming deaths from tobacco around the globe today became one of the biggest public health threats. Tobacco kills more than 7 million people a year of whom more than 6 million are users and ex users and 890,000 are nonsmokers exposed to second-hand smoke. Almost 80% of the more than one billion smokers around the globe live in low- and middle-income countries. Burden of tobacco-related illness and death is heaviest in these low and middle income countries. Tobacco users who die prematurely are leaving their families, raising the cost of health care and hindering economic development. (World Health Organization 2017b). If current trends continue, tobacco deaths will continue to rise and by 2030 it can kill more than 8 million people worldwide each year. Unless urgent action will be taken, tobacco-related illness and death could reach to a billion.(World Health Organization 2011b). Thus the World Health Organization continues its fight against the global tobacco epidemic. (World Health Organization 2017b).

WHO developed Framework Convention on Tobacco Control (WHO FCTC) in response to the globalization of this epidemic. (World Health Organization 2017c). "This is the first treaty negotiated under the auspices of the World Health Organization. It is an evidence-based treaty reaffirming the rights of all people to the highest standard of health. It represents a paradigm shift in developing a regulatory strategy to address addictive substances; in contrast to previous drug control treaties, the WHO FCTC asserts the importance of demand reduction strategies as well as supply issues. This treaty came into force on February 27, 2005." (World Health Organization 2003). This was developed by countries in response to the global tobacco epidemic. It investigates some of the causes of this epidemic, like the complex factors with cross-border effects, such as trade liberalization and direct foreign investment, tobacco advertising, promotion and sponsorship beyond national borders, and illicit trade in tobacco products. (World Health Organization 2015). It is a legally binding global treaty that sets the foundation for countries to enforce and manage tobacco

control programs so that the growing epidemic is properly addressed. As of May 2011, 173 Parties covering 87% of the world's population has joined WHO FCTC making it one of the most rapidly embraced treaties in United Nations history. (World Health Organization 2011a)

The Philippines is one of the 173 countries actively participating in the negotiations of the WHO FCTC having signed the Treaty on 23 September 2003 and ratified on 6 June 2005. The Philippines is serious to fulfil its obligations to WHO FCTC and have developed an effective national tobacco control program. (World Health Organization 2010). Since 2008, the country has embarked on working continuously with various government 3rd International Conference on Public Health offices and affiliated agencies and societies to promote policies that set standards for 100% smoke-free environments.

Health consequences of tobacco use became one of the big public health problems in the Philippines. According to the Global Burden of Disease (GBD) Seattle, WA: Institute for Health Metrics and Evaluation (IHME), "over 103,600 Filipinos die from smoking-related diseases each year, more than 23% of male deaths and 12% of female deaths (18.6% overall)." (Global Tobacco Free Kids 2017) Approximately, there are 10 to 11 Filipinos dying every hour in the Philippines due to tobacco. In the Tobacco and Poverty Study in the Philippines, "total costs of illness for the four smoking-related diseases studied were estimated at USD 6.05 billion using the Smoking Attributable Morbidity and Mortality and Economic Costs (SAMMEC) figures, while Peto-Lopez estimates yielded a more conservative but still substantial loss of USD 2.86 Billion" (Punzalan, Felix *et al*. 2013). This is an overwhelming burden to the budget of the country.

There is an urgent need to counteract the tobacco epidemic. Countries must have the political will to adopt and enforce MPOWER. WHO FCTC has provided the participating countries a package of six evidence based tobacco control measures called "MPOWER" to aid them fulfil their obligations. "The MPOWER package consists a set of six key and most effective strategies for fighting the global tobacco epidemic: 1) Monitoring tobacco consumption and the effectiveness of preventive measures; 2) Protect people from tobacco smoke; 3) Offer help to quit tobacco use; 4) Warn about the dangers of tobacco; 5) Enforce bans on tobacco advertising, promotion and sponsorship; and 6) Raise taxes on tobacco." (Kaleta et al. 2009). "MPOWER is an acronym which stands for: M- Monitor tobacco use and prevention policies; P- Protect people from tobacco smoke; O- Offer help to quit tobacco use; W- Warn about the dangers of tobacco; E- Enforce bans on tobacco advertising, promotion and sponsorship and R- Raise taxes on tobacco." (WHO 2015)

Good global monitoring in the implementation of this MPOWER should be established. Strong national and international monitoring is essential for the fight against the tobacco epidemic to succeed. Recent data from WHO Tobacco Free Initiative on the MPOWER states that: "M: half of countries – two in three in the developing world – do not have even minimal information about tobacco use. P- Only 5% of the global population is protected by comprehensive national smoke-free legislation. O- National comprehensive services supporting cessation are available only in 9 countries, representing 5% of the world population. W- Just five countries, with 4% of the world's population, meet the highest standards for pack warnings. E- Only 5% of the world's population currently lives in countries with comprehensive national bans on tobacco advertising, promotion and sponsorship. R- Only four countries, representing 2% of the world's population have tax rates greater than 75% of the retail price." (WHO 2017)

Countries should have a well-established monitoring to ensure the success of the five other policy interventions in the MPOWER package. Only through accurate measurement can problems caused by tobacco be understood and interventions be effectively managed and improved. "Comprehensive monitoring informs the leaders of governments and civil societies how the tobacco epidemic harms their countries, and helps them allocate tobacco control resources where they are most needed and will be most effective. Monitoring also shows whether policies are working and how they should be tailored to the needs of different countries, and to different groups within countries. Good monitoring systems must track several indicators, including (i) prevalence of tobacco use; (ii) impact of policy interventions; and (iii) tobacco industry marketing, promotion and lobbying." (WHO 2008)

"The World Health Organization (WHO), Centers for Disease Control and Prevention (CDC), and Canadian Public Health Association (CPHA) developed the Global Tobacco Surveillance System (GTSS) to assist all 192 WHO Member States in collecting data on youth and adult tobacco use. The flexible GTSS system includes common data items but allows countries to include important unique information at their discretion. It uses a common survey methodology, similar field procedures for data collection, and similar data management and processing techniques. The GTSS includes collection of data through three surveys: the Global Youth Tobacco Survey (GYTS) for youth, and the Global School Personnel Survey (GSPS) and the Global Health Professional Survey (GHPS) for adults." (Audera-lopez *et al.* 2005)

A new component of this GTSS was launched recently in February 2007. The Global Adult Tobacco Survey (GATS) is a nationally representative household survey which enables countries to collect data on adult tobacco use and key tobacco control measures. Results from the GATS will assist countries in implementing other components of the MPOWER. Countries will also be able to compare results of their survey with results from other countries. (Centers for Disease Control and Prevention 2016). "The GATS is initially established in the following 16 low- and middle-income countries where more than half of the world's smokers live and that bear the highest burden of tobacco use: Bangladesh, Brazil, China, Egypt, India, Indonesia, Mexico, Pakistan, Philippines, Poland, Russian Federation, Thailand, Turkey, Ukraine, Uruguay and Viet Nam." (World Health Organization 2017a).

In the Philippines, this survey was first implemented in 2009, and repeated in 2015. During the six year period between the two GATS surveys, "the Philippines has made significant progress in reducing tobacco use and implementing various tobacco control initiatives, including: restructure of excise taxes to increase the tax on tobacco products on an incremental basis; development and implementation by local government units of tobacco ordinances compliant with the Framework Convention on Tobacco Control (FCTC); development of a recognition system "Red Orchid Awards for 100% Tobacco Free Environment" for local government units, government agencies and hospitals complying with FCTC obligations; placement of graphic health information on billboards, tarpaulins, and posters; development and implementation of the National Tobacco Control Strategy (2011-2016) to accelerate implementation of FCTC; implementation of 100% smoke free policies on the premises of government agencies, health facilities, educational institutions, public terminals, public conveyances and public places; and, implementation of the total prohibition of tobacco advertising, promotion, and sponsorship by local government units." (P. WHO 2015).

GATS 2009 to 2015

"Tobacco use prevalence significantly decreased among adults from 29.7% in 2009 to 23.8% in 2015 [from 49.5% to 41.9% among males; from 10.1% to 5.8% among females]. This represents a 19.9% relative decline in tobacco use prevalence [15.3% decline for males; 42.8% decline for females]. The prevalence of current cigarette smoking among adults significantly decreased from 27.9% in 2009 to 22.5% in 2015 [from 47.2% to 40.1% among men and from 8.8% to 4.9% among women]. The percentage of current smokers who are interested in quitting (60.4% in 2009 to 76.7% in 2015) and the percentage of smokers who made quit attempts in the last 12 months (47.9% in 2009 to 52.2% in 2015) both increased significantly. However, the proportion of smokers who successfully quit in the past 12 months largely remained unchanged from 2009 (4.5%) to 2015 (4.0%). The percentage of current cigarette smokers who thought of quitting smoking because of health warnings on cigarette packages increased significantly from 37.4% in 2009 to 44.6% in 2015. There was a significant increase in the percentage of adults who noticed anti-cigarette smoking information at any location (80.1% in 2009 to 83.2% in 2015). Exposure to secondhand smoke (SHS) in homes (54.4% in 2009 to 34.7% in 2015) and in the workplace (32.6% in 2009 to 21.5% in 2015) declined significantly. Among all public places for which data were collected, the largest decline in exposure to SHS occurred in government buildings (25.5% in 2009 to 13.6% in 2015)." (P. WHO 2015)

Baguio City, is one city in the country which has started its anti-smoking campaign since 1966. This city is serious in the global fight against tobacco. It has its own city ordinance prohibiting smoking in public places. However, this city has never collected any baseline data to monitor its progress. The city depends on the

GATS data to evaluate effectiveness in the implementation of its city ordinances. However, Baguio City may be different from all other cities/provinces of the countries in terms of its tobacco consumption for the following reasons: Baguio a) is a destination for tourists, b) is an education center c) has cooler environment d) has increasing numbers of call centers. e) Has anti-smoking campaign since 1966. This study investigated the prevalence of tobacco smoking in the city for the first time, tracked tobacco control indicators, and compared results with the national surveys conducted in 2009 and 2015.

Methodology

This is a cross sectional household survey conducted on April to May 2012 aimed to produce city level estimates. The questionnaire (Core Adult Tobacco Survey) used was developed mainly from Global Adult Tobacco Survey (GATS) and provided by the World Health Organization. The questionnaire consists of two sections: Section A –(Background characteristics) Questions covered the following: sex, age, civil status, education, and work status; Section B – (Core Adult Tobacco Questionnaire); It consists of 9 questions covering the following: current patterns of tobacco use (daily consumption, less than daily consumption, not at all), former/past tobacco consumption (daily consumption, less than daily consumption, not at all), consumption of smokeless tobacco; patterns of smoking inside the houses (daily, weekly, monthly, less than monthly, never); exposure in the last 30 days in the workplace; questions related to advice to quit smoking by health care provider in the last 12 months; reaction to health warning labels on cigarette package; questions regarding exposure to pro-tobacco advertisement on media such as: television, radio, billboards, posters, newspapers/magazines, public walls, and exposure to any kind of promotions connected with tobacco. The reference period for the questions in the media section is within the last 30 days.

Baguio City is a highly urbanized area in Northern Luzon comprising of 319,000 residents from 129 districts. (Philippine Statistics Authority 2013). The target population for the survey included all men and women aged 15 years and over who were residents of Baguio city. Tourists or transient residents were not included. The verbal consent of all respondents was obtained at the start of the interview. Respondents were assured that all answers in the survey will be used only for research and analysis and cannot be used for any other purpose and that their identifying data, such as name and address, will never be associated with their interview responses.

Sample size determined using a 10% precision, where confidence level is 95% and proportion is at 0.5. (Lemeshow,S. *et al.* 1990). One hundred respondents were targeted. Twenty districts were chosen by simple random sampling from a list of 129. Five households from each of the 20 barangays were interviewed. Overall, there were 100 households included in the study from the following districts: Asin Road, Dizon Subdivision, Country Club Village, Camdas, Greenwater Village, Irisan, Lower Quirino Hill, City Camp Proper, Lourdes, San Roque, Bayan Park, Modern Site East, Hillside, P Burgos, Ambiong, Bakakeng, Loakan, Rock Quarry, Happy homes, Happy Hollow, South Drive, and New Lucban. The overall household response rate was 96%. From the 100 households, 162 individual interviews were completed. The individual response rates were 98.7%.

Results

Demographic Characteristics

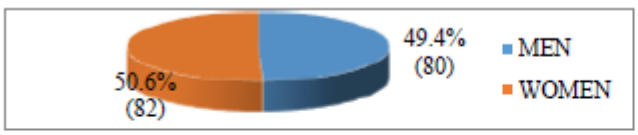

Figure 1 Percent Distribution of Individual Respondents by Sex: Core Adult Tobacco Survey (CATS), Baguio City 2012
3rd International Conference on Public Health

Overall, for adults aged 15 and over, 49.4% were men and 50.6% were women. (Figure1) Highest percent of individual respondents were aged 25-44 years old (34.6%) and lowest for 65 years and above (7.4%), while percent of respondents aged 15-24 years and 45-64 years were 33.3% and 24.7% respectively. (Figure 2).

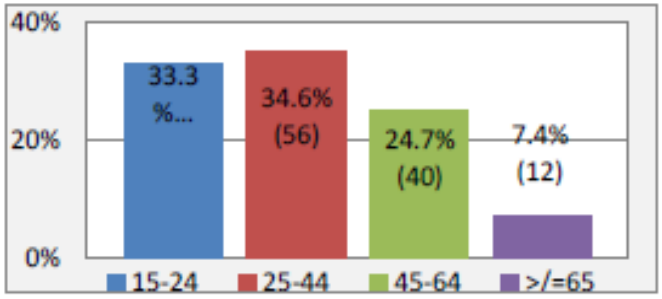

Figure 2 Percent Distribution of Individual Respondents by Age: Core Adult Tobacco Survey (CATS), Baguio City 2012

Half of the respondents are married (51.9%), 42% are single, 2.5% separated and 3.7% are widows. (Figure 3)

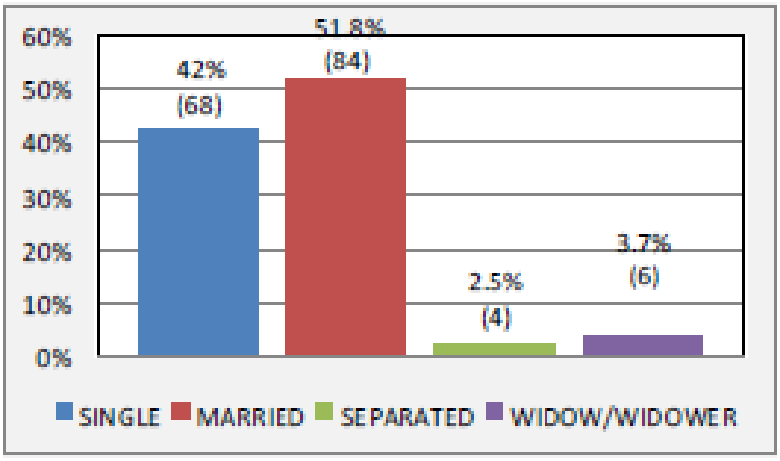

Figure 3 Percent Distribution of Individual Respondents by Civil Status: Core Adult Tobacco Survey (CATS), Baguio City 2012

Almost half of the respondents are college graduate (40.1%), one-fourth are college undergraduate (25.9%), 22.8% are high school graduate, 5.6% are high school undergraduate, 4.3% are elementary graduate and 1.2% have finished post graduate schooling. (Figure 4)

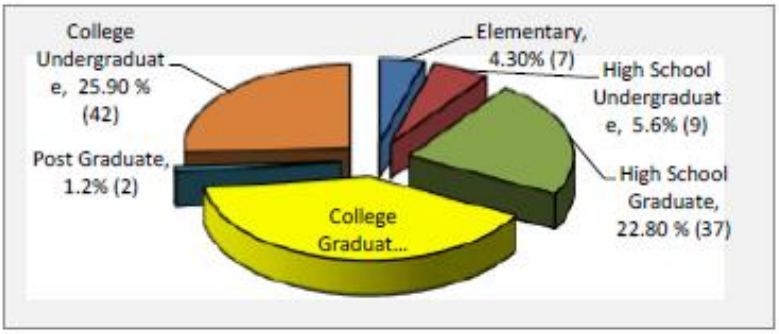

Figure 4 Percent Distribution of Individual Respondents by Educational Level: Core Adult Tobacco Survey (CATS), Baguio City 2012

Most of the respondents are working in private establishments 32.7%, 17.3% are students, 11.7% are housekeepers, 8.6 % are working in the government, 8% are self-employed, 6.2% are retired, 5.6% are

unemployed but able to work, 4.9% are working in private households, 3.7% are employers in family-owned business, and 1.2% are working with pay in a family-owned business. (Figure 5)

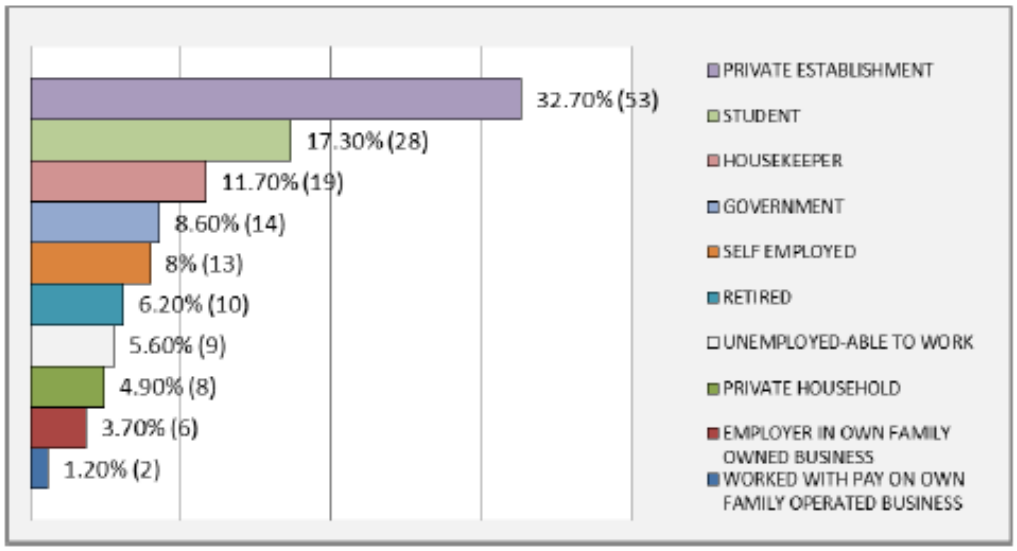

Figure 5 Percent Distribution of Individual Respondents by Work Status: Core Adult Tobacco Survey (CATS), Baguio City 2012

Prevalence of Tobacco Use

Among adults 15 years or older, 27.2% were current tobacco smokers representing the 87,000 Baguio City residents. (Figure 6) Men (42.5%) were more likely than women (12.2%) to smoke tobacco. Overall, 24.7% were daily tobacco smokers. For men, 40% were daily smokers (representing 94.1% of all male current smokers) and 9.8% of women were current daily smokers (representing 80% of all female current smokers).

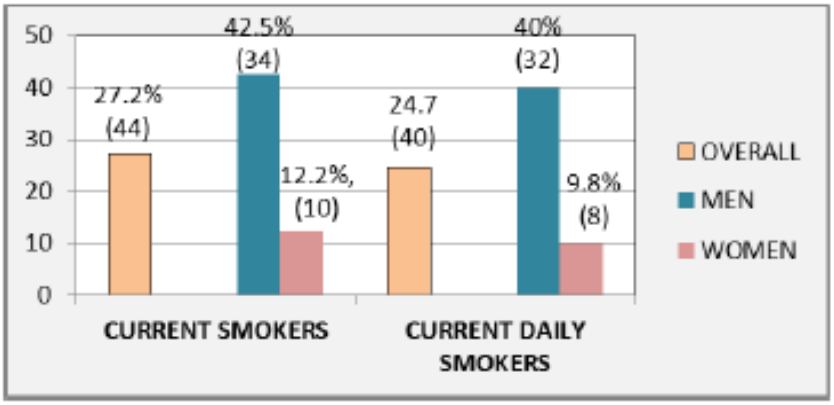

Figure 6 Percent Distribution of Adults 15 years and older by smoking status and sex: Core Adult Tobacco Survey (CATS), Baguio City 2012

Daily smoking was highest among aged 15-24 (35%, 14), high school graduates (35%, 14), and working in private establishments (37.5%, 15). (Table 1). Non Smokers were highest among those aged 25-44 years old (36%, 42), college graduate (45%, 53) and working in private establishments (31%, 36). (Table 1) 3rd International Conference on Public Health

Smokeless Tobacco

One hundred percent of smokers are using the manufactured type of tobacco and nobody is using smokeless tobacco.

Secondhand Smoke Exposure

Among adults in Baguio City, 45.1% reported daily exposure to secondhand smoke inside their homes, approximately 144,000 Baguio City residents, 6.2% reported at least weekly exposure, less than 1% reported at least monthly and 3.7% reported less than monthly exposure. Almost half of the respondents reported that smoking is not allowed inside their homes. (Figure 7).

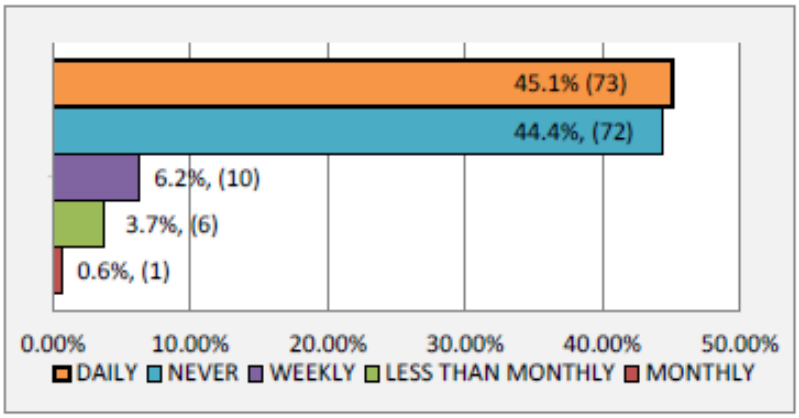

Figure 7 Secondhand smoke exposure at home: Core Adult Tobacco Survey (CATS), Baguio City 2012

For non-smokers, 33.1% reported that someone smoked daily inside their home; and 5.9% reported someone smoked at least weekly, 5.1% reported someone smoked less than monthly inside their home. More than half of the nonsmokers reported no secondhand smoke exposure inside their home. (Table 2).

Table 2 Percentage distribution of adults 15 years and older who are exposed to tobacco smoke at home by

current smoking status: Core Adult Tobacco Survey (CATS), Baguio City 2012 Current Smoking Status	Daily	Weekly	Monthly	Less than monthly	Never	Total
Daily	80% (32)	5% (2)	2.5% (1)	0	12.5% (5)	100% (40)
Less than daily	50% (2)	25 (1)	0	0	25% (1)	100% (4)
Not at all	33.1% (39)	5.9% (7)	0	5.1% (6)	55.9% (66)	100 (118)
73	10	1	6	72	162	

Out of the 162 residents, ninety nine were working and, about 27.2% of them (27) reported that they were exposed to tobacco smoke at their indoor workplace. (Figure 8)

Almost half of smoking exposure at work is in private establishments (48.1%), 29.6% are in family owned business (self-employed/employer/working with pay for the family business), 22.2% are in private household, and no one working in the government reported smoking exposure. (Table 2).

Table 1 Percentage distribution of adults 15 years and older according to smoking status by selected Characteristics	Smoking Status		Total	
Daily		Occasional		Current Non smokers
Overall	24.7% (40)	2.45 (4)	72.85 (118)	100% (162)
Age (years)				
15-24	8.6% (14)	0.6% (1)	24.1% (39)	33.3% (54)
25-44	6.8% (11)	1.85% (3)	25.95% (42)	34.6 % (56)
45-64	8.1% (13)	0	16.6% (27)	24.7% (40)
>/=65	1.2% (2)	0	6.2% (10)	7.4% (12)
100% (162)				
Education				
Elementary Graduate	1.2% (2)	0.6% (1)	2.5% (4)	4.3% (7)
High school Undergraduate	0.6% (1)	0.6% (1)	4.4% (7)	5.6% (9)
High school graduate	8.6% (14)	0.6% (1)	13.6% (22)	22.8% (37)
College Undergraduate	6.8% (11)	0.6% (1)	18.5% (30)	25.9% (42)
College Graduate	7.4% (12)	0	32.7% (53)	40.1% (65)
Post Graduate	0	0	1.2% (2)	1.2% (2)
100% (162)				
Work Status				
Private Household	1.8% (3)	0	3.1% (5)	4.9% (8)
Private Establishment	9.25% (15)	1.2% (2)	22.2% (36)	32.7% (53)
Government	1.8% (3)	0	6.8% (11)	8.6% (14)
Self employed	0.6% (1)	0.6% (1)	6.8% (11)	8% (13)
Employer	0.6% (1)	0	3.1% (5)	3.7% (6)
Worked with pay in family owned	0.6% (1)	0	0.6% (1)	1.2% (2)
Student	3.7% (6)	0	13.6% (22)	17.3% (28)
Housekeeper	3% (5)	0	8.7% (14)	11.7% (19)
Retired	1.2% (2)	0	5% (8)	6.2% (10)
Unemployed but able to work	1.9% (3)	0.6% (1)	3% (5)	5.6% (9)
100% (162)				

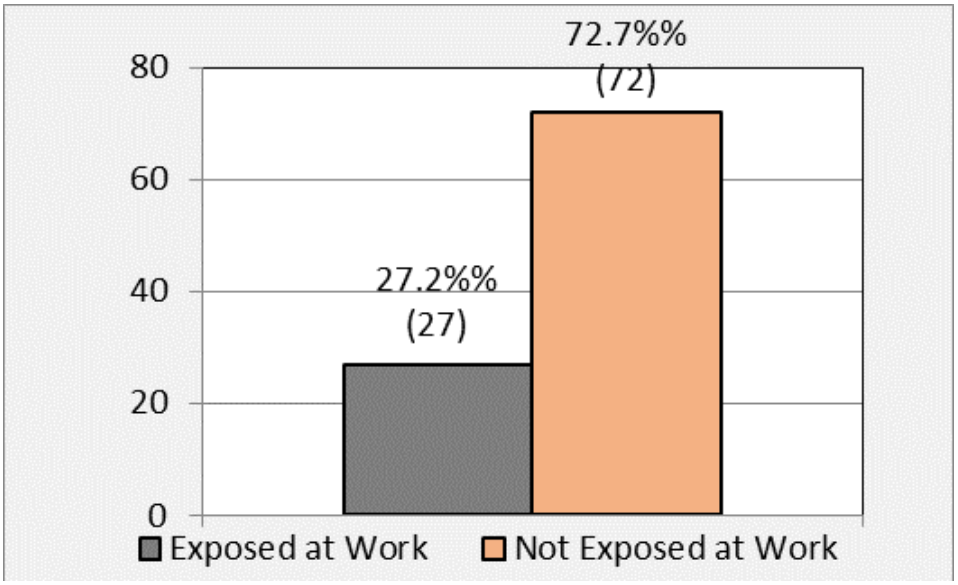

*Figure 8 Secondhand smoke exposure at *work: Core Adult Tobacco Survey (CATS), Baguio City 2012*

**work- enclosed area*

Cessation

Among current manufactured cigarette smokers (44), 97.8% or 43 of them noticed health warnings on cigarette packages during the past 30 days. 60% of these smokers reported that the warning labels on cigarette packages led them to think about quitting and 40% reported that it did not lead them to thinking of quitting. (Figure 9).

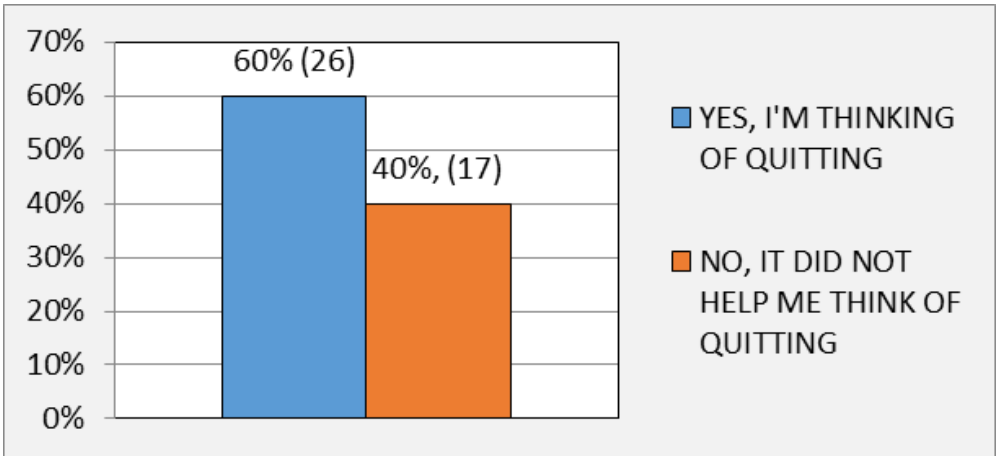

Figure 9: Percentage of smokers' response on the Health warnings on cigarette packages: Core Adult Tobacco Survey (CATS), Baguio City 2012

All men noticed the health warnings and 92.3% of the women noticed the health warnings. (Figure 10)

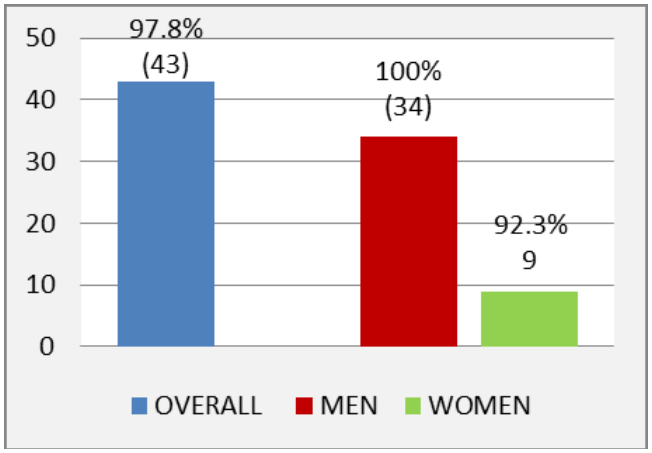

Figure 10: Percent Distribution of Current Manufactured Cigarette Smokers who noticed Health Warnings on Cigarette Packages: Core Adult Tobacco Survey (CATS), Baguio City 2012

Among the smokers, only 56.8% % (25) visited any healthcare worker in the past 12 months. Among these 25 smokers, 68% (17) received brief cessation advice from a healthcare worker while the 32% (8) did not receive any cessation advice. (Figure 11)

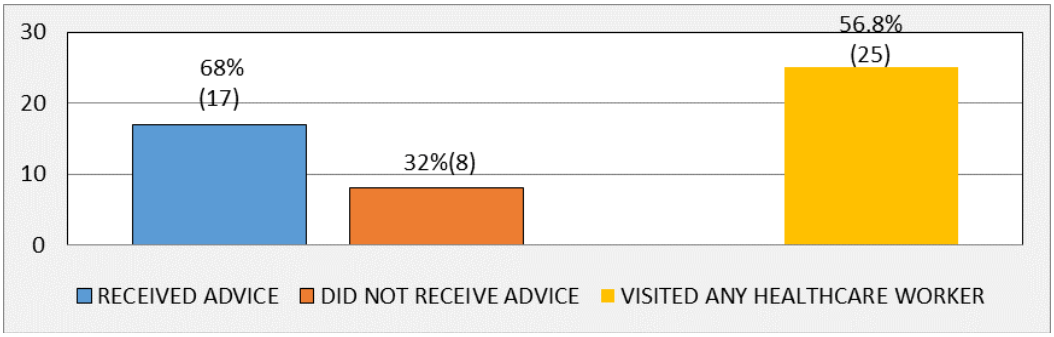

Figure 11: Percentage of smokers who received brief cessation advice from a healthcare worker: Core Adult Tobacco Survey (CATS), Baguio City 2012 *doctor/nurses/dentist/midwife/caregiver/respiratory therapist/allied health*

Media

Overall, 34% of adults noticed pro-cigarette marketing in the last 30 days (Figure 12). Having seen pro-cigarette marketing advertisement was higher among men (37.5%) than women (30.5%).

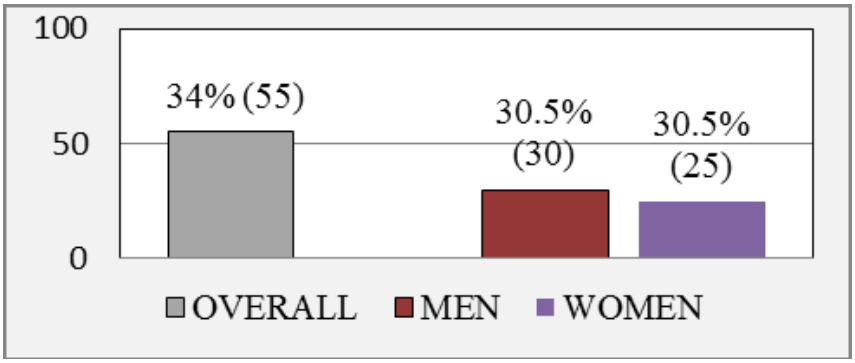

Figure 12: Percent of Respondents by Sex Who Noticed Pro-Tobacco Advertisements: Core Adult Tobacco Survey (CATS), Baguio City 2012

Overall, 32.1% of adults in Baguio city noticed any tobacco sponsorship or promotion in the last 30 days, (Figure 13). Men (35%) were more likely than women (29.3%) to notice any tobacco promotion.

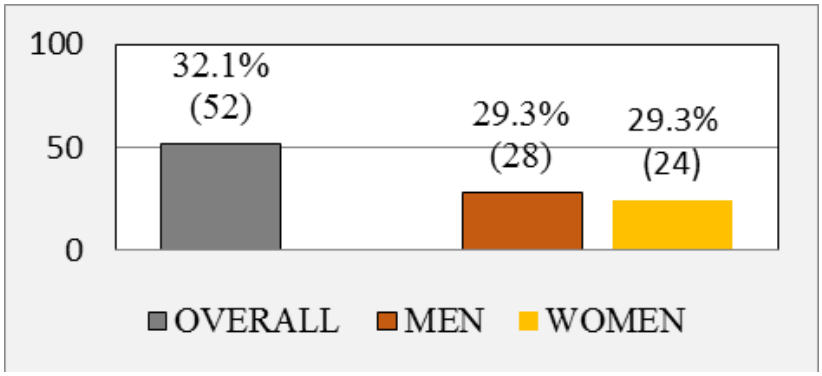

Figure 13: Percent of Respondents Who Noticed Cigarette Sponsorship or Promotion: Core Adult Tobacco Survey (CATS), Baguio City 2012

CATS VS. GATS 2009, 2015

Table 4 Comparison of some of the selected results of GATS and CATS Characteristics/indicators	GATS, 2009	CATS, 2012 Baguio city	GATS, 2015
Prevalence of current smokers	27.9%	27.2%	22.5%
Males	47.2%	42.5%	40.1%
Females	8.1%	12.2%	4.9%
Secondhand smoke exposure at home	54.4	45.1%	34.7%
Secondhand smoke exposure at work	32.6%	27.2%	21.5%
Percentage of current cigarette smokers who thought of quitting smoking because of health warnings in cigarette labels	37.4%	60%	44.6%
Percent distribution of smokers who received brief cessation advice	76.5%	68%	56.5%
Percent distribution of respondents who noticed cigarette advertising in the last 30 days	53.7%%	34%	40.5%
Percent distribution of respondents who noticed cigarette promotion in the last 30 days	74.3%	32.1%	58.6%

Discussion

Discussion of the key result areas is in accordance with the MPOWER policies which were covered in the CATS questionnaire.

Monitor- Monitor Tobacco use and Prevention policies. The prevalence of current cigarette smoking among adults showed men (42.5%) were 3.5 times as likely as women (12.2%) to smoke, with an overall prevalence of 27.2%. These findings show increased proportion of women compared with GATS conducted in 2009. The smoking prevalence has significantly dropped during the 2015 survey at 22.5%.

Protect- Protect people from tobacco smoke. The prevalence of second hand exposure at home is 45.1%. Among those who were working, 27.2% reported that they were exposed to tobacco smoke at their indoor workplace. Government workers disclosed that they were never exposed at their workplace because of the strict implementation of smoke-free policy at their workplaces. Almost half of smoking exposure at work is in private establishments (48.1%), specifically coming from the following establishments: construction, computer shop, water delivery, and call center, 29.6% are in family owned business mostly small stores and 22.2% are in private household. Results from GATS shows exposure to secondhand smoke is higher for all workers (32.6%) in 2009 but has dropped in 2015 to 21.5%

Offer- Offer help to quit tobacco use. Among those who visited any health care provider, CATS reported that only 68% were given brief cessation advice and 32% were not even asked about their smoking habits. In 2009 GATS, 67.5% were asked if they smoked and 76.5 were advised by the health care provider to quit. GATS 2015 reported lowest percentage of smokers who received brief cessation advice at 56.5%.

Warn- Warn about the dangers of tobacco. The percentage of current cigarette smokers who thought of quitting smoking because of health warnings on cigarette packages is higher in CATS (60%) as compared with 2009 GATS (37.4%) and 2015 GATS (44.6%).

Enforce- Enforce bans on tobacco advertising, promotion and sponsorship. Exposure to any cigarette advertising, in the last 30 days is lowest in CATS (34%) as compared with GATS in 2009 (53.7%) and in 2015 (40.5%). Similarly, exposure to any cigarette promotions is lowest in CATS (32.1%) compared with GATS in 2009 (74.3%) and in 2015 (58.6%).

Raise- Raise taxes on tobacco. The Core adult Tobacco survey did not include this indicator in its questionnaire.

Conclusion

During the six year period, 2009-2015, the country has made a progress in its fight against the tobacco epidemic. There was a significant reduction in the prevalence of tobacco smoking and second hand exposure at work and at home. Comparing GATS 2009 and 2015 alone, remarkable success can be seen in the changes of the control indicators. There was a reduction in advertising and promotion exposure and a significant increase in those who thought of quitting because of the health warning labels. However, there was a significant reduction of healthcare workers advising brief cessation advice.

Comparing CATS and GATS, the exposure to tobacco advertising and tobacco promotion is lower among Baguio residents. Percentage of current cigarette smokers who thought of quitting smoking because of health warnings in cigarette labels was also highest in CATS survey. This is the result of the established and strict implementation of the city ordinance within the city compared to other parts of the country.

Recommendation

Monitoring- This survey is a good start for Baguio City Tobacco Control Surveillance System**.** Information from this survey would be useful for the basis of future success of the city. The local government of Baguio should continue to support what has been started by allocating budget and designating a team to monitor progress of interventions within the city. Survey with larger study population is recommended to include majority of the districts and should be done on a yearly basis. Future surveys should include the following: number of interested smokers in quitting, the number of quit attempts made, successful strategies done by ex-smokers, secondhand smoke exposure in public places and the awareness of the presence of smoke cessation clinics in the city. Wealthy and poor districts should also be compared in terms of their tobacco consumption.

Protect- The success of 100% smoke free within the government offices maybe attributed to the fact that Baguio city has more than 40 years of anti-smoking campaign which started in 1966. The Civil Service Commission Memorandum Circular No. 17 series of 2009, mandating all government agencies to adopt and promulgate 100% SMOKE FREE policy has been fully complied with as far as this survey is concerned.(Commission 2009). Despite, the admirable control in the workplaces, smoking is still a burden to almost half of the population. Among adults in Baguio City, 45.1% reported daily exposure to secondhand smoke inside their homes. This is due to the fact that the existing policies do not address smoking in the residences. Republic act 9211, or the "Tobacco Regulation Act of 2003," and the existing anti-smoking ordinance of the city "ordinance 8 series of 2008" do not address secondhand smoke exposure at home.. Further, the city ordinance of Baguio City prohibits public smoking and encourages smoking within ones' residence and private vehicles. This will further aggravate the situation of the population being exposed to secondhand smoke in their homes. Amendments to the ordinance should include secondhand smoke exposure at homes to protect other family members especially the children from the harm of tobacco. It should also include strict implementation of SMOKE-FREE WORKPLACE in private establishments to include all small enterprises as long as there is a threat of secondhand exposure to the public. Surveillance system should be well established in monitoring these private establishments.

Offer- WHO FCTC recommends in Article 14 that Parties implement best practices to promote cessation of tobacco use and implement the treatment of nicotine addiction. (World Health Organization 2017c). Relative to Program" as well as the "Smoking Withdrawal Clinics" under the DOH. (Republic of the Philippines 2003).

The survey shows that only 68% were given brief cessation advice and the rest were not even asked about their smoking habits. This just shows that the healthcare providers of Baguio city are not serious with the global fight against tobacco and not well equipped with the smoke cessation strategy. The tobacco dependence management is new to the medical field and strategies to address this have yet to be passed on to the health care professionals. The Health care workers of Baguio city must include smoking history as part of the medical consultation and physical examination. The Department of Health should conduct local trainings for doctors of the city to be equipped with the latest strategy of tobacco control. A specific local referral system should be outlined and implemented.

Warn- The result of the survey shows that shows 97.7% of Baguio residents noticed health warnings on cigarette packages during the past 30 days. Yet, only 60% reported that the warning labels on cigarette packages led them to think about quitting. The country during this time has yet to comply with the obligation to FCTC's provisions for implementation of the graphic health warning. Variations of warnings is also recommended to include some helpful facts like "Smoking causes Oral Cancers" or "Second hand smokers are equally at risk as smokers."

Enforce- This survey shows lower percentage of respondents who noticed tobacco advertisements and promotion as compared with the national survey. However, despite the MPOWER strategies, one third of the respondents noticed advertising and promotion. According to the Comprehensive Anti-smoking ordinance of Baguio City, "the National Police (PNP) is tasked with the proper and vigorous implementation of the

ordinance." With the present police-population ratio, (1:572), (Tupas 2017) this is not feasible and impossible. The work is a burden to most of them since they have been commissioned to maintain peace and order, to investigate and prevent crimes, and other related functions. To effectively discharge this mission to its constituents and to protect the health of the community, it is essential that the mayor of the city delegate officers other than PNP to help to implement these legal obligations. Amendments of the existing ordinance should include the "E" policy of MPOWER and include other citizens in the implementation.

Acknowledgements

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METABOLIC SYNDROME RISK FACTORS IN EMPLOYEES FACULTY OF PUBLIC HEALTH, UNIVERSITAS AIRLANGGA

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Abstract: Metabolic syndrome is a clustering symptoms with cardiometabolic factors including obesity, insulin resistance, dyslipidemia, and elevated blood pressure. Several previous studies have shown the risk factors for metabolic syndrome, such as obesity, smoking, lack of physical activity and unhealthy diet. This study aims to identify risk factors associated with metabolic syndrome at the Faculty of Public Health Airlangga University. This research uses descriptive method with cross sectional design. Population in this research is Employee Faculty of Public Health University of Airlangga. Diagnosis of Metabolic syndrom was followed by National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III). Data analysis was performed by discriptive to determine the risk factors and metabolic syndrome. The results showed 59,46% % (22/37) respondents included in the metabolic syndrome. Metabolic syndrome was more common in women as much as 72,7 %. The component contributing to the presence of MetS is Fasting Plasma Glucose 100 % (p value 0,157), Waist Circumferences 100% (p value 0,000), High Density Lipid 81,8% (p value 0,0025), Diastolic Blood Pressure 45,4 % (p value 0,072),Trigliceride 22,7% (p value 0,36) dan Sistolic Blood Pressure (p value 0,632). The Risk Factor of Metabolic Syndrom included increase Added Sugar (90,9%), Sodium (77,27%), less consume fruits (72,7%), less consume vegetables (86,4%), Less consume Gandum(86,4%) and less than 60 minutes of physical activity (77,3%) , Smoking (9,09%).

Keywords: Risk factors, Metabolic Syndrome, Component

Introduction

Metabolic syndrome is a collection of interconnected symptoms with cardiometabolic factors including obesity, insulin resistance, dyslipidemia, and elevated blood pressure (Olijhoek et al., 2004; Angel Rodríguez, 2011). Patients with metabolic syndrome have a greater risk of cardiovascular disease even though there has not been a history of cardiovascular events before. Cardiovascular disease is currently the most common cause of morbidity and mortality. There is currently little data on risk factors associated with metabolic syndrome (Geiss et al, 1995).

The prevalence of metabolic syndrome varies according to the criteria used. In a New Haven study involving 439 subjects aged 4-20 years, the prevalence of metabolic syndrome in subjects with moderate obesity (BMI z-score 2.0-2.5) was 38.7%, and subjects with severe obesity (BMI z Score> 2.5) 49.7% (Weiss, 2004).

The prevalence of obesity is increasing in the developed and developing regions. In 1999 in the United States 61% of adults were overweight and obese. Metabolic syndrome is estimated to be 22% of the adult population in the United States. In the Bogasa Heart study, metabolic syndrome in adolescents in the United States was 4.2%, prevalence in males (6.1%) was higher in women (2.1%) (Cruz et al, 2004), while in Japan 17 , 7% of obese children have metabolic syndrome (Yoshinaga, 2005).

Several studies have shown that risk factors for metabolic syndrome are obesity of the abdomen estimated by waist circumference, triglycerides (Trig) HDL-C, systolic blood pressure or blood diastolic pressure (DBP)

and glutose blood level (GLU) Cut-off used as defined by International Diabetes Federation (International Federation of Diabetes, 2007). Metabolic syndrome is considered to be those who have three or more of the above factors (IDF, 2007). Other studies suggest smoking may increase the risk of metabolic syndrome events (Li S, 2014).

Obesity and insulin resistance are important components that underlie metabolic syndrome. Hypertension in metabolic syndrome occurs through several factors: increased sympathetic nerve activity, increased activity of renin angiotension system, and vasodilation disorder (Syafruddin H, 2009).

Several complications of the metabolic syndrome have been mentioned in several studies including coronary heart disease, heart failure, renal failure, stroke, and other complications such as increased risk of atrial fibrillation, venous thromboembolism, and sudden death and decreased cognitive function

Faculty of Public Health is one of the health faculty at Airlangga University where it is expected that both employees and lecturers have a good concern for their own health. This metabolic syndrome is still foreign to the community. Therefore, this study wanted to know the risk factors of employees / lecturers to the incidence of metabolic syndrome.

Methods

This study was cross-sectional study. It was conducted in Faculty of Public health, Universitas Airlangga. The population is employees of faculty. A sample was thirty seven respondens by consecutive sampling.

Some of the variables taken in the study included blood pressure measurements performed by physicians on all respondents in a sitting position for approximately 5 minutes. Measurement The abdominal circumference is performed with a standardized measuring instrument and performed in an upright position and the respondent breathing normally. While examination of fasting blood sugar, total cholesterol, LDL levels, HDL levels performed by taking blood samples of respondents. The sample was checked into the laboratory by labeling the identity. The study protocol was approved by The Public Health research Ethics Commitee of Universitas Airlangga.

Definition of MetS

Metabolic Syndrome (MetS) is a set of risk factors that are considered responsible for the increased morbidity of cardiovascular disease among obese and diabetics. NCEP_ATP III identifies that MetS is an independent risk factor for coronary heart disease and an indication of an intensive lifestyle modification intervention.

Based on the National Cholesterol Education Program of the Third Adult Treatment Panel (NCEP-ATP III), the Metabolic Syndrome is someone with at least 3 of the following criteria:1). Obesitas abdominal (waist circumferences $\geq$ 80 cm for women and for men $\geq$ 90 cm); 2). Elevated blood triglycerides ($\geq$ 150 mg/dL, atau $\geq$ 1,69 mmol/ L) or treatment for this lipid abnormality; 3). Low High Density Lipoprotein (< 40 mg/dL atau < 1,03 mmol/ L for men and for women < 50 mg/dL atau 9 <1,29 mmol/ L); 4). Elevated Blood Pressure (Sistolik Blood Presure $\geq$ 130 mmHg, Diastolik Sistolik Blood Presure $\geq$ 85 mmHg or treatment hypertension drug); 5). Elevated Fasting plasma Glucose (FPG) (FPG $\geq$ 100 mg/dL, or $\geq$ 6,10 mmol/ L Or treatment anti diabetes) (Adult Treatment Panel III, 2001).

Result

The results of this study found there are thrithy seven responden. There are 22 /59,45% respondent have metabolic syndrome. Respondent who have metabolic syndrome almost female was 72.7%. It is like study at korea showed that the odds ratios (OR) for CVD were higher in women (OR 4.04; 95% CI 1.78 – 9.14) than in men (OR 1.98; 95% CI 1.30 – 3.03). (Hwang et al,2009)

The range age of meatbolic syndrome group was between 22 - 59 years with an average age of 43.08 years. Most respondents were in the age group 40 - 49 years in both the metabolic syndrom group as much as 13 / 59,1% as well as in the non-metabolic syndrom group of 10 / 66,7%.

Table 1 General Characteristic for Metabolic and non Metabolic Syndrome respondents.

Characteristics	Met syndrome		Non Met Syndrome		
	Number	Percentage	Number	Percentage	P value
Sex					
Men	6	27,3%	7	46,67%	0,388
Women	16	72,7%	8	53,3%	
Age					
20 – 29 years	3	13,6%	2	13,3%	
30 – 39 years	2	9,1%	2	13,3%	
40 – 49 years	13	59,1%	10	66,7%	
50 – 59 years	4	18,2%	1	6,7%	

Criteria Diagnosis based on the National Cholesterol Education Program of the Third Adult Treatment Panel (NCEP-ATP III) contains five components that support the occurrence of Metabolic Syndrome. The majorities that cause metabolic syndrome are 100% Glucose Fasting Plasma, 100% Waist Circumferences, High Density Level 81.8%. While the majority component in non-metabolic syndrome group is Glucose Fasting Plasma 86.67%.

All respondents had Fasting Plasma Glucose> 100 mg / dl in the metabolic syndrome group. Similarly, in the non-metabolic syndrome group of 13 / 86.67% of respondents had Glucose Fasting Plasma> 100 mg / dl.

In the composition of Waist Circumferences also occurs in all groups of metabolic syndrome. While in the non-metabolic syndrome group only 4 / 26.7% respondents have the Wairst Circumferences $\geq$ 90 cm in men and $\geq$ 80 cm in women. Based on statistical analysis using computer application shows p value 0,000 * which means that there is a significant relationship between Wairst Circumferences with the incidence of metabolic syndrome.

Table 2. Prevalence of Metabolic Syndrome Table and Its component for Metabolic and non Metabolic Syndrome respondents.

Characteristics	Met syndrome		Non Met Syndrome		
	Number	Percentage	Number	Percentage	P value
Fasting Plasma Glucose	22	100%	13	86,67%	0,157
Waist Circumferences	22	100%	4	26,7%	0,000*
Sistolic Blood Pressure	3	13,6%	1	6,7%	0,632
Diastolic Blood Pressure	10	45,4%	2	13,3%	0,072
High Density Level	18	81,8%	4	26,7%	0,0025*
Trigliceride	5	22,7%	1	6,7%	0,36

Another component that also shows p value <0.05 is at the High Density Lipid level of 0.0025 which means that there is a significant relationship between High Density Lipid and the incidence of metabolic syndrome. In this study, 18 / 81,8% of respondents had smaller level than normal value in metabolic syndrome group, whereas in non-metabolic syndrome group only 4 / 26,7% of respondents had greater than normal level.

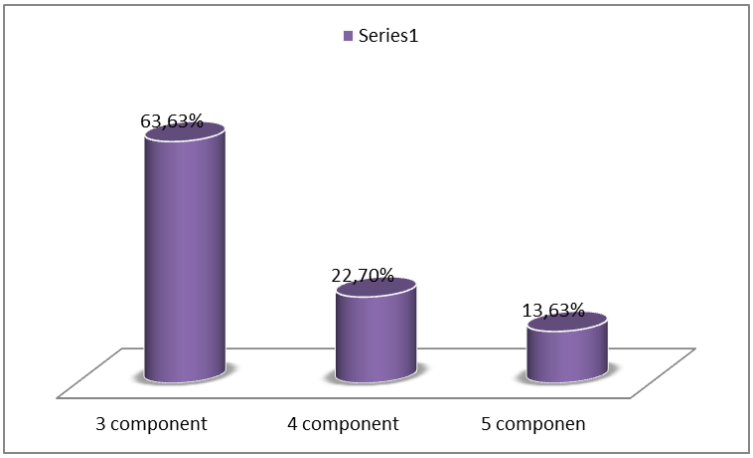

Figure 1 Jumlah komponen yang memberikan kontribusi kejadian metabolik syndrome

The diagnostic criteria based on the National Cholesterol Education Program of the Third Adult Treatment Panel (NCEP-ATP III) suggest that there are at least 3 components that support the onset of metabolic syndrome. Respondents with the most experience of MetS consisted of three components of 63, 63%, four components 22, 70% and 13.63% of which five components (Figure 1).

Metabolic Syndrome Influenced by several risk factors such as lack of physical activity, smoking, additional sugar consumption, excessive consumption of sodium, lack of consumption of vegetables, fruits and wheat. This Study, We found that Risk Factor of Metabolic Syndrom included increase Added Sugar (90,9%), Sodium (77,27%), less consume fruits (72,7%), less consume vegetables (86,4%), Less consume Gandum(86,4%) and less than 60 minutes of physical activity (77,3%) , Smoking (9,09%).

The World Health Organization recommend 150 min/weeks of moderate or vigorous exercise.(Muntner et al, 2005). This study only 1 person at Met syndrome group or non Met syndrome group have exercise more than150 min/weeks. Actually the faculty has been conducting physical activity periodically 1x per week at the University in the form of aerobic exercise. However, only a few employees who take advantage of these activities.

Table 3 Risk Factor for Metabolic and non Metabolic Syndrome respondents.

Risk Factor	Met syndrome		Non Met Syndrome		
	Number	Percentage	Number	Percentage	P value
Smoking	2	9,09%	1	6,7%	1.000
Physical Activity					
240 minutes/ weeks	1	4,54%	0	0%	0,499
150 minutes/weeks	0	0%	1	6,7%	
120 minutes/weeks	1	4,54%	2	13,3%	
90 minutes/weeks	1	4,54%	0	0%	
75 minutes/weeks	0	%	1	6,7%	
60 minutes/weeks	11	50%	5	33,3%	
30 minutes/weeks	4	18,18%	4	26,7%	
15 minutes/weeks	2	9,09%	1	6,7%	

5 minutes/weeks	0		1	6,7%	
Diet					
Sugar	20	90,9%	12	80%	0,377
Sodium	17	77,27%	12	80%	1.000
Gandum	3	13,6%	1	6,7%	0,632
Fruits					
3 cup/weeks	2	9,09%	0	0%	0,424
2 cup/weeks	4	18,18%	2	13,3%	
1 cup/ weeks	16	72,7%	13	86,7%	
Vegetables					
2 cup/weeks	3	13,6%	1	6,7%	0,632
1 cup/weeks	19	86,4%	14	93,3%	

Other study found that eating fruit and vegetables are associated with increased protection to cardiovascular disease (Mark et al,2015; Steemburgo et al,2009; Shin et al, 2009; Panagiotakoset al,2007).

Conclusion

The component contributing to the presence of MetS is Fasting Plasma Glucose 100 %, Waist Circumferences 100%, High Density Lipid 81,8%,Diastolic Blood Pressure 45,4 %,Trigliceride 22,7% dan Sistolic Blood Pressure. The Risk Factor of Metabolic Syndrom included increase Added Sugar (90,9%), Sodium (77,27%), less consume fruits (72,7%), less consume vegetables (86,4%), Less consume Gandum(86,4%) and less than 60 minutes of physical activity (77,3%) , Smoking (9,09%). Need to Modified healthy lifestyle to avoid Metabolic Syndrome.

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CORRELATION BETWEEN PARENTING PATTERN AND MPASI-GIVING PATTERN TO NUTRITIONAL STATUSOF INFANTS AGED 6-12 MONTHS IN MEKARGALIH VILLAGE

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Abstract: The quantity and quality of food given to the child is important to be thought of, planned, and implemented by their mother or caregiver. Parenting is always associated with the act of food-giving. The purpose of this study was to determine whether parenting pattern and the pattern of MPASI (Makanan Pendamping Asi/Weaning Food)-giving are related to the nutritional status of infants aged 6-12 months in Mekargalih Village. The method used in this study was the analytical method, with cross sectional approach. This study took samples from 64 respondents. The data collection was done with questionnaires and infants weighing.The data analysis was done by using chi-square test. The result of the research regarding mothers' parenting pattern in the terms of attention/support and psychosocial stimulation were in the 'good' category for 63 respondents (98,4%). The pattern of MPASI-giving in infants aged 6-12 months, that is the MPASI-giving age that stretches for the period of 6 months, was confirmed by 45 respondents (70.3%) and the type of MPASI given is the combination of weaning food and breast milk for 43 respondents (67,2%) with the frequency of 3-4 times a day for 50 respondents (78,1%). Most infants, or 49 babies (76,6%), had good nutritional status. The p> 0,05 chi-square test result showed that there was no significant correlation between parenting pattern to infants' nutritional status at the age 6-12 month and further study also showed no significant correlation between MPASI-giving pattern to infants' nutritional status. This study concluded that there was no correlation between parenting pattern and MPASI-giving pattern to nutritional status, because p> 0,05.

Keywords: Parenting pattern, MPASI-giving pattern, nutritional status

Introduction

The development of a nation aims to improve prosperity. Increasing the progress and prosperity of the nation depends on the ability and quality of its human resources. A measure of the quality of human resources can be seen in the Development Index. Nutritional problems in shaping a nation that has been well established since infancy, with good nutrition is expected the ability and quality of resources can be better. But Until now the expected source of human resources both get challenged in nutritional problems.

Infancy and childhood are times of rapid and important growth and development. The critical period is when children aged 6-24 months, because in this age group the critical growth and failure to grow (growth failure) began to be seen (Amin et al 2004).Nutritional disorders can be caused by a parenting pattern of feeding by mothers who give prelactal or weaning food too early and some are too late, and the quality and quantity given is not sufficient.

The amount and quality of food given to the child is essential to thought, planned, and implemented by the mother or caregiver. Patterns are always associated with feeding activities. Malnutrition can occur as a result of poor living habits of nutritional values.1

Parenting patterns of parents to their babies, especially at the age of 6-12 months, where at this age the baby began to introduce new foods other than breast milk, the role of parents in good parenting will have an important effect on the baby's nutritional status.

The role of mother is very influential in the state of child nutrition. Parenting plays an important role in the occurrence of growth disorders in children. Engle et al emphasizes that there are three important components (food, health-psychosocial stimulation) are factors that play a role in optimal child growth.

Prevalence of malnourished children under five is an indicator of Millennium Development Goals (MDGs) to be achieved in one region (districts / cities) in 2015, namely the decrease in prevalence of malnourished children under five to 3.6 percent or deficiency of 2 nutrients in children under five to 15.5 percent .

This resulted in one out of three Indonesian children growing up short (stunted).

One of the nutritional problems classified as classical in Indonesia that until now cannot be completely overcome is the problem of malnutrition or better known as Protein Energy Lack (PEL). The number of malnourished children under five in Indonesia is currently around 900 thousand inhabitants. This amount represents 4.5 percent of the total number of infants of Indonesia, which is 23 million people.

Based on the results of Basic Health Research in Indonesia that the national prevalence of less nutrition In 2010 was 17.9% consisting of 4.9% malnutrition and 13.0 % less nutrition.

In West Java Province with 3.1% malnutrition presentations, 9.9% less nutrition. West Java Province has begun to achieve the 2015 MDG target, but the infant's nutritional status in rural areas has not been solved, data from the Health Office of Sumedang District at Jatinangor Public Health Office in 2012 with the number of babies and toddlers totaling 7,944 but only 6874 mothers weighing their babies So it found 37 (0,5%) malnutrition, and 489 (7,1%) less nutrition.So that figure cannot infer the state of poor and bad nutritional status

Indonesia Demographic and Health Survey (IDHS 2012) shows that Only 27 percent of 4-5 month olds get exclusive breastfeeding (no additional food or beverages).

Based on a preliminary study conducted by researchers in Mekargalih Village, in 2012 there were 8 children under five years old who underwent Red-line status and there were 5 infants and toddlers with malnutrition status, and 37 infants and under-fives had less nutritional status, and found that there were still Some mothers who have babies use nannies to care for their babies, caders usually become one of the nannies for parents.

Methods

This research use analytical method that is research done to know relation of parenting pattern and giving of MP-ASI to baby nutrition status 6-12 month old. The research design using cross sectional approach that is by means of all observed variables performed together with direct interviews using questionnaires for parenting patterns and breastfeeding mothers at 6-12 months for the nutritional status of infants 6- 12 months with weight / height indicators and interpreted with status WHO nutritional status Data analysis was performed using chi-square test..

Result

Table. 1 Parenting Pattern

Parenting Pattern	Good		Poor/not God	
	f	%	f	%
Attention/support	63	98,4	1	1,6
Psychosocial stimulation	63	98,4	1	1,6

From the above table it can be seen that the pattern of mother care in terms of attention / support and psychosocial stimulation are in good category respectively as many as 63 respondents (98.4%). Thus, respondents tend to apply good parenting patterns to infants aged 6-12 months.

Table. 2 The pattern of MPASI (Makanan Pendamping Asi/Weaning Food)

The pattern of MPASI	Frequency (f)	Persentase (%)
Ages of the MPASI-giving		
Confirmed 6 months	45	70,3
Not Confirmed6 month	19	29,7
The type of MPASI given		
MPASI homemade	18	28,1
MPASI from factory	3	4,7
MPASI combination of weaning food and breast milk	43	67,2
The frequency		
1x/day	0	0,0
2x/day	14	21,9
3x/day	50	78,1
≥ 4x/day	0	0,0

From the table above can be seen that the pattern of giving of breast milk in infants aged 6 -12 months in Mekargalih Village is the age of giving the MP-ASI exactly 6 months as much as 45 respondents (70.3%), the type of MP-ASI is the combination of ASI 43 respondents (67,2%), and frequency of giving of breast milk in a day that is 3x a day counted 50 respondents (78,1%).

Table. 3. Nutritional Status Of Infants Aged 6-12

Nutritional Status	Frequency (f)	Percentage (%)
Over Nutrition Status (The cut-off point of >+2 SD)	2	3,1
Normal Nutrition Status (<-2 and >+2 SD)	49	76,6

Moderate Nutrition Status (Z-score cut-off point of <-2 SD)	10	15,6
Severe Nutrition Status (<-3 SD)	3	4,7
Total	64	100

From the table above can be seen that infants who have good nutrition status / normal as many as 49 babies (76.6%).

Table. 4 Correlation Between Parenting Pattern And MPASI-Giving (Weaning Food) Pattern To Nutritional Status Of Infants Aged 6-12 Months In Mekargalih Village

Parenting Pattern	MPASI Giving Pattern	Nutritional Status								p-value
		Over		Normal		Moderate		Severe		
		f	%	f	%	f	%	f	%	
	Ages of the MPASI-giving									
Good	Confirmed 6 months	0	0,0	35	77,8	8	17,8	2	4,4	0,142
	Not confirmed 6 months	2	11,1	13	72,2	2	11,1	1	5,6	
Poor/not Good	Confirmed 6 months	0	0,0	0	0,0	0	0,0	0	0,0	
	Not confirmed 6 months	0	0,0	1	100,0	0	0,0	0	0,0	
	Type of MPASI (Weaning Food)									
Good	MPASI Homemade	1	5,6	14	77,8	2	11,1	1	5,6	0,075
	MPASI from factory	1	33,3	2	66,7	0	0,0	0	0,0	
	MPASI combination with breast milk	0	0,0	32	76,2	8	19,0	2	4,8	

Poor/not Good	MPASI Homemade	0	0,0	0	0,0	0	0,0	0	0,0	
	MPASI from factory	0	0,0	0	0,0	0	0,0	0	0,0	
	MPASI combination with breast milk	0	0,0	1	100,0	0	0,0	0	0,0	
	Frequency MP-ASI given									
Good	1x/day									
	2x/day	1	7,7	11	84,6	1	7,7	0	0,0	
	3x/day	1	2,0	37	74,0	9	18,0	3	6,0	
	≥ 4x/day	0	0,0	0	0,0	0	0,0	0	0,0	
Poor/not Good	1x/day	0	0,0	0	0,0	0	0,0	0	0,0	0,444
	2x/day	0	0,0	1	100,0	0	0,0	0	0,0	
	3x/day	0	0,0	0	0,0	0	0,0	0	0,0	
	≥ 4x/day	0	0,0	0	0,0	0	0,0	0	0,0	

Based on the above table, it appears that there is no correlation between parenting pattern and MPASI giving pattern to nutritional status because p> 0,05.

Discussion

Parenting Pattern in Mekargalih Village

From the results of the study found that the pattern of mother care in terms of attention / support are in good category as much as 63 respondents (98.4%). For example, the situation created by the mother at meal time, where a good atmosphere is a fun atmosphere for the baby. During the study, 63 respondents who are in the good category provide answers to create a pleasant situation.

A pleasant situation at mealtime shows the mother's attention / support for the baby. In addition, fun situations can also stimulate the baby to increase appetite.

The parenting patterns studied in this study are how the mother feeds the baby, whether the mother forces the baby to eat a baby when the baby does not eat the food, and the way the mother creates a comfortable nest for the baby so that the baby is not fussy when given food.For psychosocial stimulation, there are 63 respondents who are in good category (98,4%). An example of a good psychosocial stimulus during the study is that the mother always has time to be with her baby. Having time with the baby shows good parenting, and can establish direct communication with the baby.

In this case, it can be seen that good parenting pattern by showing attention / support and psychosocial stimulation in children can form and develop social behavior. With good parenting, it also helps the baby grow in accordance with what will be achieved and in accordance with the ability he gained. Therefore, respondents apply good parenting to infants aged 6-12 months.

Quality in caring is very important, especially the pattern of care in infants, the pattern of care in different infants with parenting patterns in children or adolescents, such as authoritarian parenting, democracy. The pattern of foster care in the baby more priority on how the mother builds an inner bond, a baby who cannot speak, so that psychological stimulation and mother support to nutritional status or baby's growth is very important. Very unfortunate if there are still some parents who still use caregivers at the age of golden age. At this age is very important for baby's growth.

MPASI Giving Pattern in Mekargalih Village

It is appropriate for the mother to provide MPASI at 6 months of age.Due to the theoretical basis, the initial age of MPASI appropriate age begins at 6 months of age.This is because, at the age of 6 months the baby has salivated more so that the baby is ready to receive food other than breast milk.

If infants who are given MPASI less than 6 months will cause the baby obesity in the future. Whereas if MPASI is given when the age exceeds 6 months then it can cause delays in the development of digestive system and the development of breastfeeding skills that are delayed in infants.

This can happen because the mothers get barriers in making the MPASI such as the lack of availability of food in the local area and the lack of knowledge of how to disinfect baby food from food ingredients that are in the environment. In the provision of MPASI in infants need to be considered also the frequency in feeding intake. In the present study, the frequency of ASI per day was found to be 3x daily (main meals) of 50 respondents (78.1%) for 6-12 months of age.

According to WHO, the guidance of giving MPASI should give 2-3 times with 200kcal calorie (30%) at 6-8 months of age and for 9-12 months, MPASI dumping is given 3-4x/ day with calorie count of 300kcal (50%).

Nutritional Status

The nutritional status of the study was based on age-adjusted infant weighing. This is consistent with the theory that weight is one of the most important things to determine the baby's nutritional status, in this way it can be seen whether the growth function disorders and the composition of the baby.

Through anthropometric measurement, the child's nutritional status can be determined whether the child is classified as normal, moderate or severe nutritional status. For that reason, the weight and height of measurement results are compared with an international standard issued by WHO. Nutrition status is not only known by measuring body weight or height according to age individually, but also a combination of the three. Each indicator has its own meaning. The indicator (body weight / Age) shows sensitively the current nutritional status (as measured) as it is volatile, but not specific because weight other than affected by age is also affected by height. This indicator can be easily and quickly understood by the general public, sensitive to see changes in nutritional status in the short term; And can detect obesity.

Indicators (Height / Age) can describe past nutritional status or chronic nutritional problems. Someone who is short of the possibility of past nutritional conditions is not good. In contrast to the weight that can be fixed in a short time, both in children and adults, then height in adulthood can no longer be normalized.

In this case the nutritional status can also be monitored by the mother independently, by teaching the mother to routinely weighing to posyandu or polindes (Maternal and Child health Service) and carrying monitoring book of child growth at the time of examination. A properly fledged child growth monitoring book each month can determine a mother in giving food, for example if the child in 3 consecutive months does not gain weight then the mother can know so that parents who have baby can make preparation what will Done, such as giving the MPASI with different variations, make your own snacks, accompany the baby at mealtime. The role of cadres as the nearest information giver by parents, is very important in monitoring the nutritional status, monitoring the growth and development of children in cooperation with the local village midwife.

Correlation parenting pattern to Nutritional Status

The results showed that respondents who do parenting in the form of attention / support and psychosocial stimulation with good category have a good nutritional status baby.

The parenting patterns that respondents give to their babies are: how a mother creates a pleasant or non-boring situation while feeding the baby, does not force the baby to finish the food, prepares the baby's own food, accompanies the baby at meals, introduces new foods Or semi-solid according to the age of the baby, and there is always time for the baby even for a while.

In this study showed that mothers who have good parenting and mothers who have poor parenting does not affect the nutritional status of the baby. In accordance with the theory of mothers who have poor parenting patterns can provide a good complementary food so that the baby has a good nutritional status. The number of respondents' answers about all activities that are included in the attention / support as well as the dominant psychosocial stimulation and the nutritional status of the infants also tend to be good. Statistically with chi-square test, there was no correlation between mother's parenting pattern to baby's nutritional status because p> 0,05.

Based on the observations of the research that has been carried out by the mother's parenting is appropriate, as an example when weighing the baby, the mother is willing to deliver the baby to posyandu(Maternal and Child health Service) to weigh the baby. This indicates that there is a mother's concern for her baby's growth and the mother always has time for her baby. But there are still some mothers who sometimes do not monitor weight loss because of several reasons. Like a mother who works as a factory worker. This is in accordance with the theory that the working mother can affect the baby's nutritional status.

Correlation of MPASI Giving Pattern to Nutritional Status

Provision of MP-ASI conducted on infants such as: since when do the mother give the first breastfeeding, what kind of food is given first time, the type of food given at the present age, what kind of food interlude that mother give, and how many times in a day Mothers give MPASI and food interlude in infants. This study was supported by Musaphi et al in Infant-feeding practice of mother and the nutritional status of infant the Verb of District of Limpopo Province in 2008 mentioned in his research that breastfeeding up to 6 months did not show any significant reaction effect on nutritional status outcomes in infants.In addition, this study was also supported by Yamnur Mahlia in "The Influence of Characteristics and Fostering Patterns on Infant Growth and Development in Pangkalan Susu Subdistrict Langkat Regency in 2008 stated that there is no relationship between types of food stewardship given and the frequency of food given to growth And development in infants.

The field found some mothers give food to their babies with the frequency of eating (hour / time) not in accordance with the needs of the baby.Although some babies are given irregular food but the mothers do it

with great patience while persuading the baby when baby feeding is fussy or crying. The parenting pattern that the mother gives to her child is good enough, not forcing the baby to spend as well as the food that is given. By not forcing the baby to eat it reduces the occurrence of vomiting in infants, besides not forcing the baby to eat it is necessary to know that variations of food for the baby also affects infants eat with gusto and can consecrate without fuss, food variations can also Introduce new feeding in infants, so baby Can meet the needs appropriately.

Correlation Between Parenting Pattern And MPASI-Giving (Weaning food) Pattern To Nutritional Status Of Infants Aged 6-12 Months In Mekargalih Village

Based on the results of the study it appears that there is no relationship between parenting pattern and the pattern of MPASI on nutritional status because p> 0,05.This is indicated by the number p that is always above 5%.This insignificant effect can occur because there are other variables that affect nutritional status in Mekargalih Village.

It can be concluded that there are several other factors related to the infant's nutritional status as mentioned in the 2008 Yamnur study stating that the number of children, parental education, parent employment, family income, clean healthy living behavior in the family setting, the provision of complete basic immunization accordingly With the schedule and age of the baby.In the 2008 Yamnur study also mentioned complete basic Immunization has an effect on the baby's nutritional status.Based on research conducted in the field is still met the mother who gave the reason that the mother did not bring her baby to immunization due to not knowing the schedule of immunization, fear of side effects of immunization in infants.

Based on the 2008 Yanmur study that the importance of complete primary immunization in infants is to give babies immune to some diseases, from infectious diseases that will make the baby difficult to eat and become fussy, growth becomes impeded this can affect the status..Therefore, it can be said that the baby's nutritional status is not only influenced by how the mother nurtures the baby with psychosocial stimulation and support for the child, but also the mother's care pattern in infant care such as support for the child to get complete basic immunization until 9 months, The field found there are families who are reluctant to immunize their babies, due to cultural and religious conditions that affect the choice of mothers in providing care in terms of support complete infant immunization.

Conclusion

1. The p> 0,05 chi-square test result showed that there was no significant correlation between parenting pattern to infants' nutritional status at the age 6-12 month and further study also showed no significant correlation between MPASI-giving pattern to infants' nutritional status
2. This study concluded that there was no correlation between parenting pattern and MPASI-giving pattern to nutritional status, because p> 0,05.
3. There are still babies who have Severe Nutrition Status and Over Nutrition Status

Suggestion

Public Health Office Sumedang West Java

Can plan knowledge extension program to public about parenting and pattern of giving of MPASI

Community health centers and Maternal and Child health Service

It is important for health officials, to monitor the growth of infants that can involve family members, especially mothers in providing counseling to mothers about baby nutrition so that the mother understands

and seeks to give the best nutrition for the baby so that it can grow optimally and counseling to the public is expected the public will understand the importance of maintaining health in infancy.

Midwife and family

Growing access to infant growth that may involve family members in the mother in providing counseling to the mother.

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ASSESSMENT OF IMPLEMENTATION OF THE PHILIPPINES' EXPANDED BREASTFEEDING PROMOTION ACT OF 2009 (REPUBLIC ACT NO. 10028)

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Abstract: Malnutrition among 0 to 5 year old Filipino children is persisting. Translation of Republic Act No. 10028 or the Philippines' Expanded Breastfeeding Promotion Act of 2009 is vital towards enhancing efforts in addressing the first 1,000 days critical period in infancy and early childhood. The study reviewed and analyzed the status of the law in terms of its implementation, determined enhancing and hindering factors for its implementation using focus group discussions and key informant interviews among various entities known to play a key role in the implementation of R.A. No. 10028 based on the implementing rules and regulation (IRR). Based on the evaluation criteria developed, there were aspects in the IRR that remain "unclear" or were "present, but with questions". Knowledge and understanding of the law among program implementers varied. Awareness, information dissemination, advocacy and promotion as well as partnerships and commitments facilitate implementation of the law. On the other hand, the absence of a monitoring and evaluation system, unavailability of resources in the form of financial, materials, manpower, carrying capacity of focal persons and agencies and commitments of local government units hinder its implementation. A Joint Memorandum Circular enjoining partner-implementers to their full participation according to identified roles and tasks in the IRR are keys to the law's operationalization. Research participants voiced the need for the review of the policy, a "re-assembly" of the national working group on infant and young child feeding (IYCF) program and the creation of an oversight committee on the implementation of the law.

Keywords: Filipino children, breastfeeding promotion, Philippines

Introduction

The priority that the health and nutrition sector occupies in any government's agenda is not an arguable fact. Despite this, however, the food security situation of developing countries remains bleak as global hunger remains high in these areas. With a Philippine global hunger index or GHI of 13.2, hunger remains a serious problem in the country (von Grebmer et al, 2013). At the same time, malnutrition among 0 to 5 year old children in the Philippines has been persistent for almost four decades now even with the "blueprint" of programs that are drawn precisely to address this. Prevalence of underweight among preschool age children has been on a slow decline at an average rate of -0.98 percentage points since 1993 (FNRI, 2014). As of 2015 the DOST-FNRI reports prevalence of underweight, stunting and wasting among 0-5 years old children at 21.5, 33.4 and 7.1 per cent, respectively (FNRI, 2016). The Philippine Plan of Action for Nutrition 2011 – 2016 (PPAN) has responded to results of national and regional nutrition surveys conducted by the DOST-FNRI and has "built on the varying degrees of successes of the mix of strategies and interventions" to address

the problem. Addressing the persistent macro and micronutrient malnutrition that plague nutritionally-vulnerable households and population groups at different life stages are driven by the international agenda (UN bodies) as these programs are implemented at the national and local level.

Investments in infant and young child nutrition

The period of infancy until 2 years old considered a period of rapid growth, increases the infants and young children's vulnerability to growth faltering. When increased requirements for energy are matched with inappropriate infant and child feeding, health and nutrition is easily compromised. Attention to the first 1,000 days of an infant and young child's life is raised considering that this is the "window of opportunity" where nutrition and health experts and other actors can intervene and catch the potential growth faltering that is often present among this population group.

Philippine policies that address this critical period are in place such as: (a) the National Policy on Infant and Young Child Feeding (IYCF) (Administrative Order No. 2005-0014) that was issued in May 23, 2005; (b) the Milk Code (Executive Order No. 51) issued in October 20, 1986; and (c) Republic Act No. 10028 or the Expanded Breastfeeding Promotion Act of 2009 that was signed in May, 2010, amending Republic Act No. 7600 that pushed for the "rooming-in" policy in hospitals. Investments have been poured on IYCF activities, central of which are exclusive breastfeeding for the first six months of infancy and continued breastfeeding alongside giving of age-appropriate complementary foods up to two years of age as recommended by the World Health Organization (WHO) (Department of Health, 2011). Executive Order No. 51 or the Milk Code [Adopting a National Code of Marketing of Breastmilk Substitutes, Breastmilk Supplements and Related Products] was signed in 1986 with the Implementing Rules and Regulation revised in 2006 to align with international standards. Monitoring of compliance to the Milk Code by health facilities and milk companies remains a big challenge as revealed in a report by the World Health Organization (2015) as full implementation of the rIRR (Administrative Order No. 2006-0012) is heavily contested by milk companies, and now with the "15th Congress of the Philippines drafting a consolidated bill to amend the Milk Code and its rIRR. If passed, the bill would have erased the gains and improvements brought by the Milk Code, the rIRR and other legislation" (WHO, 2015).

Laws pertaining to the promotion of breastfeeding are Republic Act No. 7600 signed in 1992 which has since been amended by Republic Act No. 10028 in 2010. The current law expanded on the "rooming-in" hospital policy of Republic Act No. 7600 and campaign for mother-baby friendly health facilities. This is the creation of enabling environment for continued breastfeeding even at work and in public places. Specifically, these are the setting up of lactation or breastfeeding stations in these places as well as the provision of lactation break as office policy that will encourage lactating mothers to breastfeed their babies by expressing breastmilk to take home.

Rationale

The interpretation and translation of food and nutrition policies, specifically Republic Act No. 10028 is vital towards enhancing efforts in addressing the first 1,000 days critical period of infancy and early childhood. In addition, Republic Act No. 10028 is one of the legal instruments that drive efforts at intensifying IYCF Program. This study is not an evaluation of the implementation of the law *per se*, but it benchmarks the place of the law alongside its current implementation based on responses of key stakeholders and partner-implementers.

Key Features of the Implementing Rules and Regulations of Republic Act No. 10028

Republic Act No. 10028 is the national policy crafted to encourage, protect and support the practice of breastfeeding by way of enforcing the "rooming-in with breastfeeding" as hospital policy and aligned with

national and international commitments for the "protection of women with the provision of safe and healthful working conditions for working mothers".

Key features of the Implementing Rules and Regulations (IRR) are:

1. the establishment of lactation stations in all health and non-health facilities, establishments or institutions
2. the provision of lactation breaks as office policy which is in addition to the regular breaks for snacks and meals
3. continuing education, re-education and training of health workers and health institutions on lactation management
4. information dissemination and education programs for pregnant women and women of reproductive age through the health workers
5. the integration of breastfeeding education in school curricula
6. advocacy activities such as holding of the "Breastfeeding Awareness" month during August of every year

Existing Structures

Based on the IRR of Republic Act No. 10028, partner-implementers from the national government were identified to implement the law with the Department of Health (DOH) taking the lead. These are the Department of Labor and Employment (DOLE), the Civil Service Commission (CSC), Department of Interior and Local Government (DILG) through the local government units (LGUs), Department of Education (DepEd), the Commission on Higher Education (CHED), Technical Education and Skills Development Authority (TESDA), Department of Social Welfare and Development (DSWD) and the Professional Regulations Commission (PRC). The Academic Institutions, Professional and Socio-Civic Organizations are among the institutions identified to comprise the private sector. Section 29, Rule VIII of the IRR provides that "implementation mechanism is the responsibility of the DOH, the DOLE, LGUs, Employers, Trade Unions, NGOs, the Bureau of Internal Revenue (BIR), Department of Trade and Industry (DTI) and other concerned partners." Monitoring of implementation of the law is stipulated to be carried out at the national, regional and provincial level following appropriate monitoring guidelines developed by the DOH.

Key to implementation of these laws and policies would be enforcement of policy instruments such as Joint Memorandum Circular, Administrative and Office Orders. The Local Government Code of the Philippines essentially placed the power in LGUs in executing these laws, based on how these apply to the peculiarities of their locale.

Conceptual Framework

The study used the fundamentals of the United Nations Children's Fund (UNICEF) Triple A cycle of problem assessment and resolution or ***A***ssessment - ***A***nalysis – ***A***ction anchored on the use of context and the process by which policies are brought down to the implementers, believed to be key steps at refining implementation bottlenecks as seen in Figure 1.

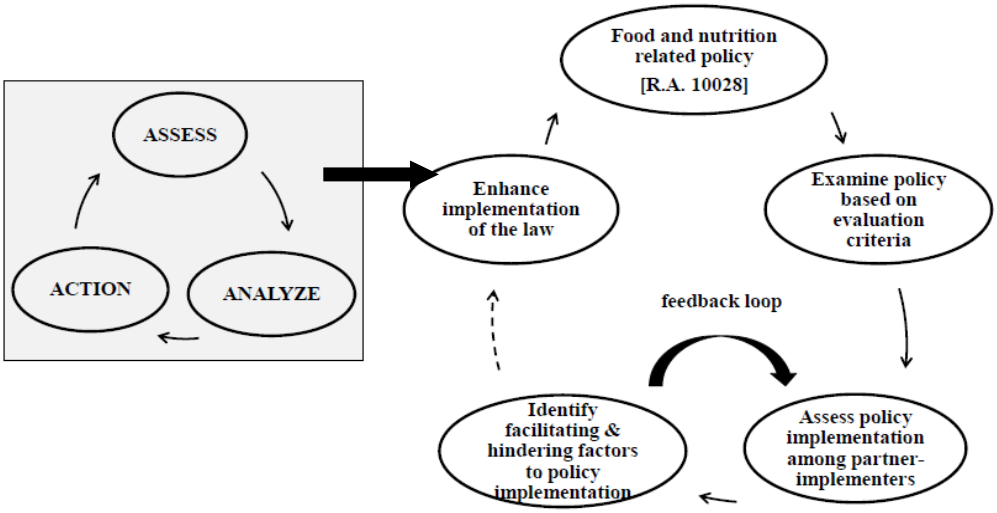

Figure 1. Identifying enhancing and hindering factors to national and local level food and nutrition policy implementation using a modified UNICEF Triple A cycle approach

Based on an arbitrarily-set criteria developed in the study to evaluate Republic Act No. 10028, aspects of the law found "unclear" were used as take-off points to assess policy implementation among key stakeholders. Facilitating and hindering factors to policy implementation as identified in the process were analyzed and presented in a feedback forum *cum* workshop with end view of providing recommendations to enhance current implementation of the law. Visualizing how Republic Act No. 10028 should be implemented based on the IRR and how it is currently handled by partner-implementers are imperatives to understand possible coherence or discord in the operationalization and implementation of the law.

Methodology

Policy scan of laws, executive and administrative orders executed from year 2000 with clear reference to "food security" and "nutrition security" of nutritionally-vulnerable population groups with focus on infants and young children 6 months to below three years old was done.

Evaluation criteria

Ten aspects were used as policy evaluation criteria rated in terms of clarity or whether these were considered in the crafting of the IRR as seen in Table 1. Based on the policy evaluation criteria developed, there were aspects in Republic Act No. 10028 and the implementing rules and regulations that remain "unclear" or were "present, but with questions", specifically on the scope of downstream policy implementation; monitoring and evaluation; the identification of milestone indicator; manpower to carry out program; and the expected policy outcome. These became the bases for the guide questions that were developed for the focus group discussions and key informant interviews

Table 1. Evaluation criteria to assess implementation of Republic Act No. 10028

Evaluation points	Operational definition
time-bound	pertains to the specific time frame for policy operationalization and observe an output
relevance	the policy is highly justified to warrant proposal and implementation
scope of implementing rules and regulation [IRR]	pertains to the policy coverage including the target clients and other stakeholders such as government agencies, non-government agencies, private groups and people's organizations

scope of downstream policy implementation	a conceptual representation or discussion of how the policy will work in broad and specific terms
monitoring and evaluation	monitoring and evaluation component of the policy
milestone indicator identified	pertains to success indicator of the policy
manpower to carry out the program	key people to implement the policy at the national and local level
expected policy output	immediate output of the policy such as but not limited to improved breastfeeding environment
expected policy outcome	indirect outcome of the policy or policy externalities such as but not limited to increased nutrition knowledge, expansion of breastfeeding practice to other mothers
source of fund	public and private sources of funds to implement the policy

Selection of Study Sites

The top 15 provinces with high prevalence of food insecurity based on the 2011 Regional Updating Nutrition Survey results of the DOST-FNRI was used as basis for the selection of two provinces: one province with a good performance in terms of local level nutrition program planning and implementation and another province with a high prevalence of underweight and is not a recipient of any nutrition award. These provinces were Ifugao and Capiz found in Luzon and Visayas islands, respectively. Four municipalities were selected for each province.

Selection of Research Participants

Representatives from different departments in the government, the local government units, government controlled corporations, non-government agencies and organizations, the professional organizations known to play a key role in the implementation of Republic Act No. 10028 based on the IRR or were known to encourage breastfeeding in the workplace (for example, the *Bangko Sentral ng Pilipinas* (Central Bank of the Philippines) or BSP) were included as research participants.

Data Collection

Data collection was carried out in two phases: phase 1 at the national level and phase 2 at the local level of policy implementation. This paper reports on the assessment of policy implementation at the national level in 2014 and 2015. Four focus group discussions (FGDs) were convened among participants from partner-implementers at the national level to examine the following components/features of the law: (a) implementation, monitoring and evaluation; (b) milk banking; (c) integration of Republic Act No. 10028 in the curriculum; and (d) breastfeeding in the workplace. Key informant interviews (KII) of two officials from the DOH were conducted to have an overall picture of the implementation of the law from the perspective of the National Center for Disease Prevention and Control – Family Health Office (NCDPC-FHO) and the continuing education and training of health workers by the National Center for Health Promotion (NCHP). Key informants from the DepED, CHED, the Nutritionist-Dietitian Association of the Philippines (NDAP) and the CSC were interviewed on aspects such as incorporation of breastfeeding concepts in secondary and tertiary levels of education and in the constitution and by-laws of professional organizations, and the implementation of the law in government offices. The research proceeded within due ethical considerations. Signed informed consent was solicited from the research participants after explaining details of the research.

Results

Current implementation

From the DOH, the law is downloaded vertically to the sub-national and local levels and followed through to non-health entities such as the national government agencies (partner-implementers) on the strength of Administrative Orders and Memoranda Circulars issued by the departments concerned (Figure 2). Among these agencies, DOLE and the DILG through the LGU have clear mandates to implement and monitor the law.

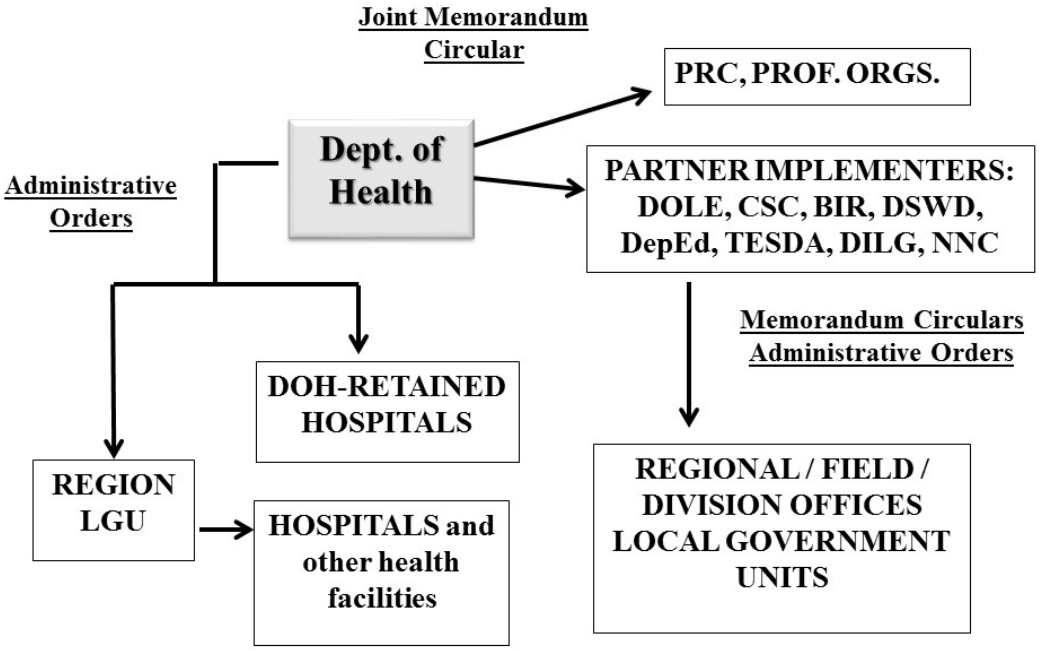

Figure 2. Implementation of Republic Act No. 10028 at various levels

Knowledge and Understanding of the Law

Knowledge and understanding of the law among partner-implementers varied. The role of the DOH with regards to Republic Act No. 10028 is clear based on the response of the NCDPC-FHO-KI. Accordingly, the implementation of the law is seen as a mandate of the DOH, making sure that this is "cascaded vertically to the LGUs and "followed through" horizontally to "non-health entities" such as the DepEd, the DOLE, the Professional Regulation Commission (PRC) and other partner –implementers".

In terms of promotional activities, it is viewed that through the IRR, "breastfeeding support [becomes] a component of education, information and provision of communication". Accordingly, the "health professionals in these health facilities have a big role to play in breastfeeding promotion, aside from capacity building of health workers and information education campaign in the village (*barangay)*".

Three partner-implementers expressed various levels of understanding of their agency roles in the implementation of the law within their office mandates. These roles covered advocacy, crafting of guidelines for exemption and tax administration. Advocacy at the LGU level was expressed as a role of the NNC key informant (KI). Crafting of the guidelines for the exemption of putting up lactation stations rests upon the DOLE. With the expiration of the application period for "tax exemption", the BIR's role on tax administration is now more towards developing guidelines on "[tax] deduction" – which is essentially a post-audit activity. The DSWD-KI was very limited in describing the implementation of the law within their department mandate. The DOLE and the CSC are tasked to cascade the law to private and government

companies, establishments and offices, respectively. Cascading the law to public offices is unclear according to the CSC-KI. There has been no effort to monitor the establishment of lactation stations in public institutions, according to the CSC-KI. Admittedly, the DOLE has not fully complied with guidelines specifically in terms of informing companies about Republic Act No 10028. Related monitoring activities are lodged with the LGU such as the Manila Health Department (MHD), it was later learned. There is a perception that the DOH at the national level is viewed "not as the primary implementer" (NCDPC-FHO-KI), but rather to operationalize the law [to make it move] as "implementation of the law within the health sector is the responsibility of the hospital (as health facility implementer) and the LGU". The Strategic Plan of Action for IYCF 2011 – 2016 is cited by the NCDPC-FHO-KI as the instrument to operationalize the IYCF Program and Republic Act No. 10028.

Implementation of Republic Act No. 10028 by Key Feature

Breastfeeding in the Workplace

Lactation facilities for women-employees to express their milk are present in BSP and the MHD. The lactation station in BSP was put up in 2009 in support of the implementation of Republic Act No. 10028. Feedback was received that some lactating employees were not allowed to breastfeed in between working hours so, the BSP's Wellness Division issued an office order in 2013 adopting Republic Act No. 10028 which allowed lactating employees to express breastmilk inside the lactation station two to three times a day during the 40-minute lactation break. With the MHD, their lactation station was put up in the city government employees' clinic in 2005 as part of the city's nutrition program of the DOH under Department Circular 2011-0365 (Guidelines for Mother-Baby-friendly Workplace certification) and is availed by many of the lactating mother-employees. However, they have no office policy on breastfeeding and their lactation station that is open for all has not been accredited yet.

Milk Banking and Milk Storage Facility

At the time of the study, four hospitals – the Philippine Children's Medical Center (PCMC), Dr. Jose Fabella Memorial Hospital (DJFMH), the Philippine General Hospital (PGH), the St. Luke's Medical Center in Global City (SLMC-GC) and one LGU – the Makati Human Milk Bank (MHMB) operate human milk banks. No facility accreditation has yet been done, only certification of trained staff as of 2014.

Different stories were shared by the hospitals and LGU in establishing the human milk bank. The concept of milk banking started in the PCMC in 1996 primarily to address the needs of premature infants. The PCMC's experience in milk banking was unique since the breast milk supply started as partly sourced from lactating mothers from adjacent villages (*barangays*), around the hospital vicinity until the hospital decided to put up a storage facility which later evolved to a milk bank with seed donations from local corporations. The PCMC milk bank was formally inaugurated in 2008. In Dr. Jose Fabella Memorial Hospital (a maternal and newborn tertiary hospital), its human milk bank was first established by a neonatologist. With 60 to 80 deliveries per day, there were sufficient mother-patients who served as milk donors. Milk donations were pooled and pasteurized using the Pretoria method of pasteurization. These were kept in a refrigerator with freezer, in an area beside the Neonatal Intensive Care Unit (NICU) which also served as breastfeeding and milk expression area. The human milk bank in SLMC-GC started as a milk storage facility in 2012 until it fully became operational after acquiring the needed equipment and staff training in 2014. Donated breast milk are dispensed only for prescribed clinical use or hospital purchase order for infants from the hospital's NICU, pediatric wards, pay wards and emergency rooms. In 2009, the city government of Makati started a milk-letting activity where breastfeeding mothers from the community were invited to donate breast milk. The collected milk was sent to its partner hospitals. In that same year, the wife of the City Mayor died from childbirth leaving behind a premature born infant who was nourished with the breastmilk from the PCMC human milk bank. This brought about the idea of establishing one for the City of Makati. In March 2013, the Philippines saw its first LGU-run milk bank which is the MHMB.

Ten per cent of milk donations in human milk banks are allotted for instances of disasters which are sent to the Philippine General Hospital which takes charge of funneling these to affected areas. The MHMB also allots milk for emergencies, wherein a partner NGO transports the milk.

Integration of Republic Act No. 10028 in the Curriculum by the Different Stakeholders

Formal and non-informal institutions as partner-implementers each has their own unique stories in the integration of Republic Act No. 10028 in the curriculum of non-formal courses of TESDA and the formal courses of the DepEd and the university. In TESDA, the topic of breastfeeding has not been integrated in the non-formal skills courses, unlike the topic of human immunodeficiency virus (HIV) which is part of gender and development. As early as 1996, a nursery for the children of employees and trainees was already put up in TESDA through an international donor fund. This is strongly related to the breastfeeding campaign and the broader concern for gender and development. The TESDA's management support to breastfeeding cannot be considered as totally zero because the agency has breastfeeding facilities and women trainees/workers are allowed to use the facility for breast milk expression. Only the inclusion of breastfeeding topic is lacking in non-formal course curriculum. In DepEd, key informants came from two levels, the basic elementary and secondary education. For the DepEd's Bureau of Elementary Education curriculum (DepEd-BEE), the topic of breastfeeding is not included. In Grade 8 or high school level, the focus of the course is maternal health, specifically, the essential newborn protocol (*Unang Yakap*) [first embrace of the mother to the newborn] and the initiation of breastfeeding as well as the benefits of breastfeeding for both the mother and infant. For the secondary education, Republic Act No. 10028 is integrated in formal and non-formal courses' curriculum whenever possible, which means that among the several breastfeeding-related concepts, the topic which will fit in one subject will be included. However, the whole "breastfeeding idea" will not be taught as a separate subject. The DepdEd does not have any instructional materials for breastfeeding related topics, hence, they were asking the DOH or whoever is the concerned agency to develop the material to serve as their basis for teaching/inclusion in the subjects. The key informant from the DepEd-BEE admitted that there is no breastfeeding station or lactation room in their workplace. At the university level, no memorandum circular has ever been issued related to this because breastfeeding is already a topic in the subject of Nutrition in the Life Stages even before the implementation of the law with the discussant coming from the Nutrition and Dietetics program. While the integration of breastfeeding topic in the university curriculum is being considered, its integration in all discipline appeared unrealistic since each discipline has specific goal to achieve as related by the key informant. Integration of the law is more related to accreditation where one of the requirements is on the need for a breastfeeding facility in the academic institution. The breastfeeding area has been there for two years already, however, nobody avails or uses the facility.

Continuing Education and Training

Based on the IRR, the DOH shall provide the 'pool of experts' responsible to educate and train partner-implementers on matters pertaining to the law including breastfeeding education and promotion. This provision indicates a "supply driven" process where the department is given the hand to develop materials and modules solely for implementing this component of the law. However, the NCDPC-FHO-KI is not aware if there is such a 'pool of experts/trainers' that the DOH provides solely for this purpose. This may indicate that implementation of the law for this particular component is "demand driven", meaning the education and training will ensue on demand. According to the NNC-KI, the NNC and the DOH are in-charge of IYCF trainings at the grassroots level, however, the NNC-KI has no knowledge of the full extent of the law's placement in the IYCF activities. The Nutrition Program Coordinators or NPCs coordinates the IYCF trainings at the local level.

Public Education and Awareness on Breastfeeding Promotion

Operationalization of the law in terms of public education, awareness campaign and breastfeeding promotion is carried within identified strategies in the IRR (Rule VII of the IRR): in the Philippine Health Promotion

Program (PHPP) through healthy places, the Communication for Behavioural Impact or COMBI, advocacy and networking activities. Along these strategies, the NCHP is involved in dissemination of health programs in healthy setting, the use of the IYCF framework, peer counseling training and advocacy among local chief executives and in social marketing activities.

The National Center for Health Promotion of the Department of Health develops health promotion and communication plans and cascade these up to the regional health offices. Primary targets of advocacy efforts are the policy makers and decision makers especially the local chief executives. In terms of awareness [communication] campaign, there is the Breastfeeding TSEk (denoting a √ mark) (**T-**ama, **S –** apat at **Ek** – slusibo [Correct, Enough and Exclusive]) advocates for exclusive breastfeeding aside from the *Unang Yakap* (first embrace) which is the campaign component of Republic Act No. 10028 IRR. The DSWD-KI cited awareness campaign and orientation as their participation to breastfeeding promotion. According to the NCDPC-FHO-KI, breastfeeding advocacy can be 'overwhelming' to some degree in addition to [implementation of the] Milk Code, which affects the implementation of Republic Act No. 10028.

A joint memorandum circular (JMC) of the DOH with the DOLE, DepEd, DSWD, and the DILG was drafted in 2014, but for some reason was never executed according to the NCHP-KI. This is a directive addressed to all regional directors, local chief executives, chiefs of hospitals, bureaus/centers directors, heads of offices and all other concerned agencies to implement Republic Act No. 10028, stating the "roles and participation of each department". The draft document includes a provision for localization of the law [one that aligns with department mandates] and within the "prescribed recommendations of the DOH and the WHO/UNICEF Infant and Young Child Feeding guidelines".

Monitoring and Evaluation of the Implementation of Republic Act No. 10028

At the national level, monitoring is done only in retrospect, when they have to depend on Program Implementation Reviews (PIR). "These are reports coming from the regional office counterparts, the IYCF coordinators and to some extent selected provincial health offices who are invited". This is also true for the monitoring of IYCF activities by the National IYCF Technical Working Group according to the NCDPC-FHO-KI. The DOH "falls short on how they really go down since the LGU health offices do not have the mandate to regulate, [instead] they are partner-implementers". Monitoring activities should be streamlined. Based on the account of the NCDPC-FHO-KI, it appears that the role of DOH when it comes to monitoring the implementation of the law is unclear. The department has no guidelines on monitoring and evaluating the implementation of the law. The NCDPC-FHO-KI thus, expressed the need for a "structured monitoring and evaluation system, the [need for] a periodic assessment as well as consolidation of progress as to how the law is implemented". The key informant added that the DOH has been examining implementation of various programs, "spreading resources too thinly and there is no focus". The NCPDC-FHO-KI perceived that monitoring of the implementation of Republic Act No. 10028 be done or looked at within the context of the whole law, examine whether partner-agency commitments to the law are carried out. Among partner-implementers, the DOLE has a straightforward response when it comes to monitoring of the law. Labor Law Compliance Officers (LLCO) who are lodged with the DOLE's Bureau of Working Conditions are spread out to all regions of the country to inspect the implementation of Republic Act No. 10028, one of several items incorporated in its Labor Law Compliance Assessment Checklist.

Fund Support

Government funds are used to implement the law in the DSWD, BIR, DOLE and the MHD as well as in the DOH in its health promotion activities. The DOH budget is supplemented with funds from three major developmental partners in IYCF activities such as the UNICEF, the United States Agency for International Aid (USAID) and the WHO which funded the development of the LGU manual for mother-baby friendly health facility.

Facilitating Factors to the Implementation of Republic Act No. 10028

Awareness, Partnerships and Commitments

Facilitating factors identified in the implementation of the law are awareness, partnerships with the community and private organizations as well as commitments of partner-implementers. The key informants from different agencies and organizations agreed that awareness and clear understanding of Republic Act No. 10028 is requisite to its promotion and advocacy. Knowledge and understanding of the law is significant for the module developer of DepEd and for staff in-charge in integrating the topic in the TESDA's non-formal education curriculum. Instructional materials will help guide the Higher Education Institution to deliver the principles of breastfeeding (CHED-KI) as well as develop the curriculum (NCHP-KI). This reference guide, however, has not materialized according to the NCHP-KI. The advent of on-line social media has contributed to increasing the awareness level of mothers about breastfeeding. Volunteerism and advocacy among mothers were identified as factors for the successful promotion of the program. From the end of service providers, the social media becomes a venue for responding to complaints and reports on licensing concerns (NCDPC-FHO-KI).

Community mobilization and enhanced community partnership will facilitate implementation of the law, citing the DJFMH's partnership with the MHD and the MHMB with the village (*barangay*). Networking with health professional organizations is seen by the NCDPC-FHO-KI to be a viable avenue to enhance implementation of the law.

The calculation of monetary equivalence and lives saved in terms of maternal, infant and young children's health and nutrition as an outcome of the Republic Act No. 10028 will make the law become "news worthy", according to the NDAP-KI [and therefore has the potential to for budget appropriation].

Hindering Factors to Implementation of Republic Act No. 10028

The absence of a monitoring and evaluation system and the unavailability of resources in the form of financial, materials, manpower, carrying capacity of focal persons and agencies and non-commitments of LGUs were identified as hindering factors to implementation of the law. It was noted by the informants that while some agencies and offices claimed to be implementing the law, the lack of office policy on Republic Act No. 10028 and the perceived gap in enforcing penalty for non-compliance were voiced out as hindrance to implementation by the MHD-KI and the BSP-KI, respectively. In this regard, implementation may be limited to the provision of lactation station but not the crafting of office policy on lactation breaks. It was suggested by the NCDPC-FHO-KI that monitoring must be strengthened, including the evaluation of the implementation efforts.

Resources

Budget allocation for the implementation of the law is constrained based on the accounts of the discussants and key informants. The absence of operational funds hinders the implementation of Republic Act No. 10028 as expressed by discussants from the hospitals, human milk banks and the BIR. The perceived "weakness" in the [enforcement of the Milk Code] as cited by the NCDPC-FHO-KI, prompted the recommendation of appropriating funds for the monitoring of the Milk Code by the FDA and the institutionalization of the Milk Code secretariat.

The inability [of establishments] to comply fully for accreditation of lactation stations is also a function of budget. An example is the conversion of the comfort room to a lactation room and the absence of a lactation nurse as recounted by the BSP-KI.

The absence of breastfeeding information materials for teaching was cited by the DepEd-BEE-KI as hindering factor in addition to the lack of capacity from their end to produce the materials on breastfeeding promotion.

The DepEd-BSE is dependent on the DOH to conduct the training-workshop on breastfeeding and related topics, believing that they, at the department, are not equipped to discuss breastfeeding unless medical practitioners do it.

Workload was cited by the MHD-KI as a hindering factor to implementation of the law, where, aside from the breastfeeding program they also handle immunization for various age groups and other programs. In addition, the bulk of pre-assessment accreditation of hospitals and other establishments were also cited to hinder the implementation of the law. The involvement of several agencies in the implementation of the law where roles are not properly defined is perceived as problem in the implementation of Republic Act No. 10028 according to the NDAP-KI. On top of all these efforts to create an enabling environment, the BSP-KI thought that it is still the personal decision of the mother whether to express milk or not.

All these factors have implications on the complementarity of task assignments and work delineation among partner-implementers. The IRR should address these factors, sustain upgrading of lactation management skills and identify understudy or encourage mentorship.

Discussion

Knowledge and understanding of the law differed among the research participants with low awareness observed among key informants and discussants from formal and non-formal education institutions (DepEd, TESDA, CHED) and the CSC. Ambiguity of the place of Republic Act No. 10028 in the partner-implementer's department mandate may lead to non- or under-performance of its role in the law's implementation.

When it comes to the implementation of Republic Act No. 10028 the execution of roles by each department rests on their respective mandates. For example, the interest of DOLE with respect to the law is mainly about compliance to existing labor laws, one of which is the Republic Act No. 10028. For the DOH, the NCPDC-FHO-KI perceived that the "crux of the law lies between the MBFHI-certified hospitals as it liaises with the community". This is the time when the mother and the newborn are released from the hospital, when breastfeeding promotion should be sustained. Thus, for DOLE and the DOH, Republic Act No. 10028 can easily be fleshed out.

The CSC, meanwhile, lags behind as the counterpart of the DOLE in implementing and monitoring the implementation of the law in the public sector. In the IRR, the involvement of the CSC is on the issuance of exemption from establishing lactation stations and its supposed role in the monitoring of the implementation of the law in government offices. However, it was noted that the LGUs are tasked to monitor the establishment of lactation stations and the crafting of lactation break as policies in government offices and public establishments such as malls at the local level.

On the other hand, the integration of breastfeeding concepts in the formal, non-formal, secondary and tertiary education is one area where the law is met with some of the bigger challenges. Key informants from the DepEd, TESDA, CHED and the university called on the health sector/professionals to provide them with reference materials or breastfeeding modules where lesson plans and curriculum can take off from.

A provision in the IRR talks about the DOH, "in coordination with other agencies involved in the implementation of the Act, shall adopt appropriate monitoring guidelines for the national, regional and provincial levels". There is no such monitoring scheme present in the current implementation of the law. According to the NCDPC-FHO-KI, a monitoring and evaluation system that could provide coherence in terms of "who reports to who" in order to track the implementation of as well as measure gains from the law since its passage and operationalization needs to be built into the IRR of the Republic Act No. 10028.

The lack of policy instruments such as memoranda circular, administrative or office orders that would have effected a clearer implementation of the law as this is downloaded "horizontally" and "vertically" by the

DOH contributed to its poor implementation. In order for an effective execution of appointed tasks as broadly stated in the IRR, partner-implementers need to acknowledge their role in the implementation of the law. As lead agency in the operationalization and implementation of the law, a JMC emanating from the DOH enjoining partner-implementers to their full participation according to identified roles and tasks in the IRR is believed to be key to the law's operationalization.

This was affirmed in the national policy forum *cum* workshop on the implementation of Republic Act No. 10028 wherein workshop participants echoed a lack in policy review and the "re-assembly" of the national working group on IYCF Program. A recommendation for the creation of an oversight committee on the implementation of the Republic Act No. 10028 was raised by workshop participants as well as the call for a revisit of the status of the Joint Memorandum Circular that would clarify the specific roles of partner-implementers at the national level and address efficiency of implementation. As expressed by some of the key informants, an evaluation of the current status of Republic Act No. 10028 is seen as necessary for forward planning. The passage of Joint Memorandum Circular, Administrative/Office Orders, Memorandum Circulars as well as the development of Monitoring and Evaluation Guidelines is seen as key steps to address these concerns.

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PERCEIVE OF VULNERABILITY AMONG HIGH RISK PREGNANT MOTHER WHO REFUSE REFERRED TO THE HEALTH FACILITY IN PAITON, PROBOLINGGO, INDONESIA

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Abstract : Perceive of Vulnerability Among High Risk Pregnant Mother Who Refuse Referred To The Health Facility In Paiton, Probolinggo, Indonesia . The most important strategy to prevent maternal mortality is early detection high risk pregnancy and prompt treatment. This study aimed to explore the perceive of vulnerability among high risk pregnant mothers who refuse to referred to the health facility. This is a qualitative study conducted on April 2017 in Paiton, Probolinggo, Indonesia. The respondents are head of public health center (PHC), 2 midwifes as key informants and 2 high risk pregnant mothers who refuse to referred to the health facility. Data were collected by in-depth interview and validated using triangulation. Head of PHC is told by mothers that they afraid if their acceptance to be referred to hospital could be a bad signal such as they are delivered home dead or fatal conditions. They belief that refusing is the best choice for their life. Both midwives feel that their condition as high risk pregnant mothers based on the referred standard but mothers still go to other midwife to get second opinion. High risk pregnant mothers say that they are still in a healthy condition and their recent pregnancy do not give bad effect to their life. So, they persist because find their neighbor can deliver normally even she had high risk pregnancy and she can't handle it if her baby need formula milk. The second mother has a busy husband that can't drive her to hospital, different perception about hospital choice and perception about delivery baby in hospital only needed by a pregnant mother who got fatal conditions.

Keywords: High Risk Pregnancy, Women

Introduction

Reducing maternal mortality (MMR) is one of the indicators in SDGs. High-risk pregnancies are the leading cause of maternal death. Treatment of high-risk pregnancies is essential for early treatment, right against risk and postpartum care. Probolinggo is a with an increased maternal mortality (MMR) in the last 3 years. Trends MMR Probolinggo from 2013 to 2015 can be seen in Figure 1.

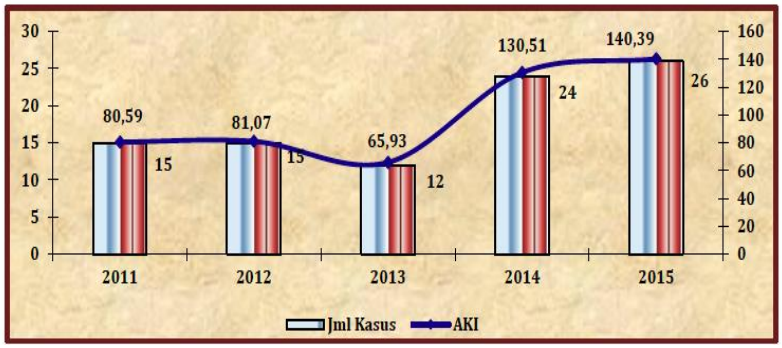

Figure 1. Mortality Rate of Probolinggo in 2011-2015

Based on Figure 1, the MMR Probolinggo in 2013 has actually decreased to 65.93 per 100,000 live births compared to 2012 or from 15 to 12 people. In 2014 there could be a sharp increase of 2-fold. MMR in 2014 amounted to 130.51 per 100,000 live births or as many as 24 people. In 2015 again increased to 140.39 per 100,000 live births or 26 people. The increase event will not be in 2014, the upward trend in 3 consecutive years should be addressed immediately (Probolinggo Health Office 2015, 2016).

Review problems that match the increase in the MMR. The main factors and directly to the profession that is sick and not handled properly. To order about what is a big problem, priority issues and what might be done then it is important to do in Probolinggo.

Methods

Study Design

The design used in conducting this situation analysis is the descriptive study design. Situation analysis was carried out in Probolinggo, Indonesia for 1 week on 3rd week of April 2017.

Data Collection

Health data on the analysis of this situation consists of secondary data and primary data. Secondary data is sourced from health service profile, Puskesmas, hospital, data in resident service and other related institution. Primary data collecting through indept interview (in-depth interview) by using interview guidance to some key respondents like KIA program holder, midwife coordinator. In addition, Focus Group Discussion (FGD) was conducted with village midwives and some pregnant women.

Analysis

The data have been analyzed descriptively by using epidemiology approach so that the number obtained by person, place and time. Data on health indicators compared to MSS and strategic plans to be achieved. Computer assisted data analysis using Microsoft Excel 2016 software.

Result

The Hanlon Method is a technique used to determine the priority of the problem quantitatively with four groups of criteria (Hanlon and Pickett, 1984; NACCHO, 2011). With the aim that planners can identify outside factors that can be included in the process of prioritizing problems, grouping factors that exist, weighting those groups of factors and allowing members to change factors and values as necessary. Data are presented in tables, graphs, maps and narratives

Socio-demographic Characteristics

The population of Probolinggo in 2015 is 1,140,480 people with an area of 1.696 Km2. As with othes in Java, the population density of Probolinggo is high, amounting to 672.4 people/ Km2. The ratio of male and female population (sex ratio) was 95.2%. This shows the number of male population is lower than women or every 100 female population there are 95 men. The number of live births as many as 18,520 people.

Health resources owned by Probolinggo include 20 inpatient health centers, 13 non-inpatient health centers and 33 mobile health centers. This means that each Puskesmas has 1 mobile health center. Ratio of Puskesmas with population is 1: 34.560 person. Ideally ratio of puskesmas with population is 1: 30.000 which mean still less amount of puskesmas needed.

The total number of Pustu is 87 and the ratio of Pustu with Puskesmas is 2,64: 1 or every 1 Puskesmas has 2-3 Pustu. There are also 40 Polindes and 45 Poskesdes.

Table 1 : Number of Posyandu by Year

Variable	Years				
	2011	2012	2013	2014	2015
Number of Posyandu	1.312	1.312	1.312	1.312	1.312
Primary	145	94	73	20	9
Medium	564	571	581	473	420
Complete	567	614	638	766	808
Independent	36	33	20	53	75
Number of Existing Cadres	6.133	5.846	5.789	5.872	5.974
Number of Active Cadres	5.429	5.391	5.413	5.724	5.792

Probolinggo has 6 hospitals consisting of 5 hospitals and one mother and child hospital. Probolinggo also has 15 clinics, 61 individual practice physicians, 7 traditional medicines, 13 pharmacies, 2 drug stores and 1 small business of traditional medicine.

Direct Cause of Maternal Death

Based on data from Probolinggo Health Office, the most direct cause of maternal mortality is preeclampsia/ eclampsi as much as 30,77%. In addition, the direct cause of maternal mortality is heart disease 19,23%, bleeding 11,54%, hyperemesis 3,85% and Others 34.62%.

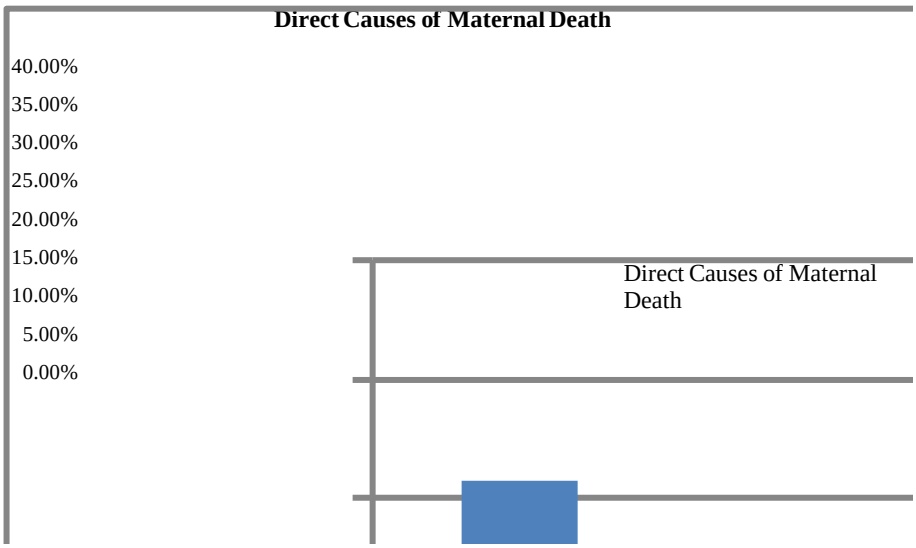

Chart 1 : Direct Causes of Maternal Death

Pregnancy Complications Cases Occurred

Cases of pregnancy complications that occur in Probolinggo include: anemia of pregnant women with Hb <8 g%, high blood pressure (systole> 140 mmHg, diastole> 90 mmHg), eclampsia, comorbidities, elderly pregnant women. The cases of labor complications that occur are premature rupture of membranes, vaginal bleeding, latitude of pregnancy> 32 weeks, breech position in primigravida, severe / sepsis infection and preterm labor.

Discussion

Countermeasures Program

The performance of the maternal and child health problem mitigation program can be seen based on several coverage indicators. Some of these include the coverage of ANC visits in the first quarter (K1) of 97.41% and third quarter ANC visits (K4) of 88.11%. A decrease in K4 coverage versus K1 may occur in part due to a lack of recording and reporting or it could be because pregnant women are visiting unreported and advanced health services.

Performance indicators that are also important to see are childbirth assisted nakes 96.54%, 96.28% puerperium service, coverage of vitamin A in the postpartum of 99.15% and coverage of TT2 + in pregnant women of 68.43%. The scope of the first tablet (Fe1) was 97,41% and the third quarter (Fe3) was 88,11%. While coverage of obstetric complication handling more than 100% equal to 133,71%. The main cause of achieving coverage that exceeds 100% is the underestimation of the target or (under estimated) estimates. The estimated number of high risk pregnant women in Probolinggo 2015 is 3,929. On the other hand the number of high risk pregnancies handled 5,254 people (133.71%).

This fact shows low estimates whereas on the other hand high-risk pregnancies occur. This low estimate causes early detection is less than optimal.

Problems and Solution of High Risk Pregnancy

Based on the results of the interview can be known some problems of high-risk pregnancy in Probolinggo . One of the main problems in the prevention of high risk pregnancy is the perception of susceptibility of pregnant and family mothers. The perception of susceptibility of high risk pregnant women and families who feel fine and no problem affect their medication retrieval behavior. The perception of pregnant women and the family referred to will end in a more fatal situation until death. A taboo perception if checked in early pregnancy. Mothers and families do not believe high risk pregnant, when delivered instead did not come to visit. The existence of these perceptions becomes an obstacle in the process of referring high risk pregnant women.
In addition, there are also known problems in early detection of anemia in pregnant women. Some midwives do not have portable hemoglobin meters. On the other hand in the support of community leaders and village leaders, some village heads do not prioritize health programs.

In the effort of high risk pregnancy confection some efforts that have been done include Gebrak, Gemasiba and Desa Siaga. Gebrak is a maternity facilitation movement by nursing school students. The problem in the implementation of Gebrak is limited to pregnant women who live close to the campus and have not yet reached more remote areas that are more problematic. Gemasiba is the movement to save mother healthy children. This effort is a cross-sector involving Babinsa, religious leaders, community and cadres especially for early detection. Whereas Desa Siaga is less run optimally due to funding problems and management activities.

Priority Issue

Based on the determination of priority problems using Hanlon method then selected problem of early detection of high risk pregnancy. Early detection is not only a matter of discovery and diagnosis but overall began to delay recognizing the danger signs of pregnancy complications, prevention and further treatment. The result of problem priority using Hanlon method can be seen in Table 4.2.

Table 2. Problem priority

Problems	Skor total	Rangking
The problem of early detection of high-risk pregnancies, including: delay recognize the danger of pregnancy complication, prevention and further treatment	15	1
The perception of susceptibility of high risk pregnant women and families who feel fine and not a problem	12	2
Some Village Heads do not prioritize health programs	10	3

Identify the Cause of the Problem

Identify the cause of the problem in the analysis of this situation using the method of fish bone (bonefish). The problem of early detection of high-risk pregnancies, including: delay recognizing the danger of pregnancy complication, prevention and further treatment

The main cause of the problem of early detection of high-risk pregnancy is the perception of susceptibility of high risk pregnant women and families who feel fine and no problem. The perception of pregnant women and families who referred to will end up with a more fatal situation until death a taboo perception if checked in early in pregnancy and mothers and families do not believe high risk pregnant, but did not come visit.

Alternative Problem Solving

Some of the alternatives that can be offered for the above problem solving are prenuptial KIEs to prospective brides to improve their understanding of the importance of recognizing the danger signs of pregnancy complications and further prevention. By providing early recognition of pregnancy signals it is expected that couples will be more aware and more aware of the importance of prevention.

Assistance of pregnant women and families to improve perceptions of susceptibility is an important strategy in the detection of high-risk pregnancies. The family is the immediate environment and the first most important role in tMMRng precautions. The family approach should also be supported by community empowerment through the involvement of community and religious leaders in delivering health messages. It is also important to promote health about KIA which is packaged in cultural elements and local wisdom.

Conclusion

The problem of high-risk pregnancy prioritization in Probolinggo is the lack of early detection due to delay recognizing the danger signs of pregnancy complication, prevention and further treatment. Causes of such delays include:

1. Perceptions of vulnerability of high risk pregnant women and families who feel fine and not a problem
2. Perceptions about pregnant women and families who referenced will end up with a more fatal situation until death
3. A taboo perception if checked in early pregnancy
4. Mothers and families do not believe high risk pregnant, when delivered even not come to visit

Recommendation

For the community

The results of this situation analysis is expected to provide information for the public about the picture of high-risk pregnancy problems in Probolinggo in detail, so that it can be made health program planning for the prevention.

For Probolinggo Health Office

The results of this study can be used as input material in the planning and implementation of health programs, especially in the field of maternal and child health in the future.

For Next Researchers

The results of this study are expected to be useful as a learning experience in conducting situation analysis of health problems and planning of prevention programs.

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Glossaries

Angka Kematian Ibu (MMR) = maternal mortality (MM)

KIA (Kesehatan Ibu dan Anak) = health of both mother and child

Puskesmas (Pusat Kesehatan Masyarakat) = Community Health Centre

Polindes (Pondok Bersalin Desa) = The village maternity pos

Ponkesdes (Pondok Keseehatan Desa) = The village health pos

Posyandu (Integrated Health Pos)

Gemasiba (Gerakan Bersama Selamatkan Ibu dan Anak) = A Joint Movement Save Mother and Child by the Government

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INTELLIGENT DIGITAL ON BOARDING

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Abstract: In last few decades on boarding has been evolved from paper based approach to paper less approach and today on boarding can be done anywhere any time with any device. With the emergence of technology and availability of internet on boarding process becomes quite easy. But most of the time patient ends up providing non contextual information. Existing on boarding services give similar experience to all patients despite their age, gender and complaints. This paper is proposing a context aware digital on boarding solution for the patients to personalize patient's on boarding experience. Proposed solution understands patient's context with the help of workflow based questionnaire. Basis of questionnaire is patient's gender, complaint and age group. This solution generates summary based on the patient's response and publish summary which can help doctors in diagnosing the problem. This solution can be integrated to the existing hospital information system to provide better on boarding experience to the patients. Health Research Institutes can do health behaviors analysis of patients using data collected by system. This solution can be used by health workers in remote areas to understand the patient's problem by asking contextualized questions populated by the system and hence they can provide primary care to the patient.

Keywords: digital on boarding, context aware intelligence, work flow based questionnaire, natural processing language

Introduction

On boarding is the management of the early stages of a relationship between a business and a customer. The hottest industry of the moment -the tech industry- is obsessed with the client on boarding experience and has been using it as a competitive differentiation strategy for a long time now.

Health care industry is also moving towards customer (patient) centric. And hence industry is bound to provide better on boarding experience to the patients. Not many people enjoy filling out paperwork and our patients are probably not the exception. Most of them are already using the internet for most things, like applying for jobs, investing, renewing their driver's license, shopping and even looking for partners.

In last few decades on boarding has been evolved from paper based approach to paper less approach and today on boarding can be done anywhere any time with any device. With the emergence of technology and availability of internet on boarding process becomes quite easy.

Through digitization users have well on boarding experience, they fill forms with their convenience. But

- Most of the existing digital on boarding platform gives static experience to the patients.
- Hospital on boarding services gives similar experience to all the patients despite their age, gender and complaints.
- While on boarding hospital services, patient ends up providing very basic information or non-contextual information. All the contextual information they have to provide to the doctors and then doctors will diagnose problem and start with the treatment.

- Existing patient on boarding process is very time consuming because the information needed to on board patient is not fixed. While on boarding patient, different set of information is needed based on gender, age, and complaints.

Solution Approach

Intelligent digital on boarding is a context aware process which provides workflow based questionnaire for the input provided by the patient and hence gathering the information based on the patient's context.

The process include reading and making sense of the patient's input mapping it to the rules and relations of the question tree and then publish the most appropriate question to the user.

The process also prepares the summary based on the user's input.

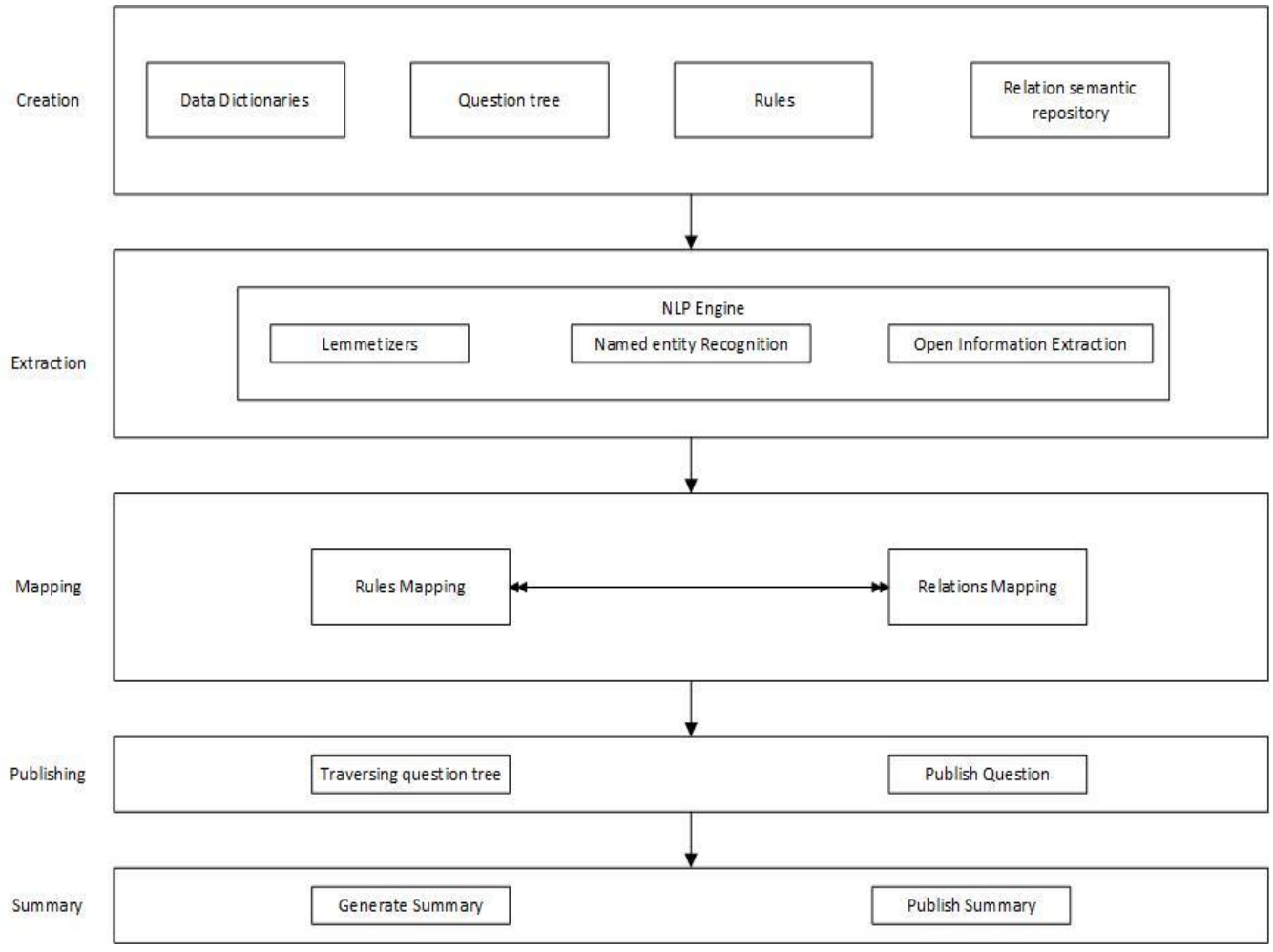

Figure 1: Figure depicts the five different phases of the solution.

Creation phase:

To make sense of user's input system needs knowledge base. The process is creating the different kind of data dictionaries, question tree, rules and relations among the questions to establish knowledge base.

- Data Dictionaries:

When patient registers a complaint it usually contains four things body part, its condition, or any disease name and duration of the complaint.

For Example:

I have fever: This contains disease name FEVER

I have headache: This contains body part (Head) and its Condition (ache)

The process creates data dictionaries for body part, conditions and diseases. To create data dictionaries process uses web crawlers to crawl WebMd knowledge base, UMLS knowledge base etc.

Table 1 Sample data dictionary for body organs

Body parts	Description	Department
Eye	The eye is a slightly asymmetrical globe, about an inch in diameter.	Ophthalmology

Table 2 Sample data dictionary for condition of body parts

Condition	Description	Severity
Pain	Highly unpleasant physical sensation caused by illness or injury.	Low/Medium/High

While process creates data dictionary for disease name it will add symmetrical meaning or layman terms for the diseases with the help of experts.

Table 3 Sample data dictionary for diseases

Disease Name	Description	Body Organ Mapping	Symmetrical Meaning Word
Fever	a medical condition in which the body temperature is higher than usu al and the heart beats very fast.	Whole body	Have temperature, have high temperature, down with temperature, have flue etc

- Rules

Other than the three data dictionaries there will a set of riposte value which contains the keywords/ information from the user's input which will not fall under the above said categories

For example:

User input is:" He is having pain in right eye from last two days".

Body Part: EYE ; Condition: Having Pain ; Riposte set value: right ;Duration: last two days

Rules will be defined by experts. Rules will be combination of

Body part +Conditions [AND/OR/NOT] /Disease + Age + Gender+ Riposte value+ Duration.

Rules will be stored in the form of hash maps.

Rule: Map<Key, List<Set>>

- Question tree

Question tree contains questions and relation among these questions.

Each question has a rule (defined in creation phase) associated with that, the question will be published only after validating the rule and verifying the relation between question.

Question tree will be created with the help of experts.

$/R_x$ Is the relation between the questions.

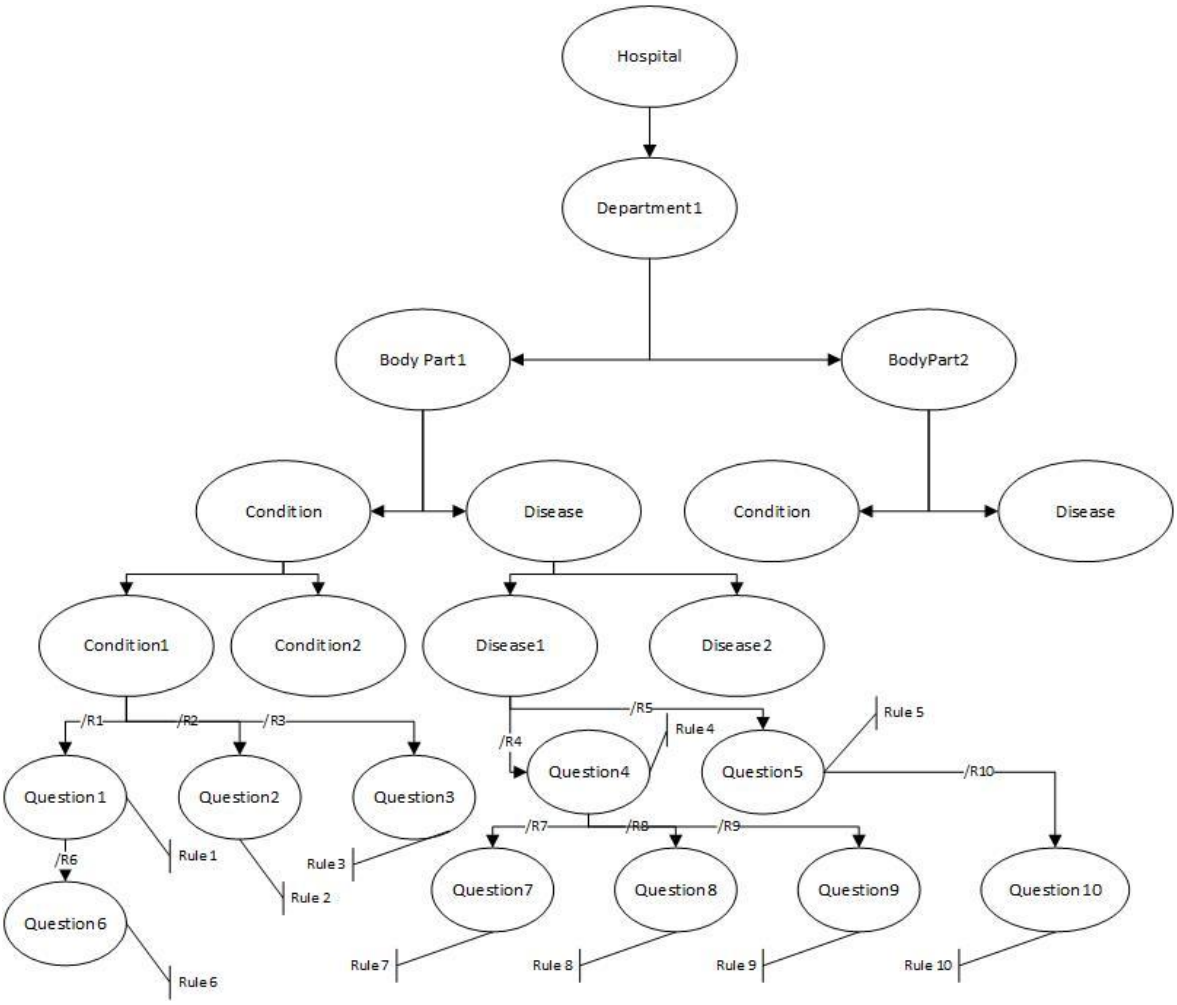

Figure 2: Sample format of question tree

- Relations

Question tree contains relation symbolized as ***"/R_x"*** between disease and the questions related to that disease or between condition and question related to that condition. There is a relation between two questions also.

The relations defined in question tree will be of form

Relation = <Set Name: set value>

Where Set Name can be any of the following:

Body Part, Disease Name, Department Name, Doctor Name, Duration, Condition or Riposte set value.

Relation can contain one or more sets separated by ";".

For example /R1= {<Duration: 1 week> ;< Condition: have cough>}

The process creates comprehensive semantic repository for relations with the help of experts. For each relation there will be a possible symmetrical meaning.

Table 4 Sample Relations with their symmetrical meaning words

Relation #	Relation	Symmetrical Meaning Words
R1	1 week	Last one week, past one week etc
R2	Comes & goes	On and off etc

Extraction phase:

Creation phase establishes the knowledge base for the system. The extraction phase of process includes Natural language processing techniques to extract meaning full information from the patient's input. The process uses three different natural processing language techniques lemmatizer, named entity recognition and open information extraction tool.

- Lemmetizer uses data dictionaries as the vocabulary and extract body part, disease name and department name.
- Named entity recognition extract doctor name, hospital name, date and time.
- The information extracted by open information extraction will be wrapped and compared with the data dictionaries and mapped to the condition and riposte set value.

Hence the output of the extraction phase is the different sets as body part, disease name, department name, doctor name hospital name, duration, condition and riposte set value.

Mapping phase:

Extraction phase results in different types of sets , to make sense of those set, mapping phase maps e sets to the relations with the help of rules and comprehensive set of relations created in the creation phase.

- Rules Mapping

The format of rules is the set of hash maps, so the process compares the output sets of extraction phase with the rules and map to the most probable rule.

- Relation Mapping

The output set of the extraction phase will be compared to the relation data dictionary and its symmetrical meaning words and hence most probable relation will be mapped.

Post mapping phase the output is the one rule and one relation.

Publishing phase:

This phase include traversal of the question tree and publishing the most probable question.

- Tree Traversal

Traverse question tree with department, body part, condition, disease, time duration, rule and relation as input using breadth first search algorithm for the first time. Store question and change root node value of the tree as that question.

- Publish question

Send the stored question as the response to the user interface for publishing the question.

Record user's input and repeats extraction phase and mapping phase. In publishing phase traverse tree with rule and relation as input using breadth first search algorithm for the first time. Store question and change root node value of the tree as that question and publish the question.

Repeat the process until the leaf node of the tree.

Summary phase:

While traversing the question tree, the process is storing the traversal path

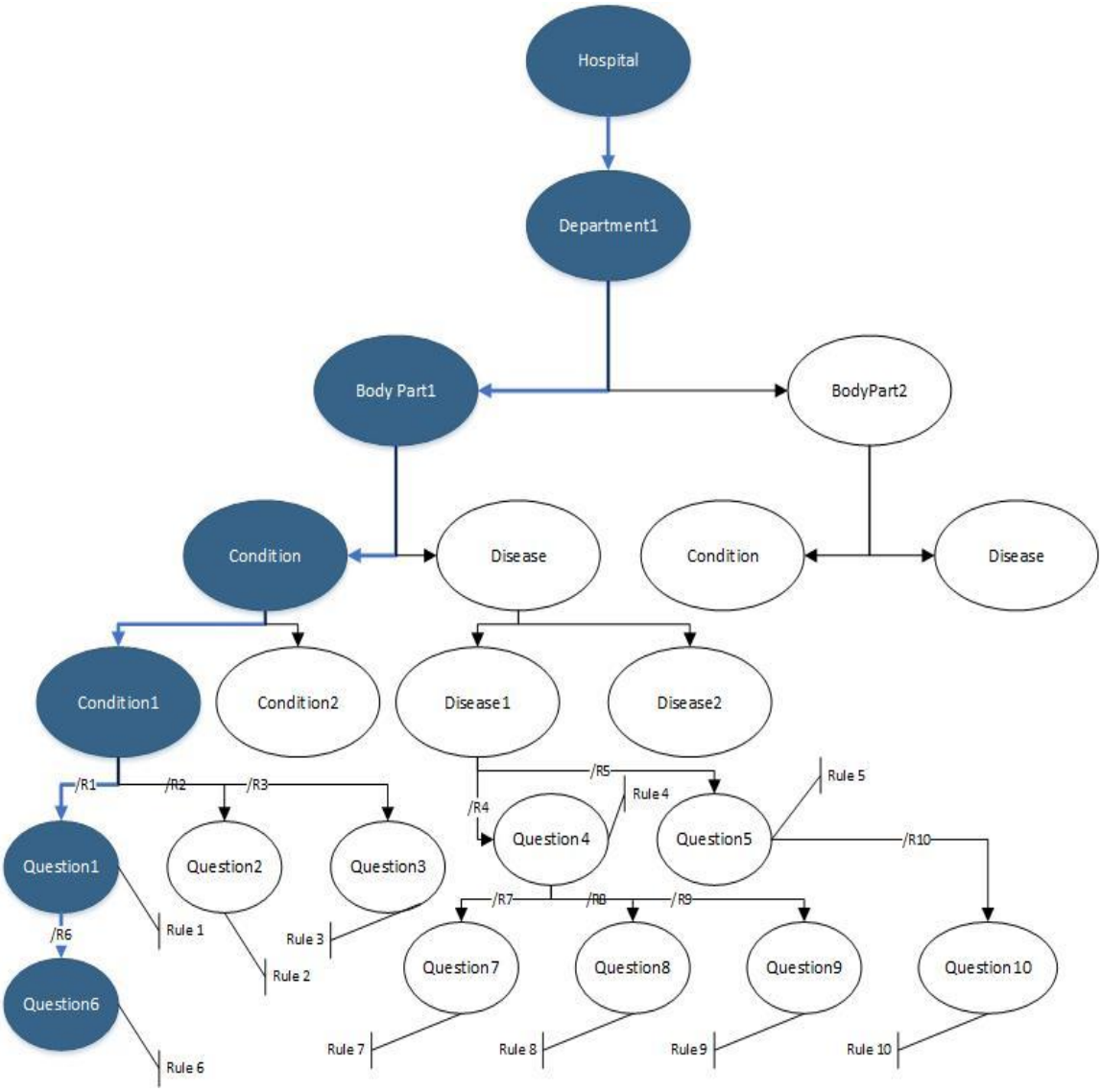

Figure: 3 Highlighted portion of the figure is the traversal path.

The format of the question tree contains the body part its condition/disease (if any) and the based on conditions/disease and the relations (extracted from the user's response) questions will be selected.

This traversal path will be helpful in generating the summary. The summary will be prepared in the following format:

Patient Name + Body Part +Condition/Disease + [Information extracted from questions and their relations]

Extracting information from the questions & relation tree path:

- Replace interrogative words from the questions with the relation of the question to the next question.
- Replace pronouns of the questions with the word "patient".
- Apply Open information extraction technique of Natural language processing (refer extraction phase for more information).
- Merge the extracted information of all the questions one by one.
- Remove duplicate data from the merged data.
- Append the merged data in the summary format.

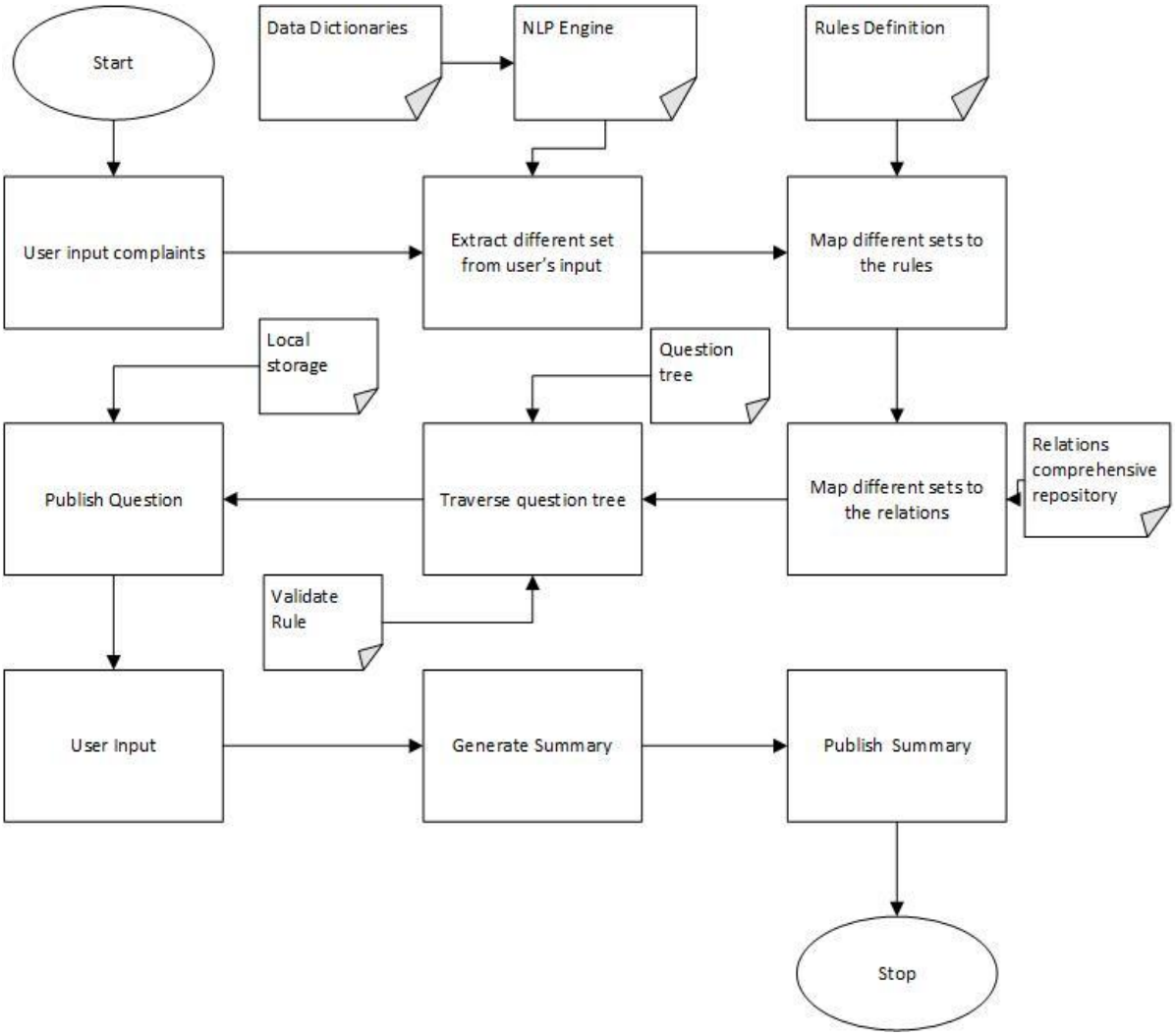

Figure 4: *is depicting the sequential flow of entire process*

Result

This platform is more relevant to the users on boarding any service online. It could be through website or mobile app.

I run this solution for a patient on boarding hospital services for chest pain using this platform.

Chest pain generally originates from one of the organs in the chest (heart, lung, or esophagus) or from the components of the chest wall (skin, muscle, or bone). Occasionally, organs close to the chest, such as the gall bladder or stomach, may cause chest pain. Pain in the chest may also be the result of neck pain that is referred to the chest, called referred pain.

Reason for chest pain could be heart attack, angina or any other. But if it is case of heart attack or angina delayed treatment can result in death of patient.

With the help of this platform user will able to provide all the required information related to chest pain on the way, so that after reaching to the hospital treatment can be started without delay.

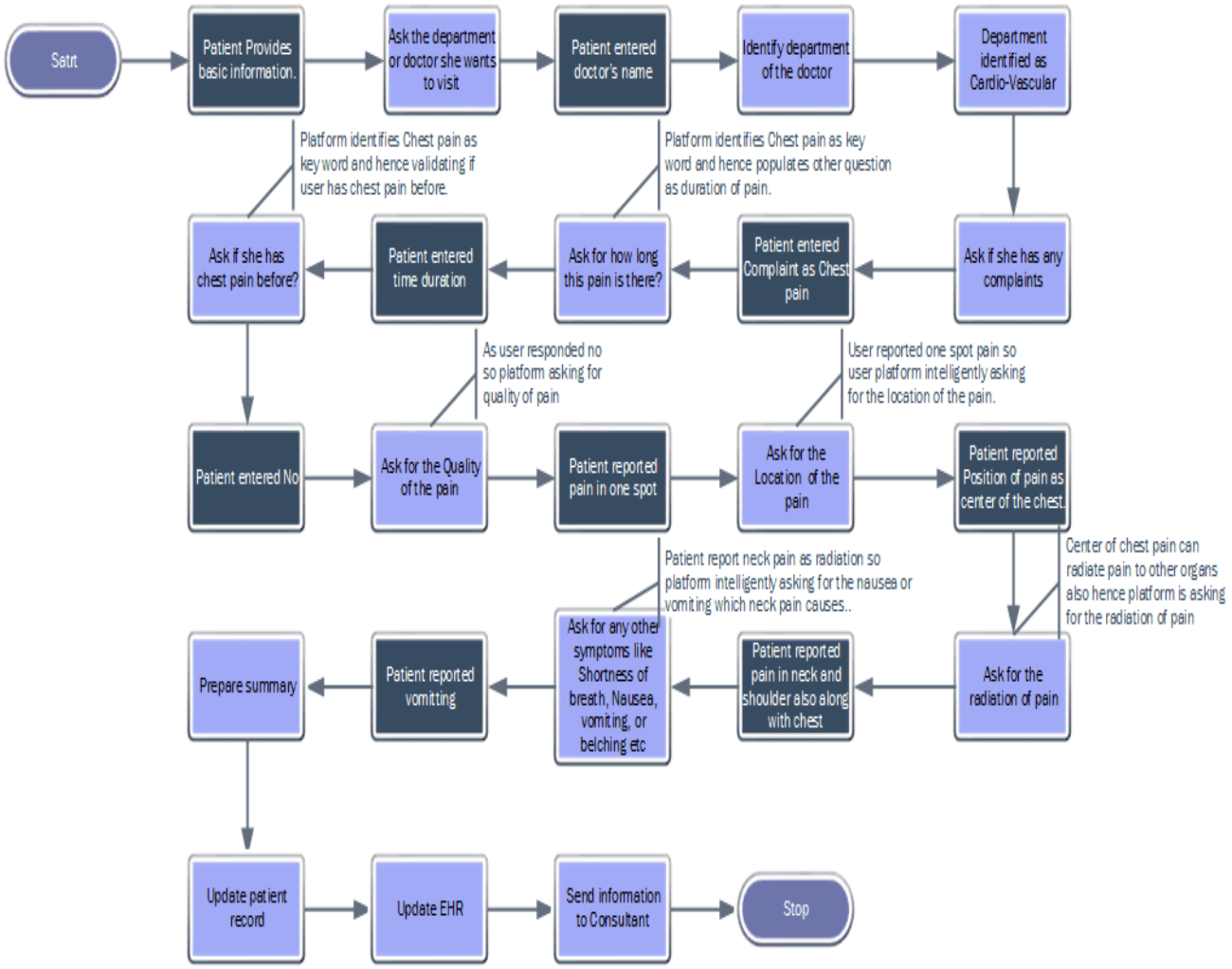

Figure 5: Figure shows the work flow based questionnaire system asks for a patient on boarding hospital services with chest pain as the chief complaint.

Business Usage of this approach

- **Hospital Information System**
  - This solution can be integrated to the existing hospital information system to provide better on boarding experience to the patients.
- **Health Research Institutes**
  - Research Institutes, through the data collected from the system, can do health behaviours analysis of patients.
- **Insurance Companies**
  - Insurance Companies can customize plans based on the patient's need.
- **Health Care Worker:**
  - Health care workers usually working in remote areas with very less facilities of consultant and they are not equipped with all the knowledge and hence sometimes they are not able to ask relevant questions to the patient about their complaint and hence patient has to bear the pain until they will get connected to the doctor and then patient explain complaint to doctor, this entire process take so much of time but with the help of this solution health care workers can ask the questions populated by the system based on user's input and hence the time to treat patient can be reduced significantly.

Conclusion

People can on boarding any service at anytime from anywhere through any device. People sometime don't use some of the service because their on-boarding process takes lot of time to provide information which is non-contextual.

The primary goal of this platform is to ask for context aware information for on boarding process which in turn will reduce on boarding time and gives user personalized experience.

This platform promotes culture of citizen developer and reduces cognitive overloading.

Future work

- In future the system could provide the recommendations of the test which could be required based the complaints provided by the patients.
- In future the system could trend the disease out-break in any specific region and learn to ask questionnaire based on the travel of the patients.
- In future there could mobile app for the same and could sync with the patient's travel details and provide notifications to the patients based on the disease outbreak in that region if any

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ASSOCIATION BETWEEN BLOOD LEAD LEVELS AND BASOPHILIC STIPPLING ERYTHROCYTES IN CHILDREN

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Abstract : Lead is the heavy metals that pollute the air and lead exposure continues to be the most serious public health problem. Increased lead absorption causes negative effect such us increased number of basophilic stippling erythrocytes. Battery smelting industry is an important source of lead pollutants today. Cinangka is one village in Bogor District that has battery smelting. Based on the results of investigation by KPBB (Komite Penghapusan Bensin Bertimbal) in 2010, the mean of blood lead levels (BLL) in Cinangka children's was 36.6 µg/dl (WHO threshold = 10 ug/dl).Aim of this study was to analyze the effects of BLL on the basophilic stippling erythrocytes in children. This study used a cross-sectional design. Blood samples were taken from 103 children in Cinangka Village Bogor District, Indonesia (2014) to measure BLL and basophilic stippling erythrocytes. A questionnaire used to determine the data on the level of parent's education, parent's income and nutrient intake. A nutritional status was known by calculating the Body Mass Index. Overall, 103 children (43 boys and 60 girls) with mean±SD age of 11,27±1,03 years were studied. The mean BLL on children was 14,70 µg/dl, whereas the lowest BLL 0,05 µg/dl and the highest BLL 52,11 µg/dl. The results also showed 61.2% of children had high BLL (≥ 10 µg/dl). Statistical analysis with chi square showed that the BLL (p = 0.001) and mother's education level (p = 0.005) had significant association with basophilic stippling. Based on multivariate anaylisis, BLL was the most dominant variables associated with basophilic stippling.

Keywords: Blood lead levels (BLL), Basophilic stippling erythrocytes, children

Introduction

Lead is one of the heavy metals that pollute the air and lead exposure continues to be the most serious public health problem (Mitchell, 2006). 40% of children in the world had blood lead levels > 5 µg/dl. Some of them had blood lead levels > 10 µg/dl of which 97% of them live in developing countries (Ustun, 2004). According to the WHO report, 18 children died in Thiaroye sur Mer, Senegal, during November 2007-March 2008 due to encephalopathy caused by lead intoxication. This could happen because of lead contamination to the environment resulting from the presence of informal companies/industry in the battery recycling/smelting (Haefliger, 2009).

The battery recycling/smelting industry is an important source of lead pollutants today. Most of the lead in the world is a secondary form as a result of battery recycling. 97% of the batteries in the world are reportedly recycled, most of which occur in low-income countries and generally informal industries, especially those that are not controlled by government (WHO, 2010).

Lead at the exposure level of at least 10 µg/dl can interfere the hem synthesis, but in the initial disorder there is no clinical disorder (Lidsky, 2003). To compensate for the disruption of Hb synthesis by lead, medulla spinalis will increase the production of erythrocytes so that many reticulocytes and basophilic cells are obtained. The basophilic cell formed as part of the metabolic disorder of Hb formation is a sign of lead poisoning (Darmono, 2001). The Balali-Mood (2010) study in Iran found a significant association between

blood lead levels and basophilic stippling erythrocytes ($p = 0.048$). A study by Kyrell in Turkey showed that children had higher blood lead levels than men and all women ($p < 0.001$). The results also showed that blood lead levels were negatively correlated with Hb in children ($p < 0.05$) (Kyrell, 2005).

A research conducted by Ahmad (2009) in Pakistan on 190 children aged 1-12 years divided into 2 groups where group A was the children living around the repair shop car as many as 62 people (39.5%) and group B was children who lived in the vicinity of a battery recycling of 128 people (60.5%). The results showed that mean of blood lead levels in children living around car repair shops and battery recycling sites were 11.4 µg/dl (1.3-34.2 µg/dl). Among the 190 children, 98 children (51.6%) had higher blood lead levels than the WHO recommended (10 µg / dl). Among 98 children with high blood lead levels, 61 children (32.1%) had blood lad levels between 10-15 µg / dl, 24 children (12.6%) had a blood lead level of 15-20 µg / Dl and 13 children (6.8%) had blood lead levels> 20 µg / dl indicating severe lead poisoning. Children living in areas near the battery recycling site (mean ± SD 12.85 ± 6.02) had high blood lead levels ($p <0.020$) than children living around car repair shops (mean ± SD 10 , 19 ± 6.13) (Ahmad, 2009).

Cinangka is one of the villages in Bogor District which has battery smelting industries and becomes a place polluted by lead. In the 1980s, Cinangka became a center of former battery smelting where battery smelting activities became home-based industries. In the middle of the settlement, residents burn lead without chimneys and emissions drainage filters that cause polluted air and the sky is shrouded in black mist (Committee on the Elimination of Leaded Gasoline, 2011).

In Cinangka Village, lead pollution on the ground reached 270,000 ppm, whereas the WHO threshold is 400 ppm (Ministry of Environmental Health, Indonesia, 2011). Based on the investigation report of KPBB (2010) in Cinangka Village, it was known that the mean of blood lead levels of children above the WHO threshold (10 µg/dl) and CDC threshold (5 µg/dl) was 36.6 µg / dl. The minimum BLL was 16.2 µg/dl and maximum > 60 µg/dl (Committee on the Elimination of Leaded Gasoline, 2011).

Children are groups that are vulnerable to lead exposure. Increased lead absorption cause a decrease of Hb, decrease in number of erythrocyte and shortening of the erythrocyte life span, an increase in the number of reticulocytes and an increase in the number of basophilic stippling erythrocytes (Joko, 1995). The objective of this study was to analyze the effects of BLL on the basophilic stippling erythrocytes in children.

Method

This research used cross sectional research design. The study was conducted during May-June 2014. The population in this study were elementary school children grade 4, 5 and 6 in 4 elementary school located in Cinangka Village, Ciampea Subdistrict, Bogor Regency with the number of 535 students. Sampling was done by using simple random sampling method with total sample as 103 people.

Data on blood lead levels and basophilic stippling erythrocytes were obtained through venous blood sampling. Blood specimens were obtained by taking 3 ml of venous blood (2.5 ml for lead measurement and 0.5 ml for erythrocyte examination) in the arm/elbow fold and performed by 3 experienced health workers consisting of 1 laboratory staff Puskesmas Cilandak, South Jakarta which has been working for 20 years,2 laboratory staff at Jati Rahayu Hospital, Bekasi who have been working for 10 years and 5 years. Measurement of blood lead levels used AAS (Atomic Absorption Spectrophotometer) at Hiperkes Laboratory, Jakarta. Basophilic stippling erythrocyte examination was done through examination of peripheral blood vessel preparation.

Questionnaires were used as instruments for measuring data on variable of nutrient intake, parent education level, parent income level and nutrient intake (protein,calcium and iron. Nutrient intake was obtained from the processing of food recall 2 x 24 hours (on weekends and active days) then summed and made the average value, then the value is converted into percentage of nutrient intake by comparing the value with the standard set by the Ministry of Health RI no 75 of 2013 is appealed to the Indonesian nation. Meanwhile, for

nutritional status variables, obtained from the measurement of body height and weight of chuldren then calculated Body Mass Index (IMT) and converted into Z-score value.

Informed consent has been provided to the respondent to be considered whether willing or refusing to be a respondent. This research has been approved by the Ethics Committee of the Faculty of Public Health of the University of Indonesia.

Data analysis was done through univariate analysis, bivariate and multivariate analysis. To analyze the correlation of blood lead level, nutritional status, parent education level, parent income, nutrient intake, with basophilic branched erythrocyte was used chi square test. Multivariate analysis used multiple logistic regression.

Result and Discussion

The sample of 103 children who were Cinangka elementary school students aged 9.33-14.00 years old with average age 11,27 years. Most of the respondents were female (58.3%). Respondents came from 4 different elementary schools located in Cinangka Village. Most respondents came from SD 3 Cinangka (31.1%). Most of the respondents were 5th graders (38.8%). Most respondents had high blood lead levels (≥10 µg / dl) of 61.2% or 63 respondents (table 1).

Table 1. Distribution of Blood Lead Levels Categories Based on WHO Threshold

Variable	Frequency	Percentage
High Blood Lead Levels (≥10 µg/dl)	63	61.2%
Low Blood Lead Levels (< 10 µg/dl)	40	38.8%
Total	103	100%

Laboratory results showed most respondents had basophilic stippling erythrocytes, with a percentage of 62.1% (table 2).

Table 2. Distribution of Basophilic Speckled Erythrocytes in Children in Cinangka Village

Variable		Frequency	Percentage
Bashopilic stippling erythrocytes	Yes	64	62.1%
	No	39	37.9%
Total		103	100%

The description of respondent characteristics consist of nutritional status, parent's education level, parent's income is shown table 3.

Table 3. Distribution of Nutritional Status, Parent's Education, Parents Income on Children in Cinangka

Variable	Frequency	Percentage
Nutritional Status		
- Stunting (BMI/Age < -3)	3	2.9
- Underweight (-3 ≤ BMI/Age < -2)	16	15.5
- Normal (-2 ≤ BMI/Age≤ 1)	70	68.0
- Overweight (1 < BMI/Age≤ 2)	10	9.7
- Obesity ((-2 ≤ BMI/Age > 2)	4	3.9

Father's education level		
- Low	71	68.9
- High	32	31.1
Mother's education level		
- Low	81	78.6
High	22	21.4
Parent's income level		
- Low	79	76.7
- High	24	23.3

Most of the respondent (80%), percentage of the fulfillment of good nutrition intake of protein, calcium and iron under the standard of Nutrition Adequacy Ratio recommended by the Ministry of Healt wis 80%.

Bivariate analysis using chi square test between the main variables, covariable with dependent variable of basophilic stippling erythrocyte showed that high blood levels and low level of maternal education were risk factors for basophilic stippling erythrocytes (table 4).

Table 4. Relationship BetweenVariable Blood Lead Levels, Covariabel with Basophilic Stippling Erythrocyte Variable on Children

Variable	Basophilic stippling erythrocytes				Total		Odds Ratio (95% CI)	*p value*
	Yes		No					
	F	%	F	%	F	%		
Blood lead levels								
High (> 10µg/dl)	60	95.2	3	4.8	63	100	180 (38.093-850.551)	0,001
Low (≤ 10µg/dl)	4	10.0	36	90.0	40	100		
Total	64	62.1	39	37.9	103	100		
Nutritional status								
Abnormal (BMI/Age >1 and BMI/Age <-2)	19	57.6	14	42.4	33	100	0,754 (0,324-1,757)	0,512
Normal (-2≤BMI/Age≤1)	45	64.3	25	35.7	70	100		
Total	64	62.1	39	37.9	103	100		
Father's education level								
Low	48	67.6	23	32.4	71	100	2,087 (0,890-4,896)	0,088
High	16	50.0	16	50.0	32	100		
Total	64	62.1	39	37.9	103	100		
Maternal education level								
Low	56	69.1	25	30.9	81	100	3,920 (1,459-10,532)	0,005
High	8	36.4	14	63.6	22	100		
Total	64	62.1	39	37.9	103	100		
Parent income level								

Low	52	65.8	27	34.2	79	100	1,926 (0.763-4.859)	0.162
High	12	50.0	12	50.0	24	100		
Total	64	62.1	39	37.9	103	100		
Protein intake								
< 25.715	10	83.3	2	16.7	12	100	2.500 (0.903-6.918)	0.072
≥ 25.71%	54	59.3	37	40.7	91	100		
Total	64	62.1	39	37.9	103	100		
Calcium intake								
< 6.28%	20	76.9	6	23.1	26	100	2.500 (0.903-6.918)	0.072
≥ 6.28%	44	57.1	33	42.9	77	100		
Total	64	62.1	39	37.9	103	100		
Calium intake								
< 10.67%	34	66.7	17	33.3	51	100	1.467 (0.658-3.267)	0.348
≥10.67%	30	57.7	22	42.3	52	100		
Total	64	62.1	39	37.9	103	100		
Iron intake								
< 24.00%	34	68.0	16	32.0	50	100	1.629 (0.728-3.644)	0.233
≥24.00%	30	56.6	23	43.4	53	100		
Total	64	62.1	39	37.9	103	100		

After bivariate analysis, there were 7 variables that can enter into the multivariate model. These variables include blood lead levels, father's education level, maternal education level, parent's income level, protein intake, calcium intake and iron intake. The final model of multivariate logistic regression analysis showed that blood lead levels were the dominant variable associated with basophilic stippling erythrocytes (OR = 180.00, 95% CI: 38.093-850,551). The calculation result of multivariate anaylisis showed OR = 18,729. The end result of the interaction test showed an interaction between the variables of blood lead levels in the blood with protein intake (OR = 138.267, 95% CI: 31,113-614,457). The results of the confounding test was found that the variable of iron intake and maternal education was the confounding variable for the correlation of blood lead level with basophilic stippling erythrocytes.

Discussion

The mean of blood lead level of the respondents was 14.70 µg / dl, higher than the WHO threshold (10 µg / dl). In 2012, the CDC has set a threshold level of blood lead level of 5 µg/dl (PEHSU, 2013). The lowest blood lead levels was 0.05 µg/dl and the highest was 52.11 µg / dl.

The results of Tiurdinawaty's research on elememantary school students grade 4 and 6 in Cikarang sub-district in 2008 showed the average of blood lead was lower than the mean of blood lead level in Cinangka elementary students in this study. The mean blood lead level in elementary school students in Cikarang was 6.13 µg/dl, where the median value was 5.72 µg/dl. Lowest value 0.17 µg/dl and the highest 15.97 µg/dl (Tiurdinawaty, 2008). This showed that children in Cinangka have been exposed to higher lead due to environmental contamination from the battery smelting industry that has been established since the 1980s. The results of Ahmad's research in Pakistan showed that children living around car repair shops and batteries recycling sites have an average blood lead level of 11.4 µg/dl (1.3-34.2 µg / dl). Children living in areas near the battery recycling site (mean = 12.85) had high blood lead levels ($p < 0.020$) compared with children living around car repair shops (mean = 10,19) (Ahmad, 2009).

Based on the information in the Cinangka, it was known that several factors related to the high blood lead level on children in Cinangka, especially children with blood lead level ≥ 30 µg/dl. It could happen because the parents of their chidren working as laborers or employees in the battery smelting industry, the residence of children closed to battery smelting industry, (± 1 km distance), as well as children residence near the river where washing used batteries.

According to CDC (2012), blood lead levels in children depend on the environment, habits and nutritional status Nutritional status is also related to the daily intake of nutrients in children. In low-calcium, iron, zinc and protein dietary conditions, can increase lead absorption14 (PEHSU, 2013).

According to Caroline W. (1995) in Suciani (2007), blood lead levels can be affected by prolonged exposure, exposure dose and lead entry into the body. The level of lead in the blood is also affected by the distance between the dwelling and the source of the pollutant17. The research of Chahaya et al (2005) in Pematang Siantar City found that there was a correlation between lead level in blood of pedicab driver with the distance of house to source of pollutant18. According Atrisman (2002), ambient air with a 0.5 meter radius of the source of exhaust emissions is the location of the greatest risks. Distance of 0.5-1 km is a moderate risk and above 1 km is a mild risk.

Of the 103 children in Cinangka Village who became the sample, most of them had basophilic spotted erythrocytes (62.1%). The result of bivariate analysis was statistically known that there was correlation between blood lead levels with basofilic stippling erythrocytes. Similar results are shown by the Balali-Mood (2010) study in Iran. The study found a significant association between blood lead levels and basofilic stippling erythrocytes (p value = 0.0487).

In the erythrocyte maturation process, lead causes deficiency of the pyrimidine-5'-nucleotidase enzyme (this P5'N enzyme is involved in the degradation of RNA / ribosomal ribonucleic acid in reticulocytes). Due to P5'N enzyme deficiency an intracellular aggregate is formed as a consequence of ribosomal degradation failure. The presence of basophilic spots in these erythrocytes is a morphological form of intracellular aggregates due to the failure of ribosomal degradation. Genetically, P5'N enzyme deficiency is associated with chronic hemolysis, characterized by basophilic stippling in erythrocytes and accumulation of pyrimidine nucleotides (Rodak, 2012 and Greer, 2014). The basophilic cell formed as part of the metabolic disorder oh Hemoglobin (Hb) disorder of Hb formation is a sign of lead poisoning (Darmono, 2001)

The presence of basophilic stippling erythrocytes indicates that lead poisoning has occurred on children in Cinangka. Most children with lead poisoning are asymptomatic. There were 3 children in Cinangka who had blood lead levels > 40 µg / dl. This indicates that the children has been severely exposed by lead despite the undetectable signs of poisoning (Ministry of Health Indonesia, 2013).

Based on the study, nutritional status and nutrient intake (protein, calcium and iron intake) was not significantly correlated with basophilic stippling erythrocytes on children in Cinangka. Indirectly the nutritional status affects the basophilic stippling erythrocytes by absorption of lead levels in the blood. Children with poor nutritional status are more vulnerable to absorb more lead than children with good or normal nutritional status.

The existence of the relationship is not significant, it is likely to indicate that there are other factors that more influence the occurrence of basophilic stippling erythrocytes. Most likely is due to environmental or residential factors. A child with the same nutritional status but residing in different environments (such as near or remote home locations with the battery industry), is likely to receive different lead exposures. Therefore, it can increase the risk of accumulation of lead in the body and cause basophilic stippling in their erythrocytes.

As stated by CDC (2012) that environmental, habits and nutritional status can influence the variation in lead levels in a child's blood (PEHSU, 2013). Nutritional status is also related to daily nutritional intake in

children. When the intake of certain nutrients is less then there will be nutritional deficiency. Based on Correia (1998) in Suciyani (2007) on low calcium, iron, zinc and protein diets can increase lead absorption (Suciani, 2007). High lead absorption further increases the risk that a person has basophilic spotted erythrocytes.

The result of bivariate analysis showed that there was not significant correlation between father education level and basophilic stippling eytrhrocytes on children in Cinangka.A person's level of education basically affects one's knowledge. Although knowledge is part of the area of conduct, it will not guarantee that a person with sufficient knowledge possesses the same behavior (Syafri, 2013).

However, the results showed that children who had mothers with low educational level were 3.92 times more likely to have basophilic-stippling erythrocytes than children with mothers with higher education (p = 0.005, 95% CI: 1.459-10.532). Maternal education will affect knowledge as well as parenting patterns at home. In contrast to the level of education of the father who did not show a significant relationship, maternal education showed a significant relationship. This means that mothers with higher education are able to adopt a healthy lifestyle for themselves and their families so as to minimize the adverse effects of lead hazard, whether through good dietary regulation or other prevention efforts. The rigorousness of this study is the non-measurement of maternal health behavior.

The statistical analysis showed there was not relationship between parent's income level and basophilic stippling erythrocytes on children in Cinangka. This can be caused even if a family has a high income and is able to meet the needs of his life well, but possibly because of ignorance or lack of knowledge and awareness about the pattern of good consumption of food then causes the family to consume insufficient food types of certain nutrients and less variation in diet.

Theoretically, families with high income levels will be better able to provide for their daily needs, including the need for food, whereas with a low monthly household income the possibility of a child and other family members not getting food rich in sufficient iron and the diet of children living in families with less economics are usually monotonic (Gutema, 2014).

Friedman's research showed that relatively well-earned family meals are not much different in quality compared to low-income family meals. This suggests that ignorance of the benefits of food for health is one of the reasons for the lack of nutrient quality consumed (Syafri, 2013). Research conducted by Zhou, et al in Adelaide, Australia in 2005-2007 did not find any association of socioeconomic status with macro nutrient intake nor micro (Zhou, 2012).

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WEIGHT STATUS AND CONSUMPTION OF SUGAR - SWEETENED BEVERAGES AMONG AFFLUENT ADOLESCENT BOYS AND GIRLS

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Abstract: Obesity in relation to Sugar Sweetened Beverages (SSB) consumption, a worldwide problem has extensively documented in western countries. Still, Indian data on SSB consumption of adolescents is lacking. Therefore, nutritional assessment, SSB intake, dietary consumption and milk consumption (assessed through 24 hour dietary recall method) prevalence, locale of SSB (assessed through semi structured questionnaire) among adolescents was recorded. Study was conducted at private schools of Jodhpur city (Rajasthan, India) including (600) adolescent aged 13-15 years. Grading of nutritional status was compared with WHO (2007) classification .For selection of categories and classification of SSB'S, NHANES III and NHANES 1999-2004 was referred. Among 15 years obese (20.62%) boys and (24.60%) girls were consuming maximum dietary calories (i.e. 1887.5±67.17 k.cal/day vs. 1942.16±296.94 k.cal/day respectively). Prevalence of soft drink consumption on a daily basis was reported among all the age group (100%) adolescents. Most preferred place for SSB consumption was home and school. Girls aged 15 years, consumed lesser milk (165.49±128.34 ml/day) as compared to boys. With advancing age, the caloric intake from SSB has increased among adolescents.

Keywords: Sugar Sweetened Beverages(SSB), Obesity, Affluent adolescents, Soft drinks

Introduction

Obesity is a condition of abnormal or excessive fat accumulation in adipose tissue. Bell *et al*. (2005), suggested that excess fat should not be considered as a disease, but instead as a, ―collective adoption to the pathological environmental pressure to eat too much and exercise too little.

This disease in now emerging to suggest that the prevalence of overweight and obesity is increasing worldwide at an alarming rate. Over the past few decades, globally percentage of overweight had increased by 3.3% in 2000 (Onis and Blossner, 2000). WHO, Obesity International Taste Force (IOTF), 2004 reported 155 million youngsters as overweight or obese. The problem of overweight and obesity is confined not only to adults but also reported among children and adolescents of developed as well as developing countries. Over the past 25 years rate of overweight and obesity was observed as doubled in children (6- 11 years) and tripled in (12 to 17 years) adolescents (Dietz, 2004). Projections made for overweight and obesity among European Union's children assumed a linear trend, the proportion of overweight children would increase by almost 17%, and over 19% obese children from 2006 to 2010 (Leach and Lobstein, 2006).

The secular trends in prevalence of overweight and obesity among urban Asian Indian adolescents in New Delhi aged 14-17 years, revealed that, the obesity increased significantly 9.8% in 2006 to 11.7% in 2009 ($P<0.01$), where as underweight decreased from 11% to 3.9% ($P<0.001$) (Gupta et al., 2011).The emerging evidence suggests an increase in over-nutrition status among children as well as adults. The National Family Health Survey (NFHS-4) 2015-2016, data showed that Indian obesity doubled in past 10 years among adolescents and adults aged 15-49 years.

Adolescence is a period of transition from childhood to adulthood it assumes critical position in the life cycle of human beings, characterized by an exceptionally rapid rate of growth and physical changes. Even changes can be observed in their food choices which are influenced by surrounding social and physical environment. Urbanization related intake behaviors may promote obesity including frequent consumption of meals at fast-food outlets, consumption of over sized portions at home and at restaurants, consumption of high calorie, low fiber foods and intake of sugar sweetened beverages. Dramatic increase in the frequency and size of soft drinks consumption is thought to be as the modern world's culprit that may contribute in obesity epidemic.

Clarie (2008), stated that US children and adolescents drive 10-15% of total calories from Sugar Sweetened Beverages (SSB). The percentage of calories consumed as SSB and fruit juice from 1988 to 2004 were estimated and it was found that on average, kids 2 to 19 years old got 242 calories a day from these beverages in 1988-1994, and 270 calories daily in 1999-2004 intake of SSB increased from 204 to 224 calories daily. While fruit juices intake rose from 38 to 48 calories per day. The sharpest increases in SSB consumption, of 20% were seen among 6 to 11 years old. Among teens, the 84% who drank SSB consumed 30 ounces daily or 360 calories, representing 16% of their calorie intake.

In India on premise consumption (at the place of purchase), of soft drinks for e.g. railway stations, restaurants and cinemas, accounts for an estimated 80% of the total soft drink market with in-house consumption (soft drinks purchased for consumption at home) accounted for the remaining 20% of the market (Centre for Management Research, 2005).Corresponding to the consumption, soft drink sales were also growing which was 76% between 1998 and 2002 from 5670 million bottles to over 10,000 million and increased at least 10% per year through 2012 (PTI, 9/29/2004). India food and drink report Q3 (2011), showed that growth in sales of soft drink was +11.9% and +9.6% as compound annual average growth during 2015.

Well-described data on obesity are available in the adult population from developed countries but data about Sugar Sweetened Beverage (SSB) consumption and contribution in affluent adolescent obese from developing country is still lacking. Therefore right from the beginning that is from school age extensive work is required to be undertaken. Although the cause of this apparent obesity epidemic is likely to be multi factorial, the findings may suggest that SSB consumption could be an important contributing factor. Thus, keeping in view the above facts and for providing direction for further work the current study is structured in concern with consumption pattern of Sugar Sweetened Beverages and obesity among adolescents.

Methods

A cross-sectional study was conducted including all private public schools (catering affluent group of society) of Jodhpur (Rajasthan) ,India. With fee structure of>1000 rupees per month were listed and approached for their consent to carry out the research. The schools, those agreed to be part of the study, four of them were then randomly (every alternate) selected. The sample size consisted of 600 subjects comprising of 300 girls and 300 boys, studying in 8, 9 and 10 standards, aged 13, 14 and 15 years.

Nutritional anthropometry was used to assess the nutritional status. It includes the subject's height and weight. Height and weight of adolescents were taken, as per the guidelines given by Gibson, 2005. Weight was measured by taking bathroom weighing scale with a 125 kg maximum capacity to the nearest 0.1 kg. For measuring height in standing position, a wall fixed anthropometer was used. The ratio of height and weight was used to measure BMI. Therefore BMI was accurately calculated using the formula, BMI = Weight (kg)/ Height (m2). The cut-off point, BMI classification system, helped in prediction of the magnitude of the underweight, overweight and obesity status. Grading of nutritional status has been expressed on the basis of BMI values, as suggested by WHO, 2007.

Sugar Sweetened Beverage (SSB) consumption pattern :Various beverages are available in the market and are prepared at home. For selection of categories and classification of SSB'S, NHANES III and NHANES 1999-2004 (NHANES, 2004), classification includes 5 mutually exclusive, Non alcoholic beverage categories (Wang *et al*., 2008).

1. Cola (Pepsi, thums up etc.)

2. Non cola (sprite, seven up etc.)

3. Non carbonated and fruit flavored (roohafza, tang etc.)

4. Fruit juices with added sugar (maaza, frooti etc.)

5. Other beverages (tea, hot coffee, cold coffee etc.)

Quantity: The quantity consumed each time adolescent's drank SSB i.e. SSB consumption every instance in context with glasses, cans and bottles. The taken quantity was converted into ml and calculated to find out total SSB consumption. Thus individual's consumption of SSB was made easy to evaluate.

Prevalence of SSB: With the help of open ended questions the prevalence of SSB was carried out.

Preference of SSB: A list of SSB available in local market was listed down in questionnaire and it was categorized in different categories. For the purpose each category was individually ranked by subjects that indicated the preferences or choice.

Location of SSB consumption: To evaluate, locations for frequent SSB consumption, the categories and sub-categories identified were, home environment (own home/ other people's home), school, restaurants, juice centers and fast food centers.

Sugar Sweetened Beverage calorie: Data gathered from 3 day, 24 - hour dietary recall, (i.e. 2 weekdays and a weekend) was calculated. SSB caloric values were used through the information, related to calories on the brand of SSB's.

Calorie Comparison: Calorie of each subject, calculated from Sugar Sweetened Beverages was compared with BMI and weight status viz. underweight, overweight or obese to evaluate the impact of SSB consumption. The comparison of calorie output from SSB vis-à-vis calorie output from regular meals is pictured to describe the contribution of calorie from SSB in a day's diet.

Dietary assessment: For dietary assessment, 24 - Hour Dietary Recall methods is used. All the foods and beverages (including milk intake), a person consumes within 24- hour dietary recall method, during 3 day dietary survey was listed . Assessment included two weekdays and one weekend. The quantity of the cooked food ingredients was converted into raw quantity to calculate the calorie content of each, using nutritive values of Indian foods, ICMR, 2000. To calculate energy of ready to eat food i.e. biscuits, chips etc. and SSB consumed was referred to calculate nutritional information given on packets. Thus, total daily dietary energy and SSB calories intake was assessed. Dietary calorie intake was compared with RDA given by ICMR, 2000

Consumption of milk: It was computed by 24 hour dietary recall method and compared to examine the amount of milk displaced with SSB consumed from day's diet of the subject.

Development of tool: Tool was developed for the collection of data related to the parameters described above. The tool consisted of semi-structured questionnaire, it was pre tested on 30 non-sample subjects for the clarity and to elicit the complete required information. The tool was finalized after necessary modifications.

Statistical analysis: The data of all 600 subjects were compiled and transcribe on excel sheet. The tabulated data was than given codes to each different variable. Range, Mean, median, standard deviation was applied for significance of data.

Result

Nutritional status: The nutritional status of all the adolescents is presented according to age which reveals that in the age group of 13 years, highest number (69.85%) of boys and 36.36% of girls were underweight. Whereby, only 9.52% of boys but 28.19% girls were normal. This indicates that normal nutritional status was maintained by more girls as compared to boys. Slightly higher numbers of overweight boys (20.63%) were observed in comparison to girls (15.45%). In contrast, none of the boys were observed as obese than girls (20.00%). In the age group of 14 years, more boys (58.44%) than girls (35.93%) were found underweight. Nearly one fourth of boys (20.77%) enjoyed normal nutritional status and more than 40.62% girls had normal weight. The magnitude of overweight was less (11.68%) in boys in comparison with girls (14.06%), while nearly similar number of both boys (9.10%) and girls (9.37%) were pictured as obese . Among boys in the age group of 15 years, 37.5% were underweight against 26.19% underweight girls. Almost forty percent boys (40.62%) and girls (41.26%) had normal nutritional status. Among boys and girls, prevalence of overweight and obesity was 20.62% vs. 24.60% and 1.25% vs. 7.94% respectively . This age group was influenced by overweight and obesity with a pattern of upsurge, plateau and then decline

Sugar sweetened beverage consumption pattern: Diverse lifestyle conditions have been related to the rise in changing dietary habits in which recently, the rise in irrational and injudicious use of SSB came into lime light.In the age group of 13 years, 25.39% of boys and maximum 70.90% girls drank 200-400 ml. While more than fifty percent of the boys (52.38%) as compared to 16.37% girls consumed > 400-600 ml of SSB. Whereby, 19.05% boys and 12.73% girls had >600-800 ml consumption. Only 1.59% of the boys were observed as > 800-1000 ml and >1000 ml consumers while none of the girls fell under this category.Among 14 year aged, only 2.59% boys as compared to maximum 35.94% of girls drank 200-400 ml of SSB. In contrast, higher number of boys 63.65% while lesser number of girls 26.56% drank > 400-600 ml. Approximately similar number of the boys (23.38%) and girls (25%) consumed >600-800 ml. In addition, lesser number of the boys (6.49%) and girls (12.50%) drank >800-1000 ml. While only 3.89% boys consumed >1000 ml as none of the girls were observed as consuming the same quantity of SSB. In the age group of 15 years, 9.37% boys and 11.12% girls consumed 200-400 ml. Where, maximum 35% boys drank as compared to 23.02% girls > 400-600 ml of SSB. In contrast, 34.38% of the boys and a higher number of maximum 42.85% girls drank > 600-800 ml SSB. Approximately similar number of the boys (19.38%) and girls (20.63%) had > 800-1000 ml consumption. Likewise, the boys and girls consumed > 1000 ml of SSB were 1.17% and 2.38% respectively.

Prevalence of soft drinks consumption: In 13 year age group, 79.03% of the boys and 98.1 % girls consumed soft drinks daily. Whereas among both boys (20.97%) and girls (1.86%) did not have soft drinks on daily basis. Among 14 year aged, more than forty percent (44.15%) of the boys and surprisingly all of the girls (100%) were daily soft drink consumers. More than half of the (55.85%) boys and none among the girls did not consume soft drinks on daily basis. In the age group of 15 years, 60% of the boys and again, all girls (100%) consumed soft drinks daily. Only 40.63% boys reported as not consuming soft drinks daily, as shown in figure:1.

Preferences of SSB: Current study depicted that with age choice of SSB varied. Some of them were collectively disliked (least preferred) by adolescents viz. Fizzy and Sugarcane juice. In general, Carbonated beverages were found to be most popular and preferable among adolescents. Subjects reported that Carbonated beverages are refreshing and good in taste.

Place of SSB consumption: From figure :2, it is clear that among 15 year age group, maximum (49.07%) of boys and (52.76%) girls were frequently consuming any SSB at home environment. Followed by in- school, restaurants, juice centers and fast food centers. Results are consistent for rest of the groups

SSB calories and weight status: Age wise consumption of food and SSB intake showed that among 13 year aged underweight boy‘s, mean daily dietary calorie intake was found to be 1365.44± 160.46 k.calories and 190.19± 87.34 from SSB. In case of underweight girls consumed 1489.75± 301.99 calories in a day and out of

which 167.99± 46.69 calories were through SSB consumption. Among normal weight boys, dietary caloric intake was 1276.72±206.48 and 181.44±14.85 k.calorie through SSB. In case of girls, dietary caloric intake was 1409.77±215.61 and 173.45±30.81 k.calorie through SSB. In overweight boys total daily dietary and beverage consumption provided 1416.69±143.53 and 215.47±63.51 k.calorie respectively. In comparison to boys, overweight girls consumed more total dietary calories in a day 1495.5±134.90 and 197.59±26.54 calorie were contributed from SSB consumption. None of the boy in this age group was found to be obese. The obese girls had 1711.76±502.54 calorie in a day and 312.48±103.38 k.calories came from SSB source. It was noted that maximum SSB calories were consumed by obese girls as compared to boys and girls of other weight status. The 14 year aged, boys and girls consumed more calories through food and beverages, which suggests that with age caloric consumption also increased. Underweight boys consumed 1539.35±205.37 calories from diet and 236.83±81.18 through SSB calorie Whereas girls consumed more dietary and SSB calorie, which was recorded as 1632.97±147.74 for dietary and 250.10±78.80 for SSB calories respectively .Boys and girls categorized as in normal weight status consumed 1505.25±202.86 and 1665.64±249.46 dietary calorie respectively. Whereas, SSB calories was observed as, 236.98±106.56 vs. 279.04±127.35 for both boys and girls. Overweight boys (11.68%) had 1642.48±292.60 dietary calorie and 260.51±50.63 SSB intake. Whereby, as compared to boys, girls consumed, more calorie (i.e.1669.44±267.19) from diet and as well as through SSB intake (219.44±267.19). Maximum dietary consumption was observed in obese boys and girls i.e.1700.53±309.62 and 1733±178.26 k.calorie/day respectively. However, boys consumed less (342.06±64.36) SSB calorie as compared to girls (397.72±99.01 calories. In the age group of 15 year, underweight boys and girls dietary calorie intake was observed more (1937±252.16 calorie/day) in boys than girl consumers (1795.21±295.83 calorie). Similarly, SSB intake was more (340.81±83.07) in boys than that of girls (275.68±113.31). Surprisingly, normal weight boys consumed less (1834.22±242.21) dietary calorie as compared to underweight boys and through SSB 343.17±88.52 k.calories were consumed .Normal weight girls had more (1900.28±345.31 calorie) total dietary calorie as compared to normal weight boys. On comparing SSB calorie consumption with boys, it was observed that girls consumed more (326.56± 97) calories. Overweight boys (20.62%) had mean caloric dietary intake of 1854.42±266.44 and 375.34±90.94 as SSB calorie . Comparatively girls had more (1861.87±347.40) dietary and SSB (364.08±128.71) calories than overweight boys . Boys those who were obese had 1887.5±67.17 total dietary and 438.16±12.02 SSB calorie consumption. Maximum total dietary (1942.16±296.94 k.calorie) and SSB (443.86±52.88 k.calorie) were observed in obese girl subjects. Results are given in Figure :3.

Milk vs. SSB:As indicated in Figure : 4, among 13 year age group, boys had 218.17±226.23 ml/day milk and 530.15±172.86 ml/day of SSB intake. Girls also had less milk consumption (133.33±94.53 ml/day) then SSB intake (462.27±146.39 ml/day). It was observed that though girls consumed less SSB than boys but in contrast, boys consumed more milk than girls did. Among 14 year aged boys, the consumption of milk was 226.28±252.18 ml/day while SSB intake was noted to be 622.07±183.26 ml/day. Girls also had less milk intake than SSB, 200±0 vs. 557.03±239.02 ml/day respectively. In 15 year aged boys milk intake was 265.11±252.18 ml/day. While SSB consumption was 682.5±180.33 ml/day. Again, girl‘s intake of milk was observed less (165.49±128.34 ml/day) and SSB intake was more (694.44± 227.17 ml/day).

Discussion

In children and adolescents, BMI varies with age and gender. As children grow older, BMI increases (Pietrobelli *et al,* 1998). Present study also indicated that, BMI increased with age among males of 13-15 years and with girls no such trend could be observed. In the present study among the adolescents, 18.67% overweight and 7.83 % obese were determined using BMI. Where Kapil *et al.* (2002), reported a 7.4% obesity in affluent school children in Delhi. A higher prevalence of overweight girls has also been reported by Ramchandra *et al.*, (2002) and Marwah *et al.* (2006), from upper socioeconomic status (USES) school girls which was 19.01% compared to 16.75% boys.

The findings of the present study are also partially comparable with French et al. (2003), which indicated that between1977 and 1998, the consumption of carbonated soft drinks by school aged children in United States aged (6-17 years) has increased from 5 fl. oz. (148 ml) to 12 fl. Oz. (355 ml) day(-1). Grimm et al. (2004),

reported that soft drink consumption was higher among boys compared with girls (P=.03), and intake increased with age (P<.001). Finding by Nielsen and Popkin (2004), suggested that the US large increase in soft drinks consumption is mainly driven by children aged 2 to 18 years and consumption increased by 50.25% (317- 476ml) and 32.5% (212-281ml) day(-1) for boys and girls respectively. Which is in consistence with current study , 13 year aged (52.35 %) boys, consumed >400 ml to 600 ml and 14 year aged (35.94%) girls had 200-400 ml SSB consumption.

According to Nylund (2002), a common problem associated with consumption of a large number of soft drinks is the increased acid levels throughout the body. All soft drinks are very acidic, but dark colas are much more acidic. Present study indicated that almost all adolescent's preference was dark cola.

Sharma (2008) from India reported that, in-home juice consumption has increased from 30 to 80% in last 3 years. Even Wiecha *et al.* (2006), also stated that homes and fast food restaurants are potentially greater source of soft drink consumption.

It was observed that, with advancing age, the calorie intake from SSB as a percent of total calorie increased. This study clearly suggests an uptrend in the consumption of SSB with advancing age among boys and girls. However, boys consumed more SSB as compared to girls. Overall data indicated negative correlation between SSB consumption and weight status among 300 boys and positive correlation among girls (r^2 = -0.1298 for boys and r^2= 0.1265 for girls). But SSB consumption was high for boys and girls (i.e. 443.86±52.88k.cal/day vs. 443.86± 52.88 k.cal/day; i.e. R^2 =0.0238 for boys; R^2 =0.0641 for girls). Various workers found that an increase in the consumption of sugar drinks was significantly associated with greater weight gain and greater risk of obesity over time in both children and adolescents ,Ebbeling *et al.* (2006), Welsh *et al.* (2005). On considering the dietary intake of overweight and obese adolescents included in the current study, it was observed that their average dietary intake was less. However, SSB calorie were much more, which indicates the larger portion size (i.e. 673.66 ml/day by overweight and 739.74 ml/day by obese) and hence contributing as extra calories per day. Gillis and Bar (2003), found that among children and adolescents (4-16 years) obese subjects consumed more sugar sweetened drinks and combination of sugar sweetened drinks and sodas than did non obese subjects. Where, Ludwig and colleagues (2001), observed an association between sweetened beverage consumption and children's weight with each 12 oz sugared soft drink accounting for a 0.18 kg/m^2 increase in BMI and a 60% increase in risk of being obese. Similar observations were noted in current study. Over the past 25 years, adolescents have changed their beverage intake and decreased their milk intake, (Bowman ,2002 and French *et al*.,2003). This shift had a negative impact on health by lowering nutritional quality and decreasing micronutrient intake. Present study also showed that in all the subjects milk consumption was much lower (203.49±201.37 ml/day) than that of SSB intake (613.5±210.79 ml/day). Consumption of high sugary drink intake may place children at risk for not getting the nutrient they need for optimal health. Mrdjenovic and Levitsky (2003) defined that this may contribute to increased risk of bone fractures and obesity. Blum *et al.* (2005), also found that change in milk consumption was inversely correlated with Sugar Sweetened Beverage consumption. Increase in diet soda consumption was significantly greater for overweight and subjects who gained weight as compared to normal weight status subjects.

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Appendix

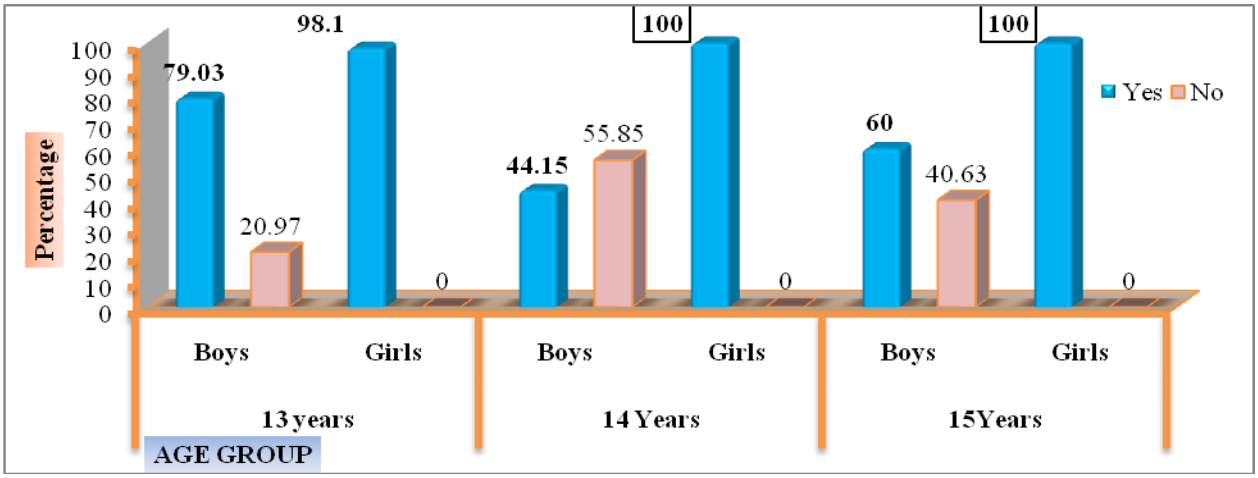

Figure:1 Prevalence of Soft Drink consumption

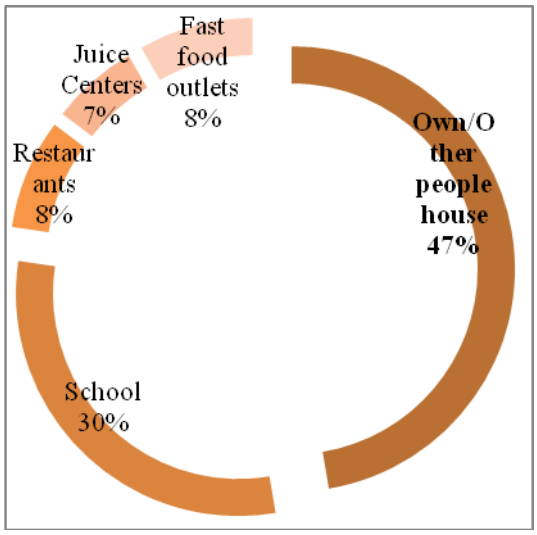

Figure:2 Locale and source of SSB consumption

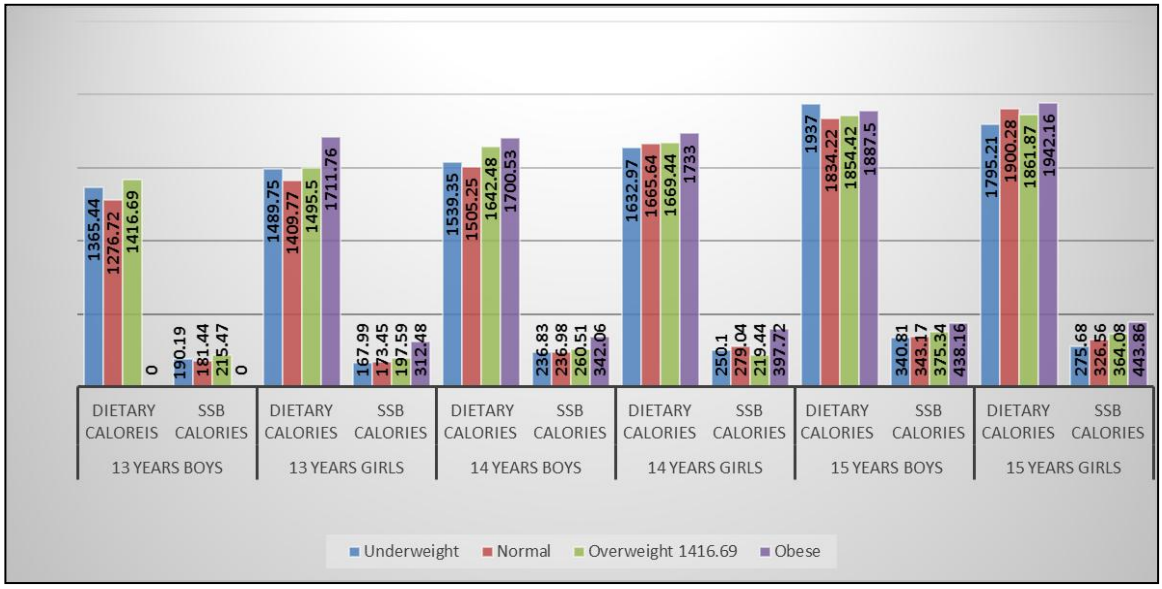

Figure: 3 Mean total dietary and SSB consumption

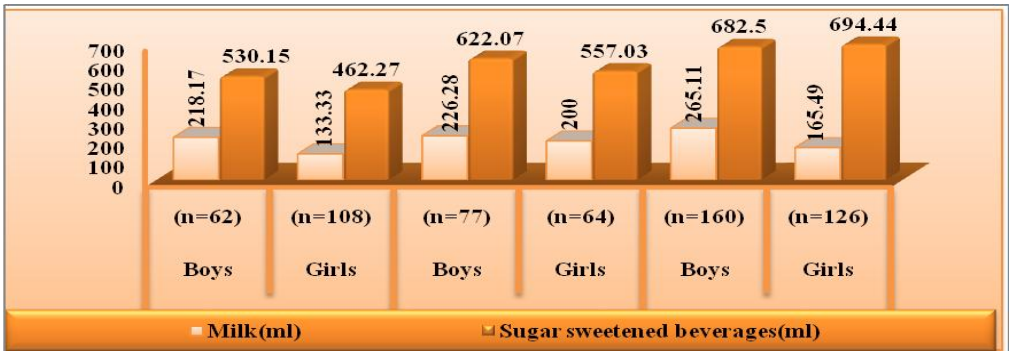

Figure:4 Per day milk and SSB consumption

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MATERNAL FACTORS ASSOCIATED WITH CHILD NUTRITION IN RICE-BASED FARM HOUSEHOLDS IN CENTRAL LUZON, PHILIPPINES

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Abstract: Mothers play key roles in the development of children's eating behavior, food consumption, and nutrition. This study primarily aimed to determine the maternal factors associated with child nutrition. A cross-sectional community survey was conducted in rice-based farm households in Central Luzon to obtain anthropometric measurements from 275 children 0 to 10 years old and their mothers. Socio-demographics were collected on mothers. Mothers' knowledge level on health and nutrition was also assessed. Among pre-school children, stunting (15.2%), underweight (16.8%), and wasting (19.5%) were low, medium, and very high, respectively. The corresponding figures in school-age children were 16.9%, 18.9%, and 22.1%. Compared with males, female children exhibited higher prevalence in almost all malnutrition indicators (stunting, wasting, and underweight), pre-school age (16.9% to 20.4% vs 16.7% to 19%) and school-age (13.7% to 25.5% vs 19.1% to 23.1%). Logistic regression analyses revealed that low educational attainment for mothers [AOR=2.78 (CI: 1.03, 7.48)] and low household income [AOR=2.28 (CI: 01.08, 4.82)] led to higher odds of underweight. Absence of a major illness or disability [AOR=0.33 (CI: 0.12, 0.87)] in mothers resulted in lower odds of wasting. Mothers with lower BMI [AOR=5.47 (CI: 1.43, 20.95)] and non-membership in organizations (e.g. farmers association) [AOR=2.21 (CI: 1.12, 4.35)] led to higher odds of wasting. Living in rural areas [AOR=2.61 (CI: 1.22, 5.57)] resulted in higher odds of stunting. Maternal factors such as education, nutritional and health status, and other factors such as income and place of residence were associated with the occurrence of malnutrition in children. Hence, this study recommends gender-sensitive nutrition interventions directed to mothers for improved child nutrition.

Keywords: anthropometric data, child nutrition, maternal factors, stunting, underweight, wasting

Introduction

Child undernutrition is a public health concern among developing countries. UNICEF (2014) considers good nutrition as the hallmark of any economic, social, and human development initiatives. Although malnutrition has received massive attention globally, it remains pervasive. Halim et al. (2015) noted that child malnutrition in low- and middle- income countries accounted to 42% and 53%of all stunted and wasted children in the world, respectively. Additionally, malnutrition in developing countries annually contributes to 40% of the 11 million deaths of children under 5 years old, globally (UNICEF 2003). In the Philippines, malnutrition also remains a major public health concern. In fact, findings from the 8th National Nutrition Survey conducted by the Food and Nutrition Research Institute (FNRI) indicated a high prevalence of stunting, underweight, and wasting in both pre-school and school-age children in 2013.

Mothers play key roles in improving the nutritional status of children (Muller & Jahn 2009, Melo et al. 2013). Shrimpton stated that "if women have control in resources at family level, there would be less malnutrition; if they are oppressed, malnutrition tends to increase" (UNICEF 2003). Poor maternal nutrition and women's

inadequate or lack of access in education, employment, and technology have greatly hindered the improvement of children's nutritional status (UNICEF 2013). This is obvious in South-Asia where women's limited access to education and employment has been identified as major reasons explaining the very high malnutrition among children(UNICEF 2003).

While these factors are already known to greatly impact children's nutritional status globally, a close rexamination in a local scale might provide the most relevant information to policymakers to address hyperlocal issues. This study set out to identify maternal factors (e.g. demographic, social, and economic) that are associated with children's nutritional status in rice-based farm households in Central Luzon, Philippines using cross-sectional data with the ultimate goal to inform policies and programs that are directed to address the secular issue of children's malnutrition in the region.

Methods

Study Area, Sampling Design, and Survey Participants

This study was conducted in Central Luzon which is the top rice producing region of the Philippines. In 2013, the region produced 3,409,468 metric tons of rice. It has contributed one-third of the total rice production in the country. Central Luzon is a combination mountainous areas, plain fields composed of farm lands, and sea harbors. It is located between North Luzon and the National Capital Region (PSA 2013). It has seven (7) provinces namely Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac and Zambales. Based on the 2015 Census of Population, the region is the third largest which accounted for about 11.1% of the country's population (PSA 2016).

The study sample was taken from all the provinces of the region. Stratified random sampling was used. A multi-stage sampling procedure was made with barangay (village) as the primary sampling unit and farm households as the secondary sampling unit. Intensity of farming activities was a major consideration in selecting the barangays. The barangays were drawn using probability proportional size, where size can be measured as the number of farm households. Fifty five (55) households were selected from each of the 11 sample barangays in each province. A total of 385 households were obtained. One hundred sixty-six (166) households with children who were 0 to 10 years old were taken as the final sample. There were a total of 275 children and 166 mothers included in the study with children as the unit of analyses.

Anthropometry

Anthropometric measurements including height-for-age (HFA), weight-for-age (WFA), and weight-for-height (WFH) were collected. All participants who gave their informed consent were interviewed face-to-face by one of the trained interviewers using a pre-tested structured questionnaire. Mothers and children were asked to remove their shoes and other excess clothing before any anthropometric measurements were taken. All anthropometric measurements followed the procedures described in Lohman et al.(1988).Body weight was measured using a portable electronic digital scale (National NS-05). Height was measured using a tape measure and was read to the nearest 0.1 cm once correct positioning was confirmed. Body mass index (BMI) was computed as weight in kilograms divided by the square of height in meters.

Maternal Knowledge and Awareness

Health and nutrition knowledge of mothers was assessed in terms of knowledge on nutrient quality and diet-health relationship awareness using standard diet-health questions following Wilson et al. (2014) and USDA (2013) methods with modifications in terms of food choices and nutrients of interest.

Data Analyses

Anthropometric data were analyzed using two Word Health Organization (WHO) software to assess the growth of children in terms of HFA, WFA, WFH, and BMI-for-age z-scores or standard deviations. Anthropometric data for children 0 to 5 years old were analyzed in WHO Anthro version 3.2.2 (2011) (WHO 2010) while WHO AnthroPlus 2009 (WHO 2009) was used to analyze data of children from 6 to 10 years old. The anthropometric measurements were used to determine the implications of the three malnutrition indicators. Stunting means that a child is too short for his or her age and it reflects chronic undernutrition. Underweight is a combine result of stunting and wasting and refers to a child whose weight is lower for his or her age. Wasting implies acute malnutrition and it refers to a child who is too thin for his or her height (UNICEF/WHO/World Bank Group 2016). A z-score below -2 standard deviation (SD) in HFA, WFA, WFH, and BMI-for-age indicates that a child is experiencing stunting, underweight, and wasting/thinness, respectively (UNICEF 2013; WHO 2006). The two WHO software provided the percentage of prevalence of the three (3) malnutrition indicators at different levels of analysis: within age groups, provincial, and regional levels. Stunting prevalence is categorized as low at <20%, medium at 20-29%, high at 30-39%, and very high at ≥40%. Likewise, underweight prevalence is low at <10%, medium at 10-19%, high at 20-29%, and very high at ≥30%. Wasting/thinness prevalence is low at <5%, medium at 5-9%, high at 10-14%, and very high at ≥15%(WHO 2010).

To assess the association of child and various maternal factors (e.g. mother's age, health condition, nutritional status, and education) with the children's nutritional status, Pearson Chi-square test and logistic regression were employed using IBM SPSS Statistics version 20 software. Logistic regression was used to assess how well the pre-identified factors explain the occurrence of the three malnutrition indicators (stunting, underweight, and wasting), and likewise how these factors are related to the outcomes, whether positive or negative (IBM Corporation 2011, Makoka 2013, Wong et al. 2014). There were three models generated and these were assessed using goodness-of-fit (e.g. Omnibus Tests of Model Coefficients and Hosmer and Lemeshow Test). The regression analysis results included coefficients (B), *p*-value (Sig.), and odds ratio [Exp (B)] with confidence interval (CI) of 95%. Coefficients indicated the direction of relationship, whether positively or negatively related. Odds ratio indicated the association of a variable with the odds of the outcome. If the odds ratio is less than 1, a variable is associated with lower odds of the outcome. Otherwise, a factor is associated with higher odds of the outcome (Pallant 2005). The *p*-value indicated the statistical significance of the relationship of a factor to a malnutrition indicator. Levels of significance (e.g. at 1%, 5%, and 10%) were likewise indicated.

Results

Socio-economic characteristics

Among the 275 children aged 0 to 10 years, 45% were female and 55% were male. The average age of these children was 5.4 ± 3.1 years. More than half of them were living in rural areas (53.1%) and the rest were from urban areas (46.9%). Many of them (41.5%) belonged to households whose annual income ranged from PhP 100,000 to 249,000. Mean age of mothers was 39.9 ± 11.3 years. Livelihoods of 28.3% of the respondents were from non-agricultural sources while 7.8% rely on agricultural sources. The average household size was 6.0 ± 4.7, and the average household income was PhP 237,731 (Table 1).

Maternal status, knowledge and awareness on nutrition and health

Most mothers (89.1%) in Central Luzon considered themselves healthy as only a few indicated that they had major illnesses or disabilities (10.8%). This was also supported by the higher percentage of mothers that were classified as normal (71.1%) in their nutritional status based on their BMI with a mean of 21.8 ± 3.4. There were only few who suffered from mild (10.2%), moderate (3.01%), and severe (1.81%) chronic energy deficiency (Table 1). Additionally, almost all of them were not smokers (98.8%) nor alcohol drinkers

(95.8%). Seminar or training attendance regarding nutrition, however, was not impressive (20.5%). Membership in local organizations (e.g. farmers association) is relatively good (47.6%) (Table 1).

As regards the knowledge of the mothers on the nutrient content of some food items, majority (57%) answered correctly. There were 21 questions asked where 10 of them measured diet-health relationship knowledge of mothers. Interestingly, most of them (79 – 95%) were aware of the health problems related to being overweight, smoking, and having too much fat, alcohol, salt, sugar, and cholesterol intake. However, only 52.2% and 54.8% of the respondents were familiar with health problems related to low fiber and iron intake, respectively (Table 2).

Children's nutritional status

Among pre-school children (0 to 5 years old), wasting (19.5%) was very highly prevalent in the region. Underweight (16.8%) was of medium prevalence. Low prevalence of stunting was observed (15.2%). Wasting was particularly very high in the provinces of Aurora (33.3%), Nueva Ecija (28.6%), Pampanga (20%), Tarlac (18.8%), and Bataan (18.8%). Wasting was not a major concern in Bulacan (5.6%) and Zambales (10.5%). Underweight was very highly prevalent in Bataan (36.8%), followed by Nueva Ecija (16.7%) and Tarlac (15%) both classified under medium prevalence. Generally, stunting was low in the region but highly prevalent in Aurora province (34.5%).Among school-age children (6 to 10 years old), thinness/wasting (22.1%) was very high in the region. On the other hand, both stunting (16.9%) and underweight (18.9%) were medium. Tarlac (35.3%) had the highest prevalence of wasting, followed by Pampanga (31.3%) and Bulacan (28.6%). Stunting was high in Bataan (37.5%) and Pampanga (29.4%). Underweight was also very high in Bataan (34.8%), and high both in Bulacan (25.0%) and Tarlac (23.5%) (Table 3).

Additionally, stunting (20.7%) and thinness/wasting (24.1%) were highest from 84 to 95 months old. On the other hand, underweight (21.7%) was highest in children from 96 to 107 months old (Table 4). Female school-age children had higher prevalence of underweight (25.5% vs 23.1%) and wasting (25.5% vs 19.1%) compared with males. However, male school-age children had higher prevalence of stunting (19.2% vs 13.7%) than females.

Association of maternal factors with child nutrition

Bivariate findings

Pearson chi-square tests between maternal factors and children's nutritional status are presented in Table 5. Findings indicated that maternal education was an important factor in the occurrence of underweight ($\chi2$=9.6; *p*-value=0.002). Underweight was high (24.6%) among children whose mothers had low educational attainment (elementary level up to high school level). Place of residence was also found to have significantly contributed to stunting ($\chi2$=5.2; *p*-value=0.023). There was a higher percentage of stunting in rural areas (24.0%) than in urban areas (13.2%). Lower household income was positively associated with the occurrence of underweight ($\chi2$=7.1; *p*-value=0.008). Underweight was higher in households with income below the poverty threshold level (31.3%) than households that were not.

Multivariate findings

Child's characteristics

In logistic regression analysis, the child factors considered were age and sex. The relationship between these factors and the occurrence of malnutrition was not found statistically in all malnutrition indicators.

Maternal factors

Logistic regression analysis also revealed some maternal factors that were significantly associated with certain malnutrition indicators in children of rice-based farm households in Central Luzon (Table 6). Higher level of educational attainment was inversely related to the occurrence of underweight. Children whose mothers had lesser education, did not reach college level, are 2.78 times more likely become stunted than children whose mothers attained tertiary education [AOR=2.78 (CI: 1.03,7.48)]. Children whose mothers did not have major illnesses are 0.33 times less likely become wasted than children whose mothers had major illnesses [AOR=0.33 (CI: 0.12, 0.87)]. Mothers with underweight and normal BMI are 3.55 [AOR=3.55 (CI: 1.09, 11.60)] and 5.47 times [AOR=5.47 (CI: 1.43, 20.95)], respectively, more likely have wasted children than mothers who were overweight/obese.

Membership in local organizations was also found to be a significant determining factor of nutrition deficiencies. Having no membership in these organizations was associated with higher cases of stunting, underweight, and wasting, but was only statistically significant for wasting. Children whose mothers were not members of local organizations would be 2.21 times more likely become wasted than children whose mothers had memberships [AOR=2.21 (CI:1.12, 4.35)].

Other household factors

Children living in rural areas are 2.61 times more likely become stunted than children living in urban areas [AOR=2.61 (CI: 1.22, 5.57)]. Urban areas are places with a population density of at least 1000/km^2 (PSA 2014). Lastly, lower household income showed higher occurrence of stunting, underweight, and wasting. This relationship, however, was found to be statistically significant in underweight only. Households with annual income below poverty threshold in the region are 2.28 times [AOR=2.28 (CI: 1.08, 4.82)] more likely have underweight children than households with income above poverty threshold (Table 6).Poverty threshold in the region is PhP 7,890 per month (PSA 2012).

Discussion

Acute malnutrition was highly prevalent in pre-school and school-age children among rice-based farm households covered in this study. Indeed findings showed high prevalence of wasting and underweight among children in this region. Additionally, female children exhibited higher prevalence in almost all malnutrition indicators than males. In the Philippines, poverty remains a major problem in rural communities where agriculture is the major source of income (IFAD 2009).This is because agricultural productivity and profitability have decreased in the recent years that resulted in lower income especially in rice farming. These communities have rice as their staple food, and it is not common to diversify their diet. These situations have made them highly vulnerable to malnutrition.

Results showed that maternal factors such as education, nutrition and health status, and others such as lifestyle and place of residence were strongly associated with the occurrence of malnutrition in children. These findings are supported by the results of several studies showing that low maternal education, knowledge and beliefs on nutrition and health, and poor child care practices are risk factors contributing to child malnutrition (Muller & Jahn 2009, Melo et al. 2013, Wong et al. 2014).

A mother who attained at least college level or a college graduate had lower chance of having a stunted child than a mother who had primary to secondary education only. A child whose mother did not reach tertiary education are 2.78 times more likely become stunted than children. This is supported by the study of Rohner et al. (2013) in the Philippines indicating that mother's education was inversely related to stunting, lower chances among children whose mothers are highly educated. Stunting imposes a serious threat in a child's future, socially and economically. Poor health and cognitive development of children brought by stunting will make them into adults who are less educated, poorer, less healthy, and more prone to non-communicable diseases (UNICEF Indonesia 2012).One of the underlying causes of malnutrition is the lack of education and

knowledge of the child's caregiver (UNICEF 2013).Stunting is a manifestation of an early chronic exposure to undernutrition of a child (UNICEF 2013). Hence, nutrition interventions should also be done at the early stage of child development. The first 1000 days (0 to 2 years old) of child is considered as crucial, most especially for stunting, as its occurrence cannot be reversed beyond this period (UNICEF 2013). Mothers who does not have enough knowledge on child nutrition and health will most likely give insufficient care and feeding to their children. Corollary to this, Stewart et al. (2013) explained the issues surrounding complementary feeding and how it correlates with stunting. Under this practice, between ages 6 and 24 months, food items other than breast milk are being introduced to a child. Inadequate complementary feeding practices such as introducing poor quality food items with low micronutrient and dietary diversity, inadequate feeding especially during and after illness, and unsafe food and water will contribute to stunted growth and development.

Living in urban areas was found to be inversely related to stunting. The probability of having a stunted child in urban areas is lower by 42% than in rural areas. Smith et al. (2005) stated that "urban children have better nutritional status than their rural counterparts because of the cumulative effect of series of more favorable socioeconomic conditions such as employment, social networks, better access to health care facilities and other services that will eventually provide better caring practices for mothers and children."

This study also established that a healthy mothers as indicated by the self-reported presence or absence of major illness or disability is a strong predictor of wasting in children. Probability of wasting among children was noted to be 0.33 times lower if mothers were healthy than those who reported that they had major illnesses or disabilities. It was reported that foods, diets, and nutritional status are associated with increased blood pressure and blood cholesterol that are risk factors for non-communicable diseases and also serve as major causes of illnesses (WCRF 2013). Undernutrition and unhealthy practices increase the chance of mother to get afflicted with illnesses that consequently will have negative repercussions on their children. Hypertension is another maternal factor that can also influence stunted growth and development (Stewart 2013). Unhealthy household environment is also identified as an underlying cause of malnutrition (UNICEF 2013). The odds ratio also indicated that wasting is 2.47 times more likely among children whose mothers are not members of any local organizations as compared with those who are. This could be attributed, but not solely, to the very high prevalence of wasting among pre-school (19.5%) and school-age (22.1%) children in the region which were remarkably higher compared with the national prevalence of only 7.9% and 8.6%, respectively (FNRI 2013).

Income was found significantly associated with underweight in bivariate analysis (Pearson chi-square test) and in multivariate analysis (logistic regression). Underweight occurs 2.28 times more likely in children whose household income were below poverty threshold level.

Conclusion

Children, 0 to 10 years old, in Central Luzon experienced greater acute malnutrition than chronic malnutrition with significant gender differences. Maternal factors such as education and health status, and other factors such as lifestyle and place of residence were highly associated with the occurrence of malnutrition in children. Therefore, interventions should be nutrition- and gender-sensitive to ensure health security for both male and female children in rice-based farm households. Health and nutrition education may be more effective in improving the household nutrition if targeted towards mothers.

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Tables

Table 1. Socio-demographic characteristics and maternal nutrition and health status (n=166 mothers, 275 children)[a]

Variables	Frequency	Percentage (%)	Mean	SD[b]
Children Factors				
Age of child			5.4	±3.1
Female child	125	45.6	5.4	±3.1
Male child	150	54.5	5.4	±3.2
Maternal Factors				
Mother's Age			39.9	±11.3
Education Attainment				
Elementary Level	4	2.4		
Elementary Graduate	28	16.9		
High school Level	17	10.2		
High school Graduate	55	33.1		
College Level	19	11.5		
College Graduate	30	18.1		
Vocational Course/Graduate	13	7.8		
Occupation				
Not working	106	63.9		
Agricultural	13	7.8		
Non-agricultural	47	28.3		
Nutrition based on BMI[c]				
Mother's weight (kg)			54.2	±8.7
Mother's height (cm)			158	±6.2
Average BMI			21.8	±3.4
Mild CED	17	10.2		
Moderate CED	5	3.0		
Severe CED	3	1.8		
Normal	118	71.1		
Overweight	19	11.5		
Obese	4	2.4		
Health & Lifestyle				
Healthy/ without Illness/ without disability	148	89.2		
With major illness/ disability	18	10.8		
Smoking				
Yes	2	1.2		
No	164	98.8		

Drinking				
Yes	7	4.2		
No	159	95.9		
Others				
Household Size			6.0	±4.7
Household Income				
under 40k	17	6.2		
Php40,000-59,999	15	5.5		
Php60,000-99,999	42	15.3		
Php100,000-249,999	114	41.5		
Php250,000 & over	87	31.6		
Average Annual Household Income			PhP237,731	PhP221,637
Residence				
Rural	146	53.1		
Urban	129	46.9		
Trainings & Organizations				
Attended Training				
Yes	34	20.5		
No	132	79.5		
Membership to Organizations				
Yes	79	47.6		
No	87	52.4		

[a]Sample population *(n)* only includes mothers with 0 to 10 years old. [b]SD, standard deviation. [c]BMI Classification: Severe Chronic Energy Deficiency or CED=<16.0, Moderate CED=16.0-16.9, Mild CED=17-18.9, Normal=18.5-24.9, Overweight= 25.0-29.9, Obese=≥30.0

Table 2. Maternal knowledge and diet-health awareness in rice-based farm households (n=385)[a]

Nutrition and Diet-Health Questions	Correct/Positive response by mother	
	Frequency	%
Nutrition Question and Answer[b]		
Which has more fiber?		
Fruit or Meat	344	89.4
White rice or White corn	168	43.6
Brown bread or White bread	176	45.7
Fresh fruit or Apple juice	169	43.9
Mungbean or Cabbage	266	69.1
Which has more cholesterol?		
Liver or Lean Meat	188	48.8
Butter or Margarine	178	46.2
Egg White or Yolk	244	63.4

Skimmed Milk or Whole Milk	227	58.9
Fish or Beef	346	89.9
Which has more fat?		
Loin pork chops or Pork spare ribs	52	13.5
Hotdogs or Ham	114	29.6
Peanuts or Popcorn	306	79.5
Ice candy or Ice cream	333	86.5
Roast chicken or Fried chicken	314	81.6
Which has more sugar?		
Soft drink or Beer	365	94.8
Raisins or Candies, hard	279	72.5
Grapes, raw or Mango raw	155	40.3
Peanut butter or Cheese	269	69.9
Brown sugar or White sugar	237	61.6
Are you aware that there is good and bad cholesterol?	140	36.4
Diet-Health Question[c]		
Have you ever heard about any health problems that might be related to how much:		
Fat a person eats?	339	88.1
Saturated fat a person eats?	335	87.0
Fiber a person eats?	201	52.2
Salt a person eats?	360	93.5
Cholesterol a person eats?	364	94.6
Sugar a person eats?	361	93.8
Iron a person eats?	215	55.8
A person is overweight?	304	78.9
A person smokes?	357	92.7
A person drinks alcohol?	357	92.7

[a]Sample population *(n)* includes all mothers with and without 0 to 10 years old children. [b]Measured maternal knowledge on nutrient quality of some food items; Correct answers are underlined. [c]Measured diet-health awareness of mother.

Table 3. Prevalence of malnutrition per province in Central Luzon among children 0 to 10 years old in rice-based farm households (n=275)

Province	Height-for-age (Stunting)[a]						Weight-for-age (Underweight)[b]						Weight-for-height (Wasting)[c]					
	0 to 5 years old			6 to 10 years old			0 to 5 years old			6 to 10 years old			0 to 5 years old			6 to 10 years old		
	% below -2 SD[d]	Mean[e]	SD	% below -2 SD	Mean[e]	SD	% below -2 SD	Mean[e]	SD	% below -2 SD	Mean[e]	SD	% below -2 SD	Mean[e]	SD	% below -2 SD	Mean[e]	SD
Bataan	6.3	-0.65	1.3	37.5	-1.02	2.13	36.8	-0.72	2.26	34.8	-0.91	1.56	18.8	-0.19	1.92	16.7	-0.25	2.04
Bulacan	5.6	-0.47	1.57	5.3	-0.52	1.59	5	0.45	2.21	25	-0.77	2.26	5.6	0.68	2.05	28.6	-0.81	1.48
Nueva Ecija	14.3	-0.63	1.6	7.7	-0.17	1.37	16.7	-0.83	0.99	7.7	0.2	1.56	28.6	-0.02	3.06	0	0.28	1.67
Pampanga	13.3	-0.12	1.83	29.4	-0.05	2.1	5.9	0.45	1.69	11.8	-0.7	0.81	20	0.04	2.25	31.3	-0.99	2.25
Tarlac	4.8	0.37	2.07	6.3	-0.54	1.78	15	-0.25	1.6	23.5	-0.89	1.3	18.8	-0.76	1.45	35.3	-1.46	2.1
Zambales	15.8	-0.51	1.99	23.5	-0.26	2.09	5	0.08	2.12	5.6	-0.59	1.26	10.5	0.62	2.32	22.2	-0.44	2.44
Aurora	34.5	-1.06	1.87	4.2	0.26	1.85	27.6	-1.54	1.18	16.7	-0.76	1.12	33.3	-1.08	1.75	19	-0.75	1.36
Regional	15.2	-0.46	1.82	16.9	-0.34	1.89	16.8	-0.4	1.89	18.9	-0.68	1.48	19.5	-0.17	2.1	22.1	-0.64	1.97

Ns???

WHO classification of severity of malnutrition by prevalence: [a]Stunting low (<20%), medium (20-29%), high (30-39%), very high (≥40%); [b]Underweight low (<10%), medium (10-19%), high (20-29%), very high (≥30%); [c]Wasting low (<5%), medium (5-9%), high (10-14%), very high (≥15%). [d]% below -2 SD (standard deviation) indicates percentage prevalence of a malnutrition indicator (stunting, underweight, wasting). [e]Mean of SD or z-scores.

Table 4. Prevalence of malnutrition per age group in Central Luzon among children 0 to 10 years old in rice-based farm households (n=275)

Age (in months)	Height-for-age (Stunting)			Weight-for-age (Underweight)			Weight-for-height (Wasting)		
	% below -2 SD[a]	Mean[b]	SD	% below -2 SD	Mean[b]	SD	% below -2 SD	Mean[b]	SD
0-5	33.3	-1.36	1.93	45.5	-1.05	2.26	42.9	-0.01	3.11
6-11	20	-1.04	1.76	0	-0.2	1.48	10	0.48	2.3
12-23	21.4	0.12	2.46	6.3	-0.3	1.81	21.4	0.06	1.99
24-35	20.7	-0.37	2.03	9.7	0.12	1.66	14.3	0.25	2.18
36-47	6.3	-0.39	1.54	29.4	-0.7	2.07	25	-0.72	2.05
48-60	8.5	-0.42	1.54	17.3	-0.54	1.98	18.6	-0.48	1.87
(0-60)	15.2	-0.46	1.82	16.8	-0.4	1.89	19.5	-0.17	2.1
72-83	11.1	-0.3	2.11	17.6	-0.4	1.9	17.6	-0.26	2.27
84-95	20.7	-0.35	2.03	16.7	-0.69	1.62	24.1	-0.78	1.87
96-107	13	-0.06	1.85	21.7	-1.05	1.48	21.1	-0.76	2.05
108-120	18.3	-0.45	1.81	19.4	-0.61	1.3	22.8	-0.64	1.93
(72-120)	16.9	-0.34	1.89	18.9	-0.68	1.67	22.1	-0.64	1.97
N???									

[a]% Below -2 SD (standard deviation) indicates percentage prevalence of a malnutrition indicator (stunting, underweight, wasting). [b]Mean of SD or z-scores.

Table 5. Pearson Chi-square analysis for child and maternal factors of stunting, underweight, and wasting in children aged 0 to 10 years old in Central Luzon (n=275)

	Stunting			**Underweight**			**Wasting**		
Independent variables	**No.**	**%**	**χ2**	**No.**	**%**	**χ2**	**No.**	**%**	**χ2**
Child Factors									
Age of Child									
0-2	20	27.78	8.41**	10	13.89	2.51	15	20.83	0.96
3-5	6	8.70		14	20.29		18	26.09	
6+	26	19.40		31	23.13		36	26.87	
Sex of Child									
Male	26	20.8	0.53	29	19.33	0.09	38	25.33	0.01
Female	26	17.33333		26	20.80		31	24.80	
Maternal Factors									
Mother's Age									
Below 30	7	18.42	0.04	8	21.05	0.74	6	15.79	2.27
30 to 40	26	19.40		24	17.91		34	25.37	
Above 40	19	18.45		23	22.33		29	28.16	
Health Condition									
no major illness/disability	46	19.49	0.37	45	19.07	0.90	55	23.31	2.82*
with major illness/disability	6	15.38		10	25.64		14	35.90	
Mother's nutritional status based on BMI									
Normal	40	20.62	3.25	37	19.07	1.89	50	25.77	5.96*
Underweight	9	20.45		12	27.27		15	34.09	
Overweight/Obese	3	8.11		6	16.22		4	10.81	
Smoking									
Not smoking	52	19.05	0.47	54	19.78	1.13	67	24.54	6.01
Smoking	0	0.00		1	50.00		2	100.00	
Drinking									
Not drinking	51	19.25	0.54	53	20.00	0	64	24.15	3.43*
Drinking	1	10.00		2	20.00		5	50.00	
Education									
Did not reach college level	37	18.59	0.05	49.00	24.62	9.62**	55	27.64	2.49
College level or college graduate	15	19.73		6.00	7.89		14	18.42	
Mother's Occupation									
None	37	20.11	0.58	40	21.74	3.16	44	23.91	0.70

Agricultural	4	18.18		6	27.27		7	31.82	
Non-agricultural	11	15.94		9	13.04		18	26.09	
Residence									
Rural	35	23.97	5.20**	33	22.60	1.32	40	27.40	0.88
Urban	17	13.18		22	17.05		29	22.48	
Household Size									
1-4	13	21.31	1.83	10	16.39	5.97*	17	27.87	0.93
5-8	36	19.57		34	18.48		43	23.37	
9+	3	10.00		11	36.67		9	30.00	
Household Income									
<poverty threshold	13	19.40	0.01	21	31.34	7.12**	18	26.87	0.15
>poverty threshold	39	18.75		34	16.35		51	24.52	
Others									
Distance to Market									
Below 1 km	3	10.71	1.49	10	35.71	4.85*	9	32.14	1.16
1-3 km	17	18.68		16	17.58		24	26.37	
4 km +	32	20.51		29	18.59		36	23.08	
Attendance to Trainings									
No trainings attended	39	17.73	1.00	45	20.45	0.14	53	24.09	0.59
Attended trainings	13	23.64		10	18.18		16	29.09	
Membership to Organizations									
No organization	29	19.46	0.07	36	24.16	3.52*	44	29.53	3.41*
With organization	23	18.25		19	15.08		25	19.84	

Chi square ($\chi 2$) estimate values are significant at different levels: *p-value<0.10, significant at 10% level, ** p-value<0.05, significant at 5%, ***p-value<0.001, significant at 1% level.

Table 6. Logistic regression analysis for child and maternal factors of stunting, underweight, and wasting in children aged 0 to 10 years old in Central Luzon (n=275)

Independent (Predictor) Variables	**Height-for-age** ***(Stunting)***			**Weight-for-age** ***(Underweight)***			**Weight-for-height** ***(Wasting)***		
	Coef.[a]	Odds Ratio[b] (95%CI[c])		Coef.	Odds Ratio (95% CI)		Coef.	Odds Ratio (95% CI)	
Child Factors									
Age of Child									
0-2	0.61	1.84	(0.86,3.94)	-0.52	0.59	(0.25,1.42)	-0.35	0.71	(0.33,1.53)
3-5	-0.94	0.39*	(0.15, 1.05)	-0.30	0.74	(0.34,1.60)	-0.08	0.92	(0.45,1.90)
6+¶									
Sex of Child									
Female	0.06	1.06	(0.55,2.05)	-0.05	0.95	(0.50,1.81)	-0.21	0.81	(0.45, 1.48)
Male¶									
Maternal Factors									
Mother's Age									
below 30	-0.54	0.58	(0.18,1.86)	0.39	1.46	(0.50,4.36)	-0.29	0.75	(0.25,2.24)
30 to 40	-0.28	0.75	(0.33,1.70)	0.21	1.22	(0.54,2.78)	0.28	1.32	(0.63,2.76)
41+¶									
Health Condition									
no major illness/disability	-0.01	0.99	(0.31,3.17)	-0.15	1.68	(0.39,3.53)	-1.12	0.33**	(0.12,0.87)
with major illness/disability¶									
Mother's nutritional status based on BMI									
Normal	0.99	2.69	(0.73,9.83)	0.19	1.20	(0.41,3.54)	1.27	3.55**	(1.09,11.60)
Underweight	0.58	1.79	(0.40,7.94)	0.71	2.04	(0.56,7.32)	1.70	5.47**	(1.43,20.95)
Overweight/Obese¶									
Drinking									
Not drinking	1.57	4.79	(0.49,47.17)	-0.36	0.70	(0.11, 4.15)	-1.40	0.25*	(0.06,1.09)
Drinking¶									
Education									
Did not reach college	0.14	1.15	(0.52,2.55)	1.04	2.78**	(1.03,7.48)	0.35	1.40	(0.64,3.06)
College level to college graduate¶									
Mother's Occupation									
None	0.40	1.49	(0.63,3.52)	0.01	0.97	(0.39,2.43)	-0.41	0.66	(0.31,1.41)
Agricultural	0.06	1.06	(0.24,4.70)	0.42	1.45	(0.38,5.49)	0.04	1.04	(0.31,3.51)
Non-agricultural¶									
Residence									
Rural	0.96	2.61**	(1.22,5.57)	0.20	1.22	(0.59,2.46)	0.23	1.26	(0.65,2.46)
Urban¶									
Household Size									
1-4	0.98	2.66	(0.56,12.60)	-0.96	0.37	(0.11,1.27)	0.37	1.45	(0.43,4.82)
5-8	0.61	1.84	(0.43,7.92)	-0.80	0.44	(0.15,1.26)	0.11	1.12	(0.37,3.37)
9+¶									
Household Income									
<poverty threshold level	-0.37	0.69	(0.30,1.60)	0.69	2.28**	(01.08,4.82)	-0.20	0.82	(0.38,1.79)

>poverty threshold level[¶]									
Others									
Distance to Market									
below 1km	-1.06	0.35	(0.07,1.70)	0.82	2.82	(0.68,7.55)	0.28	1.33	(0.40,4.40)
1-3 km	-0.11	0.90	(0.41,2.00)	-0.32	0.70	(0.31,1.60)	0.11	1.11	(0.54,2.27)
4 km+[¶]									
Attendance to Trainings									
No trainings attended	-0.36	0.70	(0.30,1.64)	0.22	1.25	(0.49,3.18)	-0.08	0.93	(0.41,2.07)
Attended trainings[¶]									
Membership to Organizations									
No organization	0.37	1.44	(0.80, 3.81)	0.44	1.57	(0.77,3.19)	0.79	2.21**	(1.12,4.35)
With organization[¶]									
Constant	-4.91	0.01		-2.13	0.12		-0.63	0.533	
Model									
-2 Log likelihood	240.37			246.61			283.50		
Accuracy Rate of Predicting the Occurrence of the Outcome	82.50%			80.00%			76.00%		

[a]Coefficient indicates direction of relationship (positive/negative) between the predictor/independent variable (IV) and dependent variable (DV) (stunting, underweight, wasting). [b]Odds ratio: 1= IV does not affect DV, <1= IV associated with lower probability of DV; >1=IV associated with higher probability of DV. [c]CI, confidence interval. [¶]Reference Category. Significance of Odds Ratio (OR): *p-value<0.10, significant at 10% level, ** p-value<0.05, significant at 5%, ***p-value<0.001, significant at 1% level.

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UNDERSTANDING BETTER THE KNOWLEDGE, BELIEFS, AND ATTITUDES TOWARD BREAST CANCER AND BREAST SCREENING PRACTICES AMONG WOMEN LIVING IN RAS AL KHAIMAH, UNITED ARAB EMIRATES (UAE)

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Abstract: Breast cancer is the most frequently diagnosed malignant disease among women in the United Arab Emirates (UAE), and the incidence rate is rising. Breast cancer early detection practices through regular screening have been found to reduce morbidity and mortality from this disease. This study aims to explore the knowledge, beliefs, attitudes, and practices towards breast cancer and its screening methods among women living in the emirate of Ras Al Khaimah (RAK). One hundred and two women who met the study's inclusion criteria were interviewed. Pearson's chi-squared test and multivariate logistic regression analysis were performed in the statistical analysis. Relatively low participation rates in breast cancer screening practices (BCSP) were found. Women who stated that their doctors talked to them about breast cancer were significantly more likely to undergo BCSP ($p < 0.05$). Fear of being diagnosed with breast cancer, lack of a doctor's recommendation and perceived discomfort with breast screening were strongly associated with not planning to practice clinical breast examination (CBE) or mammography screening in the following 12 months. The study findings indicated that RAK women's knowledge and practice of breast cancer early detection screenings are currently inadequate. Establishing a culturally acceptable health education program with appropriate interventions is required.

Keywords: Breast cancer screening practices; Breast Self-Examination; Clinical Breast Examination; Mammography

Introduction

Breast cancer is the most frequently diagnosed malignancy among women worldwide with an estimated 1.67 million new cases in 2012 (accounting for 25% of all cancers) (Ferlay *et al.*, 2015). The incidence rates vary globally ranging from 91.6 per 100,000 women in North America to 43 per 100,000 in the Middle-East and Northern Africa (MENA) region (International Agency for Research on Cancer, 2012). Although breast cancer incidence rate is lower in the United Arab Emirates (UAE) compared with westernized countries, the incidence is increasing rapidly. The age-adjusted standardized incidence rates has increased from 19.4 per100,000 women in 2002 (Sreedharan *et al.*, 2010), to 30.8 per 100,000 women in 2004 (Gulf Center for

Cancer Control and Prevention, 2011), to 36.7 per 100,000 women in 2008 (El-Zaemey *et al.*, 2012) up to 39.2 per 100,000 women in 2012 which is one of the highest rates in the Gulf Cooperation Council (GCC) region (International Agency for Research on Cancer, 2012).

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UAE women are not only being diagnosed with breast cancer in advanced stages (Health Authority Abu Dhabi, 2008), but also at younger ages, a decade earlier compared with westernized women (Median age 49 year) resulting in poorer disease prognosis and outcomes (Najjar and Easson, 2010, Al-Othman *et al*., 2015). It was reported that nearly 24.2% of UAE women who were diagnosed with breast cancer died from the disease, compared with 15.7% among Australian women (International Agency for Research on Cancer, 2012). Currently, breast cancer screening practices (BCSP) including Breast Self-Examination (BSE), Clinical Breast Examination (CBE), and mammography remain the cornerstone of breast cancer control and prevention (Anderson *et al.*, 2008).

Unfortunately, recent research has indicated that participation rates of Arab women in breast screening is low (Donnelly *et al.*, 2013a, Elobaid *et al.*, 2014, Sabih *et al.*, 2012, Hasan *et al.*, 2017). Several studies have revealed important facilitators and determinants of BCSP (Abdallah *et al.*, 2015, Donnelly *et al.*, 2013b, Othman *et al.*, 2015, Liu *et al.*, 2014, Kwok *et al.*, 2015, Donnelly *et al.*, 2015b, Dahlui *et al.*, 2013). These factors include: demographic characteristics including age, health status, educational levels and employment status; physiological, social and cultural beliefs towards breast cancer and its screening practices; religious and fatalistic beliefs; fear of being diagnosed with breast cancer and discomfort or pain associated with CBE and mammography procedures; doctor's recommendations; perceived risk of breast cancer; and knowledge about breast cancer and its screening practices.

Whilst some data are emerging around women's engagement in breast cancer early detection practices in GCC region, few studies have been carried out which explore the relevance of previous findings to women in the UAE, particularly those living in regions distant from the large cities such as RAK. Therefore, the aim of this study was to investigate the knowledge, beliefs, attitudes, and practices towards breast cancer and its screening practices in RAK, the north-eastern most Emirate in the UAE. The findings of this study will provide evidence regarding perceptions of the women living in RAK with respect to breast cancer and BCSP and help inform the development of strategies to promote early detection program towards enhancing BCSP.

Methodology

This cross-sectional study used a structured questionnaire to collect data on the knowledge, beliefs, and attitudes about breast cancer and BCSP among women living in RAK. Ethical approval was obtained from the Human Research Ethics Committee of the University of Sydney (Project Number: 2014/884). Participants provided informed consent prior to enrolment in the study.

Convenient sampling method was used to recruit women living in RAK between January and July 2015. Initially 120 women who met the study's inclusion criteria (aged ≥ 30 years and living in RAK for at least 10 years), were invited to participate in a 35-45 minutes face-to-face interview.

The structured questionnaire used in this study was developed and validated in the United States (US) and Australia and has been recently used in a similar study in Qatari women [14]. However, we adapted the instrument by adding questions about participants' knowledge of breast cancer physical signs and treatment options, which were obtained from an existing survey validated in Muslim women living in Australia (Hossain *et al.*, 2016). The questionnaire consisted of 64 items categorized into six main sections; socio-demographic characteristics; overall health status of the participants; breast cancer knowledge; cancer beliefs and attitudes; awareness and practices of regular BCSP (BSE, CBE, mammography); participant

satisfaction with health care service provision in RAK. Forward and backward translations of the questionnaire and related documents (Behling and Law, 2000) between English into Arabic were carried out to ensure lexical equivalence and that the meaning of questions and concepts were not changed in translation. These translations were checked and approved by a Justice of Peace (JP), authorized by the Australian Government in New South Wales (NSW), Sydney, Australia.

The questionnaire was administered to participants by four female medical students from Ras Al Khaimah Medical and Health Sciences University (RAKMHSU) and a female staff from RAK Private Hospital who were each fluent in English and Arabic. Interviewers received training on the content of the questionnaire; the interview procedure, how to handle difficult situations including any interruption during interview and so on, and how to overcome barriers when conducting the interviews. The face to face data collection process was aimed to ensure a maximum response rates and the participants' full understanding of the study objectives.

Data analysis

Pearson's chi-squared test and Fisher's Exact Test (two-tailed) were used to examine the associations between BCSP and demographics information, breast cancer related knowledge, belief, and attitude variables. Participants' knowledge about breast cancer assessed both breast cancer symptoms and treatment options. A breast cancer symptoms knowledge scale was constructed based on 6 items (including breast lump, nipple discharge, crusting/ulcer/redness of nipples, dimpling of breast, swollen underarms and breast swelling). Response to each item was recorded as 0 (indicating no knowledge) or 1 (have knowledge) and then summated. A similar strategy was used to construct knowledge of breast cancer treatment options (based on 5 items). Internal validity for both scales was confirmed by a Cronbach's Alpha coefficient of 0.82 for physical signs scale and 0.76 for treatment options scale. Factors demonstrating statistical significance in bivariate analyseswere included in the multivariate regression to determine the predictors of participating in BCSP. A p value < 0.05 was considered as the cut-off for statistical significance. Data analyses were conducted using SPSS (version 22) [IBM, USA].

Results

Participants Background Information

At the data entry stage, 18 incomplete participant questionnaires were excluded, resulting in a response rate of 85%, with a final sample size of 102 participants. Study population characteristics are shown in Table 1. In brief, participants were aged between 30-65 years [mean= 41.6, Standard Deviation (SD)= 9.2]. Most participants were married, had 4 or more children, of Muslim faith, university-educated and employed. Nearly three quarters of women were Emirati nationals and the remainders were from North African, Middle Eastern or Asian countries. Nearly half of participants were teachers and a quarter of participants were in the middle income group (however, approximately 40 % of participants refused to disclose or did not know their monthly family income).

Table 1 Selected socio-demographic characteristics.

Characteristic	**n (%)**	**Characteristic**	**n (%)**
Age (Years)		**Employment status**	
≤ 40	45 (44.1)	Work full time	76 (75.5)
> 40	57 (55.9)	Unemployed[c]	26 (25.5)
Nationality		**Current occupation[d]**	
Emirati citizen	74 (72.5)	Teacher	46 (46.4)
Non-Emirati citizen[a]	28 (27.5)	Administration	19 (19.2)
Marital status		Other[e]	34 (34.3)
Single	9 (8.8)	**Education level**	
Married	93 (91.2)	University or higher level	79 (78.2)
Number of children[b]		School or diploma level	22 (21.8)

0-3	27 (29)	**Monthly family income**	
≥ 4	66 (71)	≤ 20,000 AED[f]	19 (18.6)
Overall health		21,000-40,000 AED	25 (24.5)
Good/Excellent	73 (72.3)	≥ 41,000 AED	19 (18.6)
Poor/Fair	28 (27.7)	I do not know or refused	39 (38.2)

[a]Non-Emirati citizens include (Egypt, n=9; Jordan, n=6; Syria, n=3; Palestine, n=2), and 1 participant from the following countries (Tunisia, Sudan, Somalia, Lebanon, Iran, Iraq, Yemen, and Philippines).
[b] 9 Single participants were removed from the analysis.
[c] 3 Part time workers and 1 full time student were categorized as unemployed.
[d]1 Full time student and 2 missing values were removed from the analysis.
[e] Other (22 homemakers and 12 professionals).
[f]1United Arab Emirates Dirham (AED) = 0.2723 United States Dollar (USD).

Association between background variables and breast cancer screening

Table 2 Associations between selected background (socio-demographic) variables and breast cancer screening practices.

	Breast Self-Examination (BSE)			**Clinical Breast Examination (CBE)**			**Mammography**		
	No	**Yes**		**No**	**Yes**		**No**	**Yes**	
Variables	**n (%)**	**n (%)**	**P, Unadjusted OR [95% CI]**	**n (%)**	**n (%)**	**P, Unadjusted OR [95% CI]**	**n (%)**	**n (%)**	**P, Unadjusted OR [95% CI]**
Age									
≤ 40*	23 (51.1)	22 (48.9)	0.84, 1.08 [0.50, 2.37]	21 (65.6)	11 (34.4)	0.002, 4.61 [1.71, 12.44]	36 (81.8)	8 (18.2)	<0.0001, 5 [1.99, 12.62]
> 40	28 (49.1)	29 (50.9)		12 (29.3)	29 (70.7)		27 (47.4)	30 (52.6)	
Nationality									
Emirati*	42 (56.8)	32 (43.2)	0.02, 2.78 [1.11, 6.93]	23 (47.9)	25 (52.1)	0.52, 1.38 [0.52, 3.68]	51 (69.9)	22 (30.1)	0.01, 3.09 [1.26, 7.60]
Non-Emirati	9 (32.1)	19 (67.9)		10 (40)	15 (60)		12 (42.9)	16 (57.1)	
Employment									
Work full time*	37 (48.7)	39 (51.3)	0.65, 0.81 [0.33, 1.99]	28 (52.8)	25 (47.2)	0.03, 3.36 [1.07,10.58]	55 (73.3)	20 (26.7)	<0.0001, 6.19 [2.33, 16.45]
Unemployed	14 (53.8)	12 (46.2)		5 (25)	15 (75)		8 (30.8)	18 (69.2)	
Education									
University/higher*	39 (49.4)	40 (50.6)	0.96, 0.98 [0.38, 2.51]	27 (47.4)	30 (52.6)	0.61, 1.35 [0.43, 4.29]	54 (69.2)	24 (30.8)	0.005, 3.94 [1.46, 10.63]
School/ diploma	11 (50)	11 (50)		6 (40)	9 (60)		8 (36.4)	14 (63.6)	
Overall health									
Excellent/Good*	40 (54.8)	33 (45.2)	0.08, 2.18 [0.89, 5.37]	27 (54)	23 (46)	0.01, 3.99 [1.27, 12.50]	56 (77.8)	16 (22.2)	<0.0001, 12.83 [4.45, 37.04]
Poor/Fair	10 (35.7)	18 (64.3)		5 (22.7)	17 (77.3)		6 (21.4)	22 (78.6)	

*Reference group for odds ratio.

The results of the bivariate analysis presented in Table 2 indicated that women who were > 40 years old, were unemployed, and reported their health status to be poor or fair were significantly more likely to practice CBE (p=0.002, 0.03, and 0.01 respectively) and mammography (p=<0.0001). In addition, participants were more likely to undergo mammography screening if they had a school or diploma level qualification (p=0.005) or were non-Emirati citizen (p=0.01). In terms of BSE practice, the only significant relationship shown was that non-Emirati women were more likely than Emirati women to engage with BSE (p=0.02).

Participants' beliefs, attitudes, and knowledge toward cancer and breast cancer and BSCP

Twenty-eight of 98 women reported having a family member diagnosed with breast cancer. A lump in the breast and swollen underarm were the two breast cancer symptoms that most study participants could identify (Table 3). Although the majority of participants 97% stated that they would seek medical help if they discovered any breast cancer indicative signs, only 15.2% were able to correctly identify all indicative signs of breast cancer. Two thirds of the study population was aware about the availability of drugs and surgery as possible treatments for breast cancer, however only 15 % were able to correctly identify all treatment options.

The public media was the main source of information for women about breast cancer (newspaper and magazine 60%, television or radio 56%, pamphlets 48%), followed by friends or family members 49%. In contrast, less than 35% of information about breast cancer was obtained from the health care providers (doctor 35%, health care educator 25% and nurse 18%). In contrast, less than 35% of information about breast cancer was obtained from the health care providers (doctor 35%, health care educator 25% and nurse 18%).

The study group demonstrated a variety of beliefs and attitudes regarding cancer (Figure 1). A majority of the participants believed that cancer is due to fate, would threaten relationship with loved one, and would threaten their career. Women whose doctors talked to them about breast cancer (48/94 women) were significantly more likely to engage in BCSP compared with women who did not experience these conversations. The significant associations between beliefs and attitudes towards cancer and BCSP are shown in Table 4.

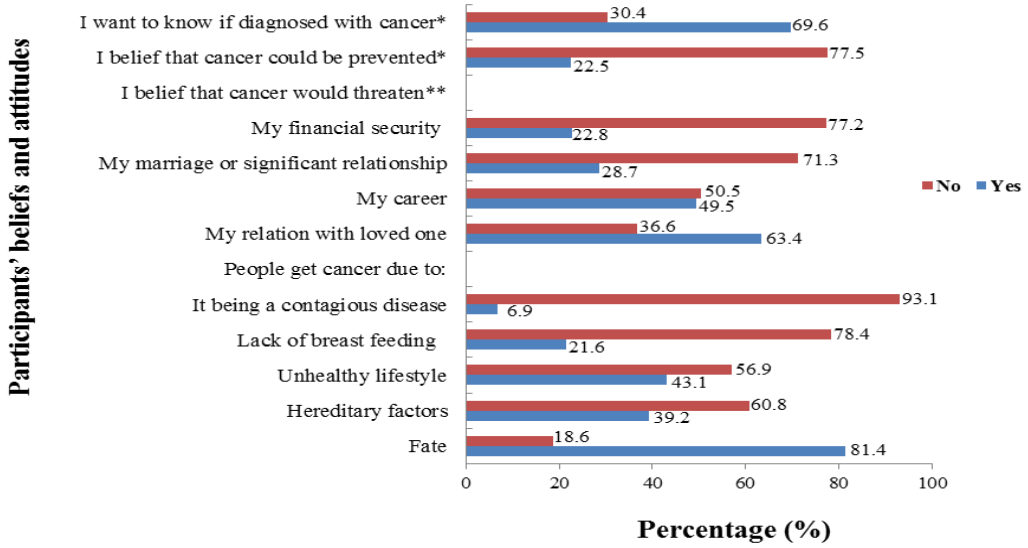

*Figure 1 Participants' beliefs and attitudes towards cancer (n=102). Note: * No and not sure answers were added together. ** 1missing value (n=101). Data represnts multiple respones options (Yes, No).*

Table 3 Participants' knowledge about breast cancer including physical signs and treatment options.

Variable	Correct response, n (%)
Physical signs (n=99)	
Lump in the breast	65 (65.7)
Nipple discharge	35 (35.4)
Crusting, ulcer or redness of the nipple	26 (26.3)
Redness or dimpling of the breast	33 (33.3)
Swollen underarm	53 (53.5)
Breast swelling	28 (28.3)
Treatment options (n=100)	
Prescription drugs	34 (34.0)
Chemotherapy	61 (61.0)
Radiation therapy	38 (38.0)
Hormonal therapy	25 (25.0)
Surgery	63 (62.0)

Note: No and I do not know answers were recorded as incorrect response.

*One participant with history of breast cancer was removed from this analysis.

Associations between participants' beliefs and attitudes with BSCP (bivariate analysis)

Breast Self-Examination (BSE)

Of the 102 women studied, the majority had a good level of BSE awareness (n=76) and knowledge (n=60) on how to perform a BSE, although only half of participants had practiced it previously (Figure 2). Of those who had practiced BSE before, 43.1% had done so in the last month, whilst an additional 15.7% last performed it within the last year and 29.4% over a longer period of time. In addition, 11.8% of participants did not remember the last time they performed the test. The significant findings are shown in Table 4.

Clinical Breast Examination (CBE)

Although 73 participants were aware of CBE screening, only 40 had engaged with CBE previously (Figure 2). Of those who had practiced CBE, 57.5% were performed by a doctor, 20% by a nurse, whilst 22.5 % were examined by both types of health professional. Analysis revealed that 63.4% and 43.1% of participants (n=101) would prefer a doctor and an Arab health care practitioner to perform the CBE, respectively. Eighty-nine precent of participants' preferred a female health professional to perform CBE. Further, 54 of 101 participants were planning to perform a CBE in the following 12 months. The main reasons found to encourage or discourage women for undertaking a CBE screening are presented in Figures 3 and 4. The significant associations between are shown in Table 4.

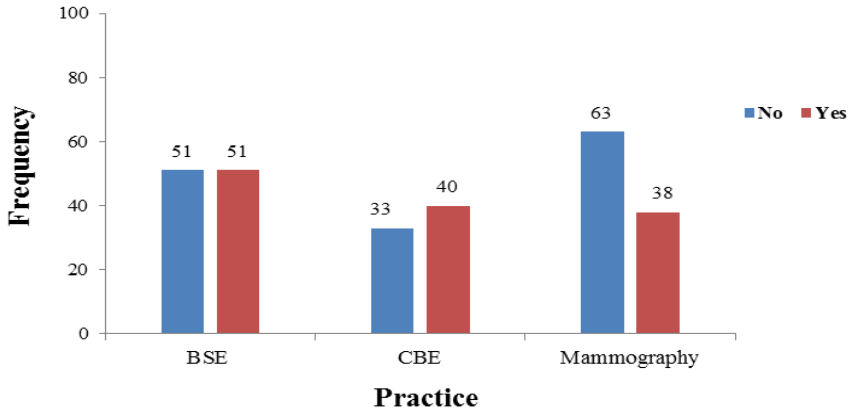

Figure 2 Breast cancer screening practices participation rates. Note: BSE (n=102) and mammography (n=101). For CBE (n=73), when individuals answered no or I did not know to the previous question (Have you ever heard about CBE?), we could not glean further CBE information about those individuals.

Mammography

Mammography was the least frequently accessed breast cancer screening practice with only 38 of 101 participants (Figure 2). Of those who had undergone mammography, 73.7% had done so in the last year, whilst an additional 18.4% performed it over a longer period of time or did not remember the last time they performed the test (7.9%). Only 15.7% of the participants (n=102) knew that mammography should be completed every two years, and an additional 20.6% did not know the answer or provided incorrect answer. Further, 40.2% and 23.5% responded that the test should be conducted once a year or only when a doctor prescribed it, respectively. Only 4% of participants (n=100) knew that mammography should be ideally performed in women aged 40 years and older, whilst 57 % failed to provide the appropriate age for screening and an additional 39% did not know the answer. The significant findings are shown in Table 4. Overall less than half of participants (n=48) were planning to undergo a mammography screening in the following 12 months. The main facilitators and barriers for women undertaking a mammography screening in the next 12 months are shown in Figures 3 and 4 respectively.

Table 4 Associations between participants' practice, awareness, beliefs, and attitudes with breast cancer screening practices.

Variables	**No, n (%)**	**Yes, n (%)**	**P, Unadjusted OR, [95% CI]**
Breast Self-Examination (BSE)			
Cancer could be prevented			
No/Not Sure*	45 (57)	34 (43)	
Yes	6 (26.1)	17 (73.9)	0.009, 3.75, [1.34, 10.52]
People get cancer because they have unhealthy lifestyle			
No*	34 (58.6)	24 (41.4)	
Yes	17 (38.6)	27 (61.4)	0.04, 2.25, [1.01, 5.01]
Doctor talked to participant about breast cancer			
No*	29 (63)	17 (37)	
Yes	15 (31.3)	33 (68.8)	0.002, 3.75, [1.60, 8.82]
BSE awareness			
No*	23 (88.5)	3 (11.5)	
Yes	28 (36.8)	48 (63.2)	<0.0001, 13.14, [3.62, 47.76]
Clinical Breast Examination (CBE)			
Cancer would threaten my relation with loved one			
No*	18 (66.7)	9 (33.3)	
Yes	15 (33.3)	30 (66.7)	0.006, 4.00, [1.45, 11.00]

Doctor talked to participant about breast cancer			
No*	20 (69)	9 (31)	
Yes	11 (28.9)	27 (71.1)	0.001, 5.46, [1.90, 15.65]
Planning for a CBE in the next 12 months			
No*	22 (84.6)	4 (15.4)	
Yes	11 (23.9)	35 (76.1)	<0.0001, 17.50, [4.95, 61.85]
Gender preference to perform a CBE			
No preferences *	8 (88.9)	1 (11.1)	
Female	25 (39.7)	38 (60.3)	0.009[a], 12.16, [1.43, 103.28]
Mammography			
People get cancer because it is fate			
No*	7 (36.8)	12 (63.2)	
Yes	56 (68.3)	26 (31.7)	0.011, 0.27, [0.096, 0.77]
People get cancer because it is hereditary			
No*	33 (54.1)	28 (45.9)	
Yes	30 (75)	10 (25)	0.034, 0.39, [0.16, 0.94]
Doctor talked to participant about breast cancer			
No*	34 (75.6)	11 (24.4)	
Yes	25 (52.1)	23 (47.9)	0.019, 2.84, [1.17, 6.98]
Participants who have a family doctor to visit			
No*	28 (82.4)	6 (17.6)	
Yes	35 (52.2)	32 (47.8)	0.003, 4.27, [1.56, 11.64]
Planning for a mammography in the next 12 months			
No*	47 (88.7)	6 (11.3)	
Yes	15 (31.9)	32 (68.1)	<0.0001, 16.71, [5.86, 47.66]
Agreeing to do a mammography after a medical consultation			
No*	27 (96.4)	1 (3.6)	<0.0001, 27.76, [3.58, 215,13]
Yes	36 (49.3)	37 (50.7)	

[a]P-value obtained from Fisher's Exact Test because 2 cells (50.0%) have expected count less than 5.

[*]Reference group for odds ratio.

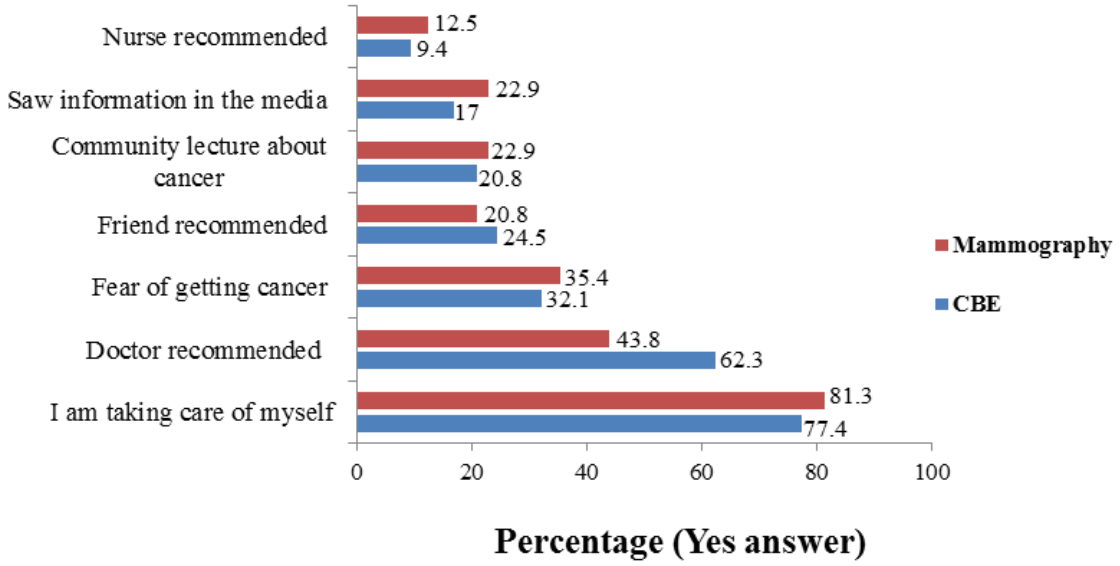

Figure 3 Facilitators of CBE and a mammography in the following 12 months. Note: CBE, n=53, 1 participant answered, "I do not know" was removed from the analysis; Mammography, n=48.

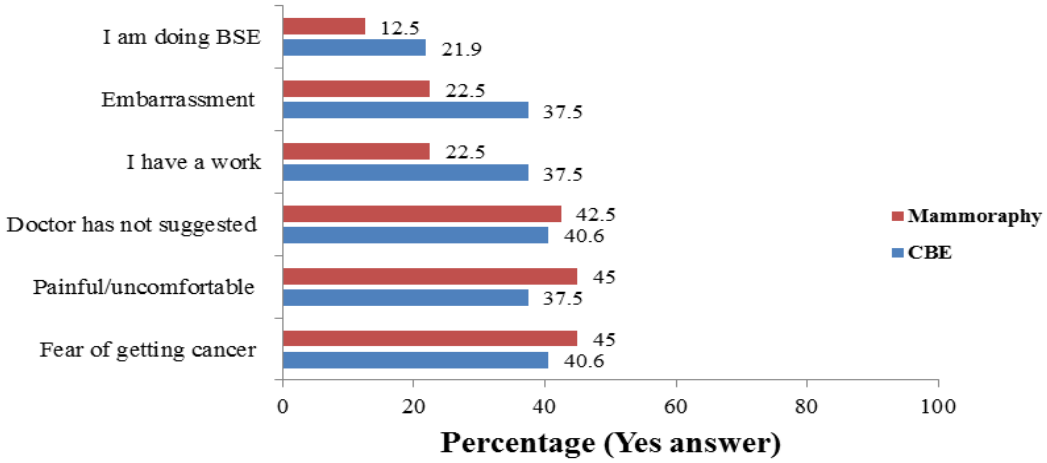

Figure 4 Barriers to CBE and a mammography in the following 12 months. Note: CBE, n=32, 4 participants answered "I do not know", 2 refused to answer, and 1 missing value were removed from the analysis; Mammography, n=40, 4 participants answered "I do not know" and 1 missing value were removed from the analysis).

Multivariate logistic regression was conducted to predict the impact of several independent variables on the probability that a participant would undergo BCSP (Table 5). Women with previous BSE awareness, women whose doctors talked to them about breast cancer, and those who thought that cancer could be prevented were 12, 3 and 5 times more likely to practice BSE, respectively. For CBE practice, women who were > 40 years old and women whose doctors talked to them about breast cancer were 3.4 and 4.6 times more likely to undergo CBE screening respectively. With regard to the mammography practice, women who were > 40 years old or described their health status as poor or fair were 9.2 and 4.8 times more likely to undergo mammography screening, respectively.

Table 5 Multivariate logistic regression of predictors associated with breast cancer screening practices.

Variables	**P value**	**Adjusted OR [95% CI]**
Breast Self-Examination (BSE)		
People get cancer because they have unhealthy lifestyle (*No, Yes)	0.47	1.48 [0.51, 4.29]
Nationality (*Emirati, Non-Emirati)	0.78	0.85 [0.26, 2.77]
Cancer could be prevented (*No, Yes)	0.03	5.88 [1.19, 29.18]
Doctor talked to participant about breast cancer (*No, Yes)	0.02	3.15 [1.13, 8.79]
BSE awareness (*No, Yes)	0.001	11.99 [2.90, 49.56]
Model Summary -2 Log likelihood (94.361); Cox & Snell R Square (0.315); Nagelkerke R Square (0.421)		
Clinical Breast Examination (CBE)		
Age group (*≤ 40, > 40)	0.04	3.42 [1.03, 11.38]
Overall health (*Good/Excellent, Poor/fair)	0.36	1.97 [0.46, 8.48]
Doctor talked to participant about breast cancer (*No, Yes)	0.01	4.67 [1.38, 15.79]
Employment status (*Work full time, Unemployed)	0.48	1.71 [0.39, 7.45]
Cancer would threaten my relation with loved one (*No, Yes)	0.09	3.02 [0.84, 10.91]
Model Summary -2 Log likelihood (66.508); Cox & Snell R Square (0.300); Nagelkerke R Square (0.401)		
Mammography		
Age group (*≤ 40, > 40)	0.003	9.25 [2.08, 41.05]
Cancer would threaten my relation with loved one (*No, Yes)	0.50	1.66 [0.38, 7.32]
Overall health (*Good or Excellent, Poor or fair)	0.04	4.88 [1.07, 22.28]
Employment status (*Work full time, Unemployed)	0.11	4.01 [0.72, 22.29]
Participants who have a family doctor to visit (*No, Yes)	0.10	3.77 [0.77, 18.59]
Nationality (*Emirati, Non-Emirati)	0.06	4.33 [0.91, 20.63]
Education level (*University or higher level, School or diploma level)	0.55	1.69 [0.29, 9.67]
Doctor talked to participant about breast cancer (*No, Yes)	0.17	2.53 [0.67, 9.57]
People get cancer because it is fate (*No, Yes)	0.41	0.49 [0.09, 2.79]
People get cancer because it is hereditary (*No, Yes)	0.46	0.59 [0.15, 2.38]
Model Summary -2 Log likelihood (63.882); Cox & Snell R Square (0.454); Nagelkerke R Square (0.620)		

*Reference group for odds ratio.

Discussion

It is well established that regular breast cancer screening practices including BSE, CBE, and mammography have been found to reduce morbidity and mortality if coupled with high-quality screening and treatment (Donnelly *et al.*, 2015a). However, UAE women may be at greater risk of mortality from breast cancer (Donnelly et al., 2012) due to diagnosis of breast cancer at a younger age and a more aggressive nature (Health Authority Abu Dhabi, 2008). Therefore, BCSP remains the cornerstone of breast cancer control and

prevention (Anderson *et al.*, 2008). In the present study, 50%, 54.8%, and 37.6% of the participants reported they practiced BSE, CBE, and mammography, respectively. These rates of participation in breast screening are similar to those reported recently by (Elobaid *et al.*, 2014) who found BSE was practiced by 48.6%, CBE by 49.4%, and mammography by 44.9% of the UAE study population. Further, the rates demonstrate a significant improvement in screening uptake when compared with earlier study conducted in the UAE where only 12.7%, 13.8%, and 10.3% practiced BSE, CBE and mammography, respectively (Bener *et al.*, 2001). Moreover, BCSP rates in our study group were higher than those reported among some other GCC courtiers (Donnelly *et al.*, 2013a, Donnelly *et al.*, 2013b, Abdallah *et al.*, 2015). These encouraging higher screening rates may reflect the recent awareness activities performed by the UAE health authorities in the last few years (Elobaid *et al.*, 2014).

Our finding that BCSP being more pronounced among women with lower education levels was surprising. It was suggested that higher education was linked to being knowledgeable about breast cancer (presumed to be linked to higher levels of education) and that actually knowledge rather than higher education was the main determinant in practicing early detection methods (Lagerlund *et al.*, 2000). Nonetheless, other studies conducted among Arab women have found that low participation even in those with sufficient knowledge (Donnelly and Hwang, 2013), suggesting that good levels of breast cancer knowledge alone will not address unwillingness to engage in BCSP. Consistent with our findings, a recent cross-sectional study conducted in the UAE showed higher BCSP among lower educated women (Elobaid *et al.*, 2014). This previous work argued that more educated women may have been more exposed to discussions about the breast cancer risk caused by radiation associated with mammography, as well as the continuing debate around over-diagnosis. A link between engagement of BCSP and lower education has also been shown outside the GCC region where in the United Kingdom it was found that women with no qualification were more likely to check their breasts compared highly educated women (Linsell *et al.*, 2008). This counter-intuitive finding between education and BCSP regardless of the cause highlights the need for comprehensive and effective public awareness campaigns across all sectors of the community, regardless of educational status.

In the current study, BCSP were more pronounced among women who stated that their health status was fair or poor compared with women with good or excellent health status. It was reported that Arab women define good health as the absence of visible symptoms of illness, so when visible diseases are apparent, preventive health measures for diseases such as breast cancer are more likely to be sought (Othman *et al.*, 2015, Kwok *et al.*, 2015). This could in part explain the higher screening uptake among women with fair or poor health status.

It has been reported that religious belief might have an influence upon women's participation in BCSP (Donnelly and Hwang, 2013). In particular, it was found that higher religiosity hindered Asian (Rajaram and Rashidi, 1999) and African American (Mitchell *et al.*, 2002) women from adopting a positive screening behavior (Donnelly *et al.*, 2013a). In the present study and consistent with previous results reported from Qatari women (Donnelly *et al.*, 2013b), more than 80% of women have linked developing breast cancer with 'fate' implying that Muslim women (who comprised 99% of our respondents) might defer responsibility for their health to fate leading to limited attention to self-care. In addition, believing that cancer is inevitable and determined by fate or God has been shown in Muslim countries to act as a barriers to BCSP (Donnelly *et al.*, 2013a). However, the extent to which fatalism is a barrier to BCSP among RAK women requires further investigations (Donnelly *et al.*, 2013b), since we have only preliminary results suggesting this relationship. It is worth considering that the Islamic guidelines promote overall physical well-being, hold the individual responsible for one's health, and permit women to have their bodies examined by male health care professionals for medical reasons (Donnelly *et al.*, 2013a). Since Islam plays a major role in Muslim society, alignment of early detection methods with religious values could be emphasized by encouraging religious leaders to highlight these Islamic guidelines within any awareness program.

Much of the literature has reported that a doctor's recommendation is the most single powerful motivator to BCSP (Donnelly *et al.*, 2013b, Donnelly *et al.*, 2013a, Elobaid *et al.*, 2014). For instance, in a recent cross-sectional study carried out in the UAE, it was reported that approximately 80% of the participants who

engaged in BCSP were encouraged by their doctors (Elobaid *et al.*, 2014). It is clear therefore that health care providers must adopt a proactive role promoting engagement in regular BCSP (Donnelly *et al.*, 2013a, Farid *et al.*, 2014). Nonetheless, the fact that only half of the participants were exposed to information about breast cancer from their doctors in our study is worrying. The importance for current, enthusiastic, and knowledgeable engagement between doctors and health providers with women across the UAE cannot be understated.

Although the value of BSE and CBE in terms of breast cancer mortality reduction is less established (Panieri, 2012, Kösters and Gøtzsche, 2003), compared with mammography screening which contributes to around 25% - 30% of mortality reduction (Panieri, 2012), both BSE and CBE have been shown to be cost-effective in facilitating early detection and down-staging in breast cancer diagnosis (Hassan *et al.*, 2015, Miller and Baines, 2011, Brennan, 2016). It is also important to note that regular BSE practice would probably make women more "breast aware" which could potentially facilitate earlier-stage detection by prompt reporting of any breast changes (Okobia *et al.*, 2006, Al-Foheidi *et al.*, 2013). This is supported by the fact that nearly 80% of breast cancer in women under 40 years old were self-reported (Stojadinovic, 2011). However, inadequate level of knowledge in regard to breast cancer indicative signs reported from the present study might greatly influence women's timely responsiveness to these changes. Therefore, increased women's knowledge in regard to breast cancer symptoms and aetiology are urgently needed. While there is no organized nationwide mammography screening in the UAE and women often diagnosed with breast cancer a decade earlier than westernized women (Najjar and Easson, 2010), current efforts to improve breast cancer screening practices in the UAE should be based on a combination of both BSE and CBE (Okobia *et al.*, 2006, Provencher *et al.*, 2016) which can be presented as being sensitive to cultural beliefs and attitudes.

The rate of mammography screening of women in our study (37.6%) was low compared to the rate of mammography in westernized countries (Health and Social Care Informarion Centre, 2014) and an international standard of 75% (Perry *et al.*, 2006). It is important to note that in developing countries initiating a national breast cancer screening program as a solution in the absence of an adequate diagnostic infrastructure is a questionable approach (Panieri, 2012, Al-Foheidi *et al.*, 2013). For instance, Bahrain was the first country in the GCC region to initiate a national breast screening programme in 2005 (Donnelly *et al.*, 2013a), however participation rate was out of expectation with only 21.1% women underwent a mammography screening in 2009 (Bahrain Cancer Society, 2014). Comparable findings were also reported from the UAE (Health Authority Abu Dhabi, 2008) and Saudi Arabia (El Bcheraoui *et al.*, 2015).

It should be acknowledged that this study had a small sample size; however, we recruited the maximum number of possible participants given time and financial constraints. Moreover, the proportion of women recruited relative to RAK population was consistent with other similar studies in GCC region (Donnelly et al., 2013a). Lastly, BCSP were self-reported, which may introduce the possibility of response bias. Other possible limitations of our study include the potential for that interviewers' bias during data collection, and an absence of in-depth information, warranting a need for future a qualitative research.

Conclusion

Breast cancer has become a major public health concern in the UAE, and early detection may play a significant role in reducing morbidity and mortality of the disease. This work compared with previous data has shown improvements in women's willingness to engage with screening programs. However, this study indicated that the RAK women's knowledge and practice of breast cancer early detection activities are inadequate. Therefore, a thorough, sensitive, and comprehensive public awareness campaign is needed that involves all relevant members of the community. This campaign should highlight that screening activities are influenced by personal and social factors not at all at odds with religious and cultural beliefs. Emphasis has to be laid on health care professionals, in terms of education and awareness as they are largely involved in patient care in the UAE. The study findings should not only provide a valuable insight to policy makers and health planners in RAK who are considering the establishment of a population-based breast cancer

screening program, but also encourage early detection strategies that are tailored to the specific needs of RAK women so that breast cancer management and prevention strategies are optimized.

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DENTAL FLUOROSIS IN URBAN SLUMS OF SOUTHERN INDIAN CITY OF MYSORE-A PILOT STUDY REPORT

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Introduction

Fluorine is the most abundant element in nature, and about 96% of fluoride in the human body is found in bones and teeth. Fluorine is essential for the normal mineralisation of bones and formation of dental enamel [1].The principal sources of fluorine was drinking water and food such as sea fish, cheese and tea [2]. The recommended level of fluoride in drinking water in India is 0.5 to 0.8 mg/l [3].

Fluorosis is an important public health problem in 24 countries, including India, which lies in the geographical fluoride belt that extends from Turkey to China and Japan through Iraq, Iran and Afghanistan [4]. Of the 85 million tons of fluoride deposits on the earth's crust, 12 million are found in India [5]. Hence it is natural that fluoride contamination is widespread, intensive and alarming in India. Endemic fluorosis is prevalent in India since 1937 [6]. It has been estimated that the total population consuming drinking water containing elevated levels of fluoride is over 66 million [7]. Endemic fluorosis resulting from high fluoride concentration in groundwater is a public health problem in India [8].

The available data suggest that 15 States in India are endemic for fluorosis (fluoride level in drinking water >1.5 mg/l), and about bout 62 million people in India suffer from dental, skeletal and non-skeletal fluorosis. Out of these; 6 million are children below the age of 14 years [9]. Groundwater is considered as the major source of drinking water in most places on earth [10].

India was one of the worst fluorosis affected countries, with large number of people suffering. This is because a large number of Indians rely on groundwater for drinking purposes and water at many places is rich in fluoride [11]. In India 62 million people including 6million children are estimated to have serious health problems due to consumption of fluoride contaminated water [12].

World Health Organization (WHO) has set the upper limit of fluoride concentration in drinking water at 1.5 mg/l [13], and The Bureau of Indian Standards, has therefore, laid down Indian standards as 1.0 mg/l as maximum permissible limit of fluoride with further remarks as "lesser the better" [14]. Intake of fluoride higher than the optimum level is the main reason for dental and skeletal fluorosis. The main source of fluoride in groundwater is the rocks which are rich in fluoride. Most of the people affected by high fluoride concentration in groundwater live in the tropical countries where the per capita consumption of water is more because of the prevailing climate [10]. Some regions in north western and southern India are heavily affected with fluorosis [15,16]. Similarly, the rocks in southern India are rich with fluoride which forms the major reason for fluoride contamination in groundwater [10], and the granites in the district of Nalgonda, Andhra Pradesh contain much higher fluoride than the world average fluoride concentration of 810 mg/kg [17]. Fluorine is often called as two-edged sword. Prolonged ingestion of fluoride through drinking water in Fluorosis in India: an overview COMMUNITY MEDICINE Arlappa N1 , Aatif Qureshi I2 , Srinivas R3 www. ijrdh.com Review Article ISSN: 2321 – 1431 Int J Res Dev Health. April 2013; Vol 1(2) 97 excess of

the daily requirement is associated with dental and skeletal Fluorosis. Similarly, inadequate intake of fluoride in drinking water is associated with dental caries [1].

Dental Fluorosis

Tooth enamel is principally made up of hydroxyapatite (87%) which is crystalline calcium phosphate [18]. Fluoride which is more stable than hydroxyapatite displaces the hydroxide ions from hydroxyapatite to form fluoroapatite. Fluorosis of dental enamel occurs when excess Fluoride is ingested during the years of tooth calcification-essentially during the first 7 years of life. It is characterised by mottling of dental enamel, which has been reported at levels above 1.5 mg/L intake [19]. On prolonged continuation of this process the teeth become hard and brittle. This is called dental fluorosis. Dental fluorosis in the initial stages results in the tooth becoming coloured from yellow to brown to black. Depending upon the severity, it may be only discolouration of the teeth or formation of pits in the teeth. The colouration on the teeth may be in the form of spots or as streaks. Dean's

Background

The prevalence of dental fluorosis in various geographical regions of India is presented in Table-2. Table 2: Prevalence (%) of dental fluorosis in different parts of India by age groups State/Area Agegroup (Years) Prevalence (%) Author Cuddalore, TN 5-12 31.4 Sarvanan et.al. Indian J Community Med. 2008; 33(3): 146–150. Alapuzzha, kerala 10-17 35.6 Gopalakrishnan et.al. Natl Med J India. 1999; 12(3):99-103. Vadodara, Gujarat Adults 39.2 - 59.3 Kotecha et al. Indian J Med Res. 2012 June; 135(6): 873–877. Davangere, karnataka 12-15 13-100 Chandrasekhar and Anuradha. Int Dent J. 2004; 54(5):235-9. Jhajjar, Haryana 7-15 30-94.9 Yadav et al. Environ Geochem Health. 2009; 31(4):431-8. Birbhum, West Bengal Adults 61-66.7 Majumdhar. Indian J Public Health 2011; 55:303-8. Punjab 5-60 91.1 Shashi and Bhardwaj. Biosci. Biotech. Res. Comm. 2011; 2:155-163. Nalgonda, A.P 12-15 71.5 Shekar et al. Indian J Public Health. 2012; 56(2):122-8. Durg, Chattisgarh Adults 8.2 Pandey. Trop Doct. 2010; 40(4):217-9. Dungarpur, Udaipur (Rajasthan) All ages 39.2-72.1 Choubisa et al. J Environ Sci Eng. 2010; 52(3):199-204. Palamau Jharkhand children 83.2 Srikanth et al. Research report Fluoride. 2008; 41(3)206–211. Assam All ages 31.3 Chakraborti et al. Current Science. 2000; 78 (12): 1421-1423. Uttar Pradesh All ages 28.6 Srivastava et al. Int J Oral & Maxillofacial Pathology; 2011:2(2):7-12. Kareka, Shivpuri Madhya Pradesh 13-50 86.8 Saksena and Narwaria. Int j Environ Sci. 2012; 3(3). Raigad, Maharashtra 0-23 91.7 Bawaskar and Bawaskar. Trop Doct. 2006; 36: 221. Nalgonda, A.P Adults 30.6 Nirgude et al. Indian J Public Health. 2010;54(4):194-6.

Purpose: The Purpose of this study was to clinically detect dental flourosis, dental caries and overall oral hygiene –related quality of life people in slums of Mysore.

Methods: A cross –sectional study is planned in a slum area to detect dental flourosis ,dental caries ,oral hygiene in slums of Mysore city

Distribution of children according to Dental condition

Total Families	202
Children	106
Enamel Mottling	40
Enamel Opacities	65
Decayed teeth	93
Stains and Calculus	103

Males	106
Enamel Mottling	17
Enamel Opacities	28
Decayed teeth	62
Stains and Calculus	42

Females	106
Enamel Mottling	23
Enamel Opacities	37
Decayed teeth	31
Stains and Calculus	61

Results: Pilot study was done in 202 families. Out of 106 children examined, 40 had enamel mottling, 65 had enamel opacities. All these families used water from a bore well situated at a distance of about 50 meters.

A Study done also showed that stains , calculus and dental caries were present in the age group between 6 to 18 years

This was due to only few families using tooth brushes with good oral hygiene

Recommendations

Prevention and control of fluorosis: Rajasthan and Gujarat in North India and Andhra in South India are worst affected. Punjab, Haryana, Madhya Pradesh and Maharashtra are moderately affected states in India, while the states Tamil Nadu, West Bengal, Uttar Pradesh, Bihar and Assam are mildly affected [23]. Since, the fluorosis is irreversible; its prevention is the appropriate, using various intervention measures. Fluoride poisoning can be prevented or minimized by using alternative water sources, by removing excessive fluoride from drinking water, and by improving the nutritional status of populations at risk. The simple interventions include provision of surface water, rainwater and consumption of Low-fluoride groundwater [24]. Other interventions are defluoridation of water through flocculation and adsorption. Similarly, health education and better nutrition are the some of the cost-effective intervention measures [24]. Authors have no conflicts of interests.

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HEALTH CARE NEEDS AND HEALTH SERVICE NEEDS FOR ADOLESCENTS LIVING WITH HIV

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Abstract: Adolescent period is the age of physical, emotional and social change. In participated adolescents with HIV, their lives are dealing with uncertainty and require specific health care management. This study was to examine health care needs, and health care service needs among 26 adolescents with HIV aged 10 – 20- years – old. Fifteen caregivers, nine health care providers and two representatives from private foundation agent were assessed for health care needs, and health care service needs for adolescent with HIV. Quantitative and qualitative approaches were used to collect data in adolescents living with HIV at a provincial hospital, Northeast of Thailand between March 2016 and March 2017. The quantitative data analysis entailed descriptive statistics with percentage, mean, and standard deviation while the qualitative data involved content analysis from individual cases, in-depth interviews, and focus group discussions. Findings demonstrated that adolescents with HIV has several needs such as (1) mental health care i.e. personal goal setting (2) sexual health care and prevention of transmission (3) life skill development and (4) non – disclosure health service. Nurses should help adolescents with HIV to meet essential needs in order to be satisfied on living with HIV.

Keywords: adolescents, HIV, health care needs, health service needs

Introduction

HIV infection is a public health problem that all countries around the world take for granted. According to a report by the Global HIV Situation in **2015**, **10-** to **19-**year-old adolescents have died, three times more likely to be infected with HIV in the next **15** years.(United Nations International Children's Emergency Fund [UNICEF], 2016)In Thailand, adolescents aged **10** to **19** years with HIV were **20**,**560** people and found that in **1** hour, there were **29** new HIV-infected adolescents **10** to **19** years old. (Thai AIDS Society, 2016) Finally, **83.98** percent were sexually abstinent. The buttons do not know the risk factors. Others were **7.99%**, **4.41%** HIV-infected patients, **3.59%** HIV-infected patients, and **0.03%** HIV-infected patients.

Adolescents are the age of body changes. This age is a high sex drive from the hormone that drives high sex drive. The nature of adolescents is curious; they try with the lifestyle of teenagers living outside the home. Adolescents are at an age where there is a chance of spreading HIV and infection. Among adolescents living with HIV, the same changes have occurred with the general adolescent. Also the effects of illness from HIV; Physical, mental, social and spiritual. There are potentially unhealthy side effects of antiretroviral drugs such as abdominal pain and severe opportunistic infections.(Hirschfeld, 1998). In addition to physical illness, HIV infection also affects adolescents with HIV, psychologically, socially and spiritually. Psychological effects are anxiety, depression, frustration, and despair. Social impact is the concealment of HIV infection among adolescents. Family and social interaction The spiritual impact of HIV infection among adolescents has an effect on the sense of confusion, uncertainty, frustration, and hopelessness. (Grassi&Sighinofi, 1996)

Although,the Ministry of Public Health of Thailand has established guidelines for adolescents with HIV infection. However, it was also found to be unable to respond many problems for adolescent living with HIV. It is found that adolescents living with HIV are risky such as alcoholic, smokers, sexually abused, unprotected

sex, lack of discipline in taking antiretroviral, lack of continuing treatment, CD4 decreased and viral load increased. It is resulting in opportunistic infections. (Rongkavilit et al., 2007).

Adolescents living with HIV have complex problems that affect the health status of HIV-infected. Therefore, they need specific care for their problems. While, care is available, focus on antiretroviral therapy to control viral load in the blood stream and increase the body's immune system. Care for adolescent living with HIV needs. This study examined health care needs, and health care service needs for adolescent living with HIV to lead the development of care model for adolescents living with HIV.

Objective of the study

To examine health care needs, and health care service needs for adolescent living with HIV.

Method

This research is a mixed method to study care needs and issues in HIV-infected adolescents aged 10-20 years. Thailand from March 1, 2016 to March 31, 2017.

Participants

The participants of this study were recruited among who related to care for adolescent living with HIV. they go to the child and adult HIV clinic. In a provincial hospital, Thailand, by the end of March, 2017, 52 participants, twenty-six adolescents with HIV aged 10 – 20- years – old. Fifteen caregivers, nine health care providers and two representatives from private foundation agent, participated in the study by purposive sampling.

Table 1: Participants

Participant	Description	Sex		N
		Male	Female	
1.Adolescents living with HIV	10 – 13years (*early adolescence*)	1	6	7
	14 – 16years(middle adolescence)	2	4	6
	17 – 20 years(late adolescence)	9	4	13
2. Caregivers	20 – 39years	-	3	3
	40 – 59years	3	6	9
	60 years old and above	2	1	3
3. Health care providers	Physician	-	2	2
	Nurses	-	5	5
	Pharmacist	-	2	2
4. Private foundation agent	Representatives from private foundation agent	-	2	2
Total		7	35	52

Ethics considerations

This research has been approved by research program HE **586376** from the Ethics Committee for Human Research, Khon Kaen University, Thailand. This research is a study of vulnerable groups that need to protect the confidentiality of their data. The researcher used the code instead of the real name of the participants. In recording, the researcher had to seek permission from the contributor and destroy the tape recorder when the research was completed.

Instruments

Quantitative instrument

- Self-care knowledge Questionnaire, measured adolescent who living with HIV's self-care knowledge. Self-care knowledge questionnaire is a 25-items true false -choice questionnaire, including physical, emotional and psychological, social. The scores between 0 – 25 score from each instrument are reliable and accurate. The indicators that should be observed in the content validity index (CVI) of self-care knowledge was 0.90 and reliability value with Kuder-Richardson (KR-20) was 0.75.
- Self-management ability knowledge Questionnaire, measured adolescent living with HIV's self-management ability. Self-management ability knowledge questionnaire is a 22-items Likert scale -choice questionnaire, including physical, emotional and psychological, social. The scores between 22 – 110 score from each instrument are reliable and accurate. The indicators that should be observed in the content validity index (CVI) of self-management ability was 0.75 and reliability value with Cronbach alpha (α) value was 0.76.

Qualitative instrument

- Semi structured interviews captured the health care needs, and health care service needs.

Data analysis

The quantitative data analysis entailed descriptive statistics with percentage, mean, and standard deviation while the qualitative data involved content analysis.

Findings

The findings demonstrated that 84.60% of the adolescents had self-care knowledge in the highest level ($\bar{X}$ = 21.20, SD = 1.95)(Table 2). Their needs of self- care knowledge were related sexual and reproductive health which were sensitive issues and require privacy for counseling.

Table 2 Adolescent living with HIV's self-care knowledgescore.

Domain of self- care knowledge (0 -25)	$\bar{X}$	S.D.
Physical	16.50	1.63
Emotional and psychological	2.80	0.63
Social	1.80	0.40
Total	21.20	1.95

Among the participants, 61.50 % had self-management abilityin the highest level ($\bar{X}$ = 87.60, SD = 10.90)(Table 3).Their needs for self-management ability improvement were on communication, life skill on refusal having sexual relation. Adjustment problems and medication compliance were also reported among this group.

- Mental health care i.e. personal goal setting
- Sexual health care and prevention of transmission
- Life skill development
- Non – disclosure health service

Table 3 Adolescentliving with HIV's self-management ability score.

Domain of self-management ability (22 – 110)	$\bar{X}$	S.D.
Physical	17.30	2.50
Emotional and psychological	18.60	3.80
Social	51.70	7.10
Total	87.60	10.90

Recommendations

- Healthcare providers should help adolescents with HIV to meet essential needs in order to be satisfied on living with HIV.by develop the model of care for adolescents living with HIV should be suitable for the disease context and nature of the adolescents.
- Capability development programme should be provided for adolescents living with HIV.
- Nurses and health team should apply the *capability*developmentprogramme in both pediatric HIV clinic and adult HIV clinic.
- The adolescents should be prepared for transitional care from adolescents to adults' health care services.

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THE INFLUENCE OF SELFCARE GROUP TOWARDS CONFIDENCE OF LEPERS IN JENEPONTO REGENCY

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Abstract: Leprosy ,one of negledted tropical diseases, is a contagious disease that is so feared by all of people. It is still become one of the problems that faced by the world society because it can lead to a very complex problem. People who are suffering from leprosy may have disabilities that are settled if it does not get healing and handling well. As impact, lepers who had been leprosy deseas get some difficulties for instant, the anxiety to approach themselves into society, lost their social status progressively, isolated from family, friends, and society. therefore, the effort to avoid distabilty toward lepers is a self caring. Selfcare can prevent disability and encourage patient self-awareness to heals. It can be developed become a selfcare group that help lepers to support each other. Because there is a quote "camaraderie". The method in this research is A cross-sectional study with 35 lepers was followed by a focus group discussion with fasilitator and health workers. The results of this research, that majority of lepers were women (68.6%), mostly aged 36-45 years (28.6%), 25 respondents (71.4%) followed self care group activities, 62.9% (22 respondents) have good confidence. Result of analysis with Chi-square test showed there was correlation between participation in self care group with confidence of leprosy patient p = 0,031, OR = 7,389 (CI 1,441-37,883). In focus group discussion , the members of self-care group stated that the self-care group had an important role in improving the confidence of leprosy patients through interaction and communication between each member, motivation and other activities. as conclusions, Self Care Group very helpful to increasing lepers' confidence. Suggestion: This activity can be developed throughout the health centers in Jeneponto. Also expected cross-sectoral cooperation in the development of Self Care Group.

Keywords: Selfcare group, Lepers, confidence

Introduction

Leprosy, one of neglected tropical diseases, is a contagious disease that is so feared by all of people[1]. It is still become one of the problems that faced by the world society because it can lead to a very complex problem. The problem is not only in terms of medical treatment but extends to social, economic, cultural, and national defense[2]. Lepers may have disabilities that are settled if it does not get healing and handling well. Disability in patients with leprosy is still stigmatization in society, so it is difficult lepers are accepted in society even though the disease has been declared cured. Disability arising in lepers is a striking defect in the manifestation of leprosy. it begins to show mild symptoms of disability in a small area with anesthesia in hand then become serious condition such as shortening of the fingers and thumb on both hands, wrists and a decrease in bilateral, ulceration and deformity remain on the both feet, making them incapable to walk[3].

Beside that, lepers who get defect in the eyes should receive serious attention because it is the most disturbing of disability for patients compared with disabilities in the hands and feet. As impact, lepers who had been leprosy deseas get some difficulties for instance, the anxiety to approach themselves into society, lost their social status progressively, isolated from family, friends, and society. lepers feel inferiority complex, depression and aloof and often ostracized by their families because of their disabilities. A fact that most

people with leprosy came from from lower middle class make the matters worse[4]. Generally, this stigma gives a negative impact on leprosy patients. It can make lepers become social psycho disorder. Most leprosy patients have a simultaneous psychiatric disorder. In addition, social environment involving not only themselves, but also their role of the labor, their role in the family and in other social roles (relationships with friends, neighbors, colleagues, social activities group and family members. patients have the possibility to have a functioning social disruption as a result of leprosy, consequent disability, social stigma and occupational impairment. The addition of psychiatric morbidity in the group can also deteriorate effect on social adjustment [5]. Therefore, to avoid disability in patients with leprosy, need to do self-care so that defects can be prevented and disability does not continue for those who already have disabilities. It can be developed become a selfcare group that help lepers to support each other. Because there is a quote "senasib sepenanggungan" or camaraderie.

Self-stigma, shame and secrecy were often reported. Discrimination and stigmatisation of ex-leprosy patients by people around them seems a less frequent problem.Yet, people affected by leprosy seem to be a forgotten group with a high social burden due to low self-esteem and reduced social participation. Medical experts do not seem to be aware of the severity of leprosy-related forms of stigma in their patients[6]. SCGs are involved in different activities and do not limit themselves toactivities related to disability care. The majority of respondents expressed satisfaction about their participation in SCGs[7].

Based on the report by the World Health Organization (WHO), received from 138 countries from all WHO regions, the prevalence of leprosy at the end of 2015 was 176 176 cases (0.2 cases per 100 000 people)[8]. The number of new cases reported globally in 2015 was 211 973 (2.9 new cases per 100 000 people). In 2014, 213 899 new cases were reported, and in 2013, 215 656 new cases. In 2015, Indonesia reported 17 202 new cases and 1,687 of them, found he was already disabled level 2 (defects appear)[9]. While in the province of South Sulawesi recorded 1220 cases with 131 cases of disability level 2. In Jeneponto number of patients amount 72 patients in 2015 and increased in 2014, namely 67 patients and 14 cases of which are disability level I and II. Community health center in Bontoramba district, recorded there are 208 people who had suffered from leprosy deseas from 2005 to 2015 and there are 31 disabled level I and 23 disabled level II, and there are 5 new lepers in 2016. According to some informations, patients who have had leprosy still has limitations interact in society. So, they need to treatmented for increasing their confidence.

Methods

Study Design

This was observational survey with cross sectional study approach. To showed the influence of self-care groups towadrs confidence of lepers.

Study population

The study was conducted on 35 lepers identified by purposive sampling technique based on their involvement in self-care group (n = 25) and l epers willing to become respondents (n = 10)

Data Collection

Data collection was done by using questionnaires distributed to respondents. Afterwards, focus group discussion was conducted on the respondents along with the self-care group facilitators and health workers.

Data analysis

Data were analyzed by Chi-square test to see the correlation between respondent involvement in self care group and respondent self confidence.

Result

Self Care Group

Baji Minasa Self-care Group (SCG) in Community health center Bontoramba was formed since 23 september 2011. This program is a cooperation between wasor (deputy supervisor of Leprosy) in the comunity health center with wasor in regency and Nederland Leprosy Relief.

Each month, the Fasilitator lead the patients to do their selfcaring, mutual brainstorming and motivating each other. Currently the group has a membership of 25 participants and mutually motivate each other. In addition, there is a Leprosy Independent association, which also facilitated the needs of members of SCG both health-related problems as well as social and economic.

Confidence of lepers

In this study, the number of respondents as many as 35 people coming from SCG members as many as 25 respondents and not a member of 10 respondents. , majority of lepers were women (68.6%), mostly aged 36-45 years (28.6%), 25 respondents (71.4%) followed self care group activities, 62.9% (22 respondents) have good confidence. For more details can be seen in the following table

Tabel 1. Analisis univariat

Variabel	N=35	(%)
Age		
12-16 years	2	5,7
17-25 years	3	8,6
25-35 years	7	20,0
36-45 years	10	28,6
46-55 years	9	25,7
56-66 years	4	11,4
Gender	11	31,4
Man	24	68,6
Woman		
Partisipasi SCG	25	71,4
Member SCG	10	28,6
Non member SCG		
Confidence of lepers	22	62,9
Good confidence	13	37,1
Less confidence		

Influence self care group toward confidence of lepers

Result of analysis with Chi-square test showed there was correlation between participation in self care group with confidence of leprosy patient p = 0,031, OR = 7,389 (CI 1,441-37,883). Based on the results of the

analysis it can be concluded that there is a relationship between participation in self-care group with confidence lepers

Results from focus group discussion (FGD)

Stigma is a great fear against leprosy. With the stigma that developed in the community, then the patients will feel embarrassed by the disease they suffered, they feel embarrassed to socialize with relatives and their neighbors, so they prefer to spend time in the garden which is a place away from the crowds[10]. The realitatif activities granting motivated by PerMaTa (Perhimpunan Mandiri Kusta) which is an organization of leprosy patients and people affected by leprosy in which they have a good self confidence and has undertaken various activities especially in order to remove the stigma and discrimination of leprosy, and doing recreational activities, with the aim of bringing the patient to mingle with the public at large as well as to boost her confidence. And to explore the ability of the patient, in this case developed what they can do to improve the quality of life.

By exploring their ability with weaving, farming, and other handicrafts. Therefore, The self-care group has become one of the efforts to increase the confidence of leprosy patients, with various activities in it and their sense of camaraderie among SCG members.

Conclusions

Leprosy is a contagious disease that is greatly feared by the public. The disease is still one of the problems faced by the world community because it can lead to a very complex problem. The problem is not only in terms of medical treatment but extends to social, economic, cultural. With the self-care group will increase the confidence of lepers. Self Care Group very helpful to increasing lepers' confidence. Suggestion: This activity can be developed throughout the health centers in Jeneponto. Also expected cross-sectoral cooperation in the development of Self Care Group.

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PARTICIPATORY EXPLORATION OF FACTORS INFLUENCING THE HEALTH OF PEOPLE WITH INTELLECTUAL DISABILITIES IN AN URBAN DISTRICT: A PHOTOVOICE STUDY

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Abstract: People with intellectual disabilities (ID) may face multiple disadvantages regarding their physical and mental health. They tend to are more vulnerable to risks of illness (associated with their impairment, medication intake or social determinants, like low socio-economic status) and are confronted with various barriers in health care and health promotion (e. g. communication or programmatic barriers). This study aims to gain a better understanding of the health-relevant factors people with ID experience in their everyday life in an urban area in Germany. An inclusive research workshop was held at the Catholic University of Applied Sciences Berlin. Ten adults with ID and six members of the university (two students, four academic researchers) joined the workshop and worked together as a research group. Photovoice, a participatory research methodology, was utilized. The research group collected data by taking photographs and discussing the pictures within the group. This process resulted in a set of qualitative categories and themes. The health-relevant factors identified were multifaceted. They ranged from housing and working conditions to the effects of keeping pets or being affected by racism and discrimination. The findings were prepared in form of an exhibition, providing a basis for developing municipal strategies for inclusive health promotion.

Keywords: People with Intellectual Disabilities, Participatory Health Research, Photovoice, Municipal Strategies of Health Promotion

Introduction

People with intellectual disabilities (ID) are considered to be a vulnerable group in regard to health problems. The prevalence of ID across the world is estimated to be around 1%, with higher rates in low and middle income countries (Maulik *et al.*, 2011). ID can be described as a "group of developmental conditions characterized by significant impairment of cognitive functions, which are associated with limitations of learning, adaptive behaviour and skills" (Carulla *et al.*, 2011, p. 177). Studies, mainly from high income countries in Europe, North America, and Australia, indicate that in comparison to the general population people with ID are more likely to suffer from poor physical (Cooper *et al.*, 2015; Emerson *et al.*, 2016; Walsh *et al.*, 2008) and mental health (Cooper *et al.*, 2015; Cooper *et al.*, 2007; Morgan *et al.*, 2008), and that their life expectancy tends to be lower (Bittles *et al.*, 2002; Heslop *et al.*, 2013). Some of these disadvantages may be explained through the disability itself, as for example Down's syndrome which is linked to a higher risk of congenital heart defects or respiratory tract infections (Haveman and Stöppler, 2014, pp. 212–215). In this context it should be also noted that people with ID have a relatively high and questionable medication intake that may cause additional adverse effects (Doan *et al.*, 2013; O'Dwyer *et al.*, 2016; Robertson *et al.*, 2000; Tyrer *et al.*, 2008). Recent research on the implications of certain lifestyle factors like nutrition and physical activity (Koritsas and Iacono, 2015), the perceptions of neighbourhood quality, social and civic participation (Emerson *et al.*, 2014), the experience of discrimination (Emerson *et al.*, 2014) or violence (Krnjacki *et al.*, 2016) emphasises that the health situation of people with ID is further influenced by social determinants.

Social determinants of health refer to the circumstances in which people live and the underlying systems that shape those circumstances, for example socio-economic status, experiences of social exclusion or social support, food supply, or transportation (World Health Organization, 2003). As people with ID are often excluded from regular education systems and the professional job market due to their impairments, these aspects seem to be of crucial importance for understanding the disadvantaged health situation of people with ID.

Given the problematic situation illustrated above, there is a need in many countries, including Germany, to develop appropriate and accessible health care services for people with ID (Hasseler, 2015; LGK NRW, 2013; Roser *et al.*, 2011). People with ID often experience barriers in health care settings, such as communication problems, inadequate facilities or inflexible procedures, as well as insufficiently trained health professionals (Alborz *et al.*, 2005). Also, in regard to health promotion strategies, people with ID seem to be overlooked, as there are relatively little programmes targeting or including this group of people (Burtscher, 2014).

Considering all these factors, the reasons for the poorer health status of people with ID seem to be complex and multifaceted, further indicating that people with ID may not only experience health disparities, but also health inequity (Hatton and Emerson, 2015). The participatory research project "GESUND!" is aiming at closing the gap between the people's needs and the lack of tailored health promotion strategies (Allweiss *et al.*, 2016; Burtscher, 2014). An aim of the project is to seek a better understanding of health-relevant factors which people with ID experience in their everyday life in their neighbourhood and to use these insights to develop integrated, inclusive health promotion strategies at the municipal level.

Methods

In our research we were adhering to a participatory research paradigm (International Collaboration for Participatory Health Research, 2013). That means that those people affected by the subject of the study were actively involved throughout the research process. Participatory approaches are increasingly being recognised in the field of public health, special education and related disciplines (Buchner *et al.*, 2016; International Collaboration for Participatory Health Research, 2013). Participatory health research is characterised by partnerships between academic institutions, community members (for example people with disabilities), health professionals, decision makers and other engaged stakeholders. An important goal of participatory research is the contribution to social change and broad impact (International Collaboration for Participatory Health Research, 2013). The potential positive effects of such approaches are assumed to include increased research quality, empowerment and capacity building among the persons involved, the sustainability of interventions, and the creation of systematic changes (Jagosh *et al.*, 2012).

The research method utilized in the project was *photovoice* (Wang and Burris, 1997, 1994). Photovoice is a qualitative visual research method. It is usually carried out as a group activity, in which data is gathered by taking pictures, telling narratives about the pictures and subsequent discussion. Joint analysis of the data enables a deep understanding of participants' conceptualization of a given situation, community, or problem. Photovoice was developed by Wang and Burris (1994) and aims to (1) enable communities to identify and reflect on their strengths and concerns, (2) encourage critical dialog and knowledge, and (3) reach policy makers (Wang and Burris, 1997).

Procedures and participants

The procedures of the study will be described, based on the seven phases of photovoice proposed by von Unger (2014, 71ff):

1. Planning and preparation: This phase was determined by developing an infrastructure for the study, including the recruitment of participants (in the following referred to as co-researchers) and target audience members. Research partnerships were established on two levels: (1) A community of inquiry composed of academic researchers and people with ID was organized to work together during data collection, analysis and

presentation of findings; (2) Existing partnerships between the academic institution, the local government and a sheltered workshop were used to facilitate the research process and to support the dissemination and exploitation of results. Co-researchers with ID were recruited from a cooperating sheltered workshop in Berlin-Lichtenberg. Inclusion criteria for participation were communication skills, ability to get to the workplace independently, and dependability regarding meeting attendance. Type and severity of the disability were not criteria for the selection of co-researchers. However, the inclusion criteria listed above indicated a mild to moderate ID. Most of the included co-researchers had already participated in a previous health education and research activity which was carried out within the scope of the "GESUND!" project. So, they had already gained basic knowledge about a variety of health subjects and had been trained in basic research methods. Altogether, the community of inquiry consisted of ten adults with ID (five women, five men; 26 to 65 years old) and six members of the university (two special education students and four academic researchers from the "GESUND!" team; four women, two men; 23 to 47 years old). In the group process, the co-researchers with ID assumed the roles of researchers and experts in their own lives; whereas, the students and academic researchers assumed the roles of moderators, facilitators, and researchers.

2. Training of co-researchers: In the time between October 2016 and March 2017 an inclusive research workshop took place at the Catholic University of Applied Science Berlin. The inclusive research workshop was similar to a seminar with weekly meetings and provided the setting for the entire research process. The theoretical basis for the workshop was the paradigm of participatory health research (International Collaboration for Participatory Health Research, 2013) and the Determinants of Health model by Dahlgren and Whitehead (1991). In preparation for the study, four morning seminars were held on the Determinants of Health model, the local municipality (district of Berlin-Lichtenberg) and on the correct and ethical use of cameras. Visualisation and the use of plain language was a key didactic element during the whole project. Furthermore, we clarified and discussed the objectives and questions of the forthcoming research: What helps us/ what hinder us to live a healthy life in Berlin-Lichtenberg?

3. Field phase: The study was conducted in the district of Berlin-Lichtenberg, Germany. The district has over 280,000 inhabitants (Amt für Statistik Berlin-Brandenburg, 2016) and lies in the eastern part of Berlin. Photographic data collection was mainly carried out during so called "neighbourhood walks." Small groups, consisting of two co-researchers and an academic researcher or student, came together on two occasions to take walks through the district. The co-researchers took selected pictures according to the following instruction: Take one or more pictures of what makes you happy in your life or is good for you, what makes you angry in your life or what is not good for you, and what you think is unjust in your life.

4. Discussion: In this phase, discussions about the pictures were held in three small groups (with around 5 members each). In preparation for the discussions, each co-researcher chose five pictures most relevant for her/him and answered questions about the pictures on a worksheet. The questions on the worksheet were the same that were asked in the discussion rounds. They were based on the "SHOWeD" formula, which stands for: "What do we **S**ee here? What is really **H**appening here? How does this relate to **O**ur lives? **W**hy does this situation, concern or strength **E**xist? What can we **D**o about it?" (Wang, 1999, p. 188). After the narratives and answers of the photographer, the group was encouraged to ask questions, reflect on the picture, and to add their own experiences and interpretations. Emerging thoughts and ideas were noted. As the discussions are an important part of data collection, they have been recorded and transcribed.

5. Analysis and results: Data analysis was a two-step procedure. Subsequent to the discussions, a first coding process was carried out in the three working groups. The pictures and notes were sorted, and headings were identified and assigned to groups of similar data. This led to an initial categorisation of findings. The procedure intersected with the previous phases, as photography, discussion and categorisation comprised an iterative process. Step two was carried out solely by the academic researchers in order to combine and extend the findings of the three working groups. The original picture narratives, notes, and discussion transcripts were included in a structured, but simplified, content analysis (Kuckartz, 2016) using the software program MAXQDA. To value the work of the co-researchers and to guarantee the comprehensibility of findings, we adopted the codes of the working groups and kept to a low level of abstraction. The analysis yielded the

identification of main topics that were presented and discussed within our community of inquiry. Each co-researcher then chose the topic that was most important to her/him and another phase of exploration began: small discussion rounds about the topic, including narratives about the co-researcher's personal relationship to the issue, and a review of the previously collected data on the topic. This process allowed for a deeper understanding of each topic and provided the basis for the presentation of our results in the form of a poster exhibition.

6. Presentation and use: Each co-researcher was responsible for the presentation of one main topic. With the assistance of the academic researchers, every person created her/his exhibition poster using photographs and texts from the preceding phases. The posters, the main result and product of the study, combined both, (a) the findings from the participatory research process and (b) the author's personal relationship to the topic. To date, the exhibition has been shown on three different occasions (the research workshop closing ceremony, an exhibition at the cooperating sheltered workshop, and during the health campaign days in a local shopping centre) to a diverse audience, including local citizens, representatives of local government and service providers.

7. Evaluation: The following questions provide the focus of the project evaluation: Were the objectives achieved? How satisfied were the people involved with their participation? What impact did the photovoice project have on politics, policy-making, living conditions, community health and other possible areas of influence? (Unger, 2014, p. 76) The evaluation is still in progress and is mainly based on interviews conducted with the co-researchers and the field notes taken at every workshop meeting and exhibition event.

Results

Table 1 summarises the health-relevant factors people with ID had identified in their everyday life in Berlin-Lichtenberg. The findings are presented as they were shown in the poster exhibition.

Table 1 Findings as presented in the "GESUND!" poster exhibition

Title	**Main topic** and related categories	Description of findings as presented on the posters
Christian, the mobile man	**Public transport**, comprehensibility of information	Trams and trains are Christian's hobby. On his poster he complains about the information given at stations, which are sometimes confusing or non-existent. He also reports that there are still old trams in use which have steps and are not easily accessible; that some public transport connections are not matched well; and that the traffic light cycles are often too short.
Christiane's crime story and poems	**Road safety for pedestrian**	Christiane was hurt in a road accident when she was little. Since then, she has problems walking. Tripping hazards, like potholes, and pedestrian unfriendly traffic light cycles impede her mobility.
My block of ice	**Managing life with little money**, housing conditions, self-determination	The author of this poster describes his housing situation in an apartment block that is in poor condition (broken windows, malfunctioning heating system, and a lift, which is regularly out of order). On the poster, he reproduces a discussion with his peers about his rights as a tenant and the difficulties he has encountered with his landlord. He states that it is very difficult to find an affordable place to live.
How I live	**Self-**	Independent living and self-determination are very

Title	**Main topic** and related categories	Description of findings as presented on the posters
	determination, living and support arrangements	important subjects for the author who lives alone with her dog and gets assistance from her brother-in-law. But she also recognises that every person is different and needs different living arrangements and levels of support.
Animals are man's best friend	**Keeping pets**, dealing with loneliness, managing life with little money	Her own pets, as well as animal welfare, are essential aspects of the author's life. She describes that her pets are helping her feel less lonely and stay psychologically stable. However, she also remarks that keeping pets requires money and effort, and that pet owners also have to handle the illness and death of their beloved animals.
My work life	**Working conditions**, subsidised and regular labour market, managing life with little money	The author of this poster chose the topic work because he really likes his job as a handyman in a sheltered workshop. On the basis of his own workplace, he describes some assets and drawbacks of work, like social bonding vs. social conflicts, or assistance and support vs. control and authority. He further addresses the issue of working in subsidised labour and points out that although his job is secure, his income is very low.
From hobbies and passions	**Recreation through hobbies**, managing life with little money, education	Nicole is a passionate cook. For her and her co-researchers hobbies are an important source of relaxation. Nevertheless, for Nicole it is sometimes difficult to follow her passion with her little income. She is further missing educational offers in plain language.
Relaxing in the neighbourhood – Sven's story	**Recreation in nature**, environmental protection, keeping pets, social interactions	Sven is a dog lover and enjoys being at his dog place in nature. It is his way of relaxing and meeting up with his friends. He is worried about pollution and garbage disposal in the green areas of his neighbourhood.
From art and smearings	**Appearance of living environment**, aesthetics	This poster is a narrative on the living environment of the author. The big prefabricated buildings in her neighbourhood are often grey and smeared. Paintings and artworks are a welcome feature of a more colourful and pleasant environment.
Wake up!	**Peaceful coexistence**, experience of racism and discrimination	The author of this poster sees himself as interested and vigilant in regard to politics. He is concerned about discrimination, racism and right-wing violence. He points out that next to foreigners and other minority groups also people with disabilities can be affected. Tolerance and peaceful co-existence are important to him. Remembering German history is one way of dealing with this issue, he states.

Discussion

This participatory research project explored the perspectives of ten persons with ID on their health-related needs, experiences and perspectives regarding their life in the urban district Berlin-Lichtenberg. The results

show what they considered to be important factors for their health and well-being. The emphasis lay on a safe and satisfying life in regard to mobility, housing, work, leisure activities, living environment and societal interactions. The right of the individual to self-determination had a high priority, being addressed in discussions about the different housing situations of the co-researchers and about the advantages and disadvantages of the subsidised vs. the regular labour market. An aspect that was considered as challenging, being raised in different contexts, was living with little money. All our co-researchers were dependent on some kind of income support because they were working in a sheltered workshop (subsidised labour market). Further, a specific barrier related to the ID of the co-researchers came to light: the need for information which is easy to understand, as reflected in complaints about confusing information at train stations or the lack of educational offers in plain language.

Although the results of the photovoice study clearly reflect the specific local situation and the unique perspectives of our community of inquiry, some of the findings reflect the broader literature on the social determinants of health and people with ID. For example, the importance of peaceful coexistence and prevention of discrimination, which was identified as one health-supporting factor in our research, was also identified by Llewellyn *et al.* (2015). On basis of their literature review, the authors report that people with ID seem to be more likely to experience discrimination, and that those experiences may correlate with poorer health outcomes (Llewellyn *et al.*, 2015). Social interactions and loneliness, also identified as factors influencing the health of our co-researchers, has also been identified in other studies (Emerson, 2010; Gilmore and Cuskelly, 2014; Stancliffe *et al.*, 2007), indicating that people with ID are highly vulnerable to loneliness. However, the scientific evidence on experiencing discrimination or loneliness is limited and the association between exposure to these factors and the health of people with ID has been rarely investigated directly.

As our findings identify concrete issues which people with ID face in their everyday lives in Berlin-Lichtenberg, we suggest using our research as a basis for developing municipal strategies for inclusive health promotion in the district. An initial step in this direction has already been taken through the public exhibitions of the photovoice project that were attended by local politicians and stakeholders from services for the disabled. A recent invitation to show the exhibition at the city hall of Berlin-Lichtenberg might further raise awareness about the situation of people with ID among local policy makers. However, at this point in time, it is not possible to anticipate the impact of the photovoice project on politics, policy-making, living conditions, community health or other possible areas of influence.

In regard to effects at the individual level, it is possible to state some preliminary findings: First of all, the co-researchers' feedback on their participation has been very positive and they seemed to be very proud about the poster exhibition and the responses of the audience. As stated in the methods section, participatory research has the potential to initiate a growth in professional capacity and competence in the persons involved (Jagosh *et al.*, 2012). A process of empowerment and gains in compentency were observable among the co-researchers (e. g. sharing information and experiences with peers, speaking in front of the group, presenting one's views publicly). Further, an increased awareness about a healthy lifestyle and other determinants of health (e. g. a growth in environmentally conscious behaviour) were identified by the co-researchers. We believe that the co-researchers may have experienced a valorisation of their social role (Wolfensberger, 1999) by participating in the project. Particularly, the egalitarian relationship and cooperation between academic and non-academic researchers seemed to play an important role in this context.

Photovoice is a highly accessbile approach that has been shown to be an appropriate methodology to conduct research together with people with ID. The different phases, steps and tasks during the research process are adjustable to different skills and levels of competency, and thus enable the involvement of people with ID. Reading and writing skills are, for example, not necessary. Another strength of the methodology is the visibility of the results, as they are not only theoretical constructs written down in an academic journal, but also objects to see and to touch. Nevertheless, there are also limitations. Photovoice is a qualitative approach, its local dimension and the emphasis on participatory process limits the transferability and representativeness of the results. Furthermore, it cannot be answered to what degree the data may have been influenced by the research context. In regard to the visibility and public nature of the approach, there may be the risk of

reinforcing the social stigmatisation of persons with ID, especially when the expectations of the audience about scientific complexity or high gloss presentations are not met.

In conclusion, the research project provided a framework for people with ID to reflect on their lives and gave them a voice to draw attention to their opinions and concerns. New perspectives on a vulnerable group were offered which show that participatory processes are able to empower people with ID in various ways.

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SURVEY OF INDONESIAN PUBLIC AWARENESS INDEX ON DRUG AND FOOD

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Abstract: Drugs and food which marketed in Indonesia must meet quality and safety requirements that are regulated by NADFC-RI. A Survey of Indonesian Public Awareness Index on Drugs and Food was conducted in 2016 with the objective of obtaining Public Awareness Index score in National scale. The Public Awareness Index is a measure (on a 100 / likert scale) that explains the level of public awareness in understanding, acting, and in the daily behavior of choosing and consuming drugs and food products. The sampling methodology used census blocks with home visit techniques in the survey area of 15 Provinces and a total of 5,240 household respondents. The Respondents are the general public at selected location with at least 15 years of age. Using approach of the Knowledge, Attitude & Perception, Practice Study to get information about people's knowledge, attitude and behavior in choosing drugs and food including traditional medicines, cosmetics and food supplements. Measurement of index survey was conducted using questionnaires that were delivered face to face and the data analysis statistically used SPSS. The study resulted the value of the Public Awareness Index on Drugs (Ethical and Antibiotics) = 65.78, Other Drugs (Traditional medicine and Vitamin) = 49.23, Cosmetics = 71.54 and Processed Food = 75.36. Overall, it can be concluded that Indonesian Public Awareness Index was at a score of 65.48. This position shows the public has been GOOD ENOUGH consciousness in choosing and consuming drugs, traditional medicine, cosmetic and food products.

Keywords: Indonesian, Public Awareness, Index

Introduction

Drugs and food have been distributed and consumed by the people must be certified safe and satisfy the quality of standard that has been set. The assignment of Badan POM is controling the drugs and food in distribution to be guaranteed safe and meet the established quality standards. This indicator is measured by taking samples of drugs and food in circulation to be tested in the laboratory. This matter is regulated in Jaminan Kesehatan Nasional (JKN) Program regulated in Law Number 40 Year 2004 regarding National Social Security System (SJSN). In JKN also imposed the quality assurance of drugs which is an integral part in the implementation of health development. Where JKN is one form of social protection to ensure that every people can meet the basic needs of life that is at least feasible toward the realization of just social welfare for all the people of Indonesia. With the increasing demand for drugs as one of the required products. While the indirect impact of the implementation of JKN is an increase in drugs consumption, both the number and the type.

One of the POM's strategic programs is community empowerment, to encourage people to protect themselves from medicinal and food products that endanger health. The awareness of community of safe Drugs and Food products, is determined by the knowledge and how the community responds to the information it receives. The ability of the community to protect itself from products and food that endanger health, starting from its awareness of security issues related to Drugs and Food. The lower the public awareness, the less likely it is to protect themselves.

Badan POM continues to encourage people to actively participate in drugs and food control by becoming smart consumers thoroughly before buying and consuming drugs and food, as well as being pro-active in providing information on drugs and Food allegedly violating regulations, such as broken food, expiration, without distribution or food permits suspected of containing hazardous substances. Besides, the public is also expected to participate in supervising intelligently in selecting products and provide information to the POM when finding products that do not meet the requirements.

Aim : The purpose of the "Public Awareness Index Survey" in selecting Drugs and Food "is to obtain a Public Awareness Index Value in choosing National Safe Drugs and Food.

Benefits: Given the value of "Public Awareness Index Survey in selecting Drugs and Food" then intervention will be done to improve the supervision of drugs and food.

Research method

The survey method used is quantitative method by doing face to face interview to the target respondent. The interviewer or surveyor who has been trained beforehand, will interview the target of the respondent with the predefined criteria. The sampling technique used is the census block that has been designed by the National Statistic Bureau (NSB) team which is the supervisor of this survey. The randomness of the sample area is set in the census block by NSB, so that the representation of national and urban / rural coverage is quite high. The total number of respondents to be targeted in the survey is 5,240 respondents.

Population and Representation

The sample in this poll is designed to be able to represent the entire population of Indonesia from every household aged 17 years and over, to the designated census block. • Surveys were conducted in 15 provinces consisting of 524 census blocks (207 urban and 317 rural) with accompanying data comprising 5,240 household samples. An estimated sampling error of +/- 1.35%, at 95.0% confidence interval.

Sampling Technique

Method of sampling technique used is using census block which has been designed by NSB Team which become supervisor of this survey. The randomness of the sample area is set in the census block by NSB, so that the representation of national and urban / rural coverage is quite high. The Census Block is the work area of an enumerator of surveys conducted by NSB.

Number of samples

Based on the statistical calculation, the total sample population were 5.240 respondents ..

Table: Composition Respondent s

No.	Province	District Number	Sensus Block			Respondent Total
			Urban	Rural	Total	
1.	Nangroe Aceh Darussalam	21	12	32	44	*450*
2.	Sumatera Selatan	16	16	32	48	*480*
3.	Bengkulu	10	11	24	35	*350*
4.	Lampung	15	15	47	62	*620*

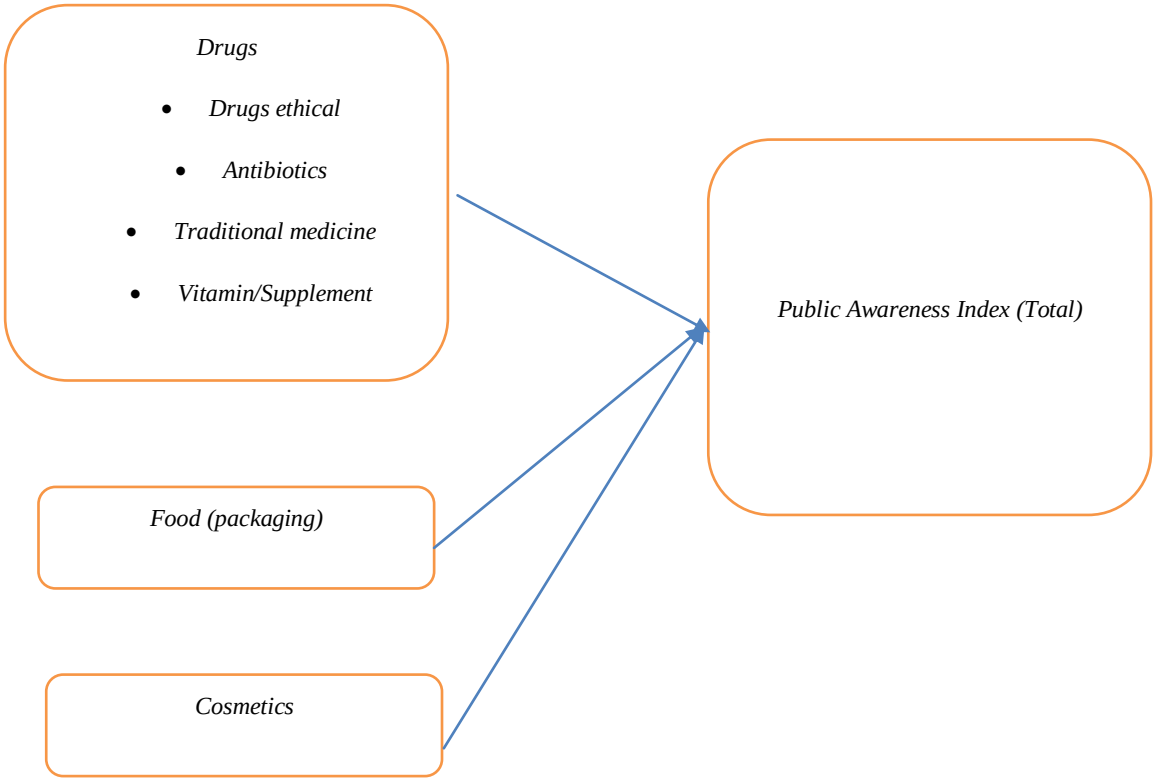
5.	DKI Jakarta	5	23	0	23	*230*
6	Jawa Barat	17	15	9	24	*240*
7	Jawa Tengah	20	10	13	23	*230*
8	Jawa Timur	16	10	11	21	*210*
9	Kalimantan Selatan	12	7	10	17	*170*
10	Kalimantan Barat	14	10	25	35	*350*
11	Kalimantan Timur	10	30	18	48	*480*
12	Kalimantan Utara	5	6	4	10	*100*
13	Sulawesi Selatan	18	9	15	24	*240*
14	Sulawesi Tenggara	16	9	22	31	*310*
15	Papua Barat	13	24	55	79	*790*
	Total		207	317	524	*5.240*

Data analysis

Questionnaires that have been filled respondents were analyzed using SPPS (Statistical Package for the Social Sciences) 23.

Public Awareness Index

The Public Awareness Index is a measure (on a 100 / likert scale) in a study that explains the level of public awareness in understanding, acting, and in good drugs, food, and cosmetic behavior. Parameters and scales follow the research instruments that have been set by the drafting Team of the Center for Food and Drugs Research Badan POM. The Public Awareness Index was organized on the following three research categories:



Result

Table Public Awareness Index Total

No.	Public Awareness Index Category	Indeks
1.	Drugs category (Ethical andAntibiotics)	65,78
2.	Other drugs category (Traditional medicines and Vitamins)	49,23
3.	Food category (Food and Package Beverages)	75,36
4.	Cosmetics	71,54
	Total Index	65,48

The Public Awareness Index measuring the level of knowledge, attitude, and behavior of individuals towards food, drugs, and cosmetics uptakes was 65.48, in 2016. It indicates an acceptable level of awareness.

The Public Awareness index towards drugs (65.78%) and other drugs (traditional medicines and vitamins) (49.23%) are lower than cosmetics (71.54) and foods (75.360)

Community Awareness Index that measures the level of public awareness in understanding, acting, and in the behavior of consuming traditional medicine, traditional medicine, packaged food, and cosmetics; In 2016 is at 64.66. This position shows the public has been Good Enough consciousness in consuming medicine, traditional medicine, food packaging, and cosmetics. : • Traditional Medicines Awareness Index (44,41) and Medicine (67,34) were lower than Cosmetics product (71,54) and Food (75,36). • Urban people (68.85) had higher levels of awareness than rural (61.93). Similarly, from the side of gender, women have a higher awareness than men significantly. Finally, the higher the education the higher the level of awareness in consuming the drugs products, traditional medicine, food in packaging, and good cosmetics.

Table : Public Awareness Index Urban and Rural

No.	Public Awareness Index Category	Area (scale 100)	
		Urban	Rural
1.	Drugs category (Ethical andAntibiotics)	69,42	63,40
2.	Other drugs category (Traditional medicines and Vitamins)	52,47	47,11
3.	Food category (Food and Beverages Product)	80,68	71,89
4.	Cosmetics	75,85	68,73
	Index Total	69,61	62,78

Based on ANOVA, as significant <0.05, those who live in urban areas (69.61) scored significantly higher than those in rural areas 62.78.

Conclusion

- Indonesian Public Awareness Index in choosing drugs and food including traditional medicine, food supplements and cosmetics was good enough with the value of 65.48.
- The index value of urban area was higher than rural.
- Women were more aware than men

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THE RELATIONSHIP OF SELF CONCEPT WITH MEDICATION ADHERENCE TO ARV IN HIV-POSITIF WOMEN'S REPRODUCTIVE IN POLY VCT WALUYOJATI GENERAL HOSPITAL PROBOLINGGO INDONESIA

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Abstract: Globally, HIV epidemic has entered a critical condition. A number of HIV cases for each Province in Indonesia's that second-highest in the province of East Java with a number of cases were began 1987 - March 2016 in East Java were 26,052 people. A number of HIV women patients until March 2016 was 74,512 people. The clinic VCT data until 30 November 2015 a number of 657 patients receiving ARV. 49 people have died, 10 people referred to and 20 people drop out. Routine control on schedule and regularly drank to ARV was 273 people and irregular drank to ARV was 297 people. The aim to analysis the relationship of self concept with medication adherence to ARV in HIV-positive women's reproductive in Poly VCT Waluyojati General Hospital Probolinggo Indonesia. The methods use analytic correlational with cross sectional study. The study population all HIV-positive women on reproductive who visit and get treatment medication to ARV in Clinic VCT Waluyojati General Hospitals were 81 people and a sample were 68 people using consecutive sampling. After asking informed concent to respondent, data collection with questionnaire and statistical tests pearson product moment. The results showed a P value = 0.167 < 0.05. Conclusion that there were no relationship of self concept with adherence to ARV medication of HIV-positive women on reproductive age. We give recommendation on next study that you must conduct to control confounding variable and partisipatory observations to search for the real cause of someone not adherence to ARV medication.

Keywords: Self concept, Adherence, ARV, Women

Introduction

3rd goals SDGs i.e ensure a healthy life and promoting prosperity for all ages. A healthy life is one of them with avoid it of society from HIV/ AIDS that continue to increase in quantity until now (UNDP, 2015).

HIV (Human Immunodeficiency Virus) is a virus that attacks the immune system so that the immune system is weakened. While the AIDS (Acquired Immune Deficiency Syndrome) is a symptom of the decline in the ability of the body's defense because of the HIV virus. HIV/ AIDS case is not only attack the high risk group but also attack the general society or called pandemic (General Director of Medical Services, 2013).

Globally, HIV epidemic has entered a critical condition. UNAIDS data 2016 indicate that until the end of the year 2015 in the world globally that people living with HIV a number of 36.7 million. The concern situation is also occur in developt countries with low socio economic status which is expected found the number of 6,000 HIV cases every day in the productive age group between 15-24 years (Data and Information Center of Health Ministry, 2014).

According to the Data and Information Center of Ministry of Health, from a number of HIV case that occur in the world, about 16 million HIV case occure in women. A number of new HIV infection in 2013 of 2.1 million including 1.9 million attacking adult and 240,000 on children age < 15 years old. A number of death

from AIDS are 1.5 million including 1.3 million adult and children at 190,000 < 15 years old (Data and Information Center of Health Ministry, 2014).

The data of cumulative number of HIV cases in Indonesia since it was first discovered in 1987 in Bali until March 2016 and has spread in 386 district/city in the whole provinces in Indonesia that are 191,073 people and cumulative AIDS are 77,940 people. A number of HIV cases for each Province in Indonesia's that second-highest in the province of East Java after Jakarta with a number of cases were began 1987 – March 2016 in East Java were 26,052 people. In Jakarta a number of HIV cases are 40,500 people, in Papua are 21,474 people, West Java are 18,727 and Central Java are 13,547 (General Director of Disease Control and Environmental Sanitation, 2016). While cumulative HIV cases in Probolinggo district were 1,030 people began 2011-2015 and 317 people died (Yuliati, 2015).

According to age group of HIV cases were began 2014-March 2016 which were highest in the age group 25-49 years old a number of 23,512 people in 2014, a number of 21,810 in 2015 and a number of 4,979 until March 2016. The second highest of HIV cases in age group 20-24 years old were 4,894 people in 2014, a number of 4,871 in 2015, a number of 1,186 until March 2016. The third highest of HIV cases were found in the group aged ≥ 50 years old were 1,816 in 2014, a number of 2,002 in 2015, a number of 513 until March 2016. The pattern of HIV transmission based on age groups during the past five years was occurred in the productive age group (General Director of Disease Control and Environmental Sanitation, 2016).

Based on sex, HIV cases occur at women is also highest. HIV cases in 2014 were 19,244 at men and 13,467 at women; in 2015 were 18,362 at men dan 12,573 at women. While HIV cases in January-March 2016 were 4,333 at men and 2,813 at women (General Director of Disease Control and Environmental Sanitation, 2016).

According to UNAIDS data in 2015, HIV patients who receive ARV were 15.8 million in 2016, and until June, patients with HIV who receive ARV were 18.2 million or approximately 49%. While the Data recipient ARV in Indonesia in 2014 at men were 57,788 and 32,545 at women, in 2015 at men were 73,632 and 42,179 at women, in January-March 2016 at men were 77,432 and 44,576 at women. A number of patients HIV that on HIV treatments in 2014 were 101,268 at men and 58,974 at women, in 2015 at men were 121,180 and 71,278 at women, until March 2016 were 126,795 at men and 74,512 at women.

According to Data of Health Ministry number 451/ Health Ministry/ decree/II/2012 about refferal hospitals for PLWHA in Indonesia are 358 hospital. The service for ARV in probolinggo district East Java one of them is Waluyojati hospitals. According to data of Clinic VCT until November 30rd 2015 recorded a number of 657 patients had recieved ARV. Of the 657 patients as many as 49 people were died, 10 people referred and 20 people drop out ARV. Whereas a routine control as scheduled and regularly drank as many as 273 people ARV and irregular ARV drinking as much as 297 people (Clinic VCT, 2015).

Somebody that infected by HIV or AIDS caused by several factors, i.e the **host factors** include injecting drug users, community groups who promiscuity such as WSW (Women Sex Worker), MSM (Men Sex Men), Inmates and bummer of childrens, recipients of blood transfusion that infected with HIV, a recipients of donor organs and health workers are a susceptible group to infect of HIV, age factor when infected by HIV; the second factors i.e **agency factors and environmental factors** (Green, 1991). The service of HIV is limited by the socio-cultural barriers, location (geographycal position) and the lack of financial support (Yuniar, 2013).

Factors affecting adherence to ARV medications according to L. Green that are a predisposing factor (level of knowledge, attitude, trust, belief, values); In addition, according to Roger, the self concept is also factor that influence someone to do (Green, 1991). Adherence is the level of a person to abide by the rules and behavior that suggested by health workers (Notoatmodjo, 2010).

According to Peltzer said that adherence when patients not only regularly treatment according to time to follow up, but also regularly drank the medicine as suggested by health workers (100%). While not adherence i.e. patients who dropped out of medical treatment or not at all (99%) ≤ (Peltzer, 2010).

Self concept is the views and attitudes of individuals towards thierself. In addition, self concept is the way of individuals to view theirself i.e physical, psychological, social (Hamim, 2015). The result of Sapiq (2015) about the relationship of self efficacy and compliance with self medication in people with TB that has similarities with the rules taking the medication of ARV shows that it is a significant relationship.

The second factors according to L. Green that are enabling factor (availability of facilities, infrastructure health); the reinforcing factors (attitudes and behaviour of health workers and other officers) (Green, 1991). The result of Sugiharti., et all in 2012 shows that other factors cause low adherence to ARV medications is fear to know of their status in society, lack of knowledge about the important of regularly treatment, depression, didn't believe in medicine, forget to drink the medicine and fear of side effects caused by a treatment (Sugiharti, 2012).

Impact someone infected by HIV or AIDS i.e slowly decline of the immune system, so that if they infected by other desease which is usually not dangerous will impact the death and other impact caused by medication ARV treatment failure i.e. resistance and the risk of drug toxicity. Quality of life of PLWHA who take ARV with the routine will be increased (Nhan, 2012).

Efforts that can be done to decrease of HIV/ AIDS cases with primary, secondary and tertiary prevention. One of them is to prevent replication of HIV, need a treatment. Treatment that can prevent it i.e. ARV (Anti Retro Viral) (UNAIDS, 2009). While the Effort can be done to improve adherence that is colaboration of multi sectors including support of supervisor to take, support of friends, family, case manager, health workers, AIDS Eradication Commission and non-governmental organizations (NGO).

Based on background, the researchers are interesting to study about "to analysis the relationship of self concept with medication adherence to ARV in HIV-positive women's reproductive in Poly VCT Waluyojati General Hospital Probolinggo Indonesia".

Methods

Study Design

The methods use analytic correlational with cross sectional study. The study population all HIV-positive women on reproductive age who visit and get treatment medication to ARV in Clinic VCT Waluyojati General Hospitals are 81 people and the sample of this study are 68 people who HIV-positive women on reproductive age who visit and get treatment medication to ARV in Clinic VCT Waluyojati General Hospitals. The sampling tecnique using consecutive sampling. This study was conducted for 2 weeks in January 2017. The inclution criteria is women respondent that ready to be a respondent and have reproductive age. Whereas exclution criteria is respondent that is process on TB treatment.

Materials

The instrument in this study using questionaire that given to respondents after validity and reliability test in other respondent that has similarities with them. The content were grouped as sections: Socio demographic Information; Self concept assesment; and adherence medication to ARV. For socio demographic information, Self concept assesment; and adherence to ARV medication were developed by the researcher based on information gathering during review of literature. The socio demographic characteristics i.e age, level of education, employment, income per month, Live status, long consumption of ARV.

Data Collection

The first, researcher explain the study procedures then asking informed consent to respondent, to be signed by the respondent. Next, giving the questionaire form and describes how to fill it aboth respondent and case manager. The questionaire of case manager is intended to check the answers of the patient about the medication ARV adherence. The results of data collection with recheck then after that is collected, then data processing and analysis.

Analysis

Data entry and analysis was done using SPSS 16 (*Statistical Package for the Social Sciences*) for windows and statistical test analyzed with Pearson Product Moment.

Result

The researcher get information from 68 respondent (HIV/ AIDS patient) such as age, Level of education, employment, income per month, Live status, Long consumption of ARV and self concept assement and adherence to ARV medication i.e:

Socio-demographic Characteristics

Based on table 1 of 68 respondents fulfill of inclution criteria shows that distribution of age almost all of the respondents i.e. 60 people was 25-49 years old (88.2%) and 15-19 years old (4.4%). Whereas distribution level of education was majority of the respondents has level of education at elementary school i.e. 48 people (70.6%) and it only has level at college and no formal education i.e each 1 person (1.5%). About empleyment majority of the respondents as house wife i.e. 48 people (70.6%) and none of them as civil servants (0%). Then Income per month in rupiah (Rp) majority of the respondents got <500,000 was 45 people (66.2%) and got income between 500,000-1 million was 11 people (16.2%).

All of them live with their families (100%) and about long consumption of ARV majority of them as many as 52 people (76.5%) was consumtion ARV ≥6 month.

Distribusion of Self Concept and Adherence to ARV Medication

Respondents whose good self concept i.e almost of them that was ≥ 66-100% (good), and none of them has self concept < (low) (0%). Whereas the respondents whose adherence to ARV medication almost of them has not adherence to ARV medication i.e 54 people (79.4%) and only 14 people (20.6%) that adherence to ARV medication.

Bivariat Analyses of Self Concept and Adherence to ARV Medication

Bivariat analysis results with pearson product moment test obtained P *value* = 0.167 > α 0.05 which means no relationship of self concept with medication adherence to ARV in HIV-positive women's reproductive in Poly VCT Waluyojati General Hospital Probolinggo Indonesia.

Table 1:Socio-demographic Characteristics

Characteristics	n=68	%
Age (Years)		
15-19	3	4.4
20-24	5	7.4
25-49	60	88.2
Level of Education		
No formal education	1	1.5
Elementary School	48	70.6
Primary High School	10	14.7
Secondary School	8	11.8
College	1	1.5
Employment		
House wife	48	70.6
Student	1	1.5
Private Sector	5	7.4
Entrepreneur	14	20.6
Civil servants	0	0
Income (Rp)		
< 500,000	45	66.2
500,000 - 1.000,000	11	16.2
>1,000,000	12	17.6
Live Status		
With Friends	0	0
Alone	0	0
With Family	68	100
Long consumption of ARV (Month)		
<6	16	23.5
≥6	52	76.5

n is a number of sample

Table 2:Distribusion of Self Concept

Characteristics	n=68	%
<33% (Low)	0	0
34-65% (Enough)	14	20.6
≥66-100% (Good)	54	79.4

Table 3:Distribusion of Adherence to ARV Medication

Characteristics	n=68	%
≤99% (Not adherence)	54	79.4
100% (Adherence)	14	20.6

Discussion

The Self Concept at HIV-Positif on Women

In this study the results of 68 respondents (Table 2) shows that Respondents whose good self concept i.e almost of them that was ≥ 66-100% (good), and none of them has self concept < (low) (0%).

Self concept is the views and attitudes of individuals towards thierself. In addition, self concept is the way of individuals to view their self i.e physical, psychological, social (Hamim, 2015). Aspects of self concept according to Agustiani (2006) is the identity of the individual himself, "who I am", behavior of theirself, self perception of the individual that the way to Act is followed by consequences from the inside, from the outside or both. Assessment is individual assessment itself.

Factors that affect Self Concept according to Amaliah (2016) i.e internal factors including Intelligence, motivation, emotions, personal competence, success and failure, health status, age, perception, physical appearance, sex, self-actualization, stress. Whereas external factors including the elderly, families, peers, role of educator, culture, social status, interpersonal experience.

Based on the above theory, one of the factors that affect a person's self concept is the age factor. It is in accordance with the results of this study on table 1 that distribution of age almost all of the respondents i.e. 60 people was 25-49 years old (88.2%) and 15-19 years old (4.4%). According to Azizah (2011) that more mature the age of someone will occur the degenerative process that impact at changes the physical, cognitive, social, mental, and sexual feelings, psychosocial and spiritual concepts including theirself. Another factor is the role of the family. The results in table 1 of 68 respondents that respondents live with their family (100%). The family is two or more individuals living in the same House that it has in one heredity, marriage and interacting with each other to conduct their roles. The role of the family can be the mother, the father, the son that one of its functions is health care and provide support.

Results of the study of Phillips (2007) about social support, coping and medication adherence among HIV-positive women with depression of living in Rural Areas of the southeastern United States shows that social support in this family affect adherence treatment to drink ARV.

Adherence to ARV Medication at HIV-Positive Women

The results in table 2 of 68 respondent shows that the respondents whose adherence to ARV medication almost of them has not adherence to ARV medication i.e 54 people (79.4%) and only 14 people (20.6%) that adherence to ARV medication.

According to the Health Ministry (2011) in adherence which is a form of behaviour that happen caused by interaction between health workers and patients so that patients understand the plan with all its consequences, agree and patients willing to conduct it. The factors that influence of adherence according to Root (2013) i.e communication, knowledge, health facilities. According to Yuniar (2013) the factors that support adherence

of ARV medications i.e internal factors include motivation, perceptions about the severity of the disease, beliefs, level of knowledge and external factors include services factors, social support from family, peer group, NGOs, health worker, stigma and discrimination, the availability and affordability of drugs.

The results in table 1 about level of education that majority of the respondents has level of education at elementary school i.e. 48 people (70.6%) and it only has level at college and no formal education i.e each 1 person (1.5%). It is accordance with statement of Suhardi (2007), the higher of the educational level, so that the higher level of knowledge of the person.

The results in table 1 about level of education shows that most of respondents has elementary school level, will affect the individual's response of knowledge about ARV and the importance of adherence to drinking ARV, despite of knowledge is also influenced by other factors such as information that ever recieved.

The relationship of Self Concept with medication adherence to ARV in HIV-positive women's reproductive

Bivariat analysis results with pearson product moment test obtained P *value* = 0.167 > α 0.05 which means no relationship of self concept with medication adherence to ARV in HIV-positive women's reproductive in Poly VCT Waluyojati General Hospital Probolinggo Indonesia.

Self concept is the views and attitudes of individuals towards thierself. In addition, self concept is the way of individuals to view theirself i.e physical, psychological, social (Hamim, 2015). Adherence is a form of behaviour that happen caused by interaction between health workers and patients so that patients understand the plan with all its consequences, agree and patients willing to conduct it (Health Ministry, 2011).

Factors that affect Self Concept according to Amaliah (2016) i.e internal factors including Intelligence, motivation, emotions, personal competence, success and failure, health status, age, perception, physical appearance, sex, self-actualization, stress. Whereas external factors including the elderly, families, peers, role of educator, culture, social status, interpersonal experience. The factors that influence of adherence according to Root (2013) i.e communication, knowledge, health facilities. According to Yuniar (2013) the factors that support adherence of ARV medications i.e internal factors include motivation, perceptions about the severity of the disease, beliefs, level of knowledge and external factors include services factors, social support from family, peer group, NGOs, health worker, stigma and discrimination, the availability and affordability of drugs.

The other factors that influencing of adherence are economic status or income. This is supported by the results in this study on table 1 of 68 respondents Income per month in rupiah (Rp) majority of the respondents got <500,000 was 45 people (66.2%) and got income between 500,000-1 million was 11 people (16.2%).

The results of the study shows that most of the repsonden have income < 500,000. The higher income or economic status will be higher amount, kind of goods and services that reached for example transportation services and others that can affect someone for being able to regularly visit to health facilities with distance between home and health services that different on each person.

It is in accordance with the results of the study of Bermudez., et all (2016) about equity in adherence to antiretroviral therapy among economically vulnerable adolescens living with HIV in Uganda shows that the economic status is significant and have a positive impact on adherence tretment in adolescents who are living with HIV in Uganda.

Factors affecting adherence not only the self concept. However, there are still many other factors that affect adherence to drink ARV i.e. long consumption of ARV. It is in accordance with the results of this study on table 1 of 68 respondents that majority of them as many as 52 people (76.5%) was consumtion ARV ≥6 month.

The ARV is therapy that given to HIV patients that must be drank for lifetime. The side effects of ARV treatment have different effect on each of them from mild side effect i.e. causes headache, nausea vomiting, diarrhea, increased cholesterol up to blood sugar levels and liver disfunction.

Conclution

The respondents whose good self concept i.e almost of them that was ≥ 66-100% (good), and none of them has self concept < (low) (0%). Whereas the respondents whose adherence to ARV medication almost of them has not adherence to ARV medication i.e 54 people (79.4%) and only 14 people (20.6%) that adherence to ARV medication. However, the results with pearson product moment test obtained P *value* = 0.167 > α 0.05 which means no relationship of self concept with medication adherence to ARV in HIV-positive women's reproductive in Poly VCT Waluyojati General Hospital Probolinggo Indonesia.

Recommendations

For health worker (Midwife)

We recommendation that you often give guidance about adherence to ARV medication and the importance of integration of HIV testing in women especially pregnant women, so that the HIV/ AIDS not transmition to her baby to remember about this case that increasing every year.

For The Next Researcher

We give recommendation on next study that you must conduct to control confounding variable and partisipatory observations to search for the real cause of someone not adherence to ARV medication.

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CONTRACEPTIVE SWITCHING PATTERN AMONG MARRIED WOMEN IN EAST JAVA

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Abstract: Switching of contraceptive methods contributes to high unplanned pregnancy rates, if the switching of contraceptive methods not rational, effective and efficient. Basic Health Research Data (2010), still found 49.4% of women in Indonesia who have more than 3 children, but still using short-term contraceptive methods. If there is no discipline in the use, short-term contraceptive use will be a risk of failure. In addition, problems that occur at the onset of switching methods are also at risk of increasing unwanted pregnancies. This is due to the inaccuracy of process switching methods (Steel & Diamond, 1999). The aims of this study was to analyze the suitability of switching contraceptive method based on age, contraceptive purposes and number of children. This Cross-Sectional study was conducted on 4705 married women. The results showed that 84.4% of women had incompatible patterns of switching of contraceptive methods. 67.4% of women over the age of 35, 57.9% of women who aim to limit their pregnancies, and 68.9% of women with two or more children switched to other contraceptive methods, but still in the non-long-term method category. Perceptions of contraceptive cost is the most dominant factor affecting the incompatible patterns of switching of contraceptive methods. Meanwhile, the source of services is a confounder factor in the relationship between perceptions of contraceptive costs and incompatible patterns of switching of contraceptive methods. Women who want to change contraceptive methods need accurate advice from the health providers about contraceptive method to make effective choices.

Keywords: Contraceptive Switching, Contraceptive Method, Pattern Switching, Rational Contraception

Introduction

Switching from one method to another is a natural and common occurrence in the cycle of use of contraceptive methods. In the implementation of the Subsystem Recording and Reporting of Contraceptive Services conducted by the National Population and Family Planning Board has recorded up to February 2015 the total cumulative number of participants who changed the method reached 183,253. This showed the participants' interest to change the method quite high.

Change method of contraception is not a problem if it is done with a rational, efficient and effective. The rational is the use of permanent contraceptive methods based on clear objectives, whether to delay, exclude or limit pregnancy. Selection of effective methods of contraception is to consider how far the method is reliable and safe and comfortable in its use. Meanwhile, the selection of efficient methods considers the costs to be incurred compared to how far these contraceptives can be used.

For Fertile Women who want to space or limit birth, switching to Long Term Contraceptive Method (LTCM) is preferred (USAID, 2006). Besides effectively used for spacing or limiting births, LTCM has many other advantages. In terms of cost, LTCM is relatively cheaper because it requires only one setting-up for a long

period of time. LTCM is also relatively safer to use. For example, IUDs that are long-term contraceptive devices that have no systemic effects circulating throughout the body, do not affect milk production and rapid fertility once IUD is removed (Puspitasari and Winarni, 2011). In

fact, in contraceptive methods, many FP participants choose short-term contraceptive methods that are susceptible to drop out and the hormone content of the method is feared to cause unfavorable side effects for its users (Toersilaningsih and Ekoriano, 2013). This is supported by the report on the Implementation Subsystem for Recording and Reporting of Contraceptive Services which shows only 22.87% of old family planning participants who choose to change the way using LTCM (BKKBN, 2013)

The result of Budyawati & Purwanto research also showed that the interest of contraceptive usage both current usage and future desire were dominated by non-LTCM, in other words, LTCM tend to be less desirable (Budyawati and Purwanto, 2011). Indonesia Demographic and Health Survey data (2012) showed that the using of LTCM by Indonesian FP participants only reached 10.6%, the rest prefer using non-LTCM.

Under recommended conditions for using LTCM, many women still choose to use non-LTCM. This can be seen from the results of Basic Health Research (2010), which showed that 49.4% of women who have more than 3 children, still using non-LTCM. Indonesia Health Demographic Survey Data (2012), showed that when women have two or more surviving children, the desire to limit births increases. However, efforts to limit births were realized using non-LTCM (injections and pills types). In addition, the phenomenon of women with risk factors is too old, and too close to the previous birth distance prefer non-LTCM than LTCM (Budijanto, 2013). In fact, for women who do not wish to have more children or who are aged more than 35 years old, switching to LTCM especially a permanent method is more advisable (USAID, 2006).

In the use of non-LTCM, if less discipline in control can cause the occurrence of unwanted pregnancy. This is supported by information from the Center for Data and Information, Ministry of Health of the Republic of Indonesia (2013) which explained that non-LTCM ranging from 1-3 months gives 20-40% chance to break use of contraception. Therefore, the risk of unwanted pregnancy is very likely to occur. Not to mention the problem of switching contraceptive methods that occur at the beginning of the switch is also at risk of increasing unwanted pregnancy. This is due to the inaccuracy of switching procedure of the method (Steel and Diamond, 1999). The same is also expressed in the WHO's policy brief which states that failure to switch after-stopping methods is a common cause of unwanted pregnancies (WHO, 2012).

The problem of switching the methods described above, becomes the basis for this research. This study was conducted on married women and using contraception in East Java. The reason for choosing this region because East Java is one of the big cities in Indonesia which is densely populated. Human Development Index (HDI) in 2013 amounted to 73.54. The unmeet rate in this area was lower than the national rate of 10.1%. However, people who use LTCM are low. The objectives to be achieved in this research is to evaluation of suitability of contraceptive switching pattern when changing a method to another based on participant conditions, such as age, family planning motivation and number of children. The existence of user factors (demand side) were analyzed its contribution in forming suitability of contraceptive switching pattern.

It is hoped that the results of this study can contribute to find out the dominant factors affecting the conformity of contraceptive methods, so that appropriate steps or intervention programs can be developed. This research was conducted by analyzing secondary data from Improving Contraceptive Method Mix (ICMM) project implemented by Center of Health Research-University of Indonesia (PPK-UI) in 2013.

Methodology

The design study was cross sectional with research subject 4798 Women Age Fertile that married and using contraception. The research area were in East Java Province covering Kediri, Tuban and Lumajang districts. To obtain a description of the variables under study, the data were analyzed by using univariate analysis. In order to know the factors that proven to contribute to the suitability of contraceptive switching pattern, the

data were analyzed by using Chi-Square test and followed by Multilevel multiple logistic regression to find the dominant variable related to the suitability of contraceptive switching pattern. This research was conducted by analyzing secondary data from Improving Contraceptive Method Mix (ICMM) project implemented by Center of Health Research- Universitas Indonesia (PPK-UI) in 2013.

Result

Contraceptive Switching Patterns

In this study, the contraceptive switching pattern were divided into four category namely the change from non LTCM to LTCM, LTCM to LTCM, LTCM to non LTCM and non LTCM to non LTCM. Based on data analysis, most participants (77.2%) switched method from one to another are still in non MKJP categories. A detailed description of the switching pattern of contraceptive methods can be seen in Figure 1.

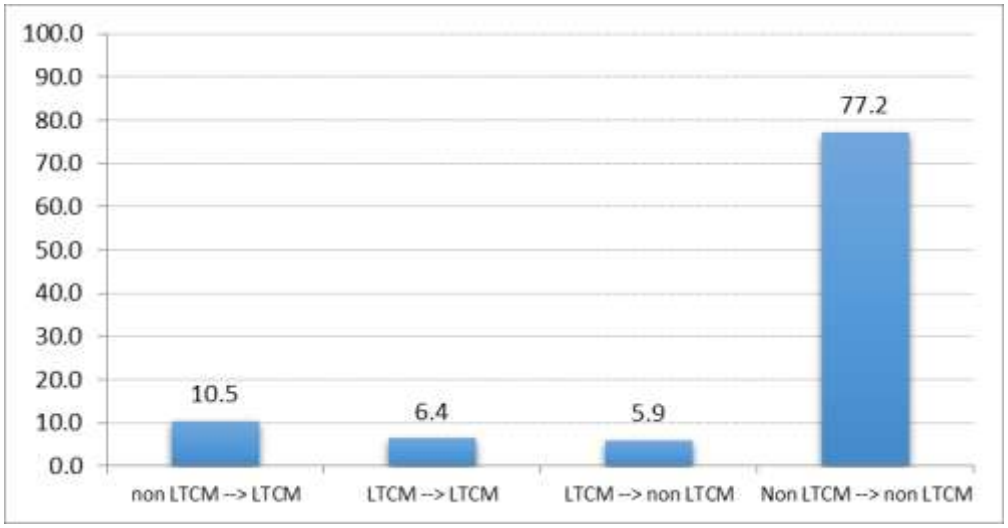

Figure 1. Distribution of Married Women Based on Contraceptive Switching Pattern in East Java 2013

Here in after is description related to suitability of contraceptive switching pattern. In this study, the contraceptive switching patterns was viewed from three aspects: age, family planning motivation and number of children. An illustration of the conformity of the pattern of replacement of contraceptive methods based on these three aspects can be seen in table 1.

Table 1. Distribution of Married Women by Age, FP Motivation, Number of Children And Contraceptive Switching Pattern In East Java 2013

Determinant Factors	Contraceptive Switching Pattern			
	Non LTCM -> LTCM (%)	LTCM -> LTCM (%)	LTCM -> Non LTCM (%)	Non LTCM -> Non LTCM (%)
Age				
< 20 Years	1.5	3.8	0.0	94.7
20–35 Years	7.2	4.0	2.4	86.3
>35 Years	14.2	8.8	9.6	67.4
FP Motivation				
Spacing	6.3	4.9	4.5	84.3
Limiting	22	10.5	9.6	57.9

Number of Children				
There is no	0.0	0.0	0.0	100.0
1 Children	3.7	5.0	3.2	88.2
≥2 Children	15.5	7.6	8.0	68.9

Suitability of contraceptive switching pattern Based on Age

The age variables are grouped into three categories, which are less than 20 years old, 20 to 30 years and over 35 years old. In the three categories of age, the contraceptive switching patterns were dominated by the switch of a method to another method that is still in the category of non-LTCM. In fact, when a woman has passed the age of 35 years, the replacement of contraceptive methods is more advisable to the use of LTCM. However, 67.4% of women aged 35 years or older tend to choose non-LTCM as the next preferred method of contraception. Only 14.2% chose to change methods from non LTCM to LTCM. While others, there are also 9.6% women over 35 years that switching of method with a less recommended pattern that is from LTCM to non LTCM.

Suitability of Contraceptive Switching Pattern Based on Family Planning (FP) Motivation

In this study, FP motivation were grouped into two categories namely to space and limit pregnancies. At the time of the method change, it was seen in each category dominated by women who still chose the non-LTCM type as an alternative to the next method of birth control. In fact, women who have the motivation to limit pregnancy, more advisable to switch to using LTCM. However, the results showed there were 57.9% among them still tend to choose non LTCM as an alternative to the next method. Only 22.0% of women chose to change their method from non-LTCM to LTCM. In addition, there are also 9.6% of women who want to limit pregnancy were switching from LTCM to non-LTCM.

Suitability of Contraceptive Switching Pattern Based on Number of Children

In this study, the number of children were categorized into three groups: no children, one child and more than two children. If a woman already has two or more children, then it is recommended to switch to using LTCM. However, the results show that 68.9% of women who have two or more children continue to use the non-LTCM type as an alternative to the next method. Only 15.5% of women choose to switch from non LTCM to LTCM. In addition, there are also 8.0% of women switch of method with the not expected of pattern (switch from LTCM to non LTCM).

Suitability of Contraceptive Method Switching Pattern Based on Age, Family Planning Motivation, and Number of Children

After modification variation contraceptive switching pattern with age, motivation of family planning and number of children, hence obtained information related to distribution of participant based on suitability of contraceptive switching pattern. The results of data analysis showed, there were 4046 of 4798 women (84.7%) experienced unsuitability of contraceptive switching pattern. The detail description can be seen in table 2.

Table 2. Distribution of Married Women by Suitability of Contraceptive Switching Pattern in East Java 2013

the suitability of contraceptive switching pattern	**n = 4705**	**%**
Yes	3991	84.8
No	714	15.2

Indeed many factors influence the suitability of contraceptive switching pattern. In this study, the user factor (demand side) allegedly closely related to the suitability of contraceptive switching pattern. To understand more deeply the interrelationship of demand side factors in shaping suitability of contraceptive switching pattern, hence can be seen picture of result of research shown in table 3.

Table 3. Distribution of Married Women Based on Unsuitability of Contraceptive Switching Pattern and Demand Side Factors

Variables	n = 4705	Unsuitable patterns of contraceptives switching methods (n = 3991)	
		Frequency (%)	P value
Demand SideFactors			
knowledge			
low	2669	2292 (85.9)	0.022*
high	2036	1699 (83.4)	
Decision maker			
Woman and husband	855	705 (82.5)	0.037*
Woman	3850	3286 (85.4)	
Feel the side effects			
Yes	1059	936 (88.4)	<0.001*
No	3646	3055 (83.8)	
Inconvenience in using contraceptives	121	105 (86.8)	0.633
Yes	4584	3886 (84.8)	
no			
Contraceptives cost perception	352	276 (78.4)	<0.001*
expensive	2337	2079 (89.0)	<0.001*
Standard	1405	1212 (86.3)	<0.001*
cheap	611	424 (69.4)	
free			
Difficulties in using	4432	3783 (85.4)	<0.001*
Standard/Difficult	273	208 (76.2)	
Easy			
Individual Chatacteristics			
Educational background			
Low	3599	3052 (84.4)	0.709
Middle	870	741 (85.2)	0.628
High	236	198 (83.9)	
Contraception's Factors			
Accessibility			
Easy	4540	3870 (85.2)	
Difficult	165	121 (73.3)	<0.001*

Service Provider Factors (Individual Data)			
Provision of information			
Yes	2550	2169 (85.1)	0.655
No	2155	1822 (84.5)	
Type of service sources			
Government	711	463 (65.1)	<0.001*
Private	3623	3203 (88.4)	0.645
Others	371	325 (87.6)	
Service provider factors (District Level Data)			
Amount of FP Field Officer			
not Ideal			
Ideal	3118	2668 (85.6)	0.047
	1587	1323 (83.4)	

Budget Allocation	**n**	**Average SD**	**P value**
Contraception switching pattern			
Unsuitable			
	3991	0.10%	0.910
		0.04%	
Suitable			
	714	0.10%	
		0.04%	

***) Correlated significantly with alpha 0.05**

Based on table 3 it is known that the variables of knowledge, decision makers, perceived side effects from previous contraceptives, perception of contraceptive cost and perception of contraceptive method showed significant correlation (α = 5%) with suitability of contraceptive switching pattern.

In addition to illustrating the demand side factors, Table 3 also illustrates other variables that are also suspected to be related to the suitability of the contraceptive switching pattern, but to be confounder factors in this study. The confounder factors are individual characteristics (level of education), ease of obtaining contraceptives, factors of service providers (giving of information, type of service source, number of family planning field officers, budget allocation). Based on the result of bivariate analysis, it was known that the confounder factors that proved to be significant correlation (α = 5%) with the suitability of contraceptive switching patterns were the ease of obtaining contraception, and the type of service source.

To find out the dominant demand side factor influence the appropriateness of contraception method after controlled by confounding variable, multivariate analysis. The result of the analysis showed that the perception variable to contraceptive cost has the greatest contribution in shaping the suitability of switching pattern of contraceptive method. However, the relationship between these two variables is also influenced by the confounding variable that is the type of service source. The detail description can be seen in table 4.

Table 4. The Demand Side Factors Associated With Suitability of Contraceptive Switching Pattern After Controlled Tool Factors, Individual Characteristic and Family Planning Services

Variable	Pvalue	OR 95% CI
Perception of contraceptive cost		
Expensive	<0.001	0.51 (0.38-0.68)
Ordinary	0.004	0.64 (0.48-0.87)
Cheap	0.682	0.93 (0.67-1.30)
Free		1
Source of Services		
Government	<0.001	0.32 (0.25-0.39)
Private	<0.001	0.31 (0.22-0.44)
Others		1
MOR of Level District = 1.00		

Women who perceived that the cost of expensive contraceptives had a chance of 0.51 times (95% CI 0.38 - 0.68) to experience unsuitability of contraceptive switching pattern compared to women who said the cost of a contraceptive was free, after being control of variables the type of service source. It can also be interpreted that women who said the cost of contraceptives were expensive, had a 1.96-fold chance of experience a suitability of contraceptive switching pattern compared to women who said the cost of a contraceptive was free after control of variables the type service source.

While women who said that the cost of their contraceptives entered the usual category, had an opportunity of 0.64 times (95% CI 0.48 - 0.87) to experience a unsuitability of contraceptive switching pattern compared to women who said their contraceptives were free. It could also be interpreted that women who said their contraceptive costs were in the usual category had 1.56 occasions to experience a suitability of contraceptive switching pattern compared to women who said their cost of contraception were free.

Women who say that their cost of contraceptives were in the cheap category have an opportunity of 0.93 times (95% CI 0.67 - 1.30) to experience a unsuitability of contraceptive switching pattern compared to women who say their contraceptives were free. It could also be interpreted that women who said their cost of contraceptives entered a cheap category had a chance of 1.08 times to experience a suitability of contraceptive switching patterns compared to women who said their contraceptive cost were free.

Based on the explanation regarding the contribution of women's perceptions about the cost of their contraceptives in establishing suitability of contraceptive switching patterns, it can be concluded that the more expensive the cost of contraception According to the participants, the more likely they were to experience a suitability of contraceptive switching patterns.

Participants who received family planning services from a government service center had a chance of 0.32 times (95% CI 0.25 - 0.39) to experience unsuitability of contraceptive switching pattern compared to those receiving FP services from others after control of the perception of contraceptive cost variables. It can also be interpreted that participants who receive family planning services from

government service centers have an opportunity of 3.13 times to experience suitability of contraceptive switching pattern compared to participants receiving FP services from others after control of contraceptive costs perception variables.

Participants who received family planning services from private service centers had a chance of 0.31 times (95% CI 0.22 - 0.44) to experience unsuitability of contraceptive switching pattern compared to participants receiving FP services from others after control of contraceptive costs perception variables. It can also be interpreted that participants who receive family planning services from private service centers have an opportunity of 3.23 times to experience suitability of contraceptive switching pattern compared to those receiving FP services from others after control of the contraceptive costs perception variables.

Discussion

The result showed that when women who change their current method to another methods, non-LTCM types remain their choice. In fact, not necessarily non-LTCM methods in accordance with their conditions. Age factors, family planning motivation and the number of children should be considered in choosing the right type of contraception.

At the age of less than 20 years, due to health reasons, a woman is recommended to postpone pregnancy (Setiyaningrum and Aziz, 2014). While pregnancy and birth are best, it means the lowest risk for mothers and children is at the age of 20-30 years. At the age of more than 35 years, a woman enters a high risk phase for pregnancy and childbirth (USAID, 2006). Due to different conditions of women in the above-mentioned age range, the type of contraceptive used is also different. At the age of less than 20 years, the type of non-LTCM is most recommended. Meanwhile, in the age range 20-35 years, the use of LTCM (IUD type) is preferred to be used. At the age of more than 35 years, the main type recommendation of contraception is LTCM (sterile type) (USAID, 2006). When referring to the above explanation, many women in East Java use contraceptive types that do not match their age.

In choosing the type of contraception used, the motivation of family planning should also be considered. In the planning of family, there are three phases that can be passed, namely the phase of delaying pregnancy, pregnancy phase and do not want to get pregnant again. For each of these phases, different types of contraceptive recommendations may be used. For the postponing phase of pregnancy, the main recommendation is the non-LTCM (pill type). Meanwhile, for the phase of pregnancy, it is better to use LTCM (IUD type). For phases of stop the pregnancy, the main recommendation use LTCM (sterile type) (USAID, 2006). If the theory is referred to evaluate the suitability of contraceptive methods, it can be concluded that many women in East Java experience a unsuitability in the contraceptive switching pattern. Some women in this study wanted to limit their pregnancies. However, their efforts to limit pregnancy are more likely to change their contraceptive methods to other methods that are still in the non-LTCM category. Risk of drop out can occurs. If drop out occurs, the possibility of an unwanted pregnancy may also occur.

In addition to age, and family planning motivation, the number of children is also a determinant factor in choosing contraceptives. This is supported by Singh and Joshi's remarks that the number of live children is not only a determinant of contraceptive use but also in the choice of contraceptive methods

used (Singh and Joshi, 2014). If already has more than two children, then the use of LTCM (sterile type) is more recommended (Setiyaningrum and Aziz, 2014). This has enough scientific reasons, where the first and second pregnancies are at the lowest risk (USAID, 2006). That is, when a woman performs a third childbirth and so on, then there is a risk that threatens the health of himself and his child. But the reality found in this study is that most women have two or more children, still prefer non-LTCM as their method of contraception. It can be concluded that there are still many unsuitability of switching patterns of contraceptive method based on the number of children.

After analyzing the suitability of switching pattern of contraceptive method by modifying switching pattern of contraceptive method with age variable, family planning motivation variable and child number variable, it can be said that most women experience unsuitability of switching pattern of contraceptive method.

In this study, it appears that most women who experience suitability of contraceptive switching pattern were women who get contraceptives for free. This can happen because in some districts such as Tuban and Lumajang have applied free contraceptives for the entire population, not just for the poor families. There are two components of service costs in financing calculations: components of contraceptive costs and consumables, and service cost components. For non-LTCM such as pills, participants pay only the registration fee, while contraceptives are already funded by National Population and Family Planning Agency, but are not included for medication in case of side effects. For LTCM, participants pay registration fee, consultation, medical service and consumables. If the participant does not want the brand that provided National Population and Family Planning Agency, then the participant must pay the cost of the contraceptive device itself, except for the poor participants where the cost borne by the government. The availability of free contraceptives by government institutions encourages FP participants to choose contraceptives that are appropriate to their condition without thinking about the expensive cost of contraceptives.

Conclusion

The research results showed that most women in East Java experienced an unsuitability of contraceptive switching patterns. The most dominant factor determining the suitability of contraceptive switching pattern of method was the participant's perception toward contraceptive cost. Women who feel that their contraceptives are free from government, tend to experience suitability of contraceptive Switching pattern. It can be said that participants more freely choose the appropriate method of contraception and they want unhindered of the cost factor. Therefore, government intervention in rational, efficient and effective use of family planning is needed, especially in the provision of quality family planning services at affordable cost.

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WHOLE GRAIN CONSUMPTION AND ITS DETERMINANTS IN MALAYSIAN MEDICAL STUDENTS

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Abstract: Whole grain consumption is associated with several health benefits. Little is known however, about whole grain consumption patterns in medical students in Malaysia. The objective of this study was to assess whole grain intake pattern and its determinants amongst Malaysian medical students. A cross sectional study investigating whole grain intake amongst 151 medical students in a private medical University in Malaysia was conducted. A self-administered questionnaire was used to assess sociodemographic variables, the whole grain intake pattern and the knowledge and attitudes towards whole grain intake. The prevalence of reported whole grain intake in the past 3 months was 51%.Chinese ethnicity, readiness to adhere to Malaysian food pyramid and self-preparation of food and eating at home were significantly associated with whole grain consumption. However, the primary determinants of food choice like education, knowledge and affordability did not seem to influence whole grain consumption. Whole grain consumption is relatively low amongst Malaysian medical students. Cultural background and self-belief influence this practice despite being from the medical fraternity. Efforts are needed to bridge the knowledge – practice gap by assessing the barriers to whole grain consumption in order to design effective initiatives to promote an increase in whole grain consumption.

Keywords: whole grain consumption, medical students, practice

Introduction

A whole grain is defined as consisting of the intact, ground, cracked or flaked kernel after removal of inedible parts such as the hull and husk (Björck I *et al*, 2012,Nutrition Society of Malaysia,2012). The principal anatomical components namely the endosperm, germ and bran are to be present in the same relative proportions as they exist in the intact kernel. Small losses of components, around < 2% of the germ or <10% of the bran, which may occur through processing methods consistent with safety and quality, are allowed.

A significant body of research indicates that whole grain consumption has been associated with greater nutrient intakes and enhanced dietary quality (O'Neil CE *et al*, 2010, Hur IY and Reicks M, 2012).Observational studies involving large populations have consistently shown an inverse relationship between whole grain intake and disease risk, with health benefits proportional to the amount of whole grain consumed (Yee EQ et al, 2012).

Consumption of 2-3 servings per day (~48 g) of whole grains may reduce risk of cardiovascular disorders (CVD), type 2 diabetes mellitus (T2DM), overweight and obesity. This dietary practice has shown to lower the risk of certain cancers also. The current evidence shows that 3-5 servings of the whole grains per day reduces not only the risk of ischemic heart diseases (IHD) and CVD, but also causes a 21-30% reduction in risk of T2DM compared to those who rarely or never consume whole grains(Liu S *et al*,1999,2000,2002,

Meyer KA *et al,*2000, Parker ED *et al*,2013). Ye EQ *et al* (2012) proposed that whole grains also aid in the maintenance of glucose and insulin homeostasis, lowering of serum cholesterol and low density lipoprotein (LDL) cholesterol concentration, and reducing inflammation and oxidative stress.

Background

Whole grains and their products form the base of the Malaysian food pyramid. Whole grains are included in one of the food groups that form the main constituent of daily diet with recommendations of 4-8 servings per day, as recommended by the Malaysian dietary guidelines (2010). As tomorrow's doctors, it is crucial for medical students to have sound knowledge of healthy lifestyles as well as practice optimal dietary habits in order to maintain their own health and well-being.

There is lack of published evidence regarding the pattern of whole grain consumption among medical students in Malaysia. Very few studies have been conducted among medical students to evaluate the dietary pattern, life style, factors affecting eating habits, attitude on nutrition intake, obesity indices and relationship between dietary habits and prevalence of fatigue (Tanaka M et al,2008, Boo NY et al, 2010, Ganasegeran K et al,2012, Crowley J et al, 2014). However, many studies have been conducted to explore whole grain intake, its likeability and association with body mass index, amongst university students and school children (Bisanz et al, 2007, Rose N et al,2007, Mellette TJ,2015,Norimah AK et al, 2015)

Nonetheless, a number of studies have evaluated the nutritional knowledge, eating habits and obesity indices of university students in general (Ruka Sakamaki et al, 2005, Sen R, 2007,Yahia N et al, 2008,Gan WY et al, 2011,N.H.Abdull Hakim et al,2012, Aaron O. Amankwaa and Reginald A. Annan, 2014,Kiranni D et al,2008, Salameh P et al,2014).

The purpose of this study was to understand the whole grain consumption pattern amongst medical students and determine the factors influencing the practice of whole grain consumption.

Materials and Methods

Study design

A cross-sectional study was conducted in a private University in Malaysia amongst medical students from both pre-clinical and clinical phases of the course. The sample size calculated to using the formula given by Krejcie and Morgan(1970) was 178, out of which 151 students completed the study giving a response rate of 84.8%.Students were invited to participate in the study after explaining the purpose of the study and the method of completing the questionnaire. Written, informed consent was obtained from the students who volunteered to participate in the study. Confidentiality of collected information and anonymity of the participants was maintained throughout the conduct of the study.

Definition of terms

Pre-Clinical phase – Defined as students who were in Year 1 (Semester 1 & 2) and Year 2 (Semester 3 & 4).

Clinical phase – Defined as students who were in Year 3 (Semester 5 & 6), Year 4 (Semester 7 & 8) and Year 5 (Semester 9 & 10).

Breakfast consumers are defined as the respondents who took breakfast every day or > 3 times / week.

Breakfast skippers are defined as the respondents who took breakfast < 3 times / week and those who never had their breakfast.

Study instrument

We used a self – administered questionnaire comprising two sections. The questionnaire was circulated online using google forms to ensure completeness of information.

Section 1 included information on sociodemographic variables like age, gender, ethnicity, phase in the MBBS programme, parents' level of education, monthly household income and living arrangement. In this section, students were also asked to report their height (in centimeters) and current weight (in kilograms), based on which their body mass index (BMI) was calculated.

Section 2 comprised information regarding breakfast related habits, dietary habits with reference to the Malaysian food pyramid, whole grain consumption, its patterns and questions pertaining to assessing the students' knowledge (both perceptual and actual)and attitude towards whole grains. Assessment of the perceptual knowledge was based on the level of confidence in the topic of whole grains answered as 'Yes' and 'No'. Actual knowledge was tested by asking questions on whole grain anatomy, their benefits and food items containing whole grains.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 20.0 was used for data analysis. The BMI was calculated as weight in kilograms divided by height in square meters (kg/m2). In this study, based on the WHO BMI cut-offs for the Asian population, a BMI < 18.5 kg/m2 was categorized as underweight, 18·5–22·9 kg/m2 as the normal range, 23.0–27.4 kg/m2 as pre-obese, and >27.5kg/m2 as obese. The relationship between whole grain consumption and factors influencing it was assessed using the Chi square test. All reported p values were two-tailed and p values < 0.05 were considered statistically significant.Multiple logistic regression analysis was performed to determine the predictors(determinants) of the practice of whole grain consumption.

Results

Sociodemographic characteristics

Table 1 shows the sociodemographic characteristics of the participants. Majority of the respondents were in the age group of 21 to 23 years (104, 68.9%). There were 102(67.5%) females and 49 (32.5%) were males. The majority were Malays (70, 46.4%), followed by Chinese (51, 33.8%), Indians (15, 9.9%) and other ethnic groups (15, 9.9%). Thirty one students (20.5%) were from pre-clinical phase and 120 (79.5%) were from clinical phase.

Regarding mother's education level, 80 (53.0%) had completed tertiary education, 65 (43%) had high school or less and the rest 6 (4%) had non-formal education. For the father's education, 98 (64.9%) had tertiary education, 48 (31.8%) had high school or less and 5 (3.3%) had non-formal education. Majority of the students (89, 58.9%) reported a monthly household income more than RM 5000 per month and most of them (91, 60.3%) were living with their friends.

Table 1 Socio-demographic characteristics of respondents (n=151)

Characteristics	Number	Percentage
Age		
19 – 21 years	27	17.9
21 – 23 years	104	68.9
≥ 23 years	20	13.2
Gender		
Male	49	32.5
Female	102	67.5
Ethnicity		
Malay	70	46.4
Indian	15	9.9
Chinese	51	33.8
Others	15	9.9
Phase of MBBS programme		
Preclinical	31	20.5
Clinical	120	79.5
Mother's education		
Non-formal	6	4
High school	65	43
Tertiary	80	53
Father's education		
Non-formal	5	3.3
High school	48	31.8
Tertiary	98	64.9
Monthly household income(RM)		
≤ 3000	35	23.2
3001 – 4999	27	17.9
≥ 5000	89	58.9

Living arrangement		
Living alone	11	7.3
Living with friends	91	60.3
Living with family	49	32.4

Whole grain consumption and its pattern

Figure 1 illustrates the whole grain consumption of the participants in the last three months. The prevalence of reported whole grain consumption in the last three months was 51% (77).

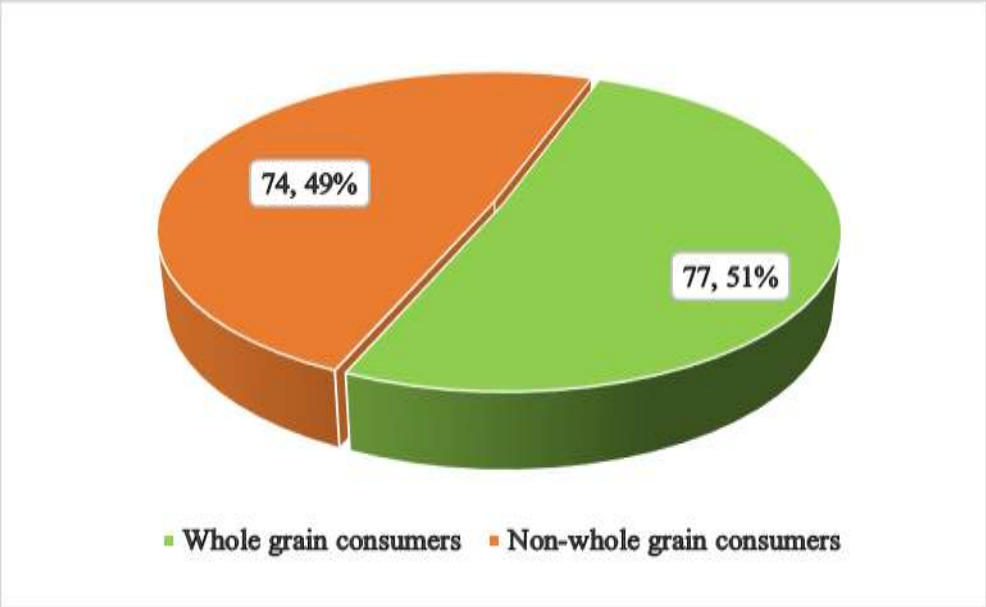

Figure 1 Prevalence of whole grain consumption amongst the participants

Figure 2 depicts the frequency of whole grain intake amongst the participants. Of the 77 participants who reported that they consumed whole grains, the proportion of those who consumed whole grains daily was 13 % (10). About 26% (20) ate whole grains >3 times a month, 23.3% (18) took > 3 times per week, 22% (17) had < 3 times per week and 15.6% (12) ate < 3 times a month.

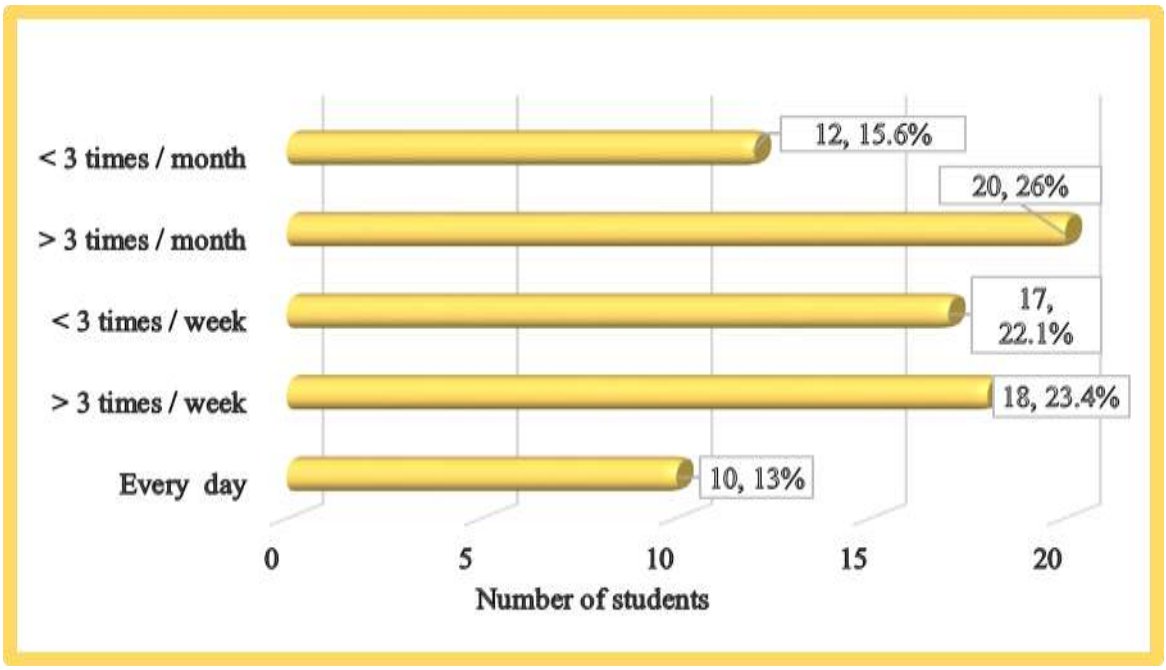

Figure 2 Frequency of intake amongst the whole grain consumers (n = 77)

Figure 3 shows the preferred whole grain choices of the whole grain consumers. Assessment of the type of whole grain consumed in the last 3 months revealed that 44.1% (34) consumed oat meal, 35.1% (27) took whole grain / whole meal bread, 10.4% (8) took brown rice and the rest 10.3% (8) ate either biscuits or bars enriched with whole grains such as granola bar etc.

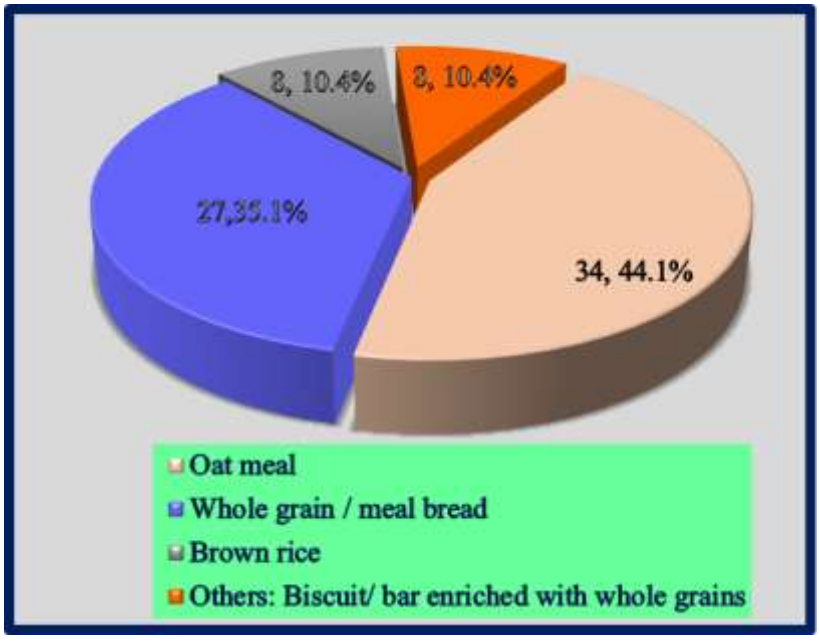

Figure 3 Preferred whole grain choices of the whole grain consumers (n = 77)

Comparison between socio-demographic factors and whole grain consumption

Table 2 presents the comparison of the socio-demographic factors with the habit of whole grain consumption.

As seen in table 2, a the proportion of whole grain consumption is higher amongst females (51,66.2%) than males (26, 33.8%) and those students in the age group of 21-23 years (47, 61%) compared to other age groups, however, these results were not statistically significant.

The practice of whole grain consumption was significantly higher amongst the Chinese students (33, 42.9%) than other ethnic groups such as Malay (25, 32.5%), Indian (10, 12.9%) and others (9, 11.7%). On the other hand, the practice of consuming non-whole grain foods was highest amongst Malay (45, 60.8%) and lower amongst other ethnic groups such as Chinese (18, 24.3%), Indian (5, 6.8%) and others (6,8.1%).

A higher proportion of students in the clinical phase were whole grain consumers (60, 77.9%) than the pre-clinical phase (17, 22.1%).

Respondents of mothers who had tertiary education (44,57.1%) had slightly higher rates of whole grain consumption compared to the respondents whose mothers had only high school or less (31, 40.3%) and non-formal (2, 2.6%) education. Meanwhile, the students whose fathers had tertiary level education (50, 64.9%) were mostly whole grain consumers in comparison with the students whose father had high school or less (25, 32.5%) and non-formal education (2, 2.6%).

Students who lived with their friends (41, 53.2%) preferred whole grain food slightly higher compared to others who stayed with family (30, 39%) and stayed alone (6, 7.8%). A majority of the respondents with mean household income ≥5000 RM (50, 64.9%) showed preference to whole grain foods.

However, the factors such as phase of MBBS programme, parental education, mean household income, and living arrangement did not reveal any statistically significant association with the practice of whole grain consumption.

Table 2 Comparison of the socio-demographic characteristics with the practice of whole grain consumption.

Socio- demographic characteristics		Whole grain consumption		Chi square value	P-value
		Yes (77)	No (74)		
Gender	Male	26 (33.8%)	23(66.2%)	0.124	0.725
	Female	51 (66.2%)	51(33.8%)		
Age	19 – 21 years	16 (20.8%)	11 (14.9%)	5.030	0.081
	21 – 23 years	47 (61.1%)	57 (77.0%)		
	>23 years	14 (18.1%)	6 (8.1%)		
Ethnicity	Malay	25 (32.5%)	45 (60.8%)	12.338	0.006
	Chinese	33 (42.9%)	18 (24.3%)		
	Indian	10 (12.9%)	5 (6.8 %)		
	Others	9 (11.7%)	6 (8.1%)		
Level of MBBS programme	Pre-clinical	17 (22.1%)	14(18.9%)	0.231	0.391
	Clinical	60 (77.9%)	60 (81.1%)		
Mother's	Non formal	2 (2.6%)	4 (5.4%)	1.546	0.462

education	High school	31(40.3%)	34 (45.9%)		
	Tertiary	44 (57.1%)	36 (48.7%)		
Father's education	Non formal	2 (2.6%)	3 (4.1%)		
	High school	25 (32.5%)	23(31.1%)	0.265	0.876
	Tertiary	50 (64.9%)	48 (64.8%)		
Living arrangement	Living alone	6 (7.8%)	5 (6.7 %)		
	Living with friends	41(53.2%)	50 (67.6%)	3.392	0.183
	Living with family	30 (39%)	19 (25.7%)		
Monthly household income(RM)	≤ 3000	13 (16.9%)	22 (29.7 %)		
	3001 – 4999	14(18.2%)	13(17.6%)	3.392	0.183
	≥ 5000	50 (64.9%)	39 (52.7%)		

Comparison between nutritional characteristics and whole grain consumption

Table 3 depicts the relationship between the various nutritional characteristics of the participants with the practice of whole grain consumption.

Regarding the breakfast consumption, regular breakfast consumers (37, 71.2%) had a significantly higher whole grain consumption compared to the breakfast skippers (10, 30.3%). The respondents who not only had food at home but preferred to prepare it themselves (45, 58.4%) took more whole grain foods compared to the ones who only had food at home (13, 18.2%) and those who had food outside (12, 15.6%).This difference was found to be statistically significant.

Based on the World Health Organization's BMI cut offs for the Asian population (Normal: 18.5 – 22.9 kg / m^2, Over weight: 23 – 24.9 kg / m^2, Pre-obese: 25-29.9 kg / m^2, Obese: ≥30 kg / m^2), our study revealed that only 48.3% (73) of students fell in the normal range. Around 16.6% (25) were underweight and, 22.5% (34) were in the pre-obese category and 12.6% (19) were in the obese range.

Comparison of BMI and whole grain consumption revealed that respondents with normal BMI were found to be slightly high in whole grain consumption (43, 55.8%) than non-whole grain consumers (30, 40.5%); Pre-obese and obese range showed not much difference. However, the data showed that a significantly greater percentage of the ones who were underweight did not seem to consume whole grains (19, 76%) compared with the ones who consumed whole grains (6, 24%).

Table 3 Comparison of the nutritional characteristics with the practice of whole grain consumption.

Nutritional characteristics		Whole grain consumption		Chi square value	P-value
		Yes	No		
Breakfast habit	Skip everyday	10 (30.3%)	23(69.7%)	20.30	0.00

	At least 3 times a week	49 (74.2%)	17(25.8%)		
	Consume everyday	37 (71.2%)	15(28.8%)		
Source of breakfast consumed	Prepare and eat at home	45 (68.2%)	21(31.8%)	7.66	0.02
	At home	13(61.9%)	8 (38.1%)		
	Outside	12(38.7%)	19(61.3%)		
Body mass index (kg / m2)	Underweight	6(24.0%)	19(76.0%)	9.49	0.02
	Normal	43(58.9%)	30(41.1%)		
	Pre-obese	17(50.0%)	17(50.0%)		
	Obese	11(57.9%)	8(42.1%)		

Knowledge, belief and attitudes towards whole grain consumption

Table 4 shows the comparison between students' perceptual and actual knowledge about wholegrains. Analysis of the perceptual knowledge was based on the level of confidence in the topic of whole grains answered as 'Yes' and 'No'. Of the 121 respondents who felt confident about their knowledge of whole grains, 98(81%) were able to correctly respond to the question on anatomy of whole grains whereas 23(19%) gave incorrect answer. Interestingly, of the 30 students who stated that they were not confident majority (23, 76.7%), gave a correct response to the question testing the actual knowledge.

Regarding the health benefits of consuming whole grains, 125 were confident while 26 were not confident. Comparison between perceptual and actual knowledge on this aspect revealed results similar to the earlier question.

Regarding the familiarity with the common whole grain foods consumed, of the 110 students who were confident, only 50% (55) were able to give correct response. Out of the 41 students who stated that they were not confident about the familiarity with common whole grain foods, 27(65.9%) gave an incorrect response. None of the differences between the perceptual and actual knowledge were statistically significant.

Table 4 Association of the students' perceptual and actual knowledge about whole grains.

Students' perceptual knowledge on whole grains		**Students' actual knowledge about whole grains**		**Chi square value**	**P-value**	**95% CI**
		Correct response	**Incorrect response**			
		Which of the following is NOT part of the edible whole grain kernel?				
I know what a whole grain is.	**Yes**	98 (81%)	23 (19%)	0.282	0.595	0.49 - 3.38
	No	23 (76.7%)	7 (23.3%)			
		Which of the following is a health benefit of eating whole grains?				
I know the health benefits of eating whole grain.	**Yes**	93 (74.4%)	32(25.6%)	0.020	0.888	0.41 –2.78
	No	19 (73.1%)	7 (26.9%)			
		Which of the following is NOT a whole grain?				

I am familiar with common whole grain foods.	**Yes**	55 (50%)	55 (50%)	3.025	0.082	0.91 –4.06
	No	14 (34.1%)	27(65.9%)			

As seen in table 5, assessment of the students' attitude towards whole grain consumption with the practice, reveals that there is a positive shift amongst participants who consume whole grains as well as those who do not.

Regarding the likeliness to adherence towards the food group in the Malaysian food pyramid, majority 108 (71.5%) expressed the wish to adhere while 43 (28.5%) said that they were less likely to adhere to the food group provided in the Malaysian food pyramid. However, we found significant differences in the attitude to adherence to food group in Malaysian food pyramid, amongst the whole grain consumers and the non-whole grain consumers (P=*0.004,95% CI 0.16 – 0.72*).

Majority of the students 117 (77.5%) expressed that they would include whole grains in their regular meals, but 34 (22.5%) said that they were not keen to change their regular food habit and move towards whole grains. Amongst the 74 respondents who did not consume whole grains, 70.2 % (52) have expressed their willingness to include whole grains in their regular diet while 22 (29.7%) still remain unchanged. This difference is statistically significant (P=*0.04, 95% CI 0.19 – 0.96*).

Out of the 151 respondents, 129 (85.4%) were willing while 22(14.6%) were not willing to encourage their family and friends to include whole grain into their meal. Even though majority of the respondents who were not whole grain consumers expressed more willingness to encourage their family and friends towards whole grain consumption, the difference was not statistically significant.

Table 5 Association of the students' beliefs and attitudes towards whole grain consumption.

Attitude towards whole grain consumption		Whole grain consumption		Chi square value	P-value	95% CI
		Yes	No			
Self-perception on likeliness to adhere to food group in Malaysian food pyramid	Not likely	14(32.6%)	29(67.4%)	8.17	0.004	0.16 – 0.72
	Likely	63 (58.3%)	45(41.7%)			
How likely are you to include more whole grains in your diet?	Not likely	12(35.3%)	22(64.7%)	4.32	0.04	0.19 – 0.96
	Likely	65(55.6%)	52(44.4%)			
How likely are you to encourage your family members or friends to include whole grains in your regular meals?	Not likely	8(61.9%)	14(38.1%)	2.20	0.13	0.19 – 1.26
	Likely	69(68.2%)	60(31.8%)			

Determinants of whole grain consumption

Table 6 shows the analysis of determinants or factors influencing the practice of whole grain consumption amongst the respondents by applying multiple logistic regression.

It is seen that ethnicity (P = *0.00, 95% CI 1.12 – 2.30,* breakfast habits (P = *0.00, 95% CI 1.39 – 3.63)* and source of breakfast consumed (P = *0.04, 95% CI 0.31 – 0.90)* are significantly associated with the practice of whole grain consumption.

Table 6 Multivariate logistic regression analysis of factors influencing whole grain consumption. (Significant)*

Variable	Standard error	Significance	Odds ratio	95% CI
Age	0.29	0.64	1.14	0.60 – 2.03
Gender	0.35	0.72	0.88	0.44 – 1.75
Ethnicity	0.18	0.00*	1.60	1.12 – 2.30
Level of MBBS programme	0.40	0.63	0.80	0.37 – 1.82
Monthly household income	0.19	0.06	1.44	0.97 – 2.13
Mother's education	0.28	0.23	1.41	0.80 – 2.48
Father's education	0.29	0.86	1.05	0.58 – 1.87
Living arrangement	0.28	0.19	1.44	0.87 – 2.53
Breakfast habit	0.24	0.00*	2.24	1.39 – 3.63
Source of breakfast consumed	0.29	0.04*	0.56	0.31 – 0.90
Body mass index	0.19	0.10	1.30	0.94 – 1.95
Self -perception of likeliness to adhere to food groups	0.41	0.06	2.14	0.95 – 4.18
Likely to encourage family and friends	0.47	0.14	2.0	0.79 – 5.12

Discussion

The prevalence of whole grain consumption amongst medical students was 51%, which is slightly less compared to prevalence (60%) of whole grain consumers among medical students in Karachi as reported by Nisar N *et al.* (2000).However, a study conducted among University students of Nebraska by Rose *et al*. (2007) found that 86% of students reported eating whole grains which is high compared to our results.

However, there is lack of evidence from studies conducted on medical students regarding the information on their pattern, frequency, preferred food and the determinants that may or may not influence whole grain consumption. Although the study done by Nisar N *et al.* (2000 on Karachi medical students reported the prevalence rate.In our study we tried to explore in detail the whole grain food pattern and its determinants. Accordingly, we found that the main sources of whole grains in medical students to be oat meal and whole meal bread; these food items are ready-to-eat food and have less preparation time and can be easily consumed at home. These findings were similar to those in the study conducted by Rose *et al*. (2007). The same study also reported that 64% of the whole grains consumers did not consume an average of at least 3 servings of whole grains per day, as per the RDA. In comparison, to this value our study shows a very low percentage, as majority of the whole grain consumers did not consume whole grain every day.

Boon NY *et al*.(2010) found that only slightly more than half (55.0%) of the students were in the normal weight category, while the rest were either overweight/obese (30.1%) or underweight (15.0%) which are

similar to our results wherein 48% were in the normal weight category, while rest were either pre-obese/obese (35.1%) or underweight (16.6%).

An individual's choice of food is being influenced by many interrelating factors. The factors influencing food choice are categorized as those related to the food, to the individual making the choice and to the external economic and social environment within which the choice is made (European Food Information Council 2004). A review of EUFIC reports that even though the key driving force to eat is hunger, there are some other factors that influence the food choice; biological determinants such as hunger, appetite, taste; economic determinants such as cost, income, availability; physical determinants such as access, education, skills (e.g. cooking) and time; social determinants such as culture, family, peers and meal patterns; psychological determinants such as mood, stress and guilt; behavioural determinants such as attitudes, beliefs and knowledge about food[32].

Subsequently, to evaluate the factors that influence whole grains as food choice in this study population (medical students), we have discussed and analyzed under different food determinant below.

Economic determinants

One of the primary determinants of the food choice is cost of the food and the affordability depends mainly on the income and socio-economic status. In our study, we assessed the affordability, socioeconomic status and parental education; they did not seem to influence whole grain consumption, although we did not assess the influence of cost of the food in this study.

Accessibility to shops is another important physical factor influencing food choice, which is dependent on resources such as transport and geographical location. The study conducted by Rose et al. (2007), attributed the high percentage of whole grain consumption to the dining centers within the campus that served mainly whole grain foods. A similar finding was reported another study that increases the whole grain consumption is influenced by the dining centers in the campus conducted by Bisanz et al. (2007). Our study included pre-clinical group at lakeside campus, a locality that had easy access to a variety of shops/supermarket and food outlet that served whole grains and clinical group at a sub-urban area that had food outlets serving food which include local, traditional food and less of whole grain and few shops/super markets that were far away. However, we did not find any influence of accessibility on the practice of whole grain consumption.

Physical determinants

Kearney *et al*. (2000) proved that level of education to influence the dietary behaviour during adulthood. Our study showed no significant influence of parents' education on the practice of whole grain consumption in their children. Though the study included the students from different level of the MBBS programme, the data showed no significant influence of the respondent's level of education on their practice of whole grain consumption. So, our study shows there is no influence on the level of education (self and parental) with the practice of whole grain consumption.

Cooking skills, method involved and preparation time are one of the important physical determinants of food choice. This study showed that respondents who prepared and had food at home were more likely to be whole grain consumers. The observation of the different choice of whole grain food consumed by the students (oat meals 44.1% (34), 35% (27) whole grain / whole meal bread, 10.3% (8) brown rice and the rest 10.3% (8) consuming either biscuits or bars enriched with whole grains such as granola bar etc.). This finding helps us to understand that they preferred food that mostly requires less cooking time or instant ready-to-cook food and also think that they have less time for food preparation. Lappalainen R *et al*. (1997) reported lack of time as a frequent attribute for not following nutritional advice, particularly by the young and well educated. They also addressed that the issue of lack of time is met with a shift in the fruit and vegetables market, from loose to pre-packed, prepared and ready-to-cook products.

Social determinants

Our study revealed a significant finding with the practice of whole grain consumption and the ethnic or cultural background. We found that the Chinese students were the highest among the whole grain consumers and Malay were the highest in the non-whole grain consumer group. This shows the influence of the cultural background and tradition on the food intake reported by a theory of planned behaviour exhibited by the students. Ajzen I & Fishbein M (1980) and Ajzen I (1988) have stated that the theory of reasoned action or its extension and the theory of planned behaviour, have been used to help explain as well as predict the intention of a certain behaviour. This model proposes that an individual's behaviour intention is jointly derived from three components; attitudes, perception of social pressure to perform the behaviour and perceived control over the behaviour (Shepherd R 1997, European Food Information Council 2004)

It has been shown that social factors impact an individual's or a group's eating behaviour directly (buying food) or indirectly (learning from peer's behaviour), either consciously (transfer of belief) or sub-consciously (Ajzen I & Fishbein M 1980) Family is widely recognized as being significant in food decisions. Research shows the shaping of food choices taking place in the home. Because family and friends can be a source of encouragement in making and sustaining dietary change, adopting dietary strategies which are acceptable to them may benefit the individual whilst also having an effect on the eating habits of others (Anderson AS *et al*.1998) However, our study shows no significant influence of the living arrangements (alone, with family or with peers) with the practice of whole grain consumption.

Behavioural determinants

We found that even though the students had high confidence level on the nutritional knowledge about the basic information on whole grain, the common whole grains available and its health benefits, this did not influence them to consume whole grains. Our findings are similar to those in the study conducted by De Almeida MDV *et al*. (1997) which suggested that that nutritional knowledge and good dietary habits are not strongly correlated.

A significant proportion of the respondents in our study who reported that they adhere to the food groups in the Malaysian pyramid were more likely to be whole grain consumers In our study we found a significantly positive attitude amongst majority of them who did not consume whole grains at present, and expressed their willingness to include whole grains in their regular diet whilst a significant percentage still remain unchanged. Gibney MJ (2004) reported that if people believe that their diets are already healthy it may be unreasonable to expect them to alter their diets, or to consider nutrition/healthy eating as a highly important factor while choosing their food. Although these consumers have a higher probability of having a healthier diet than those who recognize their diet is in need of improvement, they are still far short of the generally accepted public health nutrition goals. It is also unlikely that these groups will be motivated further by dietary recommendations.

Conclusion

Our study revealed that almost half of the medical students are whole grain consumers, but only a small percentage consumed whole grains every day. Even though there are many factors that influence the food choice, we found a striking influence of ethnic background, cooking skills and method, self-perception to adhere to food groups in the Malaysian food pyramid.

The practice of whole grain consumption was more prevalent among the Chinese, the ones who prepared and had food at home and the ones who believed they adhere to the food groups in Malaysian food pyramid. Other important food determinants such as affordability, accessibility, education, knowledge did not seem to influence whole grain intake. Majority of the Malay students were not whole grain consumers which can be

attributed to the strong cultural and traditional values influenced within the community, even in medical students.

Further, this study highlights and stresses the consistent increase in the status of being underweight among the medical schools over the past decade. Nonetheless, our study would like to put forth a hypothetical fact of consumption of more non-whole grain foods can present with population with underweight BMI, which gives scope to further research.

Finally, dynamic approaches need to be formulated that would encourage the medical students to have regular whole grains in their food and lead a healthier way. In order to achieve this goal, a multi-dimensional and multi-sectoral approach needs to adopted that should involve the

- education system to include whole grains as an important module in nutrition and its basic knowledge and health benefits emphasized not only in college schools but school level as well.
- health system to introduce a unit whose main objective must be to organize campaigns to target groups to encourage them to become whole grain consumers, and
- the mass media to disseminate information to the masses regarding health eating and the significance of whole grains.

However, further studies need to be conducted to investigate in detail the biological, psychological, motivating and hindering factors that influence whole grain consumption among medical students.

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NUTRITION AND EXERCISE HABITS AMONGST MEDICAL STUDENTS IN A PRIVATE UNIVERSITY IN MALAYSIA

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Abstract: Obesity is a major risk factor for various non-communicable diseases. The prevalence of obesity is on the rise, especially in younger populations. Improper eating patterns coupled with lack of physical activity have largely contributed to this problem. Medical students are exposed to social, cultural and study related stress during their course period. These factors influence their patterns of eating and physical activity. A cross sectional study was conducted among medical students of Taylors' University to study their nutrition habits and exercise pattern. A total of 159 medical students participated in the study. It was found that 69.8% of students had normal BMI, 14.5% of students were underweight and 15.7% students were overweight or obese. It was observed that the prevalence of obesity was more in male students as compared to female students. Out of 159 students, 15.7% of students skipped breakfast. The major food items in the diet was a combination of rice, egg, meat and vegetables. It was also noted that 42.1 % of the students consumed soda drink at least once a week. Majority of our students were involved in intentional physical activity of some kind and they were aware about the importance of both good nutrition and physical activity in maintaining good health.

Keywords: obesity, medical students, exercise, nutrition

Introduction

Obesity is excessive accumulation of fat in the body. The trend to become obese is now rising in the low and middle income countries especially in the urban areas. According to the national health and morbidity survey, the percentage of obesity in Malaysian adults is 29.71% (Abdull Hakim *et al*., 2012). According to WHO, by 2020, non-communicable diseases will account for 60% of the global disease burden and majority of the diseases will be linked to obesity either directly or indirectly (WHO NCD Surveillance Strategy, 2017). Physical activity and healthy diet play an important role in prevention of these non-communicable diseases and obesity.

Medical students are often exposed to academic, social and cultural stress in their early years of career (Abdus Salam *et al,*2015*)*. These factors influences their dietary and exercise patterns for the worst and if these unhealthy habits, are not detected, & corrected in time they usually persist and get exaggerated in adult life giving rise to plethora of non-communicable diseases including obesity. On the other hand medical students are supposed to have a sound knowledge of nutrition and exercise. However, in terms of maintaining their health, there is no concrete evidence to indicate that this knowledge is translated into practice among the health professionals (Wiskar K, 2012). A physically unfit junior doctor is a burden on the health system of the country as the person will find it difficult to fulfill the increasing demands of his profession. The research was designed to evaluate the nutrition pattern and exercise habits amongst medical students of a private university in Malaysia.

Materials and methods

A cross-sectional study was conducted in a private University in Malaysia amongst medical students.

The sample size was calculated using the formula given by Krejcie and Morgan (1970) was 178, out of which 159 students completed all aspects of the study giving a response rate of 89.3%.Students were invited to participate in the study after explaining the purpose of the study. Written, informed consent was obtained from the students who volunteered to participate in the study. Confidentiality of collected information and anonymity of the participants was maintained throughout the conduct of the study

Study instruments

A self- administered questionnaire was developed to assess the dietary characteristics as well as the level of physical activity amongst the participants. Students' demographic and anthropometric details were also obtained along with information on their nutrition and exercise pattern. Anthropometric measurements of weight, height and waist circumference were conducted. Weight was measured in kilograms using standard digital flat weighing scale in standing position with no shoes and rounding it to next 0.1 kg for simplicity. Height and waist circumference was measured using standard measuring tapes. Intentional physical activity was divided as light (walking etc.), moderate (swimming, jogging, cycling etc.) and heavy (weight training, running etc.) for at least 30 minutes on most of the days of the week.

The body mass index (BMI) was calculated as weight in kilograms divided by height in square meters (kg/m^2). In this study, based on the WHO BMI cut-offs for the Asian population, a BMI < 18.5 kg/m^2 was categorized as underweight, 18·5–22·9 kg/m^2 as the normal range, 23.0–27.4 kg/m^2 as overweight.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 21.0 was used for data analysis. The parameters of age, height, weight, BMI and waist-hip ratio were analysed using mean ± S.D. The association between BMI, gender, consumption of carbonated drinks, junk food & skipping of breakfast was determined using the Chi-square test. All reported p values were two-tailed and p values < 0.05 were considered statistically significant.

Results

Out of the 159 students who participated 58 students (36.5%) were males and 101 (63.5%) were females. As seen in table 1, the average age of male students who participated in the study was 23.2 ± 1.7 years and for female students it was 23 ± 1.5 years. The average height of the male students was 182 ± 0.5 cm and for females was 165 ± 0.9 cm. The average weight of male students was 76 ± 0.8 kg and that of the female students was 59 ± 1.2 kg. The average waist to hip ratio was 0.88 ± 0.01 in males and in females it was 0.80 ± 0.06. The average BMI for male students was 22.8 ± 0.4 kg/m^2 and that for female students was 20.9 ± 0.3 kg/m^2. The average caloric intake was 2244.6 ± 124.1 for males and 1595.2 ±42.8 for females.

Table 1 Characteristics of the respondents (n=159)

Analyzed parameters	Gender	
	Male (n = 58) Mean ± SD	Female (n = 101) Mean ± SD
Age in years	23.2 ± 1.7	23 ± 1.5
Height in cm.	182 ± 0.5	165 ± 0.9

Body weight in kg.	76 ± 0.8	59 ± 1.2
Waist hip ratio	0.88 ± 0.01	0.80 ± 0.06
BMI in kg / m^2	22.8 ± 0.4	20.9 ± 0.3
Average daily caloric intake	2244.6 ± 124.1	1595.2 ±42.8

Table 2 shows the dietary habits of the participants. Majority of the participants (134, 84.3%) consumed breakfast daily and took meals more than 3 times a day (86, 54.1%).About 30.2% had snacks less than three times per week and 69.8% took snacks daily. Many consumed junk food less than three times a week(103,64.8%) whereas 92(57.9%) consumed soda/carbonated drinks less than three times per week. Most of them took a carbohydrate rich diet including rice, bread and noodles (89,56%) while only 34(21.4%) took a variety of foods in their daily diets.

Table 2 Dietary characteristics of the respondents (n=159)

Characteristics		Number	Percentage
Daily breakfast	Yes	134	84.3
	No	25	15.7
Frequency of daily meals	Less than 3 times	73	45.9
	3 or more times	86	54.1
Frequency of consuming snacks	Daily	111	69.8
	Less than 3 times a week	48	30.2
Weekly consumption of junk food	Less than 3 times	103	64.8
	3 or more times	56	35.2
Weekly consumption of carbonated drinks	Less than 3 times	92	57.9
	3 or more times	67	42.1
Main type of food consumed	Mainly meat	28	17.6
	Rice, bread, noodles	89	56.0
	Mainly vegetables	8	5.0
	Variety of food in balance	34	21.4

As seen in Figure 1, of the 19 students who were underweight,13(68.4%) were females and 6 (31.6%) were males. Majority of the students in the normal category were females (80,69.6%) whereas 68% (17) were males in the overweight/obese category.

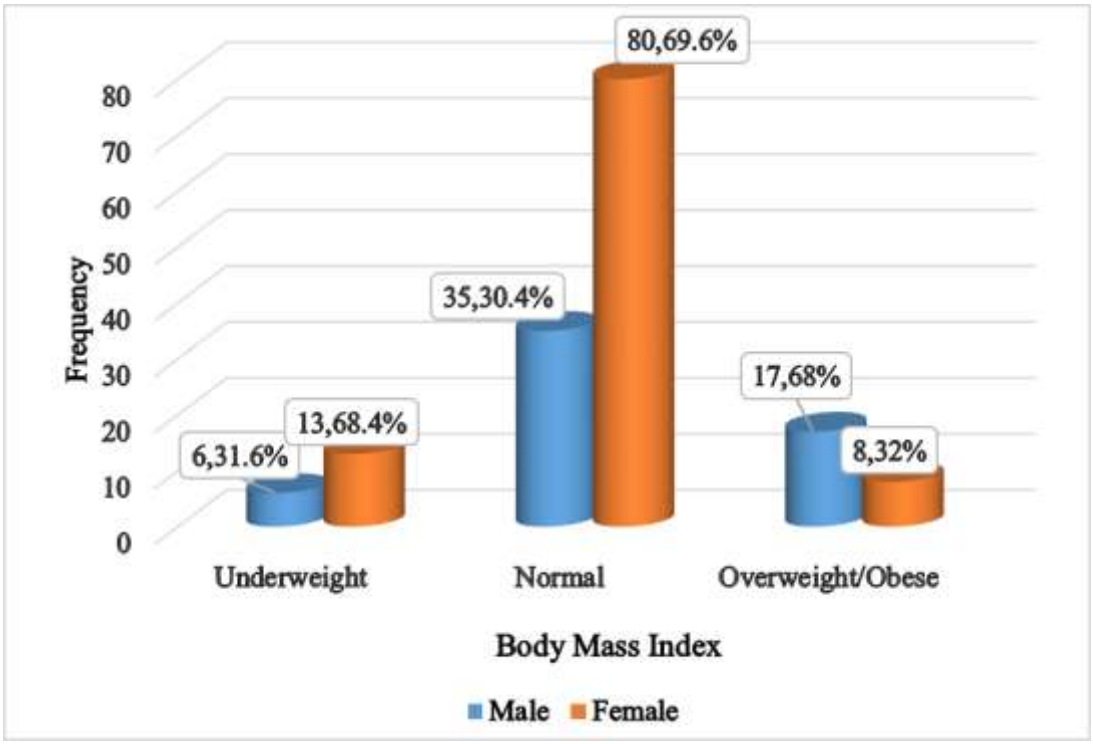

Figure 2 Body mass index distribution amongst the participants by gender

Table 3 shows the association between gender and the dietary habits of the participants. As seen in the table, more females (15, 60%) than males (10,40%) skipped breakfast every day. The consumption of carbonated drinks was significantly higher amongst females, more specifically for the frequency of more than 3 times a week (P=0.01).The consumption of junk food more than times a week was significantly higher among females. (P=0.00).

Table 3 Association of dietary characteristics of the respondents and gender (n=159)

Dietary characteristics		Gender			Chi square value	P-value	Significance
		Total	Male	Female			
Breakfast consumption	Skip everyday	25	10 (40%)	15 (60%)	1.16	0.55	NS*
	At least 3 times a week	74	25 (33.8%)	49(66.2%)			
	Consume everyday	60	23(38.3%)	37(61.7%)			
Consumption of carbonated drinks	Less than 3 times a week	92	41 (44.6%)	51 (55.4%)	6.16	0.01	S
	3 or more times a week	67	17 (25.4%)	50 (74.6%)			
Consumption of junk food	Less than 3 times a week	103	51 (49.5%)	52(50.5%)	21.5	0.00	S
	3 or more times a week	56	7 (12.5%)	49 (87.5%)			

*NS = not significant, S = Significant

The comparison of BMI with dietary habits is shown in table 4. It is observed that majority of students who consume breakfast at least 3 times a week have a normal BMI (58, 78.4%) and many of those who consume it every day have a normal BMI (49, 81.7%).Breakfast consumers have a significantly higher proportion to have normal BMI. More number of students who skip breakfast are found to be in the overweight category (11, 44%). Those students who consume carbonated drinks less than three times a week are more likely to have a normal BMI(78,84.8%).There is a significantly higher proportion of students who take carbonated drinks more than 3 times a week who are overweight/obese(20,29.9%).Similar findings are obtained for the weekly consumption of junk food.

Table 4 Comparison of dietary characteristics with the body mass index of the respondents (n = 159)

Dietary characteristics		Body mass index			Chi square value	P-value
		Underweight	Normal	Overweight / obese		
Breakfast consumption	Skip everyday	6 (24%)	8 (32%)	11 (44%)	25.6	0.00
	Atleast 3 times a week	8(10.8%)	58 (78.4%)	8(10.8%)		
	Consume everyday	5(8.3%)	49(81.7%)	6(10.0%)		
Consumption of carbonated drinks	Less than 3 times a week	9(9.8%)	78 (84.8%)	5 (5.4%)	20.2	0.00
	3 or more times a week	10 (14.9%)	37 (55.2%)	20(29.9%)		
Consumption of junk food	Less than 3 times a week	11(10.7%)	84 (81.6%)	8(7.8%)	15.6	0.00
	3 or more times a week	8(14.2%)	31 (55.4%)	17 (30.4%)		

Figure 2 depicts the status of physical activity amongst the respondents. Out of the 159 participants, 110(69%) are involved with some or other form of physical activity. However, 49(31%) students were not physically active.

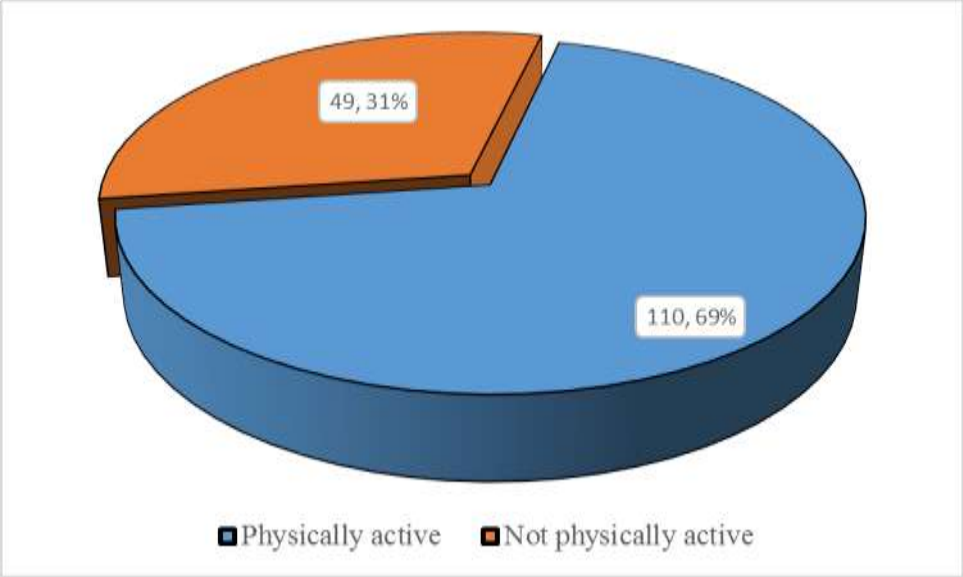

Figure 3 Status of physical activity amongst the participants (n = 159)

Of the 110 students who were physically active, majority (69.1%, 76) practiced light activity exercises. Moderate activity was practiced by 20.9% (23) students. Only 10% (11) of the students reported the performance of heavy activity.

Table 5 shows the relationship between the status of physical activity and the BMI of the participants. For comparison, students were categorized in to two categories, those with BMI < 23 kg / m^2 and those with BMI ≥23 kg / m^2.

Table 5 Association of physical activity status and the BMI (n=159)

Status of physical activity	Body mass index (kg / m^2)		Chi square value	P-value
	< 23	≥ 23		
Active	94 (70.1%)	16 (64.0%)	0.37	0.54
Not active	40 (29.9%)	9 (36.0%)		

As seen in the table, amongst the students with BMI < 23 kg / m^2, majority (70.1%, 94) are physically active and the same is true for those with a BMI ≥23 kg / m^2.There is no association found between the physical activity status and the BMI of the participants.

The comparison of the type of physical activity with the BMI of the respondents is seen in table 6.There is a significant difference in the BMI amongst the different types of activity (P = 0.01)

Table 6 Association of type of physical activity and the BMI (n=110)

Type of physical activity	Body mass index (kg / m^2)		Chi square value	P-value
	< 23	≥ 23		
Low activity	68(89.5%)	8(10.5%)	9.17	0.01
Moderate activity	18(78.3%)	5(21.7%)		
Heavy activity	6(54.5%)	5(45.5%)		

Discussion

Majority of medical students who participated in the study had normal BMI. Few students were in both obese and underweight category. This is similar to findings of a study done by N.H.Abdull Hakim *et al.* (N.H.Abdull Hakim *et al.,* 2012) on nutritional status of students in various universities in Selangor, Malaysia. The overweight cum obese category comprised of 15.72 % of student population under study and underweight category measured around 12 % of the participants. These findings were comparable to results of the study done by N.H.Abdull Hakim *et.al.* (N.H.Abdull Hakim *et al.,* 2012*)* on nutrition status of students in various universities in Selangor, Malaysia.

We wanted to explore nutritional & eating habits of the medical students and for which we considered skipping of breakfast as an important tool for assessment. Breakfast is an important meal of the day and is usually consumed during the rush hour of morning. A student who consumes regular breakfast values the importance of eating food at the right time and in general shows the attributes of good nutritional & eating behaviour.A significant number of students in our study either skipped or were irregular at eating breakfast. Our findings were similar to study done by N.H.Abdull Hakim *et.al.* (N.H.Abdull Hakim *et al.,*2012) on nutritional status of students in various universities in Selangor, Malaysia. Within the category of the students who skipped breakfast the association with overweight and obesity was clearly established in our study. Similar findings were previously observed by Yoko Watanabe *et.al (*Yoko Watanabe *et al.,*2014) in which skipping breakfast was correlated with obesity.

Consumption of carbonated drinks is increasing day by day. Easy availability of carbonated drinks at a relatively inexpensive price is the trend these days. Carbonated drinks are known to contain a lot of sugar in it and frequent consumption is a major risk factor for obesity and related disorders. In our study, we found out that a significant number of number students were drinking carbonated drinks on a daily basis and it was also observed that female students were consuming carbonated drinks significantly more than male students on an average within a week. This finding of our study is in line with the study done by Likus W *et al*. (Likus W *et al*., 2013) on dietary habits and physical activity in students from the medical university of Silesia in Poland where 39 % of the students consumed carbonated drinks on a daily basis. We also found an association between drinking of carbonated drinks frequently and obesity. Our findings are in contrast to the findings observed by Katzmarzyk P T *et.al. (*Katzmarzyk P T *et.al.,*2016) in a multinational study about relationship between soft drink consumption and obesity in 9–11 years old children.

Eating junk food either regularly in a week was more common in medical students of our university. This finding is similar to findings of a study done by Abdel-Hady Abel Fattah El-Gilany *et al*.(Abdel-Hady Abel Fattah El-Gilany *et al.,* 2016) on consumption and knowledge of fast/junk foods among medical students in Egypt where more than half of students (51.0%) prefer junk food to save time and save money and find such foods more tasty to eat. In our study it was also noticed that male students preferred to eat junk food more as compared to female students. Students on an average maintained their BMIs in normal limits in spite of consuming junk food frequently. There are other factors associated with obesity like genetic makeup and activity levels of an individual. Eating junk food is only the tip of the iceberg as one needs to take into account many other factors related to the disease when any association needs to be proven.

Exercise is one of the important determinant of healthy and disciplined life style. Exercise also leads to a disease- free life for an individual. It was observed that majority of students were involved in some level of intentional physical activity and they had a normal BMI. Paradoxically, few students despite of being physically active were having a higher BMI and physically non active ones were observed to have normal BMI. These findings were similar to findings by Riyaz Shaik Shaik *et al*.in a study among school going adolescents in Hyderabad (Riyaz Shaik Shaik *et al.*2016). These findings of our study suggest that obesity is a multifactorial causation and though direct association between sedentary life style and obesity is established long ago the approach to understanding obesity must be holistic.

Conclusion

Our study concludes that the medical students at our University are finding it challenging to maintain a balanced nutritional pattern. However, majority of the students are involved in intentional physical activity in spite of heavy work load and academic commitment. Our study could establish the relation between skipping of breakfast and obesity. Majority of our medical students were aware about the importance of healthy nutritional, eating habits and regular exercise in maintaining good health but failed to adopt healthy lifestyle given the commitment towards medical course.

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HAVE THE ADOLESCENTS BE POWERFUL IN THE IMPLEMENTATION PROGRAM FOR THEM

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Abstract: The population of adolescents in Indonesia is almost 30% of the total population of Indonesia. This figure is quite large as a potential asset for the country. Today the percentage of adolescents who engage in high-risk behavior is quite high. Data of Health Ministry that show the number of HIV cases in productive age is increasing from year to year. Therefore, youth health programs are a national priority. Many teenage health programs have been conducted from various sectors. This study aims to identify adolescent perceptions on the implementation of youth health programs. Teenagers, in this case, are grouped into 2, namely as a peer educator and as the target program (user). This study looked at adolescent perceptions in relation to the strategic steps of adolescent health programs. This research is descriptive research by using a qualitative method, subjects of research is adolescent stakeholder which is consisting of school's teenagers, adolescent community, mosque teenagers and street teenagers. Data were collected through interviews with 10 peer educators (schools and communities), interviews of 2 teenage street users, 3 teenage mosque interviews, 24 FGD participants (2 FGDs in School and 2 FGDs in the community). The results showed that the adolescent group of providers and users are still categorized as 'observers' (support, weak power, and passive involvement) in the implementation of the strategic steps of youth health programs. There are even teenagers from community youth groups who have not been exposed to teenage health programs. Adolescent health programs should involve teenagers from planning until evaluation. Therefore, the existing program suits needs and abilities of adolescents (from by for teenagers).

Keywords: adolescent, health, program

Introduction

Teenagers in Indonesia are very large, almost twenty-seven percent (26.9%) of the population of Indonesia is classified as a teenage age group. According to the 2010 population census of Indonesia, shows that the age group is 30 percent of the population. The number of adolescents increased from 35 million in 1980 to more than 42.4 million in 2010 (BPS 2010; BPS 2004, 2007a; BPS 2007b). A large proportion can be used as an asset opportunity for the nation, but if the management is not optimal it will become a serious problem, especially health problems.

Today many of the risk behaviors cause health problems. The fact is the increasing number ofadolescents with HIV-AIDS, Sexually Transmitted Infections, unwanted pregnancy and drug abuse (Ministry of Health, 2016). According to data from BAPPENAS, UNFPA and BKKBN it is known that half of the 63 million people aged 10 to 24 years in Indonesia are vulnerable to unhealthy behavior. One of the most prominent among teenagers today is the issue of sexuality (pregnant out of wedlock, abortion, infected sexually transmitted diseases) as well as drug abuse (BKKBN, 2010). Meanwhile, from the results of several surveys from the Ministry of the Republic of Indonesia on research in 2014 it can be seen that adolescent knowledge about reproductive health is still low. Adolescents are faced with difficult times in development both mentally, socially, and culturally. This can be seen from the disharmony, emotional disturbance, and behavioral disorders as a result of the pressure experienced by adolescents. The existence of unconformity due to the

changes that occur in itself and due to changes in the environment and social life and families that rarely support youth to grow and develop.

The handling of adolescent problems in Indonesia has been pursued although there are still many shortcomings. Strategies to implement youth health policies are undertaken by the governments through cross-sectoral cooperation, basic health care and referrals, and intervention patterns. This strategy has been adjusted to the needs of the stage of youth growth process (Department of Health RI, 2003). Hence the need for a synergic health program from various sectors.

The strategy set to implement the policy is one of them is the implementation of adolescent health coaching conducted through the involvement of adolescents effectively and efficiently so as to achieve optimal results. Successful implementation of the program is influenced by the involvement of all parties, ranging from government as policy makers, program implementers, community and youth (Department of Health RI, 2005a). Adolescents should be fully involved in program implementation. Therefore, research that aims to identify the involvement of adolescents in the implementation of adolescent health programs through the method of stakeholder analysis. Stakeholder analysis aims to determine the extent to which stakeholder involvement and commitment, responses and stakeholder expectations on a teenage health issue will bring about changes to the problem. The result is a mapping, then will be reviewed stakeholder perceptions of the level of influence of power (power), the level of involvement (interest), and attitudes (attitudes) linked strategic steps of youth health programs

Method

The research used the qualitative descriptive method. The research subject is adolescent as user and provider. Teenagers as providers consist of peer educator schools, Peer Educator Youth Homes, peer educator Information and Counseling Center (PIK), youth peer educator mosque, and youth street volunteers. Stakeholder as a user consists of OSIS SMA, OSIS SMP, Chairman of Karang Taruna Kota Surabaya, Teenage School, Community Youth, Teenage Pondok Pesantren, and Street Teen Representative. Data collection was obtained directly from the research location (Kota Surabaya) through in-depth interviews and FGDs between researchers and relevant stakeholders. While data processing in this research is using the qualitative approach which in principle process by analysis of description (content analysis).

Result

Subject Characteristics

Tabel 1. Subject Characteristic Based on Age, Sex, Education Level

Variable	Number of Respondents (Interview)	Number of Respondents (FGD)
Age Category (years)		
10-14	3	9
15-20	11	8
21-24	1	7
Total	15	24
Gender		
Male	7	13
Female	8	11
Total	15	24
Education Level		

Uneducated	2	0
Elementary School	1	0
Junior High School	5	6
Senior High School	4	9
College	3	9
Total	15	24

Teenagers as a user are teenagers who become the target of the program, covering adolescent school and adolescent outside school (Street Children, Pondok Pesantren, Karang Taruna, student). The teenager has a position as Chairman of OSIS, Vice Chairman, and coordinator. Groups of users who participated in the FGD consisted of teenagers, community youth, and adolescent pesantren. Teenagers as providers in this study consisted of Peer Educators, PIK, PE Community, PE teenagers, and Street Boy Volunteers Foundation "X". Based on this research can be seen that most stakeholders in a group of providers have a position as 'observers'. Most informants in this stakeholder group support, have a weak and passive influence on program implementation.

PIK Kota is a communication container of PIK-KRR all districts in Surabaya City. Based on the results of the interview it is known that the forum is conducting community-based youth services, including health information services, counseling, entrepreneurship. Actually, this forum has a 'rescue' position in implementing the program strategic steps. This is because of the forum supports, has strong influence and is actively involved in identifying problems in adolescents from all sub-districts, policy advocacy, coordination, provision of IEC, counseling. However, the implementation of monev, recording, and reporting of this forum has a position as 'observer' this is because this forum is still new this year and so far this forum requires evaluation not formally but made the format by from and for adolescents. This can be shown from the following statement :

"...so sar we have monitoring and evaluating but it is just discussions, we don't want it to be formal, there is a specific format report, we make it ourselves, we fill it ourselves..."

"...to know the result whether it is visible or not, the active year is tis year so it's never been done, we never ordered to make reports..."

Peer Educator at school is a school adolescent who gets peer educator training from Health Department. PE's position is as 'observers' in implementing the program. This is because PE already knows and support the implementation of the program but PE has not been involved in the implementation. This can be shown from the following interview :

Socialization question: *"...yes, miss, I know if there is counseling in the Puskesmas, I know it from the training at Dinas Kesehatan but after that I've never asked, I'v prompted to make some promotions to friends..."*

Peer Education question*: "...peer educators are so important, so I can tell my friends which one is right, when a friend asks I can answer it ..."*

"...Puskesmas have come to give counseling, but Puskesmas never tell us about the program..."

Monitoring and evaluating question: *"...We PE friends are never again contacted by Dinas Kesehatan, their advice to not having sex before marriage..."*

Last Stakeholder provider is Teenage Street Volunteers. These volunteers have a position as 'observers' in the implementation of health services in street adolescents. Although these volunteers are not yet aware of the

program, these volunteers have realized the importance of adolescent reproductive health services in street adolescents. This is because volunteers have identified the condition of street adolescents. This can be shown from the following interview:

"...Indeed very necessary for the condition of street adolescents…"

"...we went to observed, a 6 years old children is already like an adult, we've also met a girl around 12 years old asking for money to Daihatsu driver, but there is a condition, she have to agree that he want to touch their genitalia, she agreed, their mind was already sets that the important things is to gain some money…"

"...which we know that tere are street teenagers that down to the road by themselves wanna be free because ther is a problem with their family, they were sent by their parents may be due to their parents mindset who just rely on their child, there is the coordinator when the money is collected they must hand over the money…"

"...Such counceling also needs to be given to street adolescents, the assosiaciont of the street adolescents is very risky, free sex, even I know there is 4-year-old boy is swiping his genitals with his friend…"

Teenagers as users in this study consisted of OSIS SMP, OSIS SMA, Karang Taruna Kota, and the coordinator of street adolescents. Based on this research can show that user stakeholder group has the position as 'observer'. All informants in this stakeholder group support in the implementation of the program but the influence of these stakeholders is still weak and their involvement is still passive.

Stakeholder users of school adolescents have a position as observers in strategic steps of advocacy, coordination, preparation, external socialization, implementation, monev, recording and reporting of youth health programs. Stakeholder users of school adolescents have a supportive attitude but do not give authority and less actively involved in the implementation of youth health programs.

"...that program…I've heard about it but not in detail. We've never got this socialization…"

"...as we know going to Puskesmas is for sick people. I usually go to Puskesmas to get a health certificate for a competition…"

"...we have got the counselig from Dinas Kesehatan but it was 2 years ago. This activity should be done annually. It is not bad to increase knowledge…"

(High school Intra-School Student Organization Indepth Interview)

"...the form of media counseling usually using PowerPoint miss, our suggestion is it can be comics, TV shows that educate…"

"...It is necessary to be equal to the lcal schools, it happens that this school is downtown so we often get the facilities from the government…"

"...Our counseling usually to BK teachers, we confide the lessons problem, Intra-School Student Organization activities, opinion issues between our parents and us…"

(Junior high school Intra-School Student Organization Indepth Interview)

Based on the statement can be that it is known that stakeholders have never familiar with specific adolescent health programs, stakeholder knowledge about Puskesmas is a service for treatment, Counseling has been obtained from the Health Office but not done routinely. Stakeholder users expressed their hope to be carried out extensively and evenly throughout the school, the media are expected to be audiovisual media and media

that attract teenagers like comics, educational shows via TV. In addition, stakeholder users also stated that the implementation of counseling in schools is the responsibility of BK teacher.

Karang Taruna Kota also has a position as 'observer' towards the implementation of the program. This shows that Karang Taruna has a supportive attitude, but its influence is weak and its involvement is passive. Karang Taruna has never known a youth health program. Karang Taruna has received an HIV counseling invitation from LSMPKBI. Karang Taruna has a supportive attitude when it is involved in youth health program, it can be shown from Karang Taruna statement which is willing to form PIK-KRR in Karang Taruna. The activities of Karang Taruna during this time is to arrange the race of 17 August, to be involved in sports activities like futsal competition between sub districts.

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The last user stakeholder is the Street Teen Coordinator. Based on the results of the interviews it is known that informants do not know the health program for teenagers and informants also stated that street adolescents have never received health information. This can be shown from the following statement:

"...we can never be like that, we know money is for buying foods..."

"...what is HIV, miss? We've never got that health info..."

"...usually, yes from Puskesmas sometimes they come here, just to check our health. And telling us just like a socializayion, but most of us kinda know it from the missus like this..."

(Street Adolescents Coordinator Indepth Interview)

Based on the statement is known that the activities of street adolescents are making money through singing. Researchers can not identify their attitudes, influence, and involvement in implementing the program. Based

on the observation, it is known that street adolescents have an age range of 10 to 22 years. Even researchers directly know the risk behavior done by street adolescents, namely smoking, dating with risky behavior, drinking liquor.

Triangulation is done by researchers through FGD method with the adolescent of school, community youth, and adolescent of Islamic boarding school. FGD result shows all adolescents in school, community, and Islamic boarding school needs youth care service starting from reproductive health information, counseling, educator and peer counselor, Communicative IEC media, and medical examinations. This is because teenagers have been aware and aware of the high adolescent problems as indicated by the following statement:

"…She was pregnant when she is at second year on High School. The story began when she hasn't been in period and it continues that she has sex with her boyfriend many times, rent a boarding hous for both of them, there is an attempt to abortion starting from young pineapple juiced with pepper, jogging, jumping, but still can't because the baby's resistance is strong. She is already out of school, resigned. Now she has married…"

"…Her parents were divorced my friend is now being a harlot…"

"…there was once in m dorm, caught meetings outside…then he is not in my dorm anymore he is renting a boarding house…"

But most teenagers have not received reproductive health information, even in Pondok Pesantren have never been visited by health workers to provide health information. Teens of pesantren congregation expect routine counseling about health has given once a year when new shantri receipt. The shantri know that there should be health services in Pondok Pesantren like UKS called POSKESTREN (Pesantren Health Post).

Based on the FGD results it is known that 1 in 10 teenage school participants know the teenage health program specifically. This is because this participant has attended peer educator training in Health Department. While the FGD participants of adolescent community and Islamic boarding school adolescents do not yet know this program. FGD participants know the Puskesmas as a service to seek treatment for the sick. 2 of 7 community teenagers, 2 out of 10 school adolescents, and 1 out of 10 pesantren adolescents have visited the health center because of illness.

"In addition to health checks it should also be given counseling about health, especially adolescent health so there is an additional provision for teenage school"

"perhaps enhanced coaching for UKS cadres, if necessary there is receptacle for counseling fellow friends"

The needs and expectations of the same pesantren (poskestren) health post are expressed through one of the Poskestren cadres that they want the formation and coaching of peer counselors to become peer educators and help solve problems for their friends.

"In here (poskestren) counseling is often, sometimes from puskesmas sometimes from outside as well. Maybe more like personal approach, so if anyone who vent it would be nice"

School counseling activities are provided to student representatives such as OSIS, two-person representatives, even only to students attending extracurricular courses related to peer educators. Meanwhile, counseling activities at schools are conducted through BK teachers, but BK teachers according to some FGD participants have never provided information on reproductive health. Counseling was given by BK teachers when the teenagers were troubled such as often not attending school without permission, declining performance, wearing school uniforms that were not matched with the school rules. This is shown from the following statement:

"...If there ia any problem we confide it to our friends... it is rare to confide to BK teachers if we were not called because there is a problem... if there is a problem we've been venting tou BK teachers but we wouldn't dare to tell it overtly... most of BK teachers are fussy, fierce so we are lil bit prevent it to vent to them... when they are rambling it will be never finished, so scary..."

"...BK teachers are more creative, understanding better, balanced well with teenager, following teenagers activities, familiar"

"...We were counseling about college to BK teacher when we are at school...taking science or social class...often to called because skipping class, my uniform is to short..."

Based on the statement, it is known that teenagers expect to have a friendly, kind, communicative, and understanding BK teacher. Characteristics of BK teachers who understand their students will make students more open and believe to exclude all the things that experienced by students (can share all the problems). All FGD participants expressed the importance of being formed peer educators and peer counselors. This is because teenagers have the character to share to their fellow friends. FGD participants stated that the need for the involvement of adolescents, government, teachers, and parents in realizing adolescent health.

The need for adolescents about adolescents health programs is that they want innovative, creative, non-monotonous and always new activities. In order to attract the attention of teenagers to continue to improve their health status. In addition, the activities carried out also not only about medical activities or tend to be curative. According to WHO, the notion of health covers not only covers but also includes mental and social aspects. Adolescents want an increase in promotive and preventive activities. Such activities can be done by counseling, socialization, education or education. Health education is any effort planned to influence others, whether individuals, groups, or communities so that they do what is expected to maintain and improve the health of conductive health promotion (Notoadmojo, 2012). So then that, big hope and desire of teenagers to activity of this PKPR to improve adolescents health degree.

Conclusion

Stakeholder teenagers are still categorized as 'observers' (support, weak power, and passive involvement) because not knowing the task to be executed, there has been no follow-up or sustainability of stakeholders decision maker. Even only 1 out of 12 stakeholders who know the program, due to ever get the program socialization from the Health Department during Peer Educator training. Though youth involvement is the key to the program. Puskesmas need to involve teenagers in the implementation of strategic steps such as involving adolescents in the implementation of problem identification (teen describes health problems based on personal experience and from their peer's experience) to program evaluation.

During this time only Youth as the object of the program has not been the subject. Though adolescents have been aware of the risky behavior, the impact so that adolescents feel the need of teenage health programs but teenagers do not know there is a program Because teenagers have never been involved. Adolescents should be the pioneers of teenage health programs (from by and for adolescents) so that adolescents need to communicate to stakeholders (decision makers and providers) that there are teenage issues whether experienced personally or in the experience of others, the need for teenage health programs, the availability of adolescents to be actively involved In program implementation.

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