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27th, 28th & 29th July 2017

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Committee of the ICOPH - 2017

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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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Table of Contents Page No

Proceeding of the 3rd International Conference on Public Health, Vol. 3, 2016, pp. 1-14

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A REVIEW OF THE OCCUPATIONAL AND ENVIRONMENTAL HEALTH HAZARDS OF BAUXITE MINING IN MALAYSIA

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Abstract: This review aims to explore the potential occupational and environmental health hazards on lives of miners and neighbouring communities, in relation to bauxite mining in Malaysia. The mining related environmental issues include air, water and soil pollution due to bauxite dust; its leaching into water sources reduces soil fertility, affects agricultural food produce and aquatic life. Bauxite occupational exposure affects the health of miners, apart from negative health impacts on neighbouring communities; such as frequent respiratory symptoms, and contamination of drinking water. Other potential health effects of bauxite mining include noise-induced hearing loss and mental stress. This review describes the processes of bauxite mining, its components, the residual trace elements, and their impacts on environment and health of exposed workers and communities. It also discusses Malaysian legal requirements and occupational exposure standards for bauxite.

Keywords: Bauxite mining, occupational and environmental health hazards, Malaysia

Introduction

Aluminium (Al) metal is abundant in earth's outer layer or crust; comprising 7% by weight, which makes it the third most commonly found element after silicon and oxygen. It is highly reactive and exists in oxidized form, with other 250 minerals. Al possesses high chemical reactivity, and not been found in element form (IAI, 2008). Bauxite is the main source of global aluminium, providing 99% of metallic aluminium (IAI, 2008; 2015). Feldspars also contain aluminium; however, extraction is costly as it involves high energy consumption than bauxite (Donoghue *et. al*, 2014).

Bauxite was named after a town (Les Baux) in France where it was first found. It is the main ore of alumina (Al_2O_3), a precursor of aluminium production (IAI, 2015). Bauxite has red-brown colour and is a natural heterogeneous substance; comprising aluminium hydroxide (gibbsite, boehmite and diaspore). Other compounds are hematite, goethite, quartz, rutile/anatase, and kaolinite with few impurities (Mitchell *et. al*, 1961). Trace elements comprise arsenic, beryllium, cadmium, chromium, lead, manganese, mercury, nickel with natural radioactive substances (uranium and thorium). However, these substances can still be found in bauxite residue after alumina extraction (IAI, 2015).

Bauxite is a product of iron and silica rock (Mitchell *et. al*, 1961; IAI, 2008), which is formed by exposure of volcanic, sedimentary and metamorphic rocks to tropical or subtropical climate over millions years. That is why most of global bauxite is extracted from tropical regions, after undergoing weathering process in past (IAI, 2015). Main reserves have been found in Brazil, Guinea and Australia (Mitchell *et. al*, 1961; IAI, 2015). In Malaysia, the reserves are present in Sarawak (Bukit Batu, Bukit Gebong, Lundu-Sematan, and Tanjung Seberang), Sabah (Bukit Mengkabau and Labuk Valley), Johor (Sungai Rengit and Teluk Ramunia), and Pahang (Bukit Goh in Kuantan) (Tse, 2015).

Bauxite is mined from earth surface or from underground reserves. Most reserves are found in earth surface with 1 - 2 meter overburden; comprising top soil and vegetation (IAI, 2015). Underground deposits are found below a covering of other substances, which needs underground mining for cheaper extraction (Mitchell *et. al*, 1961; IAI, 2015). Surface mining is more frequent than underground mining as most reserves are near the surface, which are extracted by open-cut mining via open-pit method from the lateritic deposits of 4-6 meter thickness; lying below 10 meter overburden (Gardener and David, 2007). The deposits thickness vary, they are mined and processed via beneficiation process without any treatment to concentrate mineral. However, bauxite from Brazil and Vietnam contains a high proportion of clay which requires to be washed before processing (Donoghue et. al, 2014).

In the refinery Bayer process is used to refine bauxite into alumina by dissolving aluminium containing minerals in sodium hydroxide. These solids (bauxite residue, mud and sand) are washed or neutralized by using carbon dioxide or seawater treatment, then are collected in impoundments either by wet or dry disposal methods, providing 15–30% and 50–65% solids respectively (Gardener and David, 2007). Finally Hall-Heroult electrolytic process converts alumina to aluminium. To produce one ton of alumina we require 2-3 tons of bauxite, because it comprises 30-54% alumina (IAI, 2008), whereas 4-6 tons are needed to produce a ton of aluminium metal. Bauxite mining uses lesser energy than refining and electrolytic reduction process.

The current estimated global reserves stand over 70 billion tons; with Guinea leading the group with 25 billion tons (Donoghue *et. al*, 2014). There are ample aluminium reserves which at current demand can sustain another 100 years. With an increasing need of aluminium products, bauxite is in high demand, which compels new explorations to maintain the economic viability (IAI, 2008).

Apart from bauxite, the other known sources of aluminium comprise kaolin clay, shale oil, coal waste and mineral anorthosite (Gardener and David 2007), but current bauxite deposits are sufficient and economically feasible than the alternatives, so it is predicted that the methods of converting alternatives into aluminium will not go past the current levels (Mitchell *et. al*, 1961).

Recently many quarters in Malaysia have raised concerns about the negative effects of bauxite mining on environment and resident's health around Kuantan, Pahang, because of proximity of mines to the residential areas, and have created a scare among general public about its harms. Environmental pollution related to bauxite mining is a serious concern because of its direct effects along with the short and long term harms. We have noted that not enough research has been performed in this area, particularly in Malaysia; which stresses a detailed enquiry on bauxite mining to incorporate the impacts, standards of exposure and laws related to its mining. The purpose of this review is to add scientific information about the impacts of bauxite mining and its components on the environment and peoples' health, to initiate in depth reviews.

Materials and Methods

Search Strategy

For the literature we searched Google Scholar and British Medical Journal (BMJ) to find the basic information about bauxite mining and its effects, while for the details and quality papers Cochrane Library was explored. The key words entered in Google Scholar were Bauxite Malaysia Review and search was restricted to Where My Words Occur.

Ovid Medline and PubMed were explored to expand the search on environmental and occupational health impacts of bauxite mining; broad search terms were used to ensure inclusion of maximum studies. The key words entered in PubMed were Bauxite, Health Impact, Aluminium Oxide, Bauxite Refining, Bauxite Mining Respiratory and Bauxite Mining Occupational. However, our main search source was Ovid Medline due to extensive listing of articles, we applied Medical Subject Headings (MeSH) and Additional Limits for the

search. There was no Language restriction, and we reviewed all the studies published before 31st August, 2016.

Selection Criteria

For in depth review, studies were selected according to type of Ores mined and refined, while those under Kaolinite, Vermiculite Mining, Asbestos and Aluminium Nanoparticles were removed from the list. We also rejected articles or formal documents about meeting proceedings, strategic policy reports, new mining sites and studies on extraction process along with neutralization of bauxite and social issues of its mining.

Data from Western Australia, India, Mozambique, Surinam and other similar areas was incorporated, because of lack of Malaysian data. Our review included the articles on environmental impacts of bauxite mining; eg studies of microbial life, plant growth and soil contents.

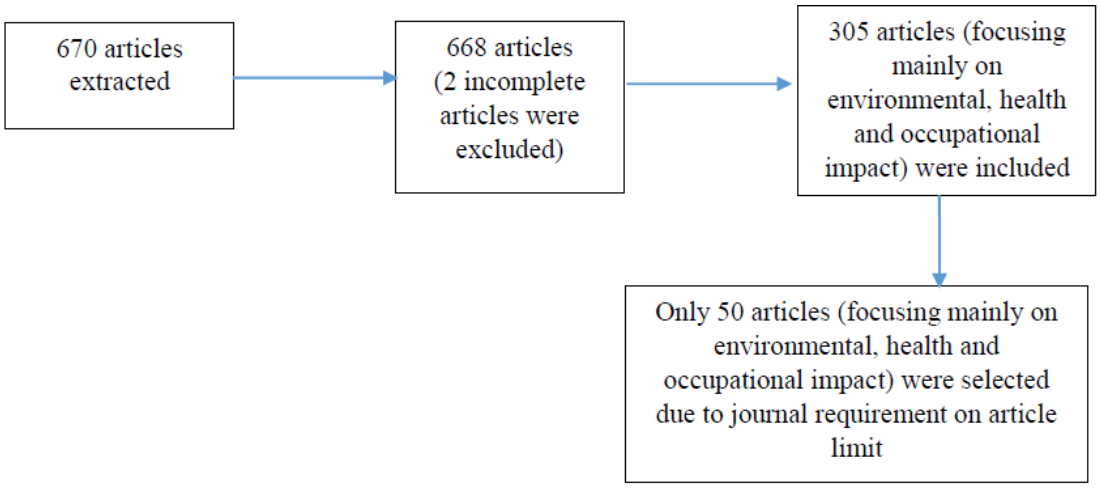

Figure 1, Illustration of articles selection criteria.

Results

According to the literature search, Australia was the main producer of global bauxite, contributing 29% in 2015 (80,000 tons) (Bray, 2016), followed by China (60,000 tons, 22%) and Brazil (35,000 tons, 13%); which is depicted in Figure 1. It is worth mentioning that Malaysian bauxite production showed a spike over one year period; from 3,260 tons in 2014 to 21,200 tons in 2015 (6.5 fold increase) which resulted from high Chinese demand after Indonesia banned its exports to promote local processing industry.

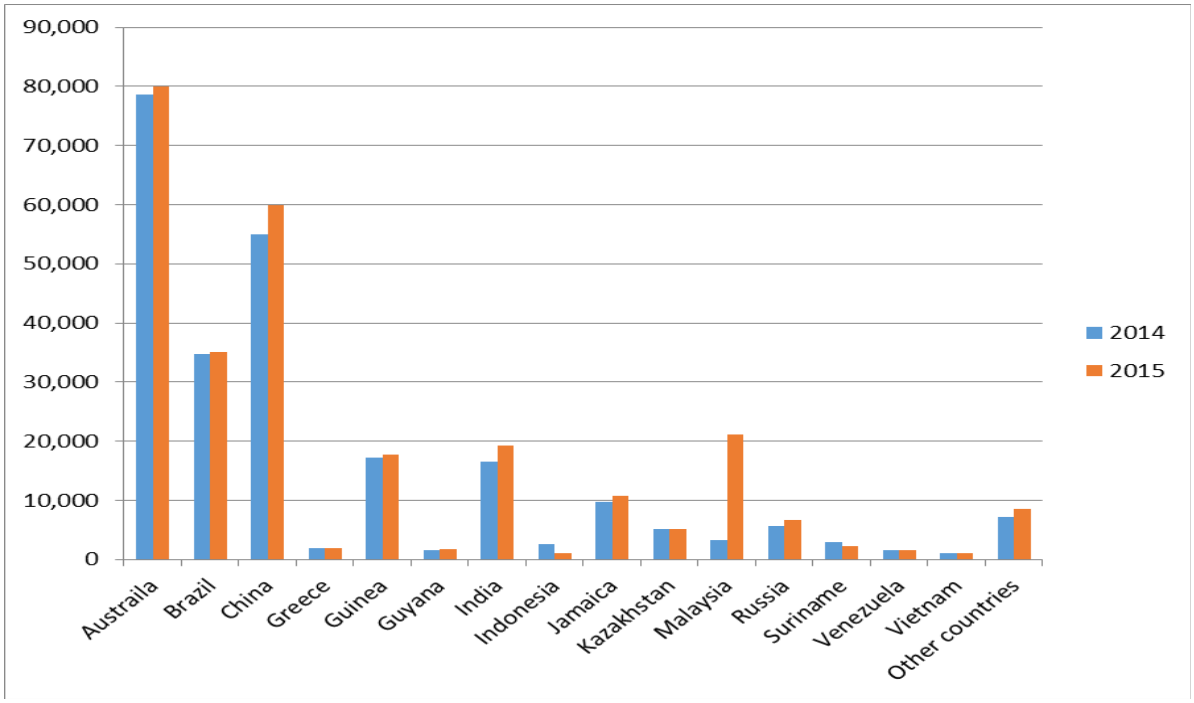

Figure 2, Bauxite amount produced by each country in 2014 and 2015 (in tons) (Bray, 2016)

Considering the bauxite reserves, largest deposits are found in Guinea (7,400,000 tons), followed by Australia (6,200,000 tons), Brazil (2,600,000 tons), Vietnam (2,100,000 tons), Jamaica (2,000,000 tons) and Indonesia (1,000,000 tons) (Bray, 2016). According to below figure, Malaysia holds about 40,000 tons of reserves, compared to other states.

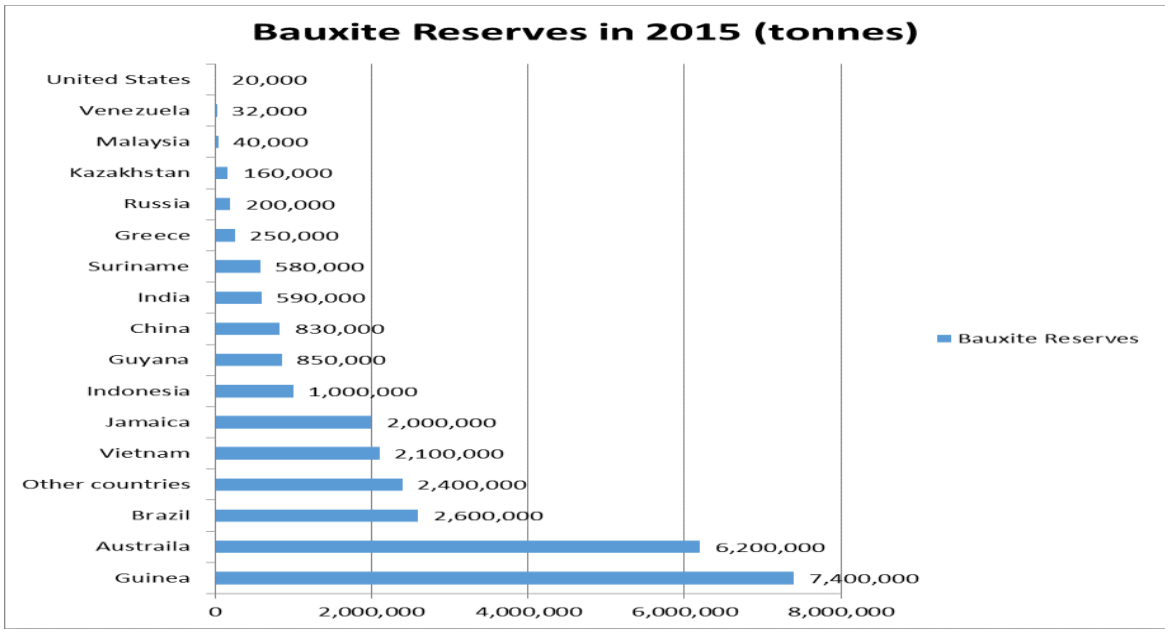

Figure 3, Bauxite reserves of each country in 2015 (Bray, 2016)

Environmental Impacts of Bauxite and its Mining

The direct impacts of bauxite mining on environment include air, water and soil pollution, while indirect effects of environmental pollution are observed on the health of miners and surrounding communities.

Air Pollution

The main problem related to bauxite is production of airborne particles due to mining activities. The International Standardization Organization (ISO) and British Standard Institute describe dust as; small solid particles below 75 µm diameter which settle due to own weight after brief suspension in air (Petavratzi and Lowndes, 2005). Other activities such as site clearance, road works, open-pit drilling, blasting, loading, haulage, vehicles movement, ore and waste rock handling also produce dust (Donoghue *et. al*, 2014).

These particles are divided into coarse and fine categories. The coarse ones have a diameter of 1-10 µm, while fine category has a diameter of 0.1-1 µm. The coarse particles are generated from erosion, road dust, soil dispersion by wind and due to human activities; eg vehicle emissions (Gelencser *et. al*, 2011), these pose fewer problems and are mostly deposited in larger airways to be coughed out. Whereas fine particles can reach alveoli to cause respiratory and cardiovascular diseases (Petavratzi and Lowndes, 2005; Abdullah *et. al*, 2016). Bauxite dust may interact chemically with atmospheric air; affecting soil, plants, local climate and depending on their size can enter vegetation. It may get dissolved in water, flows down the food chain to be ingested by humans or aquatic animals (Petavratzi and Lowndes, 2005).

The dust is of red colour and can be seen due to its iron oxide; contaminating clothes, properties, plants, food and water sources (Hashim, 2016). From the occupational health perspective it is categorized as nuisance dust or particles not otherwise specified. The coarse particles harm environment quality, affect machinery, reduce visibility and are irritant (Petavratzi and Lowndes, 2005; Donoghue *et. al*, 2014). Bauxite dust is harmful due to environmental changes and reduced visibility, it is deposited on machines and affects their life and productivity (Petavratzi and Lowndes, 2005).

Bauxite dust is inhaled as less than 10µm diameter particles, and is called Respirable Dust or Particulate Matter 10 (PM_{10}) and $PM_{2.5}$. In Kuantan, Pahang, during December 2015, 24-hour PM_{10} levels hovered between 167 to 277 µg/m^3, crossing the Malaysian National Ambient Air Quality Standards 2015 (Abdullah et. al, 2016). According to World Health Organization, there is 'no safe level' for PM_{10} and $PM_{2.5}$, during breathing these particles deposit in alveoli and lead to rise in hospital admissions from respiratory and cardiovascular diseases (Petavratzi and Lowndes, 2005; Abdullah *et. al*, 2016). Along with lung, nose and throat problems, eyes and exposed skin are also affected, as well as gastrointestinal tract. In some persons, dust can trigger allergic reactions such as asthma or eczema (Petavratzi and Lowndes, 2005).

Impact on Water Sources

The main sources of world surface water comprise streams, rivers, springs, ponds and lakes, which interact with soil and rocks of their surfaces; with environmental temperature and pH affecting adsorption and desorption of inorganic and organic substances (Bradl, 2005). Bauxite mining contaminates water sources, especially drinking water, which become harmful due presence of iron, aluminium and traces of toxic heavy metals (arsenic, cadmium, lead, nickel, manganese and mercury) (Petavratzi and Lowndes, 2005). This is an outcome of heavy and aggressive mining activities.

The main impact of heavy metals is observed on river sediments, aquatic life, and water. Heavy metals are not degradable they get deposited in river sediments and are finally consumed by plants, animals or benthic life. A study conducted on river sediments affected by mining found that the concentration of heavy metals was 1000-100,000 times of water, whereas the concentration in fish and benthic animals was 10-1000 times higher. Heavy metals enter fish from water, food chain and by breathing (Yi and Zhang, 2011). After mobilization in water they reach downstream and get deposited in clay minerals or enter algae at lower food

chain (Bradl, 2005). When heavy metal accumulation reaches a critical level it affects the life in higher food chain, and aggravates the problem.

Mining activities produce acidic water which increases heavy metals solubility and causes harm to marine ecosystem, particularly at pH5 and below. Heavy metals affect ground water due to agricultural and industrial activities, whereas mining and land filling can pollute drinking and irrigation water. After leaching into soil and water, these metals affect air by surface erosion (Bradl, 2005).

The river near Kuantan bauxite mine is the main source of water for neighbouring residents with many water treatment plants located closeby (Abdullah *et. al*, 2016). The mining related river pollution has shut several down water treatment plants. The aluminium and mercury levels in nearby communities' water were 0.20mg/L and 0.0093mg/L, respectively, which is nine times higher than Health Ministry's recommended level. In contrary, Pahang State Health Department checks of drinking water noted that aluminium and iron levels were within the National Drinking Water Quality Standards (Hashim, 2016).

Impact on Soil

Soil is the key element of ecosystem; it supplies plant nutrients, causes degradation and transference of biomass. In solid phase it consists of minerals and organic substances, while in the fluid phase it interacts with water (Bradl, 2005). In these phases ions interact and enter the soil, a higher concentration of heavy metals in soil is harmful, which suppresses these processes and biodegradation of organic matter, with lowering of the soil fertility that can affect agriculture by decreasing food quality and produce (Raymond, 2011).

Organic carbon is the indicator of soil quality, a research carried out on the soil of bauxite mines noted deficiency of plant nutrients (carbon, nitrogen, phosphorus, potassium, calcium and magnesium) which are important for normal growth. Also this soil contains high levels of Al, which limits microbial growth in soil. Under these conditions nutrients are not released into soil, suppressing plant growth in acidic medium and preventing land reclamation after mining (Lad, 2015). When soil contacts limestone during bauxite refining it turns into alkaline (Coke and Hill, 1987).

When reclaimed and un-mined lands were compared, the later showed a deeper soil depth and could grow deep-rooted trees and crops. Whereas the reclaimed soil depth was 15cm or less which could only grow a few crops. Studies proved that vegetables, root crops and legumes need at least a depth of 30cm, which was missing in reclaimed land (Coke and Hill, 1987).

Artificial pits formed during open cast mining contain large amounts of calcareous debris, which disturbs environmental balance by interrupting geo-morphological processes. Pre mining land clearance, deforestation and new road works affect the habitat; cause soil erosion and aggravate bio-diversity loss, with water pollution and increased turbidity. These impacts can be temporary or permanent; the temporary impacts need time and resources to reverse damage, whereas permanent impacts cannot be reversed (Mertzanis, 2011).

Impact of Bauxite Contaminated Soil on Food Produce

Bauxite contaminated soil is harmful for health, because its components affect the quality of soil and agricultural water. In humans food is the main source of heavy metal exposure, than inhalation of particles, skin contact and drinking water. Heavy metals get absorbed through vegetable roots and are concentrated in edible parts however capacity to absorb and accumulate these metals varies across different vegetables (Zhou *et. al*, 2016). The accumulated heavy metals include lead, cadmium and arsenic.

Cadmium in soil gets mobilized and is taken up by plants and crops. This was supported by a study which noted that the crops grown on reclaimed bauxite mine land showed high level of cadmium. Apart from plant absorption, cadmium leaches into water sources and was discovered in aquatic animals which were consumed by humans. Long term cadmium intake causes kidney and bone problems, cancers, low birth weight and abortion. This highlights the dangers of crops grown on reclaimed bauxite mines. Other crops affected by leaching and accumulation of heavy metals include sweet potatoes, with lead levels exceeding CODEX safety margin (0.1mg/kg). Lead poisoning is deadly; it harms the nervous and reproductive systems, and affects child intelligence (Wright and Omoruyi, 2012).

Occupational Exposures of Bauxite Mining

Physical Hazards

The physical hazards of bauxite mining include noise, heat, humidity, and ergonomic issues, along with vibration, ultraviolet radiation and radioactive substances (Donoghue *et. al*, 2014; Wesdock and Arnold, 2014). Studies have observed traumas, but their incidence in bauxite mining is lower than coal and metals mining. Apart from blasting, drilling, excavating and crushing, mining machinery is the cause of noise (producing 85 to 106 dB) (Donoghue *et. al*, 2014).

Research has confirmed that noise is harmful to hearing at 10m distance. Many mines operate on 24-hours/day schedule exposing miners to continuous noise (Donoghue *et. al*, 2014; Wesdock and Arnold, 2014; Nanda, 2012), beyond permissible noise level (<85dB) and exposure duration (101 - 106 dB; 4 - 15 minutes) (Dangerous Decibels, 2016), which lists noise-induced hearing loss as the main hazard of bauxite mining (Donoghue *et. al*, 2014).

Many researchers have agreed that the amount of vibration exposure of a worker at workplace reflects the work conditions and types of machines used (Vanerkar *et. al*, 2008). Due to different machinery types used in bauxite mining (excavators, drilling rigs, scrapers and haulage trucks), the most common vibration hazard is whole-body vibration rather than hand-arm vibration (Donoghue *et. al*, 2014), but this can be minimized with proper maintenance of machines.

Most of bauxite mining is done in tropics, exposing workers to ultraviolet radiations that may cause skin cancers (Fritschi *et. al*, 2008; Donoghue *et. al*, 2014). One of surveys found a high incidence of melanoma among miners, but it was not significance (Fritschi *et. al*, 2008). Another study stated that outdoor work was not responsible for high melanoma risk. While heat and humidity cause heat-related illnesses; heat exhaustion and miliaria rubra (Donoghue *et. al*, 2014).

Bauxite contains traces of radioactive materials (uranium, thorium and potassium), but very few researchers have explored this aspect. Only one study has detected minimal radiations, which was below detection level and exposure risk (Carvalho *et. al*, 2013). A similar research from Australia reported that personal dose levels among workers performing various tasks were below the exposure limit (1.0 mSv/year). Though radioactivity does not have much impact on human health, but does require regular monitoring (Donoghue *et. al*, 2014).

Chemical Hazards

Bauxite is biologically inert with minimal chemical hazards. From occupational health perspective it is categorized as Nuisance Dust or Particle Not Otherwise Specified. Bauxite miners demonstrate frequent respiratory symptoms such as cough, wheeze and rhinitis, with self-reported symptoms ranging from 1.5% to 11.8% (Townsend *et. al*, 1985; Beach *et. al*, 2001; Donoghue *et. al*, 2014). These conditions are linked to bauxite dust that is generated by breaking and blasting of crust as well as digging and loading of ore on trucks.

Research on miners exposed to bauxite and silica found atypical airway responses; cough, increased mucous and reduced forced expiratory volume in 1 second (FEV1) (Townsend *et. al*, 1985). Another enquiry observed reduced FEV_1 (7.3mL/year), which was related to work duration (Beach *et. al*, 2001). The employment duration and FEV_1 had no relation with bauxite exposure. Other researchers stated that bauxite exposure did not cause lung symptoms or functions variations (Beach *et. al*, 2001; Dennekamp *et. al*, 2015). A single case of pulmonary fibrosis was found among workers exposed to bauxite crushing and transport with bauxite particles in affected area (Bellot *et. al*, 1984). Current research on bauxite exposure concluded that it does not result in pneumoconiosis (Friesen et. al, 2009; Donoghue *et. al*, 2014).

Cancer Incidence and Mortality

An Australian research among bauxite and aluminium workers for cancer rate and death could not relate exposure with increased cancer death (Fritschi *et. al*, 2008). Many other enquiries support this finding and report that ultraviolet exposure did not result in frequent squamous or basal cell carcinoma. Another study found that melanomas and pleural mesotheliomas had no environmental or occupational link to aluminium industry (Fritschi *et. al*, 2008; Donoghue *et. al*, 2014). However one group of researchers noted the association between bauxite exposure and risk of non-cancerous respiratory sickness (Friesen *et. al*, 2009).

Biological Risks

Salient biological risks among bauxite miners include communicable diseases such as malaria, dengue, human immunodeficiency virus (HIV) and tuberculosis which require prevention and treatment. Hence mitigation of these biological risks need mining companies investment for education, screening, diagnosis and treatment along with travel medicine consultations for the workers (Donoghue *et. al*, 2014).

Ergonomic Risks

Recent bauxite mining with modern equipment requires minimal manual handing and poses few ergonomic risks (Donoghue *et. al*, 2014). However, due to long shifts and extended work hours fatigue is an issue. Workplace control measures have been placed for monitoring purpose and for cutting fatigue risk, along with solution of worker issues and roster modifications to control fatigue.

Impact on Surrounding Communities' Health

As most of bauxite mines operate in remote areas with proper boundary, so only a few researchers could study their effects on neighbouring communities. One research has listed the acute and chronic effects; acute were related to short term dust exposure, vehicle accidents, vector related diseases and work stress and can turn into chronic effects. Chronic effects arise from air, water and soil pollution (Hashim, 2016).

Health Impact of Dust Particles

A research has focussed on open cut mining and large particles release in environment; contaminating property, water, food and clothes and affecting individuals comfort. These particles irritate eyes, nose and throat (WHO, 2004), they collect on plants and render them unfit for human and animal consumption (Hashim, 2016). Fine bauxite particles (10 and 2.5 micron diameter) go deep in respiratory tract and cause frequent hospital visits due to cardiovascular and respiratory conditions along with early death (WHO, 2004). This is more harmful for kids as they have smaller lungs than adults, and end up with higher dust dose (Schuepp and Sly, 2012), which has led to frequent asthma and upper respiratory infections in Kuantan area. Local clinics data associated this to high PM_{10} levels (164 to 277$\mu g/m^3$); violating Malaysian National Ambient Air Quality Standards 2015 (Hashim, 2016).

Health Impact of Bauxite and Heavy Metals Contamination

Bauxite mining pollutes water (especially drinking water), which causes harm due to aluminium hydroxide, iron oxide and heavy metal intake (Hashim, 2016). Aluminium is nerve poison and has been associated with

Alzheimer's disease; though evidence is weak. High aluminium exposure in children has been associated with bone disease due to low phosphate absorption (Flaten, 2001; Hashim, 2016). Continuous intake of iron oxide from bauxite result in iron overload with gastrointestinal and liver disease, cardio-myopathy, diabetes, joint and skin problems (increased pigmentation) (IDI, 2009).

Long term intake of these metals causes organ toxicity and increases cancer risk (Barceloux, 1999; Ratnaike, 2003; Nawrot *et. al*, 2006; Hashim, 2016). Heavy metals collect in food items and drinking water, affecting whole food chain. They appear in seafood and are consumed by people. These comprise lead, arsenic, mercury, cadmium, chromium, manganese and nickel and cause central and peripheral nerve harm. They affect nervous and cognitive functions, increases renal toxicity, with hypertension, cardiovascular problems, skin sensitivity and high mortality (Barceloux, 1999; Satoh, 2000; Lustberg and Silbergeld, 2002; Ratnaike, 2003; Crossgrove, 2004; Nawrot *et. al*, 2006; Das *et. al*, 2008; Flora *et. al*, 2012; Bernhoft, 2012; Bernhoft, 2013). In children, heavy metals are linked to high death risk, delayed nerve development, intellectual and behavioural problems, as well as peripheral nerve damage and hearing loss (Satoh, 2000; Crossgrove, 2004; Flora *et. al*, 2012).

Mercury and cadmium toxicity is dangerous. Long term mercury poisoning causes Minamata disease due to intake of methyl mercury containing seafood, or from workplace exposure. Mercury passes through blood-brain barrier, affects the brain and causes neurological problems; such as weakness, tiredness, tremors and loss of motor control, with ataxia and sensory loss affecting sight, hearing and speech (Satoh, 2000; Bernhoft, 2012). Long term cadmium exposure causes renal and bone toxicity and manifest as Itai-Itai disease with fractures, osteoporosis, osteomalacia and renal tubular malfunction (Bernhoft, 2013). Cadmium has been linked to lung cancer and emphysema (Nawrot *et. al*, 2006).

Health Impact of Noise

One research teams has noted that noise affects the bauxite miners and nearby residents due to 24/7 mining operations. The observed health effects include noise-induced hearing loss, reduced hearing sensitivity and sleep problems; noise also exerts cardiovascular, physiological, behavioural and cognitive impacts. While people living close to mines feels mental stress (Hashim, 2016), bauxite also turns the surroundings into dark red due to iron oxide; this poor visibility can lead to mental stress. The detrimental health impacts of bauxite dust are observed on persons, water and food sources.

Discussion

Environmental Impacts of Bauxite Mining

The environmental impacts of bauxite mining are mainly seen on air, water and soil. As air pollutant bauxite dust interferes the visibility (Petavratzi and Lowndes, 2005; Donoghue et. al, 2014), it settles on plants, food, and airways and causes chronic cardio respiratory problems (Petavratzi and Lowndes, 2005; Hashim, 2016).

We lack information about bauxite related water pollution and its effects on humans as little research has been done on this. Bauxite and heavy metals present in river sediments can be taken up by aquatic animals or plants, that affects different food chain levels (Yi and Zhang, 2011).

Agricultural activities cause soil pollution by affecting the fertile topsoil; and even the restoration methods could not reverse barren soil to its original fertile status (Coke and Hill, 1987). The plants absorb heavy metals from soil, which triggers consumer food safety issues (Wright and Omoruyi, 2012). The destruction of habitat affects the diversity of flora and fauna, which is a distinct feature of Malaysia as a tropical forest country.

Occupational Health Hazards

Noise-induced hearing loss is among the salient occupational hazards of bauxite mining. Chronic noise exposure reduces hearing sensitivity, affects sleep with cardiovascular, physiological and mental health problems; chronic noise also affects behavioural and cognitive performance (Hashim, 2016). Hearing protection can help to control these issues (Donoghue *et. al*, 2014; Donoghue *et. al*, 2016).

Vibration is another mining equipment related hazard; particularly whole-body vibration and can lead to spinal problems (Donoghue *et. al*, 2014). Heat and humidity can result in heat exhaustion and miliaria, while ultraviolet and other radiations in bauxite mines have not been shown to increase the risk of skin malignancy or other health issues (Fritschi *et. al*, 2008; Carvalho *et. al*, 2013; Donoghue *et. al*, 2014).

Many studies have supported an association between respiratory features (cough, wheeze and rhinitis) and bauxite mining (Donoghue *et. al*, 2014). Despite previous proofs of relation between increased bauxite exposure and reduced FEV_1; the latest research could not corroborate this relationship (Townsend *et. al*, 1985; Beach *et. al*, 2001; Dennekamp *et. al*, 2015). Clinicians have found a case of lung fibrosis among exposed workers, but it was not due to bauxite pneumoconiosis. Also, bauxite mining is not a cause of skin cancers, pleural mesothelioma and high cancer deaths (Fritschi *et. al*, 2008; Friescen, 2009; Donoghue *et. al*, 2014).

Impact on Neighbouring Communities

As discussed earlier, only a few papers have explored the bauxite mining effects on neighbouring populations, because mines usually operate in remote areas with proper boundaries. In contrary, Kuantan mines are dispersed widely, lack demarcations and are close to the populations, thus exerting negative health effects on neighbouring residents (Hashim, 2016).

The short term effects of bauxite mining are associated with dust exposure and vector borne diseases, whereas chronic effects are due to dust particles which contaminate food and water; and result in lung infections or ailments (Hasim, 2016). The other hazard is leaching of heavy metals and bauxite products into water; exerting chronic effects on adults and children, such as nerve and renal toxicity, cardiovascular conditions and delayed nerve development with high risk of cancer and death (Barceloux, 1999; Ratnaike, 2003; Nawrot *et. al*, 2006; Hashim, 2016). Noise affects the health of populations living close to bauxite mines, with lowered hearing sensitivity and increased noise induced hearing loss (Hashim, 2016). All these impacts cause mental stress among neighbouring communities.

Permissible Exposure Limits and Biological Exposure Indices of Bauxite

Permissible Exposure Limits (PELs) of Bauxite

During 1970s, U.S. Occupational Safety and Health Administration (OSHA) established permissible exposure limits (PELs) for hazardous substance, which from worker protection point are now deemed obsolete; but has remained unchanged. However OSHA's Z-1 Table for PELs is still valid and utilized for Occupational Exposure Limits (OELs), while exposures exceeding these levels are considered harmful despite PELs compliance (OSHA, 1970).

In many countries OELs are the criteria for airborne vapours, particles and gases; while for airborne chemical concentrations, American Conference of Governmental Industrial Hygienists (ACGIH) has devised Threshold Limit Values (TLVs), assuming a situation where majority of workers are frequently exposed without adverse event (OSHA, 1970). Malaysia uses PELs mentioned under Occupational Safety and Health Act 1994 - Schedule 1: Use and Standards of Exposure to Chemicals Hazardous to Health Regulations 2000 (ILO, 2016;

USECHH, 2000). However, OELs have been established and frequently updated for chemicals listed in OSHA Z-1 Table and are referred for latest values and notations (OSHA, 1970).

Biological Exposure Indices (BEIs) for Bauxite

Chemicals levels detected in biological specimens (exhaled air, blood and urine) of healthy workers having chemical exposures which are equal to workers with inhalation TLVs are called Biological Exposure Indices (BEIs) (ACGIH, 2012). BEIs are considered biological monitoring guide to assess worker exposure and health risks. The chemical exposure dose of a worker is measured via biological monitoring.

BEIs are the concentrations below which majority of workers do not feel negative health effects. A chemical, its metabolite levels or biochemical transformations provide BEIs, but fails to measure negative effects to diagnose occupational disease, or to differentiate hazardous from non-hazardous exposures. Excess health risks are not observed even after chemical levels violate the BEIs. Investigations are recommended after workers' samples remain higher than BEIs or most of the staff from same work area or shift show levels above BEIs.

BEIs and TLVs reflect uptake of chemicals and inhalation exposure of person or group respectively, by air monitoring. There might be differences between biological and air monitoring data due to difference in individual's physiology or health status, such as habit, diet, metabolism, age, gender, body fluid composition, medicines consumption, pregnancy and illnesses; or due to person's occupational exposure including rate, intensity and duration of work, temperature and humidity, exposure to irritants, skin exposure and other work routines; or from non-occupational exposures that include water, food, personal hygiene, home air pollution, alcohol and drug consumption, smoking or exposure to domestic products or hobby chemicals.

The variations may result from method related causes such as contamination of specimen or analysis method bias, or due to placement of air monitoring device with reference to person's breathing zone, or due to particle size and its bioavailability or from variations in effectiveness of personal protective devices.

Malaysian Legal Requirements and Standards of Exposure to Bauxite

In 2012, Malaysian Department of Environment (DOE) finalized the policy to site and zone industrial and residential areas, its purpose was to provide a reference for project developers, federal, state and local governments, about feasibility of a site for specific industrial or non-industrial use which might exert negative environmental impacts (DOE, 2012).

The prime objective of this guideline is to assist in proper selection of a site, to reduce or eliminate the environmental impacts that may occur due to mismatch between a project, process and nearby localities (DOE, 2012). The main purpose of environmental planning is to prevent problems by judicious siting, to achieve long term project sustainability and to the cut cost of pollution control measures to improve project's perception among public. These principles also apply to the extraction and production of other natural sources, such as minerals and rocks.

According to Environmental Quality Act 1974 (EQA 1974), any process or activity which releases, discharges or emits pollutants and may impact the environment, must obtain comment, consent or approval of Director General of Environmental Quality, about suitability assessment of site, Environmental Impact Assessment (EIA), written permission, approval and licensing etc. EQA 1974 is associated with prevention, reduction and control of pollution and environmental quality improvement that may arise due to industrial and non-industrial activity and might produce waste or pollutants which may affect the quality of environment (DOE, 2012).

According to Mineral Development Act 1994 (Act 525); to mine is to intentionally mine minerals and includes any operation directly or indirectly and necessary therefore or incidental thereto, and mining shall be

construed accordingly. Mineral is a naturally occurring element or chemical compound that is formed as a result of geologic processes.

Under Environmental Quality Order 1987, mining is regulated as a prescribed activity and includes mineral mining in new locations where lease covers over 250 hectares area; ore processing including concentrations of aluminium, copper, gold or tantalum; and sand dredging over an area of 50 hectares or more.

Process of mining is initiated with discovery and exploration of minerals, it proceeds with extraction, processing and finally culminates in workplace closure and remedial measures. According to the guidelines, buffer zone is area of separation between two or more areas to control hazards and to protect environment (DOE, 2012). Buffer zones are for the safety and protection of humans, property and ecology.

Buffer zone determines a site's suitability for a specific industry or activities keeping in mind its short term use, the neighbouring land use along with features of receptors around that area. In buffer zone area incompatible land use is not allowed and specific procedures are employed to minimize the effects of such activities (DOE, 2012). In fact, buffer zone cannot replace prevention and control at source or management standards for activities having environmental impact; rather it provides extra protection to control offsite impacts of residues that exist despite preventive procedures; at least one km distance is recommended as primary buffer.

Bauxite mining discharges large amounts of waste water along with residual contaminants, and according to industrial classification and polluting hazardous activities is deemed a high risk activity that is almost untreatable (DOE, 2012).

Conclusion

This literature review has discussed the environmental effects of bauxite mining that occur by eco system destruction; impacting air, water, food, soil along with flora and fauna of the mining sites. Bauxite mining activities has impacts on health of miners and nearby residents, apart from environmental pollution (which was noted in Kuantan), as mines lack proper boundaries and are located close to nearby communities. We noted a knowledge vacuum about chronic health effects of bauxite mining, as these diseases take a long time to appear; during late stages of life. Therefore, an in-depth enquiry is suggested on areas which need management and control measures to minimize environmental impacts of bauxite mining, apart from negative health effects on humans.

Conflict of Interest

The authors declare no conflict of interest.

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ENVIRONMENTAL HEALTH RISK ASSESSMENT OF TOTAL SUSPENDED PARTICULATE EXPOSURE TO EMPLOYEE OF PT SEMEN PADANG

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Abstract: The cement industry has negatively impacts in air pollution that affect to the respiratory system. The aims of this study was to determine the level of environmental health risks through the risk analysis of Total Suspended Particulate (TSP) exposure to employee of PT Semen Padang, West Sumatra, Indonesia. This study uses environmental health risk analysis (EHRA) method that aims to calculate the level of risk received by a population due to environmental exposure. Research was conducted on December 28, 2015 until June 27, 2016. The number of sample were 32 respondents. The sampling technique used was accidental sampling. TSP concentration measurements by using the tool Staplex Model TFIA series High Volume Air Samplers (HVAS). The results based on the value of the intake lifetime exposure to TSP inhaled indicate that the area Coal mill and Cement mill on the employees in the Production Department II / III PT Semen Padang at risk of developing respiratory problems to the value of RQ > 1 and based on the value of the intake realtime exposure TSP inhaled were not at risk respiratory disorders with RQ <1. Based on the research value of the intake lifetime exposure by inhalation TSP indicates that the area Coal mill and Cement mill employees in the Production Department II / III PT Semen Padang at risk of developing respiratory problems due to exposure to TSP. Suggested to the company to immediately carry out control measures to reduce the risk of respiratory disorders in employees.

Keywords: total suspended particulate, exposure, environmental health risk assessment

Introduction

The cement industry is now one of the sectors that play a role in regional and state economic development. The positive impact of this industrial activity is contributing to job creation, economic growth, investment, and increase state revenues, and various other contributions both in the economic, political, and social. The negative impact is to cause air pollution inside or outside the work environment that affects the respiratory system.

One of the air pollutants that can cause health problems is rough or total suspended particulate (TSP) particles. TSP is a floating dust particle is a very complex mixture of various organic and inorganic compounds such as sulfate, nitrate, ammonia, sodium chloride, carbon, mineral dust, and water with compositions of various sizes. TSP is commonly used to describe the total particle concentration measuring ≤ 100 microns in air in a region (Lead, 1998).

According to WHO, a person exposed to TSP particulates may have acute respiratory infections (ARI), asthma, enfisema, lung cancer, cardiovascular disease, and chronic obstructive lung disease (WHO, 2010). Based on the results of epidemiological studies of PT Semen Padang is known that the area is a high level of exposure to dust that can cause lung disease and respiratory symptoms. Respiratory disease caused by TSP exposure is chronic obstructive pulmonary disease (COPD), one of the lung diseases caused by exposure to cement dust and respiratory infection (Devita, 2015; K3LH (2015).

Based on data obtained health effects resulting from exposure to TSP has been experienced by many employees of the production department. TSP exposure plays a role in the increased risk of respiratory and lung diseases in workers (Mangunnegoro and Yunus, 1992).

The results of epidemiological research on pulmonary function disorder and the factors that influence on the employees of PT Semen Tonasa Pangkep South Sulawesi showed the level of cement dust in the packing 18.47 mg / m^3, raw mill 1.63 mg / m^3, limestone cruser 14.98 Mg / m^3, mine 20,23 mg / m^3, kiln 4.56 mg / m^3, and cement mill 5,98 mg / m^3. The results of pulmonary function examination on PT.Semen Tonasa employees showed the average lung function capacity of respondents 88.22% FEV1 / FVC with standard deviation of 12.174 (Mengkidi, 2006).

TSP in the Cement Industry contains many ingredients such as tricalcium silicate, dicalcium silicate, some alumina, tricalcium aluminate, iron oxide and a small amount of hexavalent chromium (Mwaiselage et al, 2005). In addition to the cement industry many silicone, ferro and lead particles . These different circumstances also provide different toxicological properties and levels that provide different health risks to the human body (Zeleke et al, 2010).

Based on this background, the researcher encouraged to conduct research related to the level of environmental health risk of TSP exposure to the employees of Production Department II / III PT Semen Padang. The results of this study are not only useful in risk control, but also can be used as a scientific framework in decision making and Policies to address health and environmental issues.

Methodology

This research is a quantitative research in the form of descriptive method of environmental health risk analysis (EHRA) which aims to calculate the level of risk received by a population due to the exposure of TSP in the environment. This study was conducted on December 28, 2015 until June 27, 2016, with a total sample of 32 respondents. Sampling technique is accidental sampling. Anthropometric data collection and activity pattern by interview using questionnaire and TSP concentration measurement using Staplex Model TFIA series High Volume Air Samplers (HVAS).

Some of the procedures involved include hazard identification and risk sources, dose-response analysis, exposure assessment, and risk characterization. The risk level is expressed in the Risk Quotion (RQ) expressed as the ratio between the value of the intake and the reference dose (RfC). Intake is the amount of inhaled concentration per kilogram of body weight, while RfC is an approximate daily exposure dose that has no health effects in lifetime exposure. A situation is considered risky and management of control is required if RQ> 1.

Result

TSP Concentration in Environment

Table 1: Shows TSP Concentration in Air Environment of Production Department II/III PT Semen Padang

No	Location	Distance	Time	Lenght of Measurement	consentration
1	*Raw mill*	15 m	09.30-15.30	6 hour	11.9 mg/m^3
2	*Coal mill*	15 m	08.43-15.43	7 hour	30.6 mg/m^3
3	*Kiln*	15 m	09.00-16.00	7 hour	20.4 mg/m^3
4	*Cement mill*	15 m	09.00-16.00	7 hour	40.8 mg/m^3

Table 2: Shows Temperature and Humidity in Air Environment of Production Department II/III PT Semen Padang

No	Area	Temperature (ºC)	RH (Relative Humudity) (%)
1	*Raw mill*	32.05	66.3
2	*Coal mill*	3.4	67
3	*Kiln*	28.8	78.4
4	*Cement mill*	29.5	75.2

Anthropometric Characteristics and Activity Patterns

Table 3: Shows Anthropometric characteristics and Activity Patterns Respondents

No	Element	Mean	Median	Mode	Min	Max	SD
1	Body Weight (w) (Kg)	66,22	64	78	47	88	11,22
2	Lenght of Exposure (t_E) (hour/day)	8	8	8	8	8	0,00
3	Frequency of Exposure (f_E) (day/year)	270	270	270	270	270	0,00
4	Duration of Exposure (D_t) (year)	7,47	5	3	2	35	7,32

Exposure Assessment

Table 4: Shows Lifetime and Realtime Intake of TSP Exposure to Employees of Production Department II/III PT Semen Padang

No	Point of Sample	*Lifetime Intake*	*Realtime Intake*
1	*Raw mill*	0.88 mg/Kg/day	0,22 mg/Kg/day
2	*Coal mill*	2.27 mg/Kg/day	0.56 mg/Kg/day
3	*Kiln*	1.52 mg/Kg/day	0.37 mg/Kg/day
4	*Cement mill*	3.03 mg/Kg/day	0.7 mg/Kg/day

Dose-Response Analysis

The reference dose (RfC) is a dose of a risk agent that is used as a reference for the body's safe value on non-carcinogenic effects. To know the RfC of a risk agent can be seen in the US-EPA Integrated Risk Information System (IRIS) of 2.42 mg / Kg / day (Ministry of Health of RI, 2012).

Risk Characterization

Table 5: Shows Values of Risk Quotient (RQ) for Lifetime and Realtime Intake

Point of Sample	*Lifetime*			*Realtime*		
	Intake life time	RQ	Risk	*Intake real time*	RQ	Risk
Raw mill	0.88	0.36	Not Risk	0.22	0.09	Not Risk
Coal mill	2.27	1.00	Risk	0.56	0.23	Not Risk
Kiln	1.52	0.62	Not Risk	0.37	0.15	Not Risk
Cement mill	3.03	1.25	Risk	0.70	0.30	Not Risk

Discussion

Based on the measurement of TSP air emission concentration conducted by researchers in four areas of Production Department II / III PT Semen Padang, the value of TSP concentration of Row mill area is 11,9 mg / m^3, Coal mill 30,6 mg / m^3, Kiln Of 20.4 mg / m^3, and Cement mill of 40.8 mg / m^3. The data showed that the largest concentration of TSP was in the Cement mill area of 40.8 mg / m^3 and the smallest in the Raw Mill area of 11.9 mg / m^3, the concentration value passed the inhalation particulate threshold value for the employees based on the Minister of Labor Regulation Work and Transmigration Number PER.13 / MEN / X / 2011 of 2011

on threshold value of physics factor and chemical factor is 10 mg / m^3 (Minister of Manpower and Transmigration of the Republic of Indonesia, 2011).

Based on research conducted by Mengkidi in Semen Tonasa Industry also stated that the content of cement dust in packing part 18,47 mg / m^3, raw mill 1,63 mg / m^3, limestone cruser 14,98 mg / m^3, mine 20,23 mg / m^3, kiln 4.56 mg / m^3, and cement mill 5.98 mg / m^3 causing lung function disorder in the worker (Mengkidi, 2006). Looking at the level of production capacity of the Semen Padang plant on a daily basis the value of TSP concentration dispersed in air Which is inhaled by the employee while working in the area will affect the respiratory system. Based on research conducted by Huang stating that cement dust causes respiratory distress symptoms in cement workers (Huang et al, 1996). Another study conducted by Zeleke in cement industry also stated that exposure to cement dust caused respiratory problems in cement workers (Zaleke et al, 2006).

The results of temperature and humidity measurements in four areas of Production Department II / III PT Semen Padang, obtained temperature results in four areas exceeds the requirements issued by the minister of health in the attachment of Decree of the Minister of Health of the Republic of Indonesia No. 1405 / Menkes / SK / XI / 2002 on environmental health requirements of office and industrial offices for temperatures not exceeding 28°C and 60% humidity (Ministry of Health of the Republic of Indonesia, 2002). Decree of the Minister of Health of the Republic of Indonesia No. 1405 / Menkes / SK / XI / 2002 on Health (Ministry of Health of the Republic of Indonesia, 2002). In areas with hot and slightly humid temperatures particulate levels of TSP will be dispersed in air.

Based on the results of a survey of employees working at the Department of Production II / III PT Semen Padang, obtained an adult body weight range of 47 to 88 kg and an average of 66 kg. Average weight is greater than the standard weight of Indonesian adults is 55 Kg (Rahman, 2007). So that the smaller the weight the received intake will be greater because the weight serves as a denominator. Weight is an important anthropometry variable that is greatly influenced by the actual dose of an individual acceptable risk agent. The greater the individual body weight the smaller the internal dose received (Nukman et al, 2005).

Based on the results of the survey on the employees who work in the Department of Production II / III PT Semen Padang, the length of work daily employees are divided according to shift ie 3 shifts in 24 hours, the first shift at 07.00 - 15.00, the second shift 15.00 - 22.00, the third shift 22.00 - 07.00. The length of employment of employees of PT Semen Padang refers to the Decree of the Minister of Manpower no. 13 year 2003 on Employment Article 77 paragraph 2, ie each worker has a working time of 8 hours per day with a total time of 40 hours per week (Law of the Republic of Indonesia, 2003). So the data obtained average daily exposure for 8 hours / day and the average value The frequency of individual exposure in a year for 270 days / year without a holiday on the red date, in the sense that employees continue to work even on national holidays (PT Semen Padang, 2015).

Based on the results of a survey of employees working in the Department of Production II / III PT Semen Padang, the duration of realtime exposure that has been received by individuals from the largest employment period of 35 years and the smallest for 2 years. From the data, the duration of exposure 35 years actually has passed the exposure of non-carcinogen lifetime duration is 30 years, whereas at 35 years of exposure can be expected someone has had pernyakit on him. However, it is necessary to undertake an advanced epidemiological study to see the magnitude of respiratory disorders in employees who work over 30 years.

Based on the description of the anthropometric data and the activity pattern, it can be concluded that the average body weight (wb) of the employee is 66 kg, daily exposure time (tE) is 8 hours / day, the average exposure frequency (fE) is 270 days / Year and the duration of exposure (Dt) realtime is 7.47 years. So it can be concluded that the duration of work of employees working in the research area can cause respiratory disruption, because employees exposed to TSP particulates every day in a long time. This is in line with research conducted by Mengkidi in 2006 there is a working relationship with lung function disorder (Mengkidi, 2006).

Based on the results of the determination of exposure assessment conducted by incorporating the anthropometric characteristic values and activity patterns into a formula expressed as intake, so that the highest intake lifetime and real time values can be found in the Cement Mill area and the lowest in Kiln. This higher intake value can make the area more risky than other areas. So it can be assumed that respondents who have high intake value will be easier to be exposed to health problems related to risk agent exposure. Meanwhile, based on the calculation of the value of intake and risk, the areas that are still assumed to be safe are Raw mill and Kiln areas.

However, this intake is not necessarily the same as the intake received by the actual individual. Intakes received may be smaller or larger. This is because the measurement of TSP concentration is not done personally using personal dust sampler (PDS), because measurements with PDS can more represent the concentration level that is inhaled each time based on individual activity pattern respectively. While emission air measurements only show a concentration picture in suatau area that can change at any time. The risk level (RQ) value was calculated based on the duration of the lifetime and realtime exposure with RfC value of 2.42 mg / Kg / day obtained from IRIS US-EPA data.

Based on the description of health effects resulting from exposure to TSP has been experienced by many employees of production. TSP exposure plays a role in the increased risk of respiratory and lung disease diseases in workers. This is in line with the results of the epdemiological research of the PTSP production plant is known that the area is a high level of dust exposure that can cause lung disease and respiratory symptoms.

The risk control that can be done to reduce the particulate concentration of TSP in air emissions can be done with some controls, first by installing air filtering devices on pollutant sources in the factory area, secondly reducing the concentration can also be done by reducing the daily capacity of the production capacities. However, the large reduction of production capacity is very difficult because it is related to the management of the industry itself.

Daily and annual exposure time of respondents is not possible to reduce because this work schedule of employees of PT Semen Padang refers to the Decree of Minister of Manpower no. 13 of 2003 on Employment Article 77 paragraph 2, ie each worker has 8 hours of work per day with a total time of 40 hours per week (Law of the Republic of Indonesia, 2003).

Conclusion

The calculation of the lifetime risk quotion (30 years) obtained from the comparison between intake and RfC values indicates the area of Coal mill and Cement mill at risk of respiratory disturbance with RQ> 1 and the calculation of realtime risk obtained from TSP exposure is assumed safe with RQ <1.

It is suggested to PT Semen Padang to install a high efficiency TSP particulate filter device on each production machine, monitoring and maintaining existing filtering tools regularly so that the filtration system can run well and control the particulate emission at predefined standard , And the management of temperature and humidity in the production plant room. It is advisable to employees to be more concerned about the health of themselves from the dangers of exposure to TSP in the workplace by getting used to wearing masks while working at a cement plant.

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THE ASSOCIATION BETWEEN PERCEIVED STIGMA TOWARDS TUBERCULOSIS AND THE IMPLEMENTATION OF DIAGNOSIS PROCEDURE ON TUBERCULOSIS SCREENING PROGRAM IN DENPASAR, BALI, INDONESIA

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Abstract: The major issue of Tuberculosis (TB) control program in Indonesia including Bali is the low cases detection rate (32%). An intensive presumptive TB finding through screening program and then followed by diagnosis procedure is important to conduct. Meanwhile, perceived stigma is a social determinant of health that strongly associated to health-seeking behaviour. This study aimed to assess the association of perceived stigma towards TB to diagnosis procedure implementation among presumptive TB casesscreened from diabetes mellitus (DM) patients. This was an operational research during the TB screening program among DM patients. The samples were collected consecutively from January until March 2016 at 11 public health centres (PHC) in Denpasar City, Bali Province. Data were collected via interview using structured questionnaire. Logistic regression was used for statistical testing. During 3 months implementation of screening program, there were 567 DM patients screened, 342 of them were presumptive TB cases and were recommended to follow TB diagnosis procedures. There were only 87(25,4%) who followed the procedure and 255 (74,6%) refused to participate. The refusal to diagnosis procedure was associated to the TB stigma (OR=1.7; 95%CI: 1.03-2.9). Meanwhile, perceivedstigma towards TB wasassociated to the lack knowledge of TB (OR=2.0; 95%CI: 1.3-3.2) and the lack of family support (OR=1.8; 95%CI: 1.1-2.7). The diagnosis procedure coverage among presumptive TB cases screened from DM patient was still low. The perceived stigma towards TB is contributed to the high proportion of presumptive TB cases who did not follow thediagnosis procedure. Therefore, a comprehensive education toincrease public awareness and supportto the TB program are necessary.

Keywords: Tuberculosis case findings, perceived stigma, diagnosis procedure, screening program

Introduction

Indonesia has a high burden of Tuberculosis (TB). Based on The National TB Prevalence Survey, the TB prevalence rate in Indonesia was 660 per 100.000 population. TB global report estimates that the incidence rate of TB in Indonesia in 2015 was 395 per 100.000 population. Meanwhile, the national cases notification rate (CNR) in 2015 was only 135 per 100.000 population. There is a big gap between incidence and notification rate. This data also showed the lack of national cases detection rate (CDR),which was only 32%.The CNR of TB in Bali provincewaslower than national rate, it was 70 per 100.000 population in 2015. The CDR in Bali also lower compare to that in national, which wasonly 21%. It means there was only 21% incidence of TB in the Balinese population that were notified and treated(National Institute of Health Research and Development - NIHRD, 2015; WHO, 2015; Health Office Of Bali Province, 2016).

A TB casefinding, which followed to prompt treatment, is very important to end TB transmission. Passive cases finding is not adequate to find TB cases in the population. It should be enhanced into an active cases finding through screening program, one of them is to the high-risk population such as diabetes mellitus(Raviglione,

2010). DM weakens the body's immune responsesand thus can increase the risk for TB infection (Creswell *et al*., 2011). Since 2015, NTP initiates the TB screening program to DM patient. In 2016, The Denpasar Health Office had piloting an active TB case finding program through TB screening program among DM patients. All DM patients should be screened for TB using symptoms, sign identification and chest X-ray examination. The presumptive TB cases found during screening program should follow diagnosis procedure for confirmation. (Ministry of Health Republic of Indonesia, 2015).

The success of an active TB cases finding through this program is depend on the participation of presumptive TB cases who follow the diagnosis procedure. One of the main determinants of health-seeking behaviour is perceived stigma. Perceived stigma is a perceived among people regarding social exclusion in population whichrelated to certain diseases. Social exclusion is one of social determinant of health that have major consequent in health inequity (Hatzenbuehler, Phelan and Link, 2013; Craig *et al.*, 2017). Most presumptive TB cases (51.3%) perceived that other people would consider them inferior if they have TB (Abebe *et al*., 2010).

This study aimed to assess perceived stigma towards TB among DM patients who follow TB screening program and to analyse the association between perceived stigma towards the implementation of TB diagnosis procedure.

Methods

Design

This was an operational research of the implementation of TB screening program among DM patients. The study usedcross-sectional design.

Study setting

Denpasar is the capital city of Bali Province, Indonesia. The population in Denpasar in 2015 was 880,600with the sex ratio of 104,5%. Denpasar is the most populated area in Bali Province with population density of6,891.5 people per km^2. Denpasar has 11 public health centres and 4 state hospitals. Based on National Health Research, the prevalence of DM in Denpasar was 2.8%. Denpasar also have thehighest number of presumptive TB who were examined and there were more than 4,500 presumptive TB in a year(Denpasar Health Office, 2016). The NTP in Indonesia uses the WHO-recommendation of Directly Observed Therapy Short course (DOTS) strategy. The management of presumptive TB cases is a priority because normally 10% of them will confirm smear positive. A case treatment and the monitoring and reporting system are following WHO guidelines (Ministry of Health Republic of Indonesia, 2014).

Population and sample

The study population was presumptive TBthat screened from DM patients who visited public health centres (PHC) in Denpasar City from January until March 2016. A presumptive TB was aDM patient who hadminimum one of TB symptoms or had an abnormality in lung or pleura based on chest X-ray. Sample wasselected consecutively from January until March 2016 in 11 public health centres (PHC) in Denpasar City, Bali Province.

Variable, data collection and analysis

Perceived stigma towards TB isa belief when presumptive TB will receivesocial exclusion if they are diagnosed as TB. The implementation of diagnosis proceduresis procedures that should be followed by presumptive TB for TB confirmation. TB confirmation was used sputum smear examination. Knowledge regarding TB is knowledge of presumptive TB regarding the determinant, mode of transmission, symptom, mode of prevention, susceptibility and the importance of TB early diagnosis. Family support is the support of presumptive TB's

family given to subjects to follow TB diagnosis procedure, which includes some supports on transportation, financial and motivation. The data ofperceived stigma, knowledge regarding TB and family support were collected via interview using structured questionnaire. The data of diagnosis procedure implementation were checked at smear results slip.The association of perceived stigma towards TB and diagnosis procedure implementation were identified using logistic regression.

Results

Based on the implementation of TB screening program among DM patient, we have567 DM patients visited PHCs in the period of January to March 2016. A 342 of them have symptoms or shown anabnormality on thechest X-ray examination result.We identified them as presumptive TB that should follow diagnosis procedure. Among 342 presumptive TB, only 87 or 25,4% following diagnosis procedure(Figure 1).

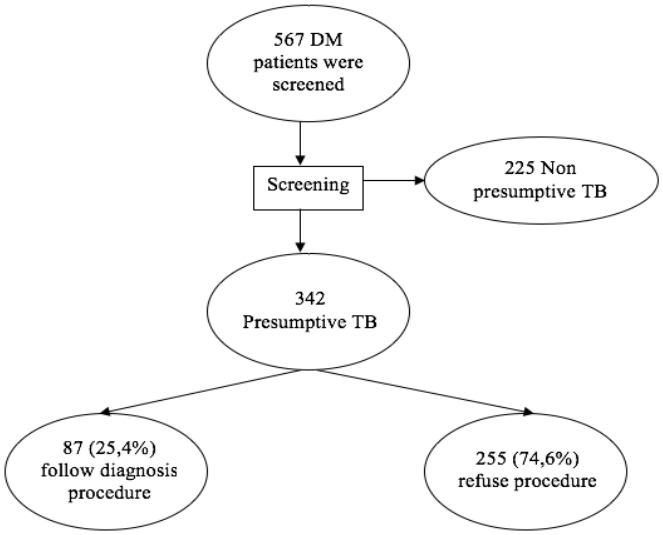

Figure 1. Scheme of Screening And Diagnosis Procedure

The subjects' characteristicsare shown in table 1. The mean of age of subjects who followed diagnosis procedure was 60.8 years old and subjects who did not follow diagnosis procedure was 61.8 years old. The proportion of male among those who followed diagnosis procedure was59.8% and among those who did not follow diagnosis procedure was 47.1%.There were 59.8% subjects who followed diagnosis procedure have educational background higher than junior high school and 49.0% were among those who did following diagnosis procedure. Most of them in both groups were still actively work and have health insurance. There were no difference of the subject's characteristics between presumptive TB who followed diagnosis procedure and those who did not follow the diagnosis procedure (Table 1).

Table 1. The Subjects Characteristic

Variable	Following procedure		Overall
	Yes (n=87)	No (n=255)	
Age (year) mean±SD	60.8±8.7	61.8±8.8	61.5±8.8
Sex, male	52 (59.8)	120 (47.1)	172 (50.3)
Education, >Junior High School	52 (59.8)	125 (49.0)	177 (51.8)
Employment			
Active work	61(70.1)	138(65.1)	229(66.4)
Retirement	26(29.9)	87(34.9)	113(33.6)
Have health insurance	84(96.6)	247(96.9)	331(96.8)

The association between perceived stigma towards TB, knowledge regarding TB and family support to follow the diagnosis procedure of presumptive TB screened from DM patients are shown in table 2. There were 150 of 342 presumptive TB (43.9%) believe that they will receive social exclusion if they were diagnosed as TB. There were 30.2% subjects followed diagnosis procedure among presumptive TB with no perceived stigma towards TB, meanwhile only 19.3% subjects followed diagnosis procedure amongpresumptive TB with perceive stigma towards TB. Perceived stigma towards TBwas associated to the succeeded of presumptive TB to follow diagnosis procedure with adjusted odds ratio (AOR) 1.7 and 95% CI: 1.03-2.9. The knowledge regarding TB and family support were not directly associated to the implementation of diagnosis procedure of presumptive TB (Table 2).

Table 2. The Association Between Perceived Stigma Towards TB, Knowledge Regarding TB and Family Support to Follow the Diagnosis Procedure by Presumptive TB Screened fromDM Patients

Variable	Follow procedure		Simple logistic	p value	Multiple logistic	p value
	Yes (n=87)	No (n=255)	OR (95%CI)		AOR (95%CI)	
Perceive stigma towards TB						
No	58(30.2)	134 (69.8)	1.8 (1.1-3.0)	0.023	1.7 (1.03-2.9)	0.039
Yes	29 (19.3)	121 (80.7)	ref			
Knowledge regarding TB						
Good	47(27.8)	122(72.2)	1.3 (0.8-2.1)	0.310	1.2 (0.7-2.0)	0.460
Lack	40(23.1)	133(76.9)	ref			
Family support						
Good	41(27.5)	108(72.5)	1.2 (0.7-2.0)	0.438	1.2 (0.7-1.9)	0.529
Lack	46(23.8)	147(76.2)	ref			

The association between knowledge regarding TB and family support to the perceived stigma towards TB are shown in Table 3. Among presumptive TB with lack knowledge regarding TB, 51.5% have perceive stigma towards TB, meanwhile among presumptive TB with good knowledge regarding TB, 36.1% have perceived stigma towards TB. Knowledge regarding TB was associated to the perceive stigma towards TB with AOR2.0 and 95% CI: 1.3-3.2. Among presumptive TB with lack family support, 48.7% have perceive stigma towards TB while among presumptive with good family support 37.6% have perceive stigma towards TB. Knowledge regarding TB was associated to the perceive stigma towards TB with AOR 1.8 and 95% CI: 1.1-2.7 (Table 3).

Table 3. The Association Between Knowledge Regarding TB and Family Support to The Perceived Stigma Towards TB

Variable	Perceived stigma towards TB		Simple logistic	p value	Multiple logistic	p value
	Yes (n=150)	No (n=192)	OR (95%CI)		AOR (95%CI)	
Knowledge regarding TB						
Lack	89(51.5)	84(48.5)	1.9 (1.2-2.9)	0.004	2.0 (1.3-3.2)	0.002
Good	61(36.1)	108(63.9)	ref			
Family support						
Lack	94(48.7)	99(51.3)	1.6 (1.02-2.4)	0.040	1.8 (1.1-2.7)	0.014
Good	56(37.6)	93(62.4)	ref			

Discussion

This study showed that many of the presumptive TB subjectsbelievedthey would have received social exclusion if they had TB. A study among presumptive TB in a rural community in Southwest Ethiopia also showed that perceived stigma towards TB was still high in population. A 51.3% presumptive TB perceived that their community would consider them inferior if they had TB(Abebe *et al.*, 2010). It is similar compare to this result, which found 43.9% people still have perceived stigma. This fact showed that stigma towards TB are still exist in the populations even in urban area such as in Denpasar City. In the other areas (rural) of Bali, the perceived stigma towards TB might be higher than this finding.Stigma towards TB should be solvedintegrally in TB control program.An education for presumptive TB cases should include psychological intervention to reduce perceived stigma (Tola *et al.*, 2016). A community intervention is alsoessential for educating people in the population such community leaders, public figures, religious leaders and non-government organizations. This is important because those figures are considered role models who have power to influence, educate and reduce the stigma towards TBin the community (World Health Organization, 2008; Arshad *et al.*, 2014).

The perceived stigma towards TB was associated to the presumptive TB who did not following diagnosis procedure. This finding has proven the consequence of TB stigma. Perceived stigma inhibits social interaction. One who keeps a secret of stigmatized disease will feel isolated. Therefore, the presumptive TB will disobey any advices from doctor or other health officer. Perceived stigma is a barrier to access health facilities. In term of health services on TB, perceived stigma leadsto the delay of diagnosis and the incompliance of the TB treatment (Aryal *et al.*, 2012; Anand *et al.*, 2014; Sharp *et al.*, 2015).A qualitative study exploring the perceived stigma towards TB and discrimination foundperceive stigma was strongly associated to the specific sociocultural context. Interventions to reduce stigma should adopt specific socio-cultural contexts. The social stigma will cause self-discrimination. Self-discrimination is withdrawinghim or herself from social relationshipsbecause they perceived unacceptable in the community (Baral, Karki and Newell, 2007).The educational and psychological interventions are important for people with presumptive TB, andto their family and the community are necessary to reduce stigma toward TB.

This study also found that perceived stigma towards TB was associated to the knowledge regarding TB and to the family support. This finding implicates that NTP should consider a comprehensive education to presumptive TB in a screening setting. The education is not only for the presumptive and people with TB but also to their family. An education to the community is also important particularly to increase their knowledge the determinant, mode of transmission, symptom, mode of prevention, susceptibility, the important of TB early diagnosis and explain that TB is a curable disease. This results provides important information to the TB control program about how to reduce perceived stigma towards TB.

NTP should enhance the coverage of TB health care services and provide further information to increase awareness of the community regarding TB. Therefore,TB officers and physicians in PHC should be capable to

identify particular problem faced by presumptive TB,including perceived stigma towards TB. When health officers conduct anamnesis or interviewing patients, they should ask about the perceived of presumptive if one had TB. They need a reliable instrument to identify perceived stigma towards TB. It will be very useful to plan proper education and knowledge to reduce the perceived stigma (Somma *et al.*, 2008; Arcêncio *et al.*, 2014).Similar finding is found in several studies regarding TB screening, case finding and consequence of TB stigma. A comprehensive health education to raise awareness and reduce the perceived stigma towards TBis main recommendation in those studies(Kidd *et al.*, 2009; Arcêncio *et al.*, 2014; Cremers *et al.*, 2015; Craig *et al.*, 2017).

The study limitations were regarding the measuring of perceived stigma. The instrument that used is limited, it only asked about social exclusion in daily activity. The questionswerenot includedsociocultural activity in the communityas the important aspect of perceived stigma. In terms of study period, this study also observepresumptive TB in limited time (only from 3 months of TB screening program implementations). The data from a year period should have more reliable result findings.

Conclusions

The major problem of TB screening program among DM patent is the low of presumptive TB who followdiagnosis procedure. Almost half of presumptive TB in urban area of Bali perceived stigma towards TB. The perceived stigma towards TB was associated to the low of presumptive TB follow diagnosis procedure. The lack knowledge regarding TB and family support were associated to perceived stigma towards TB.A comprehensive educational and physiological intervention are important to reduce perceived stigma towards TB.Health education should be focus on the determinant, mode of transmission, symptom, mode of prevention, susceptibility, the important of TB early diagnosis and TB is a curable disease. Community and family based TB control program to increase family support are essential.

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HEALTH PROFILE AND STATUS OF CHILDREN IN A SELECTED FOUNDLINGHOME: BASIS FOR A PROPOSED HEALTH MONITORING PROGRAM

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Abstract: The selected foundling home is an established institution for the unprivileged and abandoned children. Medical and Laboratory Examinations were conducted among the fifty-two (52) children of the said institution. Respiratory Tract and skin infections are among the diseases that were noted among the subjects. While Urinary Tract Infection (UTI) is not prevalent, intestinal parasitism is common among the children in the Foundling Home. Development of an effective health monitoring program is imperative to improve the present health status of the children.

Keywords: foundling home, health monitoring program, health profile

Introduction

More than one billion children are severely deprived of at least one of the essential goods and service they require to survive, grow and develop- these include nutrition, water, sanitation facilities, access to basic health-care services, adequate shelter, education and information. As a result, almost 9.2 million children under-five die every year. Most of the 25,000 children under five that die each day are concentrated in the world's poorest countries in sub-Saharan Africa and South Asia. (UNICEF, 2016). Children who are most commonly and severely ill, who are malnourished, and who are most likely to die of their illness, are those of the most vulnerable and underserved populations of the developing world. In these countries the most common causes of child mortality are due to acute respiratory infections (mostly pneumonia), diarrhea, measles, malaria or malnutrition.

The Philippines, a developing country situated in the Southeast Asian region suffered the same scenario and the leading causes of morbidity are acute respiratory tract infections (pneumonia, bronchitis), diarrhea, influenza, and urinary tract infection; whereas, pneumonia and diarrhea are the leading causes of child mortality. (Department of Health, 2011). Likewise, under-nutrition in the Philippines remains a serious problem. Available data show large numbers of Filipino children are undernourished; 3.6 million of children 0-59 months are underweight; and 4 million are stunted. Prevalence of anemia was surveyed to be 55.7% on Filipino children 6 months to less than 1-year-old. In addition, it was found that 62% of children are positive for intestinal parasites. Deaths among children below five remain highest in the poorest sectors of society, in rural areas, and among families with low educational status. The inequities in child and maternal health are most profound in geographically isolated and disadvantaged areas of the country but are also found in urban settings where areas populated by informal settlers are on the rise.

The rising population in the Philippines is another challenge faced by the government. As the Philippines have financially limited resources and a high poverty rate, the rapid increase in population has become a problem because there is an insufficient resource to support the population. Of the 100, 981, 437 population (PSA, 2015) 33.71% belongs to 0-14 year's age group. It could be assumed that one of the consequences of rising population is poverty and the rise of abandoned children. About 1.8 million children in the country, more than 1% of its entire population, are abandoned or neglected, according to the United Nations' Children's Rights and Emergency Relief Organization. Some are victims of extreme poverty; others of natural disasters and armed conflicts. The Department of Social Welfare and Development is responsible for ensuring

that many of these children find homes. Some of these children are brought to government-run orphanage or foundlings while others are taken care of by privately funded agency or non-government institution. However, orphanages in the Philippines are scarce, poorly staffed and inadequately funded.

The Manila Boystown is government-run institution that caters for Manila's abandoned, forgotten, and voluntarily surrendered children, teen-agers, and senior citizens. Children who were turn over in this institution were mostly neglected of their health needs and because of insufficient funding healthcare are limited to dental test and psychological evaluation. Since children are most vulnerable to infections and diseases particularly in this environment. This study aimed to determined health profile of children living in Manila Boystown through physical examination and laboratory tests. The examinations specifically targeted diseases and infections that are most common in children such as respiratory tract infections, urinary tract infection, intestinal parasitism and anemia. The information gathered will be used as basis for proposing an effective health monitoring program that will redound to the improvement of the health status.

Materials and Methods

Study Design and Population

This descriptive cross-sectional study was conducted in a foundling home located in Marikina City. Data were collected from fifty-two (52) children in the foundling home between the periods of November 2012 to October 2013.

Ethical Consideration

Ethical approval was secured from the Ethics Review Committee of Centro Escolar University. Local administrators gave their consent since the university has an existing Memorandum of Agreement (MOA) with the selected foundling home. Anonymity and confidentiality was observed in all stages of data collection.

Data Collection and Analysis

The children were examined by a licensed physician to determine presence of upper respiratory tract infections and skin diseases based on the current symptoms manifested by the subjects. Other respiratory tract infections which would require special procedures for detection like x-ray were not included in the study. Urinary tract infections and parasitism were detected through routine urinalysis, routine fecalysisand examination of perianal swab. The height and weight were likewise noted.

Results

Profile of the subjects

Children belonging to the four to six years old age bracket gave the highest representation which forty percent. The age of one of the subjects was not accurately determined due to unavailability of document such as birth certificate. Also, of the 52 respondents, 23 or 44.23 percent have stayed in the Foundling Home for 3-4 years. Only three children or 5.77% have been in the institution for 7-8 years. Results suggests that although the institution have exhausted all means to locate immediate families of the subjects, those children who have been there for more than 5 years may no longer have relatives to claim them.

Medical Profile

Majority of the children's height is normal with the frequency of 31 out of 52 children (59.61%) whereasthe number of children who are underweight (21 or 40.39%) are almost as much as the children with normal weight (31 or 59.62%).

Table 1: Height Distribution of the Respondents

Age	Height					
	Below Normal		Normal		Above Normal	
	n	%	n	%	n	%
0-3	2	3.85	0	0	2	3.85
4-7	3	5.77	24	46.15	0	0
8-11	14	26.92	7	13.46	0	0
Total	19	36.54	31	59.61	2	3.85

Table 2: Weight Distribution of the Respondents

Age	Weight			
	Underweight		Normal	
	n	%	n	%
0-3	2	3.85	2	3.85
4-7	9	17.31	19	36.54
8-11	10	19.23	10	19.23
Total	21	40.39	31	59.62

Physical Examination Findings

Physical examinations revealed that 46.3% were reported to have respiratory tract and skin infections, in general more than half of the subjects were evaluated as essentially normal, with a percentage of 53.7%. findings suggest that the medical conditions of the children are not closely monitored by the institution. This may be due to lack of funds needed to provide adequate and immediate treatment.

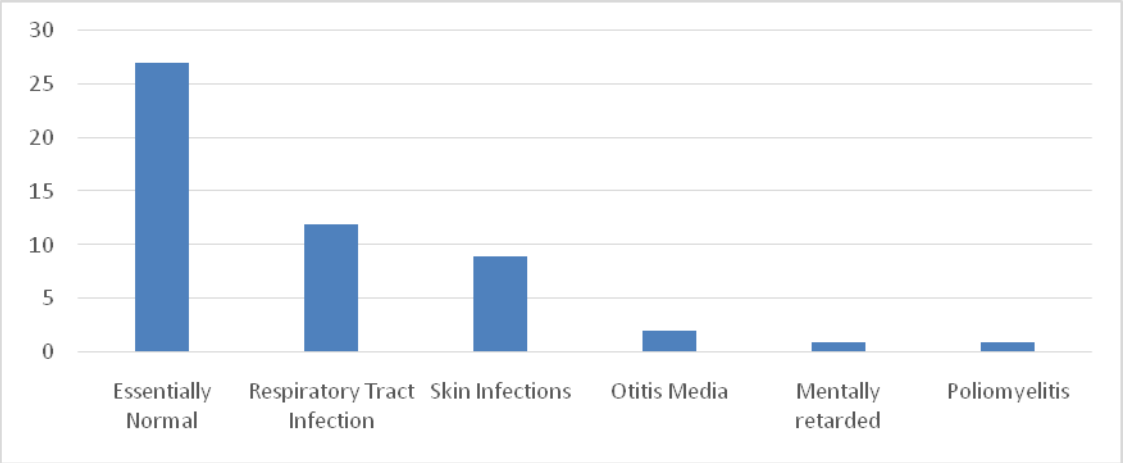

Figure 1: Physical Examination Findings

Laboratory Examination Findings

Laboratory examination of the respondents includes routine analysis, routine fecalysis and perianal swab

Table 3: Laboratory Examination Findings of the Respondents

Laboratory Examination	Positive		Negative	
	n	%	n	%
Routine Urinalysis	16	30.76	36	69.24
Routine Fecalysis	23	44.24	29	55.76
Perianal Swab	13	25	39	75

Proposed Health Program and Monitoring

Based on the findings of the study, a health program and monitoring is hereby proposed in order to address the health issues or improve the health status of the children in the Foundling Home.

Table 4: Proposed Health Monitoring Program

Goal	Objectives	Strategies	Target Population	Personnel Involved	Target Date
Improve the current health status of the children	At the end of the health program, A) 90% of the children will: 1. No longer manifest symptoms of Respiratory Tract and Skin infections 2. Be negative for Urinary Tract Infections and any intestinal parasites 3. Have normal Complete Blood Count result 4. Be able to attain normal weight appropriate for age and sex. 5. Practice proper hygiene for health promotion. B) 90% of the house parents will: 1. Be able to prepare correct list of address the nutritional needs of the children. 2. Be able to provide clean environment for the children. 3. Cooperate in the implements of the	1. Immediate and adequate treatment for those who were diagnosed with medical conditions. 2. Be channeled to private/public agencies to address the medical treatment and periodic check-up. 2.1 Monitoring Activity -Conduct Medical, Laboratory examinations every six months. -Regular deworming of children every six months. 3. Conduct health education for children and house parents that will zero in the practice of proper hygiene and environmental sanitation. 4. Provide the house parent with a seminar that will focus on the	All children in the Foundling Home	House parents, Researches, Private and Public Agencies	November 2013-March 2014

	proposed health program.	nutritional planning and meal preparation especially for the children of the Foundling Home 5. Assist in the implementation of the proposed health program			

Discussion

Forms of child abandonment have occurred in varying degrees in nearly every culture and society. Some abandoned children and foundling were housed in institutional care but their welfare and how they fared in these institutions were not given much attention. Children living in orphanages are more likely to have health problems and are at increased risk of infectious diseases; however, in the Philippines, little studies were done to assess health conditions of children living in orphanage or foundling. In this study, the health profile of 52 children living in a foundling home in Manila was determined. Physical and laboratory examinations were done to evaluate probable infections or disease. The most common findings were presence of respiratory tract and skin infections. Almost half of the children examined were also positive for intestinal parasites. These findings could be attributed to poor hygiene and environmental condition of the foundling home. Browne (2009) in his study of the risk of harm to young children in institutional care stated that some children in institutions suffer from poor health due to detrimental physical conditions, a restricted environment or a lack of interaction. Moreover, indoor crowding and sharing of personal belongings- conditions most notably found in foundling home, favor transmission of respiratory and skin infections.

Age is another important key factor that affects health of children in institutional care. Evidence strongly suggests that the experience of orphanage care is most damaging for children under the age of five and especially so for children under the age of three, since it is during these critical years that children need to develop the physical, cognitive, psychological, and social foundation for the rest of their lives. Forty percent of the respondents belong to four to six age group bracket and almost 50% have lived in foundling home for three to four years. Extensive research in child development has shown that living in an orphanage from an early age can result in severe developmental delays, disability, physical stunting, and potentially irreversible intellectual and psychological damage. The negative effects are more severe the longer a child remains in an orphanage (UN General Assembly, 2010)

Another important finding is the prevalence of underweight children. Forty percent of children examined were underweight and stunted. The cause of this could be malnutrition. Malnutrition is a common risk for children who need extra time and support to eat. Young children and those with disabilities often become malnourished when support is not give, even though there is plenty of food available (Mulheir& Browne, 2007). The Bucharest Early Intervention Project found that Romanian children lost one month of normal growth for every 2.6 months spent in an institution. Other studies in China and Russia found similar results: one-month delay for every 3.0 or 3.4 months. (Bucharest Early Intervention Project, 2015).

It has been advocated that orphanages should be an intervention of last resort and temporary solution because extensive studies showed that there is a risk on physical, psychological and mental health of children placed for a longer period in institutional care. While this is ideal, unfavorable and uncontrollable circumstances placed these children in this condition and to lessen the effect and improve their health condition, health teaching and monitoring, improved sanitation, medical intervention should be afforded to this underserved population.

Conclusion

Results of this study showed that there is a need to propose an effective health monitoring program to improve the present health status of children in the Foundling Home.

Recommendations

In view of the aforementioned findings and conclusions, the following recommendations are hereby proposed:

1.Implementation of proposed health program.

2.Conduct other test like x-ray and dental examination to fully assess current health status of the children.

3.Similar studies may be conducted to identify the health needs of other adopted communities of the College of Medical Technology or of the university.

4.Referral of children with illnesses should be address to appropriate private or public health care providers.

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REHABILITATION PROGRAM FOR SMOKERS AMONG STUDENT: SMART SOLUTION TO DECREASE THE NUMBER OF ACTIVE SMOKER IN SMKN 2 BANDAR LAMPUNG

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Abstract: Smoking is a bad habit that danger the smoker and the non-smoker. In SMKN 2 Bandar Lampung, some amounts of students, have started smoking. Therefore, it is urgent to conduct socialization and found anti-smoking. We proposed to form agents (name of agent is Mr. Narsis) to rehabilitation for smoking students that aimed to educate students about danger of smoking and delegate the students of SMKN 2 Bandar Lampung will be anti-smoking representatives who understand and able to do socialization, management, and rehabilitation for smoking students as the solution to create a healthy environment in school. The method is agents were selected from qualified participants of socialization. The selected students will go through counseling training and become peer counselor for their smoker friends. There will be 50 agents who will be divided into 17 groups, each group will counsel 5 active smoker. There were three simulations conducted with three different skills of counselor in each simulation. Another method used is snake and ladder game about anti-smoking campaign. Finally, there were three evaluations, in pre-socialization, after socialization, and the overall skills of anti-smoking counselor. The result from this program is will be form agents anti-smoking as counselor and decrease smokers at school.

Keywords: rehabilitation, counseling, anti-smoking snake and ladder

Introduction

Basically, smoking for human being is essentially viewed as a multi-complex problem because it involves smokers and other factors outside of it. For a true smoker, smoking is considered to increase concentration to solve problems, relieve drowsiness, be used as sedative and to familiarize situation. This fact shows the wrong perception of smoking (Nandika, 2013).

Research shows that cigarettes are very dangerous for the smokers themselves (active smokers) and people around them (passive smokers). Smoked cigarettes contain more than 4,000 types of harmful toxic substances (Papalia, 2011).

Among school-age teenagers, the number of smokers continues to increase every year. In Indonesia, based on data from the General Directorate of Non-Contagious Diseases Ministry of Health. Before 1995, the prevalence of teenagers to cigarettes was only 7%. In 2010 it rose to 19%. The statistical data showed that in general, a person started to decide to smoke after he was 15 years old (54.15%) and the rest (45.85%) is above that age. The first highest smoker was at a younger age of 16-18 years. This rate is very significant compared to other younger age groups (Nandika, 2013).

When cigarettes are burned, cigarettes release hydrogen cyanide gas while incomplete burning of cigarettes can produce carbon monoxide (CO) gas which makes the blood difficult to take oxygen from the lungs (Nurrohmah, 2014).

Another dangerous substance is Tar and Nicotine. Tar is the material that causes cancer. In addition, Nicotine is a substance that can stimulate the nerves and the brain that can cause addicted effects.The level of tar in cigarettes is between 0.5-35 mg per stem. Whereas, the nicotine content 4-6 mg smoked by adults every day can make someone addicted (Hartono, 2013).

The results of research in the UK showed that approximately 50% of smokers who smoke since teenagers will die due to diseases associated with smoking habits (Nurrohmah, 2007).For more detailed, the dangers of smoking for the human body can be seen in the following figure (Hartono, 2013).

In SMKN 2 Bandar Lampung, there are many students who consume cigarettes, especially the male students. Students do this habit even when they are in school. In school, smokers usually do this together with their friends in the classroom, canteen, toilets, and other places that are far from the supervision of the school officials. Even worse, there are students who skip the class to smoke with their friends.

Viewed from the students background knowledge, related to the knowledge of the dangers of cigarette consumption is still minimal. Mostly, students smoke because of being influenced by friends and lack of attention from their parents, but they are less aware of the dangers of chemicals contained in cigarettes (Thabrani, 2013). The another reasons the students become the smoker is the cigarettes assume as a friend, decrease the pain of the body, and relaxation (Salawati and Amalia, 2010).The another reasons are the smoking something like human right and should be hard to stop that activity (Pranata, 2012). Based on some research about the dangers of cigarettes , the cigarette will be give the bad effect to the vaskular of the body such as hypertension (Untari, 2012). Smoking is also associated with vital capacity of the lungs (Wijaya, 2015). Otherwise, The smoking can give the bad influence to the cardiorespiration of the body (Rizaldy, 2015). If this continues to occur in students and there is no solving of the problem quickly then there will be lung health problems, disruption in the learning process for students.

Concerning the phenomenon, Our Team through the student creativity program Mr. NARSIS (Rehabilitation Program For Smokers Among Student) agent conducted the counseling, training, mentoring, and peer counseling practical training for rehabilitation of active smokers students at SMKN 2 Bandar Lampung. The effort done by Mr. NARSIS is a smart solution to reduce the number of smokers among students and forming the cadres as Mr. NARSIS agents. By being confirmed and inaugurated, Mr. NARSIS is expected that the danger of cigarette consumption among students SMKN 2 Bandar Lampung can be solved.

Materials and Methods

Implementation Methods

The method used in the rehabilitation management activities of the smokers in SMKN 2 Bandar Lampung consists of counseling, training, mentoring of peer counseling practice. Besides that, the simulation and sharing is

conducted in the group joined in Mr. NARSIS agents. All the preparatory activities are established in the first month and the second month by doing survey, licensing, and arranging the instruments. Then, students who are able and willing, become the agent of Mr. NARSIS, including the students recommended by the principal. There will be 50 agents who will be divided into 17 groups, each group will counsel 5 active smoker. In this activity, cooperation with the Health Office and the Education Office of Lampung city is conducted as the related agencies in Bandar Lampung.

Stages of the Implementation Methods

a. Preparation stage

All preparatory activities are done in the first month and second month by survey, licensing and arranging the instruments. Then, the student who is able and willing, become the agent of Mr. NARSIS, including the students recommended by the principal. In this activity, cooperation with the Health Office and the Education Office of Lampung city is conducted, as related agencies in Bandar Lampung.For more detail, the activities dare one in the following preparatory phases.

- A field survey to review the location and other aspects of the target area.
- Creating and submitting a location permission proposal.
- Detailing the estimated funds for the program.
- Designing the educational materials about the dangers of cigarette consumption.
- Preparing the facilities of supporting activities such as power point presentation, video, pocket book, stand banner, and pamphlet.
- Preparing the identity of the Mr. NARSIS agent in the form of hat, sling, and certificate.

b. Implementation stage

1. Counseling and Training of Mr. NARSIS basic material, which consists of the following materials:
    - Counseling of basic material 1 (Cigarettes For Students),
    - Training of basic material 2 (Cigarette User Rehabilitation Management)
    - Training of basic materials 3 (Peer Counseling Guidance)
2. Training and Guiding the Practice of counseling guidance done by the counselor:
    - Training and guiding the practice of the four principles of counseling
    - Training and guidance of counseling guidance strategy
    - Training and counseling the practice of group counseling.

c. The Celebration of No Tobacco Day (*Hari TanpaTembakauSedunia/HTTS*)

1. Stating the commitment and determination of the Mr. NARSIS agent to implement the program to decrease the number of active smokers.
2. Public awareness about the dangers of cigarettes on through the action to the streets on HTTS warning

d. Cigarettes Breaking Action (*GerakanPatahkanRokok*)

1. Active smokers' awareness against the dangers of smoking by Mr. NARSIS agents.
2. Inviting to quit smoking by breaking cigarettes and changing cigarettes using candy (dates, etc.)
3. Public awareness about the dangers of cigarettes by giving brochures about the dangers of smoking by Mr. NARSIS agent.

Evaluation of Program Implementation and the Sustainability

Evaluation is done by conducting pretest before counseling, training, and counseling exercises and peer counseling guidance to rehabilitate active cigarette users. Pretest aims to measure the level of knowledge and skills of Mr. NARSIS on the rehabilitation management of cigarette users for active smokers. After the completion of the series of activities, they are given counseling, training, and mentoring of peer counseling and counseling practice to rehabilitate active cigarette users, a posttest is conducted at the end of the training activities with the aim of knowing the level of knowledge and skill of Mr. NARSIS after following the series of Mr. NARSIS activities.

In addition, to evaluate the knowledge and skills of Mr. NARSIS at the end of the program implementation of Mr. NARSIS,the success of Mr. NARSIS was also evaluated in implementing the program, so it can be obtained the information of the number of students who can be rehabilitated.

The evaluation instrument is an objective test conducted before and after the implementation of training and mentoring. In addition, checklist is also used to obtain the data of students/clients who participate in the stop smoking program.Data analysis method used is quantitative analysis using the statistical percentage that are supported with the presentation of the results of its processing by using graph.

Results and Discussions

The result reached is according to indicator of short-term success, based on the types of activity and resulted percentage of the activity target. These are the results reached during the implementation:

Students of SMKN 2 Bandar Lampung Understand the Threat and Danger of Cigarettes Consumption

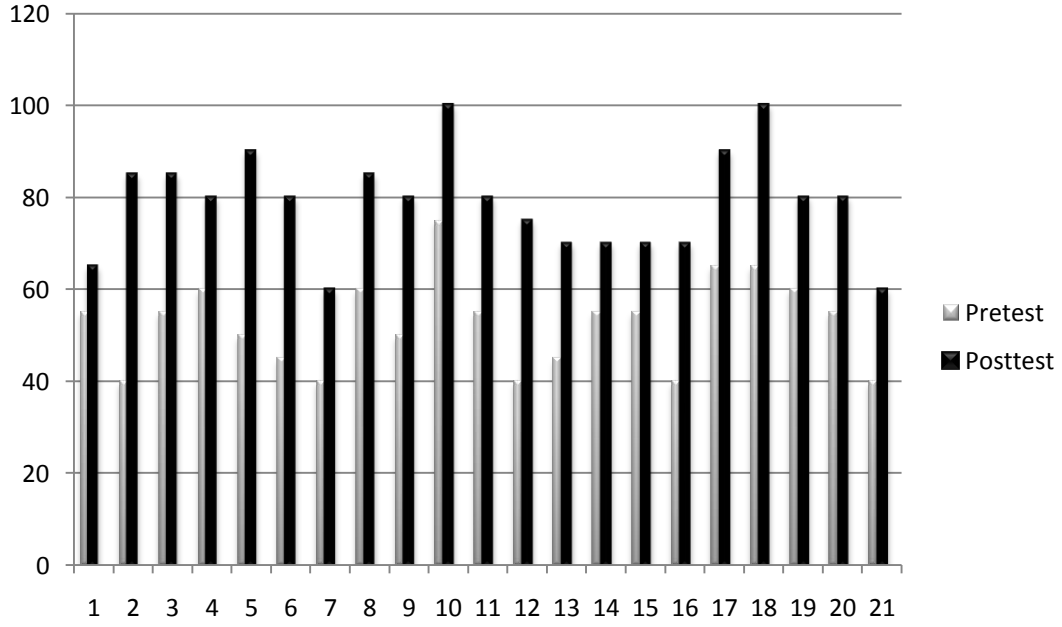
Based on the program implementation Mr. NARSIS program in SMKN 2 involving 21 Mr. NARSIS agents, it was selected to get the idea that the program succeeded in increasing the understanding of the health danger of cigarettes and providing skills for Mr. NARSIS to conduct counseling in order to rehabilitate smoker students.

During the program, the agents of Mr. NARSIS participated in seven basic materials training courses I, II, III, and IV as well as training and practice of peer counseling guidance three times. Basic material training 1 was held on Monday, May 15, 2017 with the theme of cigarette danger for students. Then, it is continued on Thursday, May 18, 2017 with the theme of rehabilitation management of cigarette users as basic material II and guidance counseling group as the basic material III. Explaining the materials is by presentations, group discussions, demonstrations, and frequently asked questions.

Training and practice of peer counseling I was held on Saturday, May 20, 2017 with the theme of four Sprinciples of counseling. Further Training and counseling guidance practice of peer group II is conducted on Monday, May 22, 2017 with the theme of guidance counseling strategy and Training and counseling guidance practice of peer group III is held on Tuesday, May 23, 2017 with the theme of peer group counseling. Material is presented by counselor with question and answer method, and peer counseling practice is done by agent.

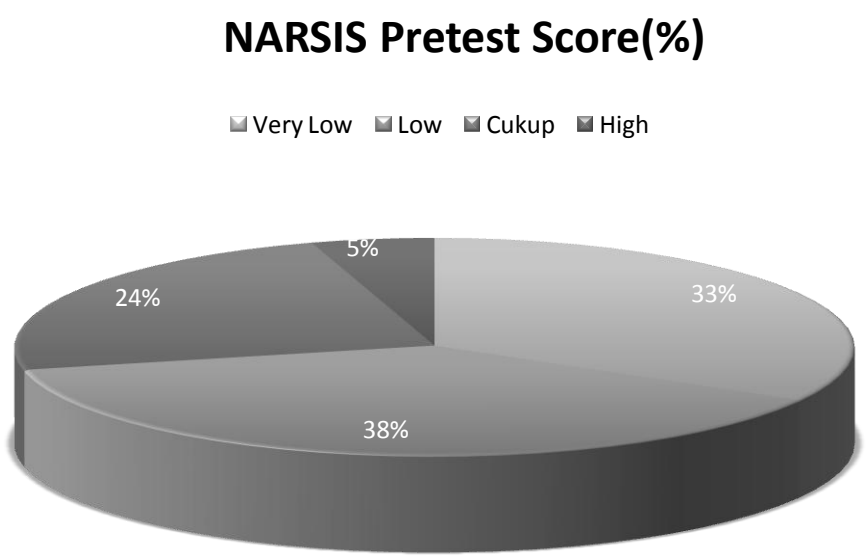
The next training material is the basic material IV and anti-smoking ladder game and was held on Monday, June 5, 2017. In the anti-smoking ladder game included the elements of education related to the threat of cigarette consumption and how to maintain lung health in the form of questions that are packed in an interesting and exciting way for students who become participants.

Before the training and counseling guidance courses, pre-test was given at MR. NARSIS to find out the initial understanding of the dangers of cigarettes and post-test is the material evaluation of the knowledge aspects of the agents after the program is implemented. The results of pre-test and post-test can be seen in the following graph:



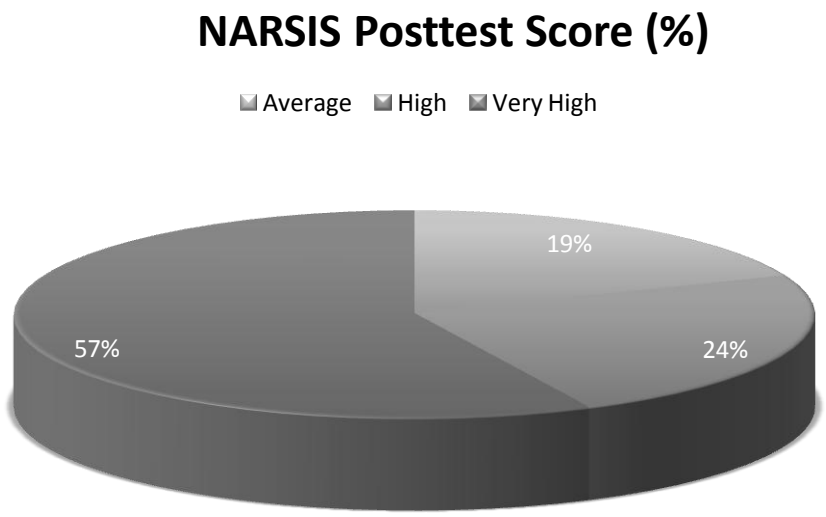
Graph 1. The Score Of Mr. NarsisKnowledge Pre-Test Dan Post-Test

From graph 1 above, it shows that the average score of posttest knowledge of Mr. NARSIS agents was 77.88 while the average score of pretest knowledge of agents was only 52.61. The highest score at the Post-test is 100 while the highest score at the time of Pre-test is 75. For more detail the percentage of pretest and posttest values can be presented in the following graph.



Graph 2:The Score of Mr. Narsis Knowledge Pretest

From graph 2 above, it shows that the score of pretest result of Mr. NARSIS about rehabilitation management of active cigarette users is: 33% received low scores (40-49), 38% is low (50-59), 24% is fair (60-69) and only 5% received high scores (70-79). Then, for the percentage of posttest score can be seen in following graph 3.

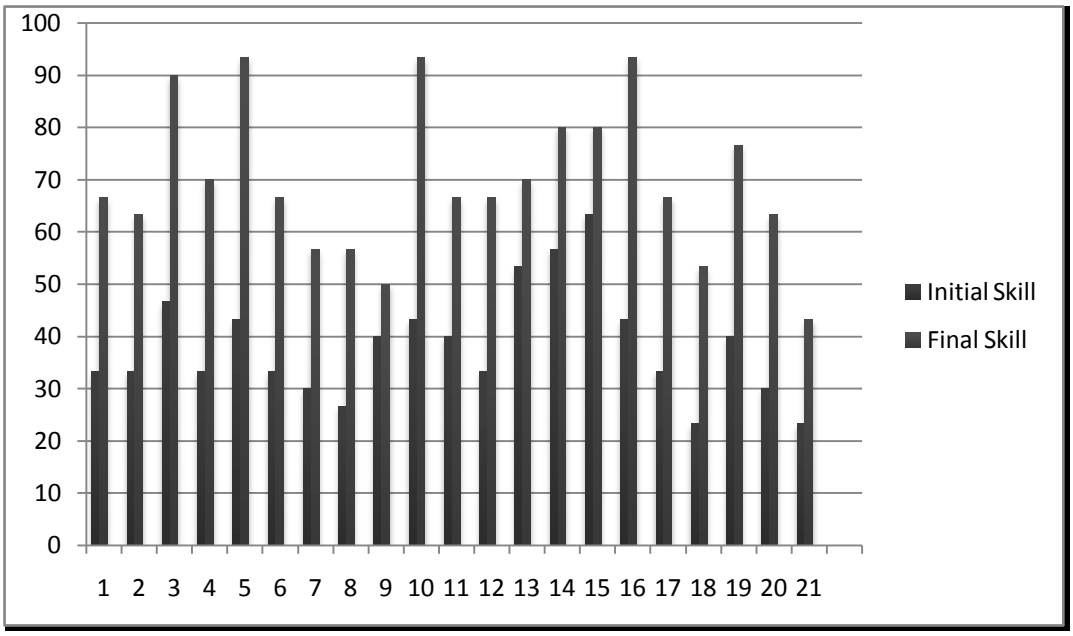


Graph 3. The Score Of Mr. Narsis Knowledge Posttest

From graph 3 above, it shows that the score of posttest result of Mr. NARSIS on rehabilitation management of active cigarette users 19% is fair (60-69), 23% is high (70-79), and 57% achieved very high score (80 and above). This means training increases Mr.NARSIS knowledge, so no one has any knowledge in the low category.

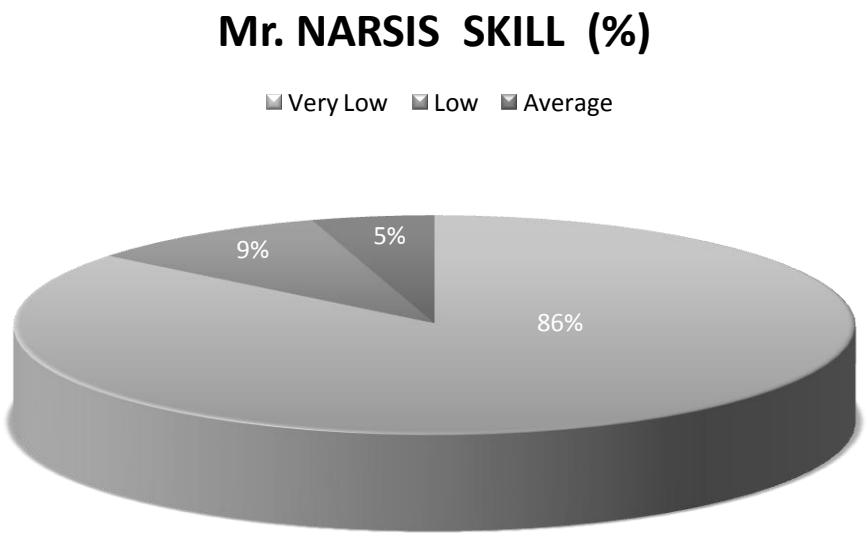
1. Establishment of Cadre Student as Agent of Mr. NARSIS in SMKN 2 Bandar Lampung Who is Able to Conduct Cigarette User Rehabilitation Management for Friends.

Besides conducting pre-test and post-test to evaluate students' knowledge, evaluation of rehabilitation management skills of cigarette users by Mr. NARSIS agents is also conducted. This skill is in the form of an assessment of the ability of an agent to conduct peer counseling conducted on Sunday, May 29, 2017. The total score of each agent is taken by average achieved by the agent is divided by the maximum score that should be achieved on the checklist and the multiplied 100%. Mr. NARSIS agent skills in conducting student rehabilitation can be seen in graph 4 below.



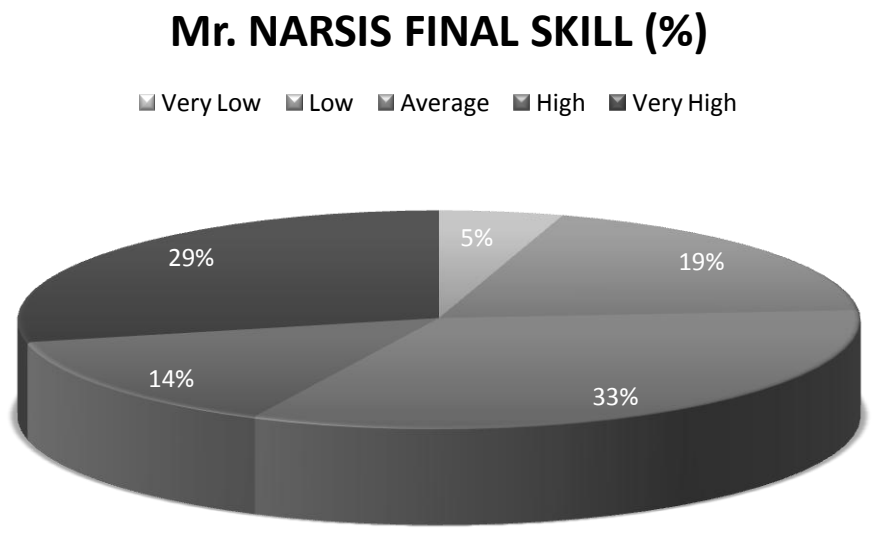
Graph 4. The Score Of Mr. Narsis Agent Skill In Rehabilitation

Graph 4 shows that the average score of the agent on the initial skill is 37.7. The highest score is 56.6, and the lowest is 23.3. Then, in the final evaluation obtained the highest score is 93.3 and the lowest score is 43.3 with an average is 70.28. Detailed percentage of initial and final skill scores is presented in the following graph :



Graph 5. The Score Of The Mr. Narsis Initial Skill In Rehabilitation

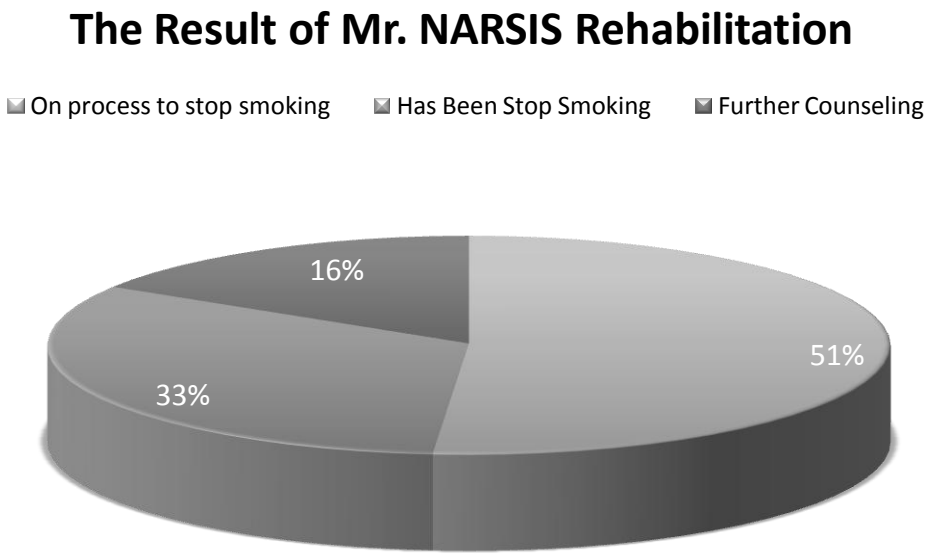
On the graph above, Mr. NARSIS initial skill 85.72% obtained very low score (less than 50), 9% obtained low score (50-59) and only 5% achieved fair score (60-69). Here, it can also be described the score of Mr. NARSIS at the end of the activity on the following graph 6.



Graph 6. The Score Of Mr. Narsis Final Skill In Rehabilitation

The graph above shows the agent skills at the end, is 5% has very low score (40-49), 19% has low score (50-59), 33% has fair score (60-69), 14% has high score (70-79) and 29% has very high skill (score 80 or more).

This following graph 7 is the result of Mr. NARSIS in conducting management of active cigarette user rehabilitation at SMKN 2 Bandar Lampung.



Graph 7. The Result Of Mr. Narsis Rehabilitation

From the graph 7, it can be seen that Mr. NARSIS during the program has succeeded in reducing the number of active smokers among students in SMKN 2 Bandar Lampung. This success was accounted for 84% of the total students attending the counseling program, with details of the achievement: 51% of students are in the progress on stop smoking, 33% had quit smoking and only 16% still needed further counseling from Mr.NARSIS.

2. Students and Officials in SMKN 2 Bandar Lampung Can Implement the Concept of "NO SMOKING AREA" in School Environment

Materials Training of Mr. NARSIS agents (Materials 1, 2, 3, and 4 also contain the introduction of tools and materials to be used as the equipment for cigarette user rehabilitation management. Skills possessed by Mr. NARSIS can be maintained with the guidebooks and pocket books availability of agents on the management of cigarette users rehabilitation for students at SMKN 2 Bandar Lampung so that the agent of Mr. NARSIS can continuously learn the rehabilitation management materials of cigarette users that have been given and can apply them independently in everyday life.

The realization of non-smoking areas in the school environment is also supported by Mr. NARSIS in commitment and attentiveness of the Mr. NARSIS team to implement the program of reducing the number of active smokers and socialization of the dangers of cigarettes in the community with the action on the No Tobacco Day (*Hari TanpaTembakauSedunia/HTTS*). This activity received welcome and support from the community and the school. In the future, the school will support and ensure the sustainability of the program by

establishing Mr. NARSIS to become one of the activity units and Mr. NARSIS as one of the extra-curricular programs of schools in Indonesia, especially in Province Lampung

Besides the non-smoking area in the school environment, it is also supported by Mr. NARSIS , an temptation to quit smoking with the act of breaking cigarettes and changing cigarettes using candy (dates, etc.) and public awareness about the dangers of cigarettes by giving brochures about the dangers of smoking done by the Mr. NARSIS agents in the form of activities In establishing Cigarette Breaking Action (*GerakanPatahkanRokok*). The actionto break this cigarette will be done once a year together with No Tobacco Day (HTTS) celebration to take to the streets to provide awareness to the community of active smokers.

Conclusion

Rehabilitation program for smokers among student is a form of education directed from students to students. In this case, the program is done in this management in the form of educating students of cigarette users through peers (Mr. NARSIS). It is expected that in this program, the selected students give a positive influence on the students themselves so that smoking behavior can be reduced or even abandoned.Education is a conscious and well-planned effort to achieve the expected educational goals by requiring the involvement of educational factors, the rehabilitation management education of cigarette users among students needs to regulate and utilize all the factors involved for the success of these activities that contribute to the achievement of program objectives which is to decrease the number of active smokers in school. In order to succeed that program, the implementation of the program involves the stakeholders (teachers, principals, communities and relevant agencies). Mr. NARSIS is in order to make a real contribution in anti-smoking program and is used as a model for schools in Indonesia, especially Lampung province.

Confirmed Mr. NARSIS agents can certainly continue the programs that have been trained and practiced during training and mentoring. Programs, such as the implementation of peer counseling to rehabilitate active smoker students, the implementation of a No Tobacco Day celebration program, and Cigarettes Breaking Action. The program of Mr. NARSIS has many benefits so that it has been appreciated by the school. This activity can be used as one of the extra-curricular activities of the students in the future.

More contribution is that Mr. NARSIS can be a model by other schools. Finally Mr. NARSIS program is not only beneficial for students of SMKN 2 Bandar Lampung in decreasing the number of active smokers, and the creation of non-smoking areas or environments, but also useful for other schools as an extra-curricular model. Besides, the benefits are also felt by the community around the school because Mr. NARSIS not only has in-door program but also out-door program, by programming activities routinely every year such as No Tobacco Day and Cigarettes Breaking Action as the media to provide education to the public about the dangers of consuming cigarettes.

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PREVALENCE OF HEMOGLOBINOPATHIES AMONG SCHOOL GOING ADOLESCENTS IN A RURAL BLOCK OF DARJEELING DISTRICT, WEST BENGAL, INDIA

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Abstract: Background: Hemoglobinopathies are commonest hereditary disorders in India. Hemoglobin E (HbE), in double heterozygous states with beta thalassemia trait may cause thalassemia, a fatal yet preventable disease. Its proven association with Rajbanshis, major ethnic group of this terrain has been well documented. Universally accepted preventive interventional strategies like screening tests for case and carrier detection remains the mainstay. **Objectives**: To determine prevalence of hemoglobinopathies among school going adolescents and find out their association with any defined ethnicity in the study area. Anemia was estimated. **Methods:** Descriptive cross sectional study was conducted from November 2015 to August 2016 in collaboration with Thalassemia Control Unit (TCU), North Bengal Medical College. It was intended to include all students of class IX and X in the government run co-education secondary schools based on their current enrolment status, pertaining to study criteria. 1792 eligible subjects were studied. After ethical clearance and briefing, data was collected from screening camps organized in schools on prefixed dates, using appropriate tools and techniques and analyzed. **Results**: Prevalence of hemoglobinopathies was 44.5%, major variants being HbE (22.6%), beta thalassemia trait (9.8%) and E-beta thalassemia (7.3%). Significant association was found between HbE hemoglobinopathies and Rajbanshis (p=.00). 45.2% study subjects were anemic. **Conclusion**: Hemoglobinopathies were substantially high in study area with HbE as commonest variant. Rajbanshis, a majority among study subjects were significantly associated with HbE hemoglobinopathies. Prevalence of anemia was alarmingly high. Planning preventive interventional strategies would ensure appropriate health behaviour of cases and carriers.

Keywords: screening, hemoglobinopathies, Rajbanshis, preventive strategies

Introduction

"An ounce of prevention is worth a pound of care" - Benjamin Franklin

Thalassemia major and few cases of intermedia are potentially fatal diseases with dreaded complications requiring blood transfusions, even for mere survival. Unfortunately repeated transfusions come with a heavy price, leading to several co-morbid states resulting in morbidity and mortality along with significant reduction in quality of life. Inherited hemoglobinopathies, namely hemoglobin variants, thalassemia syndromes and their combinations show wide variation of prevalence in different regions and among different population. Globally 1.5% of population carry beta thalassemia gene. In India 30 million are beta thalassemia carriers and 7000 babies with beta-thalassemia major are born annually [1]. South-East Asian countries account for 50% of world's thalassemia carriers and maximum Hemoglobin E (HbE) cases. HbE (β-26 glutamine→lysine) , a structural variant of haemoglobin, though asymptomatic singly, in combination with thalassemia trait may manifest as thalassemia minor, intermedia or major.[2] In absence of cure, prevention remains the mainstay.

Hence, Government of India, implemented universally accepted assessment tools like screening tests for carrier and case detection at various stages like neonatal and premarital screening and other preventive interventional strategies, counselling sessions and awareness generation activities to ensure appropriate health behaviour of cases and carriers. Beta thalassemia screening program was launched nationwide. Sensitization programs were intensified, hemoglobin variant study for case and carrier detection was done using HPLC technique (High Performance Liquid Chromatography).[1,2] Benefits of procedure and absence of risk associated was emphasized.

Premarital screening is presumed to reduce mortality and morbidity load of the disease.[2] Legislative reforms making it mandatory, especially for adolescents, who are on verge of making reproductive choices are called for. Adolescence is a phase rather than a fixed time period when enormous physical and psychological changes occur along with changes in social perceptions and expectations. Health sector needs to play a sustainable role in addressing to their diverse needs, helping them stay healthy and successfully complete their journey to adulthood.[3] Perceived to be proactive and receptive to various screening programs and awareness generation activities, schools serve as receptive area for adolescents.[4] Catering a mix of various racial groups and ethnicities , schools represent the existent local community. Adolescents, studying in secondary schools, particularly in rural areas are perceived to be better suited for assessment tests and are thus targeted for screening programs.

Assessment of hemoglobinopathy through school based approach is assumed to reflect current status of the area and help designing appropriate preventive interventional strategies to address the issues further.

Scientific literature revealed carrier rate of beta-thalassemia varied between 0 - 17% in different ethnic groups and documented proven relationship of hemoglobinopathies with ethnicity.[5] HbE have prevalence of 1-2% in West Bengal and is believed to be harboured by Rajbanshis, who comprise major ethnic group of local population.[5]

Segregated data regarding adolescents in this part of rural terrain is rare. Thus in aforesaid context and to add to the existing database, present study was conducted with the following objectives.

1. To determine prevalence of hemoglobinopathies among school going adolescents of class IX and X in the study area.
2. To find out association of hemoglobinopathies with other socio-demographic factors with special reference to any defined ethnic groups existing in the study area
3. Estimating prevalence of anemia among school going adolescents in study area

Materials and Methods

Study design, setting, subjects :

A descriptive cross-sectional study was conducted among all the government run co-education secondary schools of Naxalbari block, Darjeeling district, West Bengal, India. Study period was from November 2015 to August 2016 and field level data was collected for six months. It was intended to include all students of class IX and X studying in the 9 such schools, based on their current enrolment status. Estimated strength was 3205. However due to organizational and administrative issues, 7 schools could be studied. Estimated students were 2572.

Those with history of documented hemothglobinopathy, absent on screening days despite prior sensitisation, receiving blood transfusion within last six weeks or priorly screened for hemoglobinopathies were excluded from study. Students unwilling to participate in the study, lacking guardian consent, unavailable or absent on screening days despite prior sensitisation were also excluded. Thus finally 1792 eligible subjects could be studied.

Data collection and measurement :

Line listing of all eligible study subjects was done with help of school teachers. Briefing was done in schools two days prior to organizing screening camps clearly stating the benefit, intent and purpose of study. Sensitization was carried along with briefing to increase student participation, increase guardian consent and ensure support from school authorities. Relevant posters, pamphlets and other IEC materials were displayed and distributed. Holding counselling sessions by trained counsellors on screening days simultaneously was assured and ensured. Blood collection procedure was explained. No risk associated was emphasized. Queries were addressed.

Screening camps were held over 6 months. Dates were decided in accordance to operational feasibility of TCU and after consultation with concerned school authorities. Data was collected on prefixed dates among eligible study subjects by organizing screening camps in school premises.

Socio-demographic variables were recorded by interview method using a predesigned pretested semi-structured schedule from the eligible study subjects. Background characteristics elicited were age, gender, caste, religion, ethnicity (Rajbanshi, hilly tribes, adivasis, etc.), history of consanguineous marriages, family history of cases or carriers, history of blood transfusion or screening tests in past. Students were then subjected to blood tests for screening .

Assessment of hemoglobinopathies: Venous blood collection was done maintaining appropriate techniques and estimated by HPLC machine using recommended guidelines . Logistics and equipments for blood collection were taken to field. Blood was collected and transported to TCU with due care.

Process of Blood Collection: Trained paramedical staffs of TCU collected 5ml of venous blood in vials using EDTA as anticoagulant, transported them to TCU and ran them in cell counter (Sysmex KX 21) and HPLC machine (Variant, Bio- Rad, USA using beta thalassemia short program). Value of 3.6% of HbA2/E fraction of hemoglobin was taken as cut off point for determining beta thalassemia trait and value of more than 10% was assumed to be HbE. Blood was screened for hemoglobinopathies and anemia. Reports were handed over to highest school authorities within a month. Estimation of haemoglobin variant was done by HPLC. Recommended cut off points for different variates were considered using standard recommended guidelines.[6,7]

HPLC, the commonest tool for detecting cases and carriers has made estimation fast, reliable and reproducible with high sensitivity and specificity for identification and quantification of abnormal hemoglobin variants. However it couldn't detect α thalassemias.[8] Mandatory prerequisite of accounting for clinical history, family history, complete blood count, PBS and nutritional anemia while interpreting chromatograms was a major limitation for the present study.[8,9] Molecular studies is recommended for step wise upgradation of screening tests. Its unavailability was a major limitation for conclusive diagnosis in present study.[1]

Only those study subjects found positive were referred to TCU for further management. Family studies were done. TCU is a government endeavour and all equipments are regularly checked, assessed and kept functional. Quality control is stringently ensured and enforced.

Assessment of anemia :

Collected blood was also tested in Automated cell counter for blood parameter estimation.[6,7] Complete blood counts particularly Haemoglobin (g/dl), Hematocrit, RBC count, MCV, MCH, MCHC, RDW and Peripheral Blood Film Examinations were done.

Information dissemination: Awareness generation activities were conducted on sensitisation days. Knowledge on preventive measures for hemoglobinopathies was assessed. During sensitization sessions they were motivated for peer dissemination of information to 3 families and their performance was noted by self reporting on screening days.

Ethical consideration :

Ethical clearance from Institutional Ethics Committee, NBMCH was obtained. District Inspector of Schools and Chief Medical Officer of Health, Darjeeling district, Block Medical Officer of Health, Naxalbari block and highest school authority of concerned schools were intimidated about purpose of study and approval obtained. Informed voluntary written consent was taken. Anonymity and confidentiality of reports was ensured. Unique identification number was generated for each participant. Adolescents consented on their own behalf.[10] It was assured that data will be used for academic and research purpose only.

Data management and analysis:

Data was cleaned, checked for consistency, compiled and entered into Microsoft Xcel and analysed using principles of descriptive and inferential statistics using Statistical Package for Social Sciences version 20. Prevalence and proportion of specific attributes were calculated in percentages and association was tested by Chi square test. Data was presented in form of tables.

Results

1792 eligible subjects were studied.

Socio demographic characteristics: Equal number of students participated from class IX and X , 49.9% and 50.1% respectively. Background characteristics reveal 66.2% of study subjects were aged between 15-16yrs. Majority were boys (60.3%) , Hindus (69.2%) and Rajbanshis (56.3%). 25.3% study subjects were Muslims and 15.9% and 11.1% belonged to hill tribes and non hilly tribes like adivasis respectively. 12.9% study subjects were offsprings of consanguineous marriages and among 4.1% (73 subjects) having positive family history, 19 had thalassemic siblings whereas 54 had relatives requiring repeated blood transfusions for survival. 96 study subjects (5.3%), mostly girls, were married. (Table 2)

Hemoglobinopathy and its variants: Prevalence of hemoglobinopathies was found to be 44.5% (798 subjects). Major variants were HbE (22.6%), beta thalassemia trait (9.8%), E-beta thalassemia (7.3%) followed by HbS, HbD, HbJ in traces (Table 1). Lone inconclusive case needed parental study before final diagnosis. HbE hemoglobinopathies (E-beta thalassemia, E trait, EE disease) were found in 581 subjects, prevalence being 32.4%.

Association of hemoglobinopathies with other socio-demographic variables: Abnormal haemoglobin variants were found distributed maximally among 14-15years (54.4%) and among Hindus (47.9%), followed by Muslims and Christians. However they were equally distributed among boys and girls , 44.3% and 44.9% respectively. Among Rajbanshis, 48.8% suffered from hemoglobinopathies. Abnormal haemoglobin variants were found in 84.9% of study subjects having documented positive family history. Among offsprings of consanguineous marriages, 71.9% had hemoglobinopathies . Chi square test revealed hemoglobinopathies to be significantly associated with positive family history, consanguineous marriages and ethnicity ($p< 0.00$). (Table 2)

Association of Rajbanshis and HbE hemoglobinopathies : Among Rajbanshis, HbE variants (comprising of HbE trait, EE disease and E-beta thalassemia) were found in 41.3% subjects, whereas non HbE variants and normal haemoglobin was found in 7.4% and 51.3% cases respectively. Other ethnicities reported 20.9% HbE variants. Moreover, significant association was also found to exist between Rajbanshis and HbE hemoglobinopathies ($p< 0.00$. (Table 3)

Estimation of anaemia: Prevalence of anemia among study subjects was 45.2%. Among girls, majority were anemic (74.8%) whereas among boys only 25.8% were anemic. Among Rajbanshis, 67.1% were anemic whereas among diagnosed 798 cases of hemoglobinopathies , 78.7% had coexistent anemia. (Table 4)

16.1% (289 study subjects) had correct knowledge regarding prevention of thalassemia and 740 subjects (41.3%) reported performing peer dissemination of information after the sensitization program.

Discussion

Preventable diseases like hemoglobinopathies with potentially fatal outcomes and dreaded complications need stringent control measures. Various studies have been planned and conducted in various parts of the nation to throw light on its various aspects.

Present study concluded prevalence of hemoglobinopathies as 44.5% with HbE as the major variant. Other studies similarly revealed HbE as commonest variant in north-eastern India with a prevalence of 7-50%,[5] while another cross sectional study in North Bengal found prevalence of hemoglobinopathies among 0-20yrs as 30.5%.[1] A pilot study among Sindhi community found HbE prevalence as 19.26%.[11] However all reasons for increased prevalence hemoglobinopathies in present study was difficult to comprehend.

Inability to perform family study for the lone inconclusive case was a limitation. Chromatograms needed to be interpreted in the light that nutritional anemia and other factors were not accounted before screening tests, as recommended.8

Present study found relatively lower prevalence of hemoglobinopathies among Muslims and tribals, in contrast to other studies. Other states noted higher prevalence of hemoglobinopathies among them.1,12 Assam recorded a higher morbidity load of hemoglobinopathies , due to incorporating various linguistic and ethnically diverse population and migrants.12 Clustering of hemoglobinopathies was found in small pockets, attributable to small population size, caste endogamy, consanguinity, virtual lack of medical facilities and natural barriers like rivers, forests,etc. 1,5 Migration of people and marriages between communities has led to its wide prevalence. HbS, HbD, HbJ were found in trace amounts in present study, a finding echoed by other studies as well. HbD was found commonly in Punjab, HbS in tribal areas.1,5

HbE preponderance among hilly tribes and in Assam and Tripura regions hint a lineage simulation, acculturation and inter-caste marriages between Rajbanshis and these states. 5,12,13 Being mostly converts from Rajbanshis , Muslims exhibit more preponderance for the disease due to intermixing and narrowing down of differences with Rajbanshis genetically.1

Present study revealed Rajbanshis as the majority (56.3%) and also noted their significant association with HbE hemoglobinopathies, the commonest variants. Similiar to present study HbE was noted to be harboured mostly by Rajbanshis, the major ethnic group of local terrain.1,5 Significant association between them was documented by other studies as well.

Segregated data on adolescents was revealed by the present study. Rajbanshis and HbE hemoglobinopathies both being commonly prevalent among adolescents in the study area, advocating and implementing premarital screening becomes mandatory. Hemoglobinopathies were also significantly associated with positive family history and history of consanguineous marriages, a finding similar to a pilot study conducted among antenatal women.5

Present study noted that among subjects diagnosed anaemic, majority were girls (65.6%), a finding shared by other studies.5,12 Adolescent girls need enlightenment on importance of intergenerational life cycle approach, importance of balanced diet and awareness generation on pertinent issues.

Differentiating between types of anemia was beyond scope of study. Presuming anemia in rural terrain as nutritional, a possibility exists that HbA2 values were interpreted as false low and hemoglobinopathy exists more.1,8 Beta thalassemia trait (9.8%) in present study, pose a potential threat, since in combination with HbE, the commonest variant noted, they may lead to thalassemia.1

A large community based study revealed iron-deficiency anemia simulating HbE hemoglobinopathies in double heterozygous states , commonly in Rajbanshis and Muslims. Iron supplements having no role, inadvertent use in high risk region needs revision to avoid iron overload.[1,4]

16.1% and 41.3% adolescents in present study were aware about prevention of hemoglobinopathies and proactively participated in peer dissemination of information respectively. Another study noted 56.2% Bengalis residing in a high risk area to have good knowledge on thalassemia , but were unaware about its types. Extensive awareness generation activities among masses was conducted by them. Carrier couples were diagnosed and consanguineous marriages between carriers avoided. Special attention was given to high risk families.[14] Screening camps, psycho-genetic counsellings, premarital screenings were organized in schools, relevant materials were displayed and peer dissemination of information was carried out by them similar to the present study.

Conclusion

Hemoglobinopathies among school going adolescents in the study area was substantially high with HbE and beta thalassemia trait comprising the major variants. HbE hemoglobinopathies have higher prevalence in Rajbanshis, as compared to other ethnic groups. Moreover, HbE hemoglobinopathies are found to be significantly associated with Rajbanshis, the major ethnic group. Prevalence of anemia is alarmingly high among study subjects and girls were more anemic than boys. School going adolescents were receptive to screening programs and proactively participated in information dissemination and other awareness generation activities. However a larger study is recommended.

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Table 1: Distribution of study subjects according to normal and abnormal hemoglobin variants (n=1792)

Hemoglobin variants	Number (Percentage)
Normal hemoglobin	994 (55.5)
Abnormal variants	798 (44.5)
Hb E trait	406 (22.6)
Beta thal trait	175 (9.8)
E beta thal	131(7.3)
EE disease	44 (2.4)
Hb S	27 (1.5)
Hb D	12 (0.6)
Hb J	2 (0.1)
Inconclusive	1 (0.05)

Table 2: Association of hemoglobinopathies with other socio -demographic variables (n = 1792) (Number in parenthesis indicate percentage)

Socio-demographic Variables	Hemoglobinopathy absent (N= 994)	Hemoglobinopathy present (N= 798)	Statistical test
	N (%)	N (%)	
Age (in years)			
14-15 (n= 333)	152 (45.6)	181 (54.4)	χ^2 for linear trend =.52, df=2, p=.46
15-16 (n=1187)	715 (60.2)	472 (39.8)	
16-17 (n= 272)	127 (46.7)	145 (53.3)	
Gender			
Boys (n=1081)	602 (55.7)	479 (44.3)	χ^2=.05, df=1, p=.81
Girls (n=711)	392 (55.1)	319 (44.9)	
Religion			
Hindu (n=1241)	647 (52.1)	594 (47.9)	χ^2 for linear trend =25.23,df=2, p=.00
Muslim (n=454)	273 (60.1)	181 (39.9)	
Christian (n=97)	74 (76.3)	23 (23.7)	
Ethnicity			
Rajbanshi (n=1009)	517 (51.2)	492 (48.8)	χ^2 for linear trend =8.81, df=2, p=.00
Hill tribes (n= 285)	163 (57.2)	122 (42.8)	
Nonhilly tribes (n=198)	156 (78.8)	42 (21.2)	
Others (n=300)	158 (52.7)	142 (47.3)	
Positive family history (having thalassemic siblings or relatives requiring blood transfusion)			
Positive (n=73)	11 (15.1)	62 (84.9)	$\chi 2$ =50.29,df=1, p=.00
Negative (n=1719)	983 (57.2)	736 (42.8)	
History of consanguineous marriage among parents			
Present (n=232)	65 (28.1)	167 (71.9)	$\chi 2$ =1.31,df=1, p=.00
Absent (n=1560)	929 (59.6)	631 (40.4)	

Table 3: Association of HbE variants (HbE trait, EE disease, E beta thal) with ethnicity

Ethnicity	Hb E variants	Other variants (Non HbE variants)	Normal Hemoglobin	Statistical test
Rajbanshis (n= 1009)	417 (41.3)	75 (7.4)	517 (51.3)	$\chi 2$ for linear trend = 47.2, df = 2, p=0.00
Non -Rajbanshis (n= 783)	164 (20.9)	142 (18.2)	477 (60.9)	

(Number in parenthesis indicate percentage)

Table 4: Distribution of anemia among study subjects according to socio-demographic variables (n=1792)

Socio-demographic variables	Anemia absent (n= 981)	Anemia present (n= 811)
	N (%)	N (%)
Age (in years)		
14-15 (n= 333)	202 (60.7)	131 (39.3)
15-16 (n=1187)	635 (53.5)	552 (46.5)
16-17 (n= 272)	144 (52.9)	128 (47.1)
Gender		
Boys (n=1081)	802 (74.2)	279 (25.8)
Girls (n=711)	179 (25.2)	532 (74.8)
Religion		
Hindu (n=1241)	845 (68.1)	396 (31.9)
Muslim (n= 454)	73 (16.1)	381 (83.9)
Christian (n= 97)	63 (64.9)	34 (35.1)
Ethnicity		
Rajbanshi (n=1009)	332 (32.9)	677 (67.1)
Hill tribes (n= 285)	264 (92.6)	21(7.4)
Non hilly tribes (n=198)	144 (72.7)	54 (27.3)
Others (n=300)	241 (80.3)	59 (19.7)
Presence of hemoglobinopathies among study subjects		
Present (n=798)	170 (21.3)	628 (78.7)
Absent (n=994)	811 (81.6)	183 (18.4)

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DEMAND ANALYSIS OF THE OSING COMMUNITY FOR FIRST LEVEL HEALTH FACILITY SERVICE AT THE NATIONAL HEALTH INSURANCE PROGRAM

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Abstract: The outpatient and hospitalizations visits was low in Banyuwangi, Indonesia indicate that community demand to health services still low. The purpose of this study was to analyze the osing community demand for fisrt level health facility (FLHF) services at the National Health Insurance Program. Type of this research was analytic using cross sectional approach. The population in this study was the family in Kemiren and Olehsari village, Banyuwangi, Indonesia many as 2,026 households. The sample in this study as much as 60 households (300 family members). Multivariate data analysis using multiple logistic regression test. The results showed that there were two factors that affect demand for health service was a education level and knowledge factor (α <0.05). The factors that most influence to the demand for health services was a knowledge factor. Based on Osing community demand for first level health facility service then the number of fisrt level health facility in Glagah District was already enough. While based on the number of Osing community who participated National Health Insurance members then the number FLHF in Glagah District was already enough. The conclusion, the higher education level and knowledge of the community, the higher demand for health services.

Keywords: Demand analysis, Health Services, First Level Health Facility, National Health Insurance

Introduction

Nasional Health Insurance (NHI) in Indonesia had been implemented since Januari 1, 2014 that organized by Badan Penyelenggara Jaminan Sosial (BPJS) Kesehatan (Social Security Administrator Agency on Health). Provider of health services in NHI were first level health facilities (FLHF) include primary health center, clinic, practice of physician, practice of dentist; advanced level referral health facilities include hospital (Indonesia, 2013b).

Demand analysis for health services is one way to determine how many the demands, and the factors that most influence the utilization of health services. Demand analysis can be useful as a basis for developing health care policy and planning, to determine hospital bed allocation, as a model to describe the annual changes in individual health care expenditures, and to forecast the adequacy of health care facilities (Feldstein 1983)

Based on data from Susenas (National Socio-Economic Survey) by Badan Pusat Statistik (Central Statistics Agency) of East Java, the incidence of illness in Banyuwangi Regency increased as indicated by the percentage of population who have health complaints increased by average 1.68% on 2011 to 2013 (in 2011 as much as 31.34%, 2012 as much as 32.55%, and 2013 as much as 34.70%). Meanwhile, the percentage of outpatient visits in Banyuwangi Regency in 2011-2013 averaged 51.82% (in 2011 as much as 47.09%, 2012 as much as 46.69%, and 2013 as much as 61.68%). The percentage of residents who were hospitalized in the last year in 2011-2013 averaged 2.16% (in 2011 as much as 2.32%, 2012 as much as 1.73%, and 2013 as much as 2.42%). The low number of outpatient and inpatient visits in Banyuwangi Regency indicates that low public demand for health services in Banyuwangi Regency, including osing community. The Osing tribe is a native people of

Banyuwangi or also referred to as "wong Blambangan" and is the majority population in several districts in Banyuwangi Regency.

According to Feldstein (1983) and Trisnantoro (2006), factors affecting demand for health services consist of cultural-demographic characteristics, disease incidence, economic factors, and health service availability factors. Cultural-demographic characteristics include: age, gender, education, knowledge, marital status, and number of family members. While the economic factors include: tarifs, income, and ownership of health insurance. A Grossman model of the individual demand for Health care services, factors affecting demand for health services consist individual/client factors (age, sex, education,ocupation), healthcare resources factors (supply, acces, acceptability), prepayment factors (private insurance, national health system, out of pocket system), and environment factors (physical, economic, social, cultural) Grossman (2000).

The purpose of this research were : 1) Identifying the factors of demand (age, sex, marital status, number of family members, education level, knowledge, belief, disease incidence, income, availability of health services, participation on national health insurance, tarif / premium of national health insurance program) of Osing community, 2) Identifying the demand of the osing community on the first level health facility (FLHF) service in the national health insurance (NHI) program, 3) Analyzing the factors affecting the demand of the osing community on FLHF service, 4) Forecasting the needs of FLHF for osing community.

Method

The type of this research is analytic using cross sectional approach. Population in this research is family of Kemiren Village and Olehsari Village of Glagah District of Banyuwangi Regency as much as 2,026 families. The sample in this research is family in Kemiren Village are 27 families (135 family members), and Olehsari Village are 33 families (165 family members). Total sample is 60 families (300 family members). Data collection is done through interviews and documentation studies, and presentation of data in the form of tables and drawings. Multivariate data analysis using multiple logistic regression test.

Result and Discussion

The results were described include identifying the factors of demand, identifying the demand of the osing community on the first level health facility service in the national health insurance program, analyzing the factors affecting the demand of the osing community, and forecasting the needs of first level health facility for osing community, as follows

Factors of Demand for FLHF services

Factors affecting demand for health services are cultural-demographic characteristics, disease incidence, economic factors, and health service availability factors. Cultural-demographic characteristics are age, sex, education, knowledge, marital status, and number of family members. Economic factors are tarifs, income, and ownership of health insurance.

Table 1 Description of Demand Factors

	N	Minimum	Maximum	Mean
Age	221	1	76	30.57
Number of Family Members	221	1	6	4.04
Knowledge	221	0	11	3.54
Belief	221	0	10	5.19
Availability of Health Services	221	0	12	6.68

Table 1 shows that average age of respondents was 30 years, average of family had 4-5 members. Based on the above table, average respondent has knowledge score related to the Health Insurance program were 3.54. It shows the lack of knowledge of osing community about the NHI program. The assessment of knowledge about NHI includes knowledge related to NHI and the Health Social Assurance Administering Agency, FLHF in NHI era, contribution of NHI premium, self-knowledge for illness, and the need for health services. Based on the above table, the average respondent had a score of 5.19 (of a total score 10) in beliefs for known health services. Belief score measured from beliefs of osing community to health service include hospital, clinic, doctor practice, primary health center, Auxiliary primary health center / Village health post, midwife practice, and nurse practice. Therefore, it could be concluded that the osing community in Glagah District had a moderate level of beliefs for health services. Based on the above table, average health care availability score was 6.68. Respondents' knowledge scores related to the availability of health facilities was 7 and could be categorized that the overall availability of health services in Banyuwangi Regency was good. Some respondents already have a means of transportation that can be used to access health facilities with an average travel time of 10 minutes to health facilities.

Table 2 Description of Other Demand Factors

No	Demand Factors	Frecuency (f)	Percent (%)
1	Sex		
	Male	104	47
	Female	117	53
		221	100
2	Marital Status		
	Single	84	38
	Married	137	62
		221	100
3	Education Level		
	No School	39	17.6
	Elementery School	100	45.2
	Junior High School	36	16.3
	Senior High School	39	17.6
	College	7	3.2
		221	100
4	Income		
	< 1,426,000	0	0
	1,426,000-2,852,000	2	3
	>2,852,000	58	97
		60	100
5	Participation of National Health Insurance		
	Non members	99	45
	Members	122	55
		221	100
6	NHI premium		
	Unreachable	37	62

	Reachable	23	38
		60	100

Table 2 shows that most of the respondent's gender (osing community) was female as much as 53%, most of the respondents were married as much as 62%, most of the respondents had a primary school (PS) education as much as 45.2%, most of the respondents had income < Rp 1.426.000 as much as 97% (average income was low), most of the respondents were non members in the National Health Insurance as much as 55%, and respondents as members in the National Health Insurance were mostly as members of beneficiaries as much as 75%, respondents considered that the National Health Insurance premium was unreachable as much as 62%.

Based on the data collection, there were 32 types of diseases identified, the disease that was often experienced by the osing community in Glagah District, Banyuwangi Regency was a fever as much as 26.7% (72 case) with the average frequency of disease incidence 1 - 4 times and length of stay on illness 1 -12 days.

***Demand* for FLHF services**

Demand for FLHF services is measured by the choice of community visits to Paspan Glagah primary health center or Linawati clinic if illness, the types of services used include public outpatient including mother and child health, outpatient for dental services, inpatient, or emergency unit.

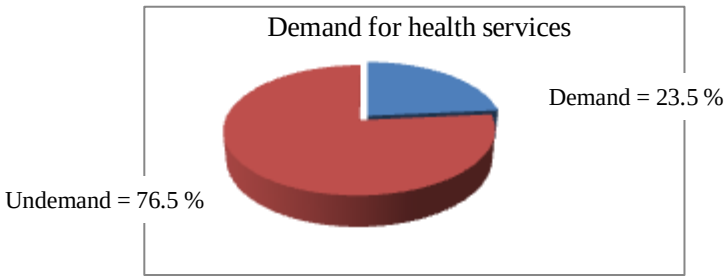

Figure 1 Demand of the osing community for health services

Figure 7 shows that most of osing community in Glagah district were undemand for FLHF service of Paspan's primary health center in Glagah and Linawati Clinic as much as 76,5%. While demand for FLHF service only was 23.5%. The osing community of Glagah District who have demand for Paspan's primary health center in Glagah and Linawati Clinic services mostly use general clinic service as much as 89%. And than, the types of health services utilized by the community were as follows.

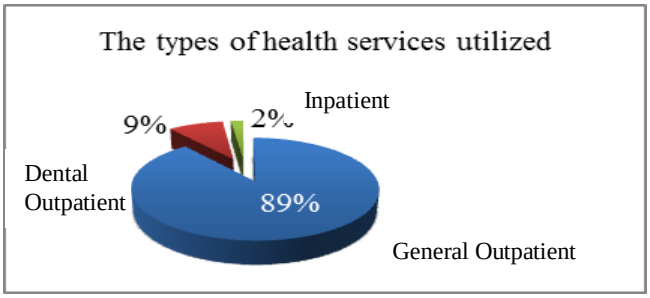

Figure 2 Type of Health Services Utilized by The Community

Based on Figure 8, the majority of respondents use outpatient services for general that was 89%. Some respondents used outpatient services for dental as much as 9% and for hospitalization as much as 2%.

The osing community who was undemand for FLHF services, other alternative health services that were utilized as follows.

Tabel 3. Distribution of Alternative Health Services for Undemand to FLHF

No	Health Service	Frecuency (f)	Percent (%)
1	Practice of midwife	12	5.6
2	Just ignore it	59	27.6
3	Treated alone	59	27.6
4	Practice of dentist	1	0.5
5	Practice of general physician	11	5.1
6	Tradistional healer	10	4.7
7	Clinic	14	6.5
8	Alternative medicine	10	4.7
9	Practice of nurse	36	16.8
10	Hospital	2	0.9
	Total	214	100

Based on table 3, if The osing community don't visit the Paspan's primary health center in Glagah and Linawati Clinic, most of respondents choose to treat alone and just ignore it was each 27.6%. Respondents said that the illnes they feel was enough just by resting at home.

Factors Affecting Demand on FLHF Services

Based on the analysis with multiple logistic regression test, there were two factors that influence the demand of health services were Education Level and Knowledge (α <0,05). The most influential factor to the demand for health services was Knowledge factor because it had the highest Exp (B) value as much as 1.188.

The level of education affects statistically the demand for FLHF services with OR 0.5, CI 95%. The osing community, Glagah District with high education level had a risk was 0.5 times greater to have demand for FLHF services compared with low educated. The variables of knowledge influence statistically to demand of FLHF services with OR 1.18, CI 95%. The osing community, Glagah District who have a high level of knowledge on the National Health Insurance have risk 1 times greater risk to have demand for FLHF services compared with low knowledge.

Based on the results of statistical tests above, indicates that there was a significant effect of education to the demand for health services on national health insurance for the osing community. The results of this study was in accordance with the results of research conducted by Nuraeni et al., (2012), which states that there was a meaningful relationship between the level of education and demand for health services in the Cilandak primary health center in South Jakarta, and also in accordance with research conducted by Serli (2013), showing that there was a relationship between education level and community demand for inpatient services in the work area of Medan Deli primary health center, Bromo primary health center and Kedai Durian primary health center, and also in accordance with research conducted by Parung (2014) which states that Education had a positive effect on the demand for health services.

Compliance between the results of this study with the results of previous research because the level of education affect the behavior of a person in using health services. Education provides the ability to access information related to health services, so it will determine a person's choice for health care facilities to be visited to solve his health problems. A person's educational status has an effect on the utilization of health care services, because

education status influences one's awareness and knowledge about health. It is often a barrier to the utilization of these services is the lack of awareness and knowledge about matters relating to health behavior (Serli, 2013).

Based on the results of statistical tests above, indicates that there was a significant influence of knowledge for the demand of health services in the National Health Insurance program for the osing community. The results of this study were accordance with the results of previous studies that have been conducted by Serli (2013), which states that there was a relationship between knowledge with community demand for inpatient services in the work area of Medan Deli Primary Health Center, Bromo Primary Health Center and Kedai Durian Primary Health Center, as well as accordance with research by Yusniar (2012), which also states that there was a correlation between knowledge and the service utilization of Liudi Primary Health Center, Bila Village, Sabbangparu district of Wajo Regency. Also accordance with research by Rakinaung et al., (2012), which states that there was a significant relationship between knowledge with Action in the utilization of Molompar Primary Health Center, Molompar II Village, East Tombatu district of Southeast Minahasa Regency, and also accordance with research by Wahyuni (2013), which states that there was a relationship between knowledge and outpatient service utilization of Tenggarang Primary Health Center in Bondowoso Regency.

The compatibility between the results of this study with the results of previous research because knowledge or cognitive is a very important domain in shaping one's actions (over behavior) (Notoatmodjo, 2003). According to Feldstein (1983), the knowledge factor is one of the factors that determine the actions of the community in choosing health services. The level of knowledge of the community is high, not always can increase the demand of osing community of Glagah district to the service of Paspan Glagah Primary Health Center and Linawati Clinic. According to Green in Notoatmodjo (2003), states that increased knowledge does not always cause behavioral changes. Although most people are well aware of the types of services available in Paspan Glagah Primary Health Center and Linawati Clinic, not necessarily the community has a demand for Paspan Glagah Primary Health Center and Linawati Clinic.

Meanwhile, Based on the results of the above statistical tests, it shows that there were no significant effect: age, marital status, the number of family members, belief on service, incidence of disease, health insurance ownership, tariff / pemium to demand for FLHF service on national health insurance for osing community. According to Feldstein (1983), factors affecting one's demand for health services are cultural-demographic characteristics (age, gender, marital status, family size, education level, knowledge, and belief), disease incidence, and economic factors (income). In addition, according to Trisnantoro (2006), the factors of health services availability (availability of health services, participation in the NHI program, tariff / premium of the national health insurance program) is another factor affecting the demand for health services. On the other hand, there are influence of distance, income, per capita food expenditure, household size, the severity of illness, the average years of formal education, age, and location to demand for healthcare (Ichoku, and Leibbrandt, 2003).

The dependent variable used was demand for private hospital care while the independent variables used include: age, educational attainment, ownership of health insurance, distance to nearest health facility, wealth index, place of current residence, religion and access to information. From probit regression model, the coefficients for age, educational attainment, distance to nearest health facility, ownership of health insurance, wealth index (through the four wealth quintiles against the first wealth quintile), place of current residence, religion and access to mass media were found to be statistically significant at different levels in determining demand for private hospital care in Kenya. The study concludes that both demographic and socioeconomic factors are significant in determining demand for private hospital care (Nyambura, 2016).

Research by Sarwono (2011), which shows that there was a significant relationship between the sex with the utilization of local health insurance in Tumbang Talaken Primary Health Center, Manuhin district, Gunung Mas Regency. In addition, the results of research conducted by Wahyuni (2013), which proves that there was a relationship between the incidence of illness with the outpatient services utilization of Tenggarang Primary

Health Center in Bondowoso, also not in accordance with the theory of Notoatmodjo (2003), which states that the incidence of disease and illness induce a person's response to conduct health seeking behavior, and also not in accordance with the theory of Feldstein (1983), which states that awareness of disease or the desire for treatment for prevention determines a person's decision in health services seeking. The rise of disease and unhealthy conditions alter the pattern of chronic disease changes to the critical determinants of the need for health care. Another opinion says that rising family incomes will increase demand for health services that are mostly normal goods. However, there are also some inferior goods health services, it is an increase in people's incomes leads to a decrease in consumption (Trisnantoro, 2006).

Sex factors had no effect can also because the respondents in this study were homogeneous, where the majority of respondents were female, so there was no difference in demand for FLHF services (Paspan Glagah Primary Health Center and Linawati Clinic). The solution for further research is to interview respondents with a balanced proportion of male and female.

The factor of the illness incidence had no effect also be caused by different levels of tolerance to illness sense. The osing community of Glagah district had different levels of tolerance for a disease that suffered. When a person is illness, they prefer to ignore disease and continue their activities without trying to cure the disease because the disease was only a small illness and will recover when made to work. Instead, someone else with the same disease have a different thought, by which if he suffered a disease, although the disease is only small diseases, he immediately perform a variety of ways to cure the disease. This is accordance with the theory by Lumenta (1989), describes that person's reaction to the symptoms of the disease relies heavily on his experience, as well as on surrounding group social and cultural factors. Some groups consider a symptom to be very worrying, but other groups can be ignored. This acceptance will determine the reaction in the treatment seeking behavior.

Needs of FLHF in Glagah Subdistrict of Banyuwangi

The overall prediction of osing community in Glagah district that had demand for FLHF service was the population of Glagah district in 2015 multiplied by percentage of osing community in Glagah district which had demand for FLHF service which is 34.914 x 23,5% = 8,205 people. The ideal condition was 1 physician serving 5,000 participants. The needs of physicians who should be available in Glagah Subdistrict, Banyuwangi on 2015 was 2 people. In Glagah district, there were FLHF that have cooperated with BPJS Kesehatan (Social Security Administrator Agency on Health), it were Paspan Glagah Primary Health Center and Linawati Clinic. Paspan Glagah Primary Health Center had 1 general physician, while Linawati Clinic had 2 general physician. Total availability of general physician in FLHF in Glagah district who have cooperated with BPJS Kesehatan (Social Security Administrator Agency on Health) were 3 physicians. Thus, based on the demand of osing community for FLHF service so the number of FLHF in Glagah district was enough even the general physician more one person.

The accordance or adequacy of the number FLHF can be encouraged by the active role of the community that had established the clinic as a form of participation in accordance with the provisions. FLHF that had cooperate with BPJS Kesehatan was Primary Health Center, Clinic, physician practitioner, dental practitioner and hospital type D. Nevertheless, it was needed clear arrangement and based on correct forecasting in order to avoid any existing FLHF excess. This can happen, considering there was already a clinic although not cooperate with BPJS Kesehatan, it was Amanah Clinic. Even may be, there were the establishment of a new clinic furthur because it was considered as an opportunity or business, but they do not needs study of health care facilities.

If it was based on the number of osing community in Glagah district who was a participant of NHI (not based on demand of osing community for FLHF service) so 45% x 34,914 = 15.711 people. The needs of physician should be available in Glagah District, Banyuwangi in 2015 were 4 physicians. Thus, the number of FLHF in Glagah district was sufficient but the general physician was less than one person.

If it was based on the total population of osing community in Glagah district so needs for FLHF as follow :

Table 4 Needs for FLHF based on Total Population

			Distribution Number of Physician in FLHF Should be			
	Total Population 2015	Needs of Physician	PHC *)	Clinic *) (C)	Independent Physician Practioner (IPP)	Total Needs of FLHF
Version 1	34.914	7	2	2	3	5 (1 PHC, 1 C, 3 IPP)
Version 2	34.914	7	2	4	1	4 (1 PHC, 2 C, 1 IPP)

Note : Based on standard, each one of primary health center (PHC) / Clinic have two physician. One physician serve 5,000 people

Based on table 3, the number of FLHF in Glagah District was not enough, and the deficiency number : 1) Version 1 were less 3 practice of physician, 2) Version 2 were less 1 Clinic, and 1 practice of physician

Conclusion and Recommendation

The conclusion of the results of this study as follows: demand factor for FLHF service describe that the average age of respondents 30 years, each family contain 4-5 members, scores of knowledge related to NHI program as much as 3.54 (less), belief score in health services as much as 5.19 (medium), health care availability score as much as 6.68 (good). Most of the respondents were female, married, had primary school (SD) education, had income <Rp 1.426.000 (low), non participan in National Health Insurance, unreached for NHI premium. There were 32 types of diseases identified, the disease that is often experienced by the society osing is a fever with an average frequency of illness occurrence 1-4 times and duration of sick days 1-12 days. Majority of the osing community undemand for FLHF services (Paspan Glagah Primary Health Center and Linawati Clinic).

There were two factors that influence the demand for health services, which was Education Level and Knowledge (α <0,05). The most influential factor on demand for health services was knowledge factor because it has the highest Exp (B) value of 1.188. The higher level of education and knowledge of the community, the higher demand for health services.

Based on demand of the osing community for FLHF service, so the number of FLHF in Glagah district was enough. If based on the number of the osing community who participated in NHI so the number of FLHF in Glagah district was enough too. If based on the total population of osing community in Glagah district so needs for FLHF was the number of FLHF was not enough, and the deficiency number : 1) version 1 were less 3 practice of physician, 2) version 2 were less 1 Clinic, and 1 practice of physician.

The recommendations based on the results of this study as follows : 1) BPJS Kesehatan (Social Security Administrator Agency on Health) cooperate with FLHF, local government, and community organizations to increase knowledge related to NHI program through socialization both in FLHF and in community; 2) BPJS Kesehatan (Social Security Administrator Agency on Health) applying quality standard of service hardly, and FLHF provide service according to quality standard so the community trust was higher; 3) BPJS Kesehatan (Social Security Administrator Agency on Health) needs to consider the obligation to become a members was a family that has enough income, have done a mapping of capable families, and proactive for the recruitment of NHI members; 4) BPJS Kesehatan (Social Security Administrator Agency on Health) cooperate with Regency Health Office to conduct arrangement and control of new FLHF, and FLHF that cooperate with BPJS Kesehatan

(Social Security Administrator Agency on Health) before; and 5) The next study to forecasting needs of health facilities on regional or national levels

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ETHNOGRAPHY OF YOUTH LEARNING

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Abstract: The purpose of this qualitative study aimed to study learning of youth through the community volunteering spirit process in a socio-cultural context. The study was conducted in one municipality located in Sra-kaew province from December 2015 to October 2016. This study employed critical ethnography method as the research design and it was divided into 3 phases :1) exploring the community to understand socio-cultural context, 2) studying the situation or event contributing youth volunteering spirit, and characteristic of youth volunteer in a community and 3) analyzing the outcome or learning of youth from the development of volunteerism system in youths by community.The participants were divided into 2 groups, including 42 key informants and 19 general informants. The data were collected using participant observation, in-depth interviews and focus group discussions, and analyzed by content analysis. The results indicated as follows. 1) The incidents and event causing youth volunteerism; Problems and needs in the community, National and local policies, Cultural practice, Cultural activities. 2) Five characteristics of the volunteering work of the youth; Sociological, Economical, Environmental, Health-related and Political characteristics 3) Seven Outcome from volunteer worked

Keywords: youth, volunteering spirit, youth's learning

Introduction

In an era of globalization, according to competitive economic situations and an abrupt change of social dynamics, most Thai people tend not to take others for granted and merely pursue wealth, benefits, and power rather than morality. Subsequently, Thai society has been gradually lacking compassion, merit, and morality. Social problems have also occurred in this time namely, corruption, crime, illegal drugs, and robbery and family problems: true reflection of the selfishness of people in society. According to the morality lacking atmosphere, it affects to youths. The researcher who studied about youth in current time said that at the present, youth lacks individual responsibility and social solidarity and as a result, it causes social problems such as illegal drugs, brawls in public, unsafe sex, unwanted pregnancy, smoking and drinking. This comes from the lack of individual responsibility and social solidarity[22].

Many organizations attempt to resolve such issues by creating the policy of educating children and youth, training parents and increasing in school curriculum on campaigns that seek to instill morality and ethics to children. According the attempt to try to solve the problems, it causes the gap which is the program or manages to overcome youth's problems that still cannot manage solutions to meet the needs of young people in the area and truly make a difference[1, 3.] To improve or even to correct the current social situation, the term "volunteer spirit" has been raised and promoted by many organizations because the "volunteer spirit" concept means that individuals are supposed to be giving rather than taking. With the volunteer spirit, individuals are willing to offer others help with their responsible ideology; which can be considered similar to the concept of public mind and public consciousness[2,3,4]. Volunteerism is an important, and increasingly popular, mechanism for young people to bring about positive with them and positive change in society and it is becoming more and more relevant as a mechanism used to engage young people to be good citizens in global peace and sustainable human

development[10,20]. Developing volunteering spirit can be done by cultivating and supporting responsibilities in youth. Responsibilities namely: self-responsibility and social-responsibility are a caring attitude for oneself and others. The volunteering spirit supports self-regulation, so the participants can be responsible for themselves and their behavior[9,17,18]. The volunteers are a group of youth that are willing to improve themselves. The volunteering spirit is a requirement that is helpful for every social community. With the supportive development from family, peer group, community and even all people around the world, the volunteering spirit can be relatively effective. Furthermore, the youths also bring direct benefits to their communities through volunteering. When presented with images of young people doing community services, the opinion of adults might be changed. They encourage positive citizenship among the youth and the adults in the community and encouraged the youth to be more engaged in their communities.

In 2010, the government declared a year of giving and volunteering and pushed it as the national agenda. The Tenth National Economic and Social Development Plan (2007–2011) and the guidelines for the development of children and youth to have a good mind related with Thai government also play a role in raising knowledge with morality among Thai children [6,7,13] and adolescents by passing the National Education Act and Amendments B.E. 2542 (A.D. 1999) (2nd Edition). The act stated that it desired Thai citizens are human beings with inclusion of physical health, mental health, knowledge, merit, and morality [8,14,15,16].

Therefore, cultivating the youth with volunteer spirit is an important thing that requires the cooperation of family, school and community and support for building volunteering spirit in youth voluntary activities supported by person, group or organization in the community such as head of the village, teachers, temple and community organizations. Khanitta Nuntaboot (2013) mentioned the four major organizations in the community that should work together, including head of the village, community administration, and community health care service and community members. These four major organizations work as the network to develop the community to be the community healthy strengthening. On the other hand, the community also learns from the youth volunteer activities[11,12].

The purpose of this research was to study the model to build volunteer spirit in youth by using community capacity. To obtain knowledge about the development of the community on volunteering spirit in youth based on postmodernism and interpretative philosophy, multiple methods to understand process and mechanism are required. This study will present the knowledge or the guidelines for developing youth volunteering spirit in the community in order to develop youth to be good citizens and create strengthening community.

Research methodology

Design: The researchers decided to use critical ethnography for understanding the nature of developing community volunteering spirit in youth by using community capacity.

Setting and key informant: The study was conducted in one municipality located in Sra- kaew province from December 2015 and October 2016. The participants were divided into two groups, including forty-two key informants who involved in developing community volunteering spirit in youth including youth group, families, peer group, and community members or officers of the local administrative organizations, community leaders and head of the village and nineteen general informants consisting of community organizations, civil group, community members who got help from youth volunteer group.

Ethical considerations: Ethical approval was obtained from the KhonKaen University Ethics Committee in Human Research. An information sheet, invitation letter, and consent form were sent to all participants directly

with a clearly explanation about purpose, methods, procedures, potential risks and benefits of the study. Participation was voluntary and written informed consent was obtained. Participants were free to withdraw from the study at any time.

Data collection: The data were collected using participant observation to understand lifestyle, beliefs and behaviors from scenario. In-depth interviews were used to understand the perception and the meanings of youth volunteerism, civil group, families and community organizations about youth volunteer spirit in the community and the process or the mechanism to develop community volunteering spirit in youth. Focus group discussions were employed for discussing and sharing opinions about youth volunteer spirit and the process or the mechanism to development community volunteering spirit in youth**.** Multiple data sources in the same study for validation purposes were used [1,2]**.** There are three types of data triangulation; time, space and person (Data Triangulation Technique)

Many data collection methods were employed in this study (Method Triangulation)**.** Trustworthiness; to enhance the trustworthiness of the findings, credibility, dependability, and conformability were established[5,21]. These included participant observation, in-depth interviews, focus group discussions, and document study[5]**.** All of the data obtained from these methods were then reconfirmed by the key informants and debriefing with the advisor having experiences in qualitative research**.**

Data analysis: Content analysis was applied to analyze the data. The analysis and synthesis process were immediately conducted at the completion of each individual interview and focus group discussion session. For The data gathered from in-depth interview, the tape recorder was heard and transcribed carefully. All of the transcriptions were then read several times and the key words or terms throughout the transcription were highlighted and noted. The coding then was made. The focus group data was also analyzed in the same format. The final emerging themes and categories were established.

Findings

1. **Characteristics of the volunteering work of the youth**

Five characteristics of the volunteering work of the youth;

1) Sociological characteristics. The activities undertake in order to promote life skills, morals and ethics, sense of responsibility for oneself and community. Examples of youth volunteer activities in sociological characteristics are: Teaching morals and ethics to children and youth, making home visits to the elderly and the disabled people.

2) Economical characteristics. These are voluntary activities in which the youth volunteers have participated in order to earn some money for the elderly and the elderly schools including Fundraising campaigns for the elderly school, making income for the elderly who are staying at home.

3) Environmental characteristics. These are voluntary activities in which the volunteers have participated in order to protect the environment in the school, temple, and community, to keep places clean, to manage waste, to save trees, as well as to inspect environmental factors causing diseases.

4) Health-related characteristics. These are voluntary activities related to both physical and mental health. These activities are taking care of the elderly, people with disabilities and poor people, teaching how to take care of oneself and avoiding risky behavior such as drugs abuse, sexual relationship, driving or using social media, making home visits to teen mothers and monitoring food safety in the community.

5) Political characteristics these are voluntary activities that promote political activities such as promoting election campaign, providing community forum for the villagers.

2. The incidents and event causing youth volunteerism

From the analysis of events causing the youth's voluntary activities, it can be

classified into 4 characteristics which are 1) Problems and needs in the community such as the elderly and disable people have been abandoned, teenage pregnancy, risk behavior, waste in school. 2) National and local policies to inculcate moral values, ethics, and a sense of social responsibility into the youths such as ministry of education's policy has guided schools to teach students about desirable characteristics, School's policy promote policy to inculcate moral values, ethics and volunteer activities, 3 Municipality's development plan in accordance with national development plan focuses on youths' development for inculcating moral values, ethics, a sense of social responsibility, and values of being good citizens. 3) Cultural practice. Being a good role model of our adults or parents has promoted voluntary activities and has created awareness of volunteer spirit in the youths. Community leaders 4) Cultural activities Voluntary work will be undertaken when there are festivals, ceremonies or activities in the community. The volunteer or community leaders will then persuade the youths to take part in the activities.

Key actors

The key actors who work for development system of youth volunteering spirit. included.

School included teachers and school directors who had important roles since the youth spent their time mostly at school**.** Apart of having friends, teachers were the ones who stayed closed to the youth**.** According to that, teachers had the important roles in instilling the volunteer spirit to the youth; providing knowledge about volunteerism and doing volunteer activities, supporting the activities in both school and community in order to foster children and the youth to have volunteer spirit**,** being an advisor as teachers had a role to give advice to the youth from the beginning, to make a plan, to organize the volunteer activities, to work, and to search for sponsors**.**

Parents were the ones who were close to the youth and they were also the ones who lived with the youth since the early age**.** They were the people who instilled the thoughts, morality and ethics to the youth**.** Being an ideal was the role of parents in order to foster the culture of volunteerism from the early age to the youth starting at home**.** Parents needed to realize of being a good role model to the youth in order to let them see and follow what the parents do**.** It was the process of instilling the youth to have volunteer spirit since they are young**.**

Social groups such as the group of volunteers, occupational groups or the elderly association were the people sector gathering to build up and develop the volunteerism to the youth**.** They invited the youth to join the volunteer activities in order to make them learn and do the volunteer work and to make them have confidence, skills, and positive attitude towards volunteer work**.** Social groups were the advisors of the youth in making working plan, assisting others, giving related information, and being a coordinator in coordinating with other organizations in order to support the volunteer work to the youth**.**

The leaders of the community consisting of a sub-district headman, the leader of the village, the members of sub-district administrative organization, the committee of the village, the religious leaders, and the local scholars were the leaders of principle in supporting the policy of volunteer development to the youths**.** They supported the activities, the work of youth volunteers in order to let them do the volunteer activities such as supporting places, budget, and convenience, supporting the news and information in organizing the volunteer

activities of the community and providing the information about the policy of volunteerism to the people in the community and providing knowledge or spreading the wisdom knowledge such as making a rice-offering and making a floating basket. It was the way to allow the youth to do volunteer work or have leader skill in managing volunteer work**.**

Local administrative organization was the organization in the local area having the important role in making policies about supporting the activities of the youth.

Youth Council was the organization inviting youth to do volunteer activities and it was the ideal of volunteer work of children and youth**.**

Outcome from volunteer worked

1) Knowing how to work : The development of volunteerism towards the youths in the process of working makes the youths to learn about critical thinking, working as a team, solving problems, planning, and working with others. This helps the youths who learnt through the development of volunteerism and working voluntarily be able to work well with others when they have to continue their study at other schools or work in other places.

2) Having morality and ethics : The development process of volunteerism instills the morality and ethics to the youths by doing activities corporately at the temple, learning about Buddhism at Buddhist center on Sunday, exchanging knowledge with teachers and volunteer workers. When they visit homes of elders or disable people, and do work, it makes them learn about life of people who need care. This make the youths know what mercy, sacrifice, think of others or people who need help is which is the development of morality and ethics to the youths in the areas.

3) Having knowledge and skills in working as a volunteer: Have knowledge and skills in looking after others such as disable people, elders, surveilling drugs, observing on the aegypti to prevent Dengue fever, having skill in being a lecturer, working with others, having skill in thinking analytically, collecting and using data, the youths can bring all skills to use with their work.

4) Being confident to express opinion: The process of building volunteering trains the youths to learn and to attend the meetings. Advisor supports them and also the work process which develop the youths to be confident in expressing their opinion at the meeting or public.

5) Being important and proud: The development of volunteerism to the youths when they work as a volunteer, what we can see from it is the youths feel proud of themselves; they feel that they are useful, particularly the stubborn ones, who are seen by others as bad people, when they have a chance to do a useful thing to the community, they feel proud of themselves and feel important. Meanwhile, parents including adults in the community, when they see their children and youths learn to work as a volunteer, who makes the youths have good behavior; they admire and feel proud of them.

6) Being a good ideal, be active, work as a volunteer: The process of working as a volunteer, there is a process of publication, communication to people in the community. Children and youths see working as a volunteer as a work that gets admiration, it makes the youths in the areas including the adults learn to be a good ideal in working with volunteer spirit. It activates the importance of the development of volunteerism to children and youths in the community.

7) Having good attitude towards volunteer work**:** When working as a volunteer and the development of volunteerism change the community and the youths, and the elders are well-cared, the leaders of the community including the youths themselves are admired.

Discussion

Systematic process and a variety of methods are required for the development or the creation of volunteerism in youth. Social capital and the potential of the area at every level are utilized to promote the development of volunteerism in youth based on the nature and the characteristics of youth in that area. In the development process, providing knowledge for understanding, the development of youth attitudes toward volunteerism, providing knowledge on planning, analytical thinking skill, problem solving and teamwork are needed [4,23]. The opportunity to work with leaders should be provided to the youth. They should also be encouraged for the participation in community activities in order to allow them to see the role model and learn volunteerism skills. Providing the opportunity for young people to plan and operate the work themselves by having advice from adults and the support from the community leaders, social groups and those involved in the community is the cooperation to create the development of youth volunteering systematically.

The study also found that the successful strategy is the cooperation of the three sectors, including local administrative organization, school and volunteer group which are the sectors that are relevant and close to the youth. There is also the support from social enterprises which is the mechanism supporting and reinforcing the occurrence of systemic volunteer spirit development and there is a group of volunteers as a role model**.** These are the significant mechanisms leading to the volunteer spirit development in the community**.** The youth are the people who are in the age of learning from external environment, learning through the model or the role model**.** Therefore, having groups working as volunteers such as a group of civil defense volunteers, a group of public health volunteers, rescue volunteers, a group of safety and security volunteers as well as the leaders of the community, the village headman, and the sub-district headman who do a volunteer work for the community makes the youth learn and see the model of activity and work. The opportunity should be given to the youth to join the activities of these groups**.** Having Youth council which is the youth organization, is the center of youth in brainstorming, planning, and doing activities together by working systemically under the advice of adults leading to the volunteer spirit development of youth**.** According to the development of community volunteer system through the whole process, there are the main leaders in the development of volunteerism, including school referring to teachers, parents, social groups, the leaders of the community, local administrative organization and Youth Council. They are close to the youth and have different roles. The roles and the responsibilities of each section will help to develop the youth volunteer system in the community concretely in order to allow this research to be used as the guidelines for the development plan of the policy or the design of volunteer youth development which is consistent with the context of the area and can create systematic operation and make a difference to the youth who are the future of the country.

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SOCIOECONOMIC DETERMINANTS OF MATERNAL ANEMIA: A DISAGGREGATED LEVEL ANALYSIS FROM ASSAM, INDIA

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Abstract: This study examines socio-economic determinants associated with maternal mortality at disaggregated level in Assam, the state with highest maternal mortality ratio in India. An extensive door-to-door household survey was carried out during 2014-15 using multistage sampling to select villages in districts with high number of reported maternal deaths. The samples consist of currently pregnant women, mother with children 0-24 months and members of families who have experienced of maternal death. The study reveals that prevailing incidences of maternal mortality and maternal complications are the result of maternal anemia. Maternal complications are more likely to be associated with lower concentration of hemoglobin level, which is a proxy for maternal anemia. In addition, concentration of hemoglobin level is positively related to socioeconomic factors-literacy, land ownershipand habitat/occupation of the sample population. As a policy prescription, such findings should encourage the policymakers to identify context specific determinants of maternal anemia for appropriate interventions, instead of 'one-size-fits-all' type of approach.

Keywords: Maternal Anemia, Social Context,Dietary Supplementary, Iron Bioavailability.

Introduction

During pregnancy, women are at high risk of anemia since requirement for iron increases due to expansionof red cells and development of the foetus/placenta (Hazra and Maitra, 2001; Nair and Iyengar, 2009). According to World Health Organization (WHO), anemia is a state which exists when concentration of hemoglobin level below 11 g/dL in pregnant women, whereas, hemoglobin level below 7 g/dL is considered as severe anemia (Sharma & Shankar, 2010; Gogoi & Prusty, 2013).Lower hemoglobin level is associated with birth complications such as increases the risk of postpartum hemorrhage, preeclampsia and preterm birth, stillbirth including death of mother and her infant (Ali *et al.*, 2011; Laflamme, 2011; Frass, 2015).

Although incidences of malaria, helminth and chronic infections play a major role in development of anemia, iron deficiency is the most common form of anemia(Singh, 2012).An estimate of WHO states that iron deficiency is responsible for 50 percent of all anemia cases (WHO, 2015). An intervention to reduce anemia induced by iron deficiency in pregnant women is distribution of iron supplementation. However, policymakers should consider the context specific determinants and sociocultural influences on the implementation of such programme (Nagata *et al.*, 2012).

WHO (2015) showed that India contributes one-third of all global maternal deaths (15 percent). Kalaivani, (2009) argued that anemia is directly and indirectly responsible for 40 percent of maternal deaths in India. At the state level, Assam has highest maternal death with 300 per 1, 00,000 live births (SRS, GOI, 2013). According to National Family Health Survey (2015-16), 46 percent of all women aged between 15-49 years are anemic in Assam (vs. at national average is 53 percent).

Previous studies from Assam highlighted that anemia is largely associated with vulnerable group of women (such as illiterate, lives in rural areas) due to lack of proper care and nutritional deficiency (Gogoi, 2011; Sharma *et al.,* 2012).Medhi *et al.,* (2006) and Das *et al.,* (2012)have shown that a high prevalence of undernutrition and anemia among laborers of tea community of Assam.[1]Recent studies done by Malakar and Malakar (2014), Bora *et al.,* (2015) and Gogoi *et al.,* (2016) have focused on prevalence of anemia based on socio-demographic factors and hospital based sample units. They suggested that community level awareness regarding nutrition and iron supplementation, monitoring of IFA supplementation and educational qualification can reduce the incidence of anemia.

Yet, to the best of our knowledge, little attention has been given to identification of prevalence of anemia in Assam at community level. The purpose of the present paper attempts to address the socioeconomic determinants of lower concentration of hemoglobin level (as a proxy of anemia) at community level. Given the non-availability of secondary data, we collected data through door-to-door household level survey with a structured questionnaire. Our finding shows that maternal complications in our sample are significantly associated with maternal anemia (reinforcing the conventional medical wisdom). To mitigate the adverse effects of low hemoglobin, we then discuss the role of iron bioavailability (in contrast with government mandated and freely distributed Iron and Folic Acid tablets) on concentration of lower hemoglobin level. Our analysis shows that concentration of hemoglobin level is positively related to socioeconomic variables such as literacy, land ownership and non-habitat of teagarden population. However, evidence in favor of literacy rate (in terms of statistical significance level) is a bit weak.

Thus, our study complements to the existing literature (on Assam) by evaluating the socioeconomic determinants of lower concentration of hemoglobin level at community level. Secondly, the present analysis identifies that socioeconomic factors like literacy, land ownership, habitat/occupation are likely to be key determinants of maternal anemia. Third, we stress on the role of iron bioavailability as a mitigating factor.

Methodology

The main objective of the paper is to explore the socioeconomic determinants of lower concentration of hemoglobin level (as a proxy of anemia) at community level. A multistage sampling design was used in the present study. At first, districts under each Administrative Divisions of Assam2were arranged according to the reported MMR for the year 2013-14. This helped us to identify four districts with highest MMR. Further, from each sample districts we have selected four Block Primary Health Center (BPHC)which had reported highest maternal death. Finally, as per block medical officers, we have selected two villages from each BPHC (total 8 villages). The details are in Table 1.[3]

By using snowball sampling, we interviewed the following from each sample village

- Currently pregnant women.
- Mothers who have children aged 0-24 months.

[1]Tea tribe population originally brought from neighbouring states of the present day Orissa, Madhya Pradesh, Bihar, Andhra Pradesh and West Bengal into Assam by British colonial planters about 150 years ago for engaging in teagardens as laborers and subsequently settled in Assam permanently. They are recognized as Other Backward Classes (OBC) by the Government (GOA; Das, 2016).

[2]Assam has four administrative divisions:

Upper Assam Division includes- Tinsukia, Dibrugarh, Sibsagar, Jorhat, Golaghat,
Lower Assam Division includes-Kokrajhar, Dhubri, Goalpara, Darrang, Bongaigaon, Barpeta, Kamrup, Nalbari
North Assam Division includes-Marigaon, Nagaon, Sonitpur, Lakhimpur, Dhemaji
Hills and Barak Valley Divisions includes-KarbiAnglong, North Cachar Hills, Cachar, Karimganj, Hailakandi
Source: Annual Health Survey (AHS) 2010-11

[3]Note that maternal death is a comparatively rare event. Therefore, data was collected from those blocks (a district comprises of several blocks) where reported maternal death was highest. Even so, we have found cases where no maternal complications arose, thus providing us with the necessary counterfactual.

- Members of a family which has experienced of maternal deaths.

Since, we follow the purposive sampling methods; we interviewed 169 subjects with reference to availability of sample unit during the period of the survey. The survey period was September 2014 to February 2015 with the reference period of 365 days preceding the date of the survey. The objective of the questionnaire was to obtain information on maternal health status and maternal deaths cases; socio-demographic characteristics of subjects; reproductive history as well as various aspects of anemia and consumption expenditure.

Data Summary

Maternal Health Outcome

Table 2 presents maternal death cases, high risk pregnancy, complication during pregnancy and normal pregnancy.

Socio-demographic Profile

Table 3 provides the detailed profile of the socio-economic and demographic characteristics of the respondents.

Maternal Death Cases

Table 4 shows the maternal death profile of the studied villages.

Results

From the field observation, it is noticed that in our sample, 91 percent of women are anemic. Further, out of 169 sample respondents, 33 percent of women had faced complication during their pregnancy and out of that, 87 percent of women are anemic. Further, Table 5 shows that concentration of lower hemoglobin level (Hb below 11 g/dL) is significantly associated with maternal complications (χ^2 = 9.09, p = 0.003). Field observations also reflects that prevalence of anemia is significantly high among Tea tribe population (χ^2 = 22.29, p= 0.000). Similarly, caste-wise prevalence of anemia reveals that anemia is highly associated with Other Backward Class(OBC) and Scheduled Caste (SC) population (χ^2 = 17.21, p= 0.001) (Table 6). The result conforms to the existing medical wisdom.

Socio–Economic Causes of Maternal Anemia in the Studied Areas:

In many cases, anemia during pregnancy develops due to low socio-economic status, customs and dietary habits. The incidences of anemia among pregnant women vary according to their societal backgrounds, lifestyles and health seeking behaviors across different cultures (Lone, Qureshi, & Emmanuel, 2004). Studies by Ensor & Cooper (2004), Singh *et al.*, (2009), Goodman & Currie (2010), Nwizu*et al.*,(2011),Mahashabde*et al.*, 2014have shown that prevalence of anemiaduring pregnancy is largely associated with maternal age, level of literacy, income level, socio-economic status, cultural belief, disadvantaged groups and utilization of health care services.

Based on this literature, variables such as literacy, income, age of marriage, food expenditure, land ownership, use of family planning methods and birth order are considered as the factors affecting the level of hemoglobin. The definition of the explanatory variables and expected signs of the coefficients of the variables are presented in Table 7.Summary statistics of all variables are presented in Table 8.

The functional relationship between the dependent and the independent variables (Model 1) is

$$lnHb_i = \alpha + \beta_0 Lit_i + \beta_1 lnAoM_i + +\beta_2 LO_i + \beta_3 BO_i + \beta_4 UFP_i + \mu_i \quad \ldots\ldots 1$$

Where,

α= Constant

β_i= Vector of Coefficients

lnHb= Natural Log of Hemoglobin Level

Lit= Literacy Level

lnAoM= Natural Log of Age of Marriage

LO=Land Ownership (Acres)

BO= Birth Order

UFP= Use of Family Planning

μ= Error term

Employing the Variance Inflation Factor (VIF), we found no collinearity problem in the present model. Further, the Breusch-Pagan test / Cook-Weisberg test and Cameron & Trivedi's decomposition have been carried out to detect heteroscedasticity in the data set. There is no evidence of heteroscedasticity problem among the variables (χ^2=7.55, p=0.37). Additionally, logarithmic transformations of the dependent variable and the independent variables are done to normalize their variations. Robust standard error has been applied to obtain an accurate p-value of the predictor variables.

In order to check the robustness of the base model, in subsequent models we added control variables such as per capita food expenditure (PCFdEx) in Model 2; per capita income (PCI)[4] in Model 3 and finally we have added Tea Garden dummy (DTGpop) (i.e. whether the respondentis a teagarden laborer or not) after controlling PCFdEx and PCI. Accordingly, the remaining three models are:

$$lnHb_i = \alpha + \beta_0 Lit_i + \beta_1 lnAoM_i + \beta_2 LO_i + \beta_3 BO_i + \beta_4 UFP_i + \beta_5 lnPCFdEx_i + \mu_i \quad \ldots\ldots 2$$

$$lnHb_i = \alpha + \beta_0 Lit_i + \beta_1 lnAoM_i + \beta_2 LO_i + \beta_3 BO_i + \beta_4 UFP_i + \beta_5 lnPCFdEx_i + \beta_6 lnPCI_i + \mu_i$$

…… 3

$$lnHb_i = \alpha + \beta_0 Lit_i + \beta_1 lnAoM_i + \beta_2 LO_i + \beta_3 BO_i + \beta_4 UFP_i + \beta_5 lnPCFdEx_i + \beta_6 lnPCI_i + \beta_7 DTGpop_i + \mu_i$$

…… 4

[4]The yearly income is calculated from monthly earning of a member in a household from his/her principal occupation

Table 9 provides the result of OLS regression models, p values and their associated AIC scores. Model shows concentration of hemoglobin level is positively related with literacy(significance level 10%)and land ownership (a proxy of wealth) (significance level 1 %). The coefficient of literacy shows that compared to respondents with no literacy, the concentration of haemoglobin level is 7% higher among literates. At the same time, compared to households with no land ownership, the concentration of hemoglobin level is5 % higher among households with land ownership.

The coefficient of land ownership and literacy are positive and statistically significant throughout. Further, after controlling per capita food expenditure and per capita income, Tea Garden dummy is negatively and significantly (at 5 % significance level) associated with concentration of hemoglobin level. It shows that the respondents who do not live in teagarden areas, the level of haemoglobin level is9 % higher than the respondents who live in teagarden areas. However, the coefficient of food expenditure per capita is negative and statistically significant (albeit at a weaker 10 % significance level).

Although Model 1 has the lowest AICscore (60.41),we choose Model 4 (60.74) as the AIC score is close enough. Moreover, it is also theoretically consistent.

Discussion

The finding of the present study provides that literacy is more or less positively associated with hemoglobin level. However, evidence in favor of literacy rate (significance level) is a bit weak. This result is consistent with findings of Bisoi *et al.*, (2011), Chowdhury *et al.*, (2015), Balasubramanian *et al.*, (2016), Mangla & Singla, (2016).

The coefficient of land ownership has a significant impact on level of hemoglobin concentration. This is consistent with the study of Haverkate *et al.*, (2014). They have considered land ownership as one of the measures of wealth. They found that higher socioeconomic classes had higher mean of hemoglobin (Hb) level. Moreover, a household with land of their own has the opportunity to engage in economic activities such as agricultural works, home garden, livestock and poultry farm of their own. An adequate amount of micronutrient food intake is necessary to ensure nutritional adequacy. Even the low-income households with land ownership can be able to maintain their nutritional diet from their home-grown food product. On the other hand, those who have no access to land of their own have to rely on the market for their daily diet. Therefore, land ownership is one of the important factors to a household for self-sustained food product and income as well to maintenance of hemoglobin level in the long run.

We also found that tea garden population, for whom occupation and habitat uniquely marge, are more likely to suffer from anemia. This is consistent with Gogoi (2011), Das *et al.*, (2012) and Sharma *et al.*, (2012).

Iron Bioavailability: Notes from the Field

Here, we supplement our statistical analysis with discuss the role of iron bioavailability as a mitigating factor. Although distribution of iron supplementation (IFA tablets) is practiced as an alternative to dietary intervention, it may not be too helpful in preventing anemia without an optimum diet maintained by the women of reproductive age group. As per the recommendation of WHO (DeMaeyer, 1989), amount of iron absorption is influenced by the combination of foods taken in a given meal. Studies by Galloway and McGuire(1994),Hallberg *et al.*, (1966), Beard (2000),Mithra *et al.*, (2013) have argued that common reasons for not consuming IFA tablets are side effects, lack of access, misunderstood instructions etc. Consumption of IFA tablets is mostly influenced by age, socioeconomic status, community awareness regarding importance of IFA tablets. A study of Patterson *et al.*, (2001) have suggested that a diet rich in iron appears to be more advantageous over iron supplementations as it is cost-effective and shows higher efficacy and benefits in the

long-term. Dietary iron absorption depends on bioavailability of iron i.e. amount of heme and non-heme iron in the meal.[5]Iron nutritional status depends on absorption of iron in the body that is determined by an adequate amount of iron in dietary composition or through the iron supplementation. A balanced diet of heme and non-heme can enhance the iron absorption to maintain hemoglobin level and to reduce the incidence of anemia (DeMaeyer, 1989; Sharma & Shankar, 2010).

Observation from field visit shows that proper diet is not maintained, particularly among the tea laborers. For instance, Table 10 provides that the per capita food expenditure on heme food product is high in Muhimari, Patgaon, Janzimukh and Kadamoni as compared to rest of the sample villages.[6]

It is clear from the Table 10 that in teagarden areas (such as Lepetkatta Tea Estate, Shakumato Tea Estate, Motinagar, Silcoori Tea Estate), the expenditure on heme product is low in daily diet. This is confined to staple foods (cereals) with low iron bioavailability. The population in teagarden areas have less access to diversified diet due to land and geographical bottlenecks. Respondents from teagarden areas live in either in quarters provided by management or temporary hut inside teagarden and they do not possess land of their own. This attributes to lack of home-grown food products. Report of Global Network for the Right to Food and Nutrition 2016, also reveals that given the lack of alternative means of livelihoods, teagarden workers are highly dependent on food rations provided by the Tea Company which is often insufficient, inadequate and of bad quality. The report also mentions that it is not affordable for the workers with their wage to have an adequate amount of food or any additional food to maintain a diversified diet. Evidence from the field survey shows that most of the teagarden workers have no ration card as the casual workers (74.42 percent) are discriminated against in accessing ration card and other facilities like hospitals, housing and other amenities. They solely depend on daily market for their food. On the other hand, people of Janzimukh, Patgaon, Kadamoni, Muhimari have diversified food availability at their own land as they live in a geographically better position along with the available water resources and access to land of their own which help them go for diversified food consumption. Home-grown foods and green leafy vegetables, fish and poultry farms of their own house help to maintain proper food habits. Table 11shows the distribution of households according to their land ownership. Households with no land holdings are from tea garden areas and rest are from non-teagarden habitat.

Conclusion and Implications

In sum, our result shows that socioeconomic determinants such as landownership and occupation/ habitat are important for better hemoglobin prospects. People who have their own land or live in areas where bioavailability of heme products (fish, meat) are high enough due to immediate geography, fare better in terms of maternal health. Micronutrient food-based approach can be taken as preventive strategies of nutritional deficiency and malnutrition. Promoting home gardens, small scale animal husbandry to maintain regional and local variation of diet, ensuring seasonal availability in the iron containing foods are vital to enhance the bioavailability (Biswas and Baruah, 2014). Findings also reveal that prevalence of anemia is high among social groups such OBC and SC population. Similarly, concentration of hemoglobin level also found significantly associated with teagarden population compared to non-teagarden population. Further, given our previous discussion, these results imply dietary inclusion of iron is to be more important than distribution of IFA tablets.As a policy prescription, one has to rethink the idea of distribution of IFA tablets: probably direct distribution of heme products in a form which is acceptable to the population will matter. Protection of wages

[5]Heme product (animal sources of iron products), non-heme products: plant sources of iron such as grains, cereals, vegetables and nuts) (MacDonald et al., 2007).

[6]The monthly food expenditure of a household is calculated by estimating the rupees spent on food items like heme (meat and fish) and non-heme (cereals- rice, dal, and veg) product and others (oil, salt, and sugar) based on 1 week recall period.

of tea garden laborers and enactment of better working conditions will also increase their economic position (so that dependence on cereal based food goes down). This can also be thought of as a policy.

Appendix

Table 1: Selected Districts and BPHC of Four Administrative Divisions of Assam Based on Highest Maternal Mortality Ratio Reported in the Period of 2013-14

District	Maternal Mortality Ratio in Districts	Name of BPHC	Maternal Death at BPHC	Name of Village
Kamrup	230.1539	Chhaygaon	7	Muhimari, Patgaon
Dibrugarh	413.3103	Barbaruah	86	Janzimukh, Lepetkatta TE
Sonitpur	297.3435	BiswanathChariali	14	Kadamani, Sakumato TE
Cachar	516.6315	Sonai	10	Motinagar, Silcoorie TE

Table 2: Maternal Health Outcome at Study Villages

Maternal Outcome	No.	(%)
Maternal Deaths	17	10.05
High Risk Pregnancy	29	17.16
Complications	27	15.98
Normal Pregnancy	96	56.8
Total Pregnancy	169	100

Sources: Field data 2014-15

Table 3: Percentage Distribution of the Respondents by Selected Socio-Economic Variables

Socio-economic Variables	No.	%
Age at Marriage		
>18	28	16.57
19-29	121	71.6
Above 30	20	11.83
Literacy		
Illiterate	88	52.07
Literate	61	36.09
Only sign	20	11.83
Birth Order		
1	66	39.05
2 to 3	76	44.97
4 to 5	22	13.01

6 to 7	5	2.96
Anemia		
>12	14	8.28
All anemia	155	91.72
Mild anemia	19	12.26
Moderate anemia	82	52.90
Severe anemia	29	18.17
ANC Coverage (N=91)		
One	2	2.08
Three	34	35.42
Four	55	57.29
Use of Contraceptive	20	11.83
Family Size Structure		
Nuclear Family	101	59.76
Joint Family	68	40.24
Housing Condition		
Kutcha	139	82.25
Pucca	20	11.83
Semi-Pucca	10	5.92
Drinking Water Facilities		
Pump tube well	92	54.44
Well	38	22.49
Supply water	30	17.75
Stream water	9	5.33

Sources: Field data 2014-15

Table4: Profile of Maternal Death Cases at Studied Villages

Cases	Age	Education Level	Weight	Birth Parity	Hb Level	Maternal History	When did Death Occur	Causes of Deaths
Case 1 (Muhimari)	19	9	41	1	9.3	0	Postpartum	Anemia and Severe Weakness
Case 2 (Muhimari)	35	3	40	4	11.4	High BP	Postpartum	Pre-Eclampsia
Case 3 (Patgaon)	35	0	40	7	6.1	0	Postpartum	Anemia
Case 4 (Lepetkatta TE)	35	0	48	5	8.1	0	Postpartum	Anemia and Weakness
Case 5 (Lepetkatta TE)	38	0	40	7	7	Nerve Problem	Postpartum	Anemia
Case 6 (Lepetkatta TE)	25	0	47	2	8.6	0	Postpartum	Pre-Eclampsia and Anemia
Case 7 (Kadamoni)	26	0	48	2	11.4	Still birth	Postpartum	Postpartum Alcoholism
Case 8 (Kadamoni)	26	0	49	5	8.2	Miscarriage	Postpartum	Postpartum Haemorrhage
Case 9 (Kadamoni)	28	0	45	3	12	Miscarriage	During Pregnancy	Miscarriage and Sever Abdominal Pain
Case 10 (Sakumato TE)	24	0	37	4	8	Anemic	During Delivery	Haemorrhage
Case 11 (Sakumato TE)	25	0	39	1	9.2	0	During Pregnancy	Severe anemia
Case 12 (Sakumato TE)	23	0	42	3	7	Anemic	During Pregnancy	Severe anemia
Case 13 (Motinagar)	39	0	49	6	3	Still birth	Postpartum	Anemia and Pre-Eclampsia
Case 14 (Motinagar)	32	0	36	3	8	Anemic	Postpartum	Edema
Case 15 (Motinagar)	33	0	48	6	10	0	During Pregnancy	Antepartum Haemorrhage
Case 16 (Silcoorie TE)	25	4	44	3	7	0	Postpartum	Respiratory problem
Case 17 (Silcoorie TE)	28	5	41	3	8	0	Postpartum	Cardiomyopathy

Source: Field Survry 2014-15

Table5: Concentration of Hemoglobin level with Maternal Complications Among Women in Studied Villages (Obs.=169)

	No Pregnancy Complications (n=119)	With Pregnancy Complications (n=50)	Chi Square Test
Hb level above 11 g/dL	35 (29%)	4 (8%)	χ^2= 9.0929
Hb level below 11 g/dL	84 (71%)	46 (92%)	p= 0.003

Source: Survey data 2014-15

Table 6: Prevalence of Anemia based on Population Characteristics and Caste Dummies in Studied Villages (N=169)

	No Anemia (Hb>12)	With Anemia (Hb<11)	Chi Square Test
Non-Tea Garden Population	33 (38%)	6 (7%)	χ^2= 22.29
Tea Garden Population	54 (62%)	76 (93%)	p= 0.000
Caste Dummies			
General	14 (30%)	32 (72%)	
OBC	9 (15%)	52 (85%)	χ^2= 17.21
SC	1 (4%)	26 (96%)	p= 0.001
ST	15 (43%)	20 (57%)	

Source: Survey data 2014-15

Table 7: Definition of the Explanatory Variables and their Expected Impact on Better Concentration of HeboglobinLevel

Variables	Definition	Expected sign
Lit	Literacy (1= if respondent is literate; 0= otherwise)	+
PCI	Per capita income (on yearly basis)	+
PCFdEx	Per capita food expenditure (monthly food expenditure in rupees)	+
AoM	Age of Marriage (years)	+
LO	Land Ownership (area inacres)	+
UFP	Use of family planning methods (1= if respondents use any family planning methods; 0= otherwise)	+
BO	Birth Order (1= if birth order is not more than 2-3; 0= otherwise)	+
DTGgroups	Dummy Tea-Garden Population (1= if respondents live in tea garden areas; 0= otherwise)	+/-

Table 8: Descriptive Statistics of the Variables Influencing in Concentration of Hemoglobin level

Variables	Mean	Std.Dev.	Min	Max
Lit	0.390533	0.48932	0	1
PCI	9945.32	6158.334	2000	36250
PCFdEx	7063.32	2713.541	2790	21060
AoM	18	3.278719	12	28
LO	0.614615	1.091507	0	5.61
UFP	0.118343	0.323974	0	1
BO	0.35503	0.479944	0	1
DTGpop	.4852071	.5012664	0	1

Source: Survey data 2014-15

Table 9: Hemoglobin Level with Associate Variables Based on Primary Data

Variables	Dependent Variable (Hemoglobin Level)							
	Model 1		Model 2		Model 3		Model 4	
	Coefficient	t	Coefficient	t	Coefficient	t	Coefficient	t
Lit	.079886*	1.72	.0808792*	1.75	.0835586*	1.79	.067095	1.46
	(.0463135)		(.0462493)		(.0467139)		(.0458967)	
lnAoM	.1824529	1.46	.1850926	1.49	.1715918	1.36	.1464689	1.17
	(.1246365)		(.1240561)		(.1260556)		(.1246934)	
LO	.059295***	3.24	.0574258***	3.09	.0584949***	3.13	.059959***	3.37
	(.0183202)		(.0185623)		(.0187076)		(.0178045)	
BO	.0109568	0.24	.0126023	0.28	.0114584	0.26	-.0092022	-0.20
	(.044955)		(.0446955)		(.0447645)		(.0468862)	
UFP	-.036568	-0.58	-.0403766	-0.63	-.0455272	-0.71	-.0457748	-0.73
	(.0627803)		(.0637)		(.06391)		(.0628172)	
PCFdEx	-	-	-.0526487	-0.97	-.0821126	-1.28	-.1098439*	-1.66
			(.0540208)		(.0639643)		(.0662663)	
PCI	-	-	-	-	.0333922	0.77	.0558757	1.24
					(.0434481)		(.0451198)	
DTGpop	-	-	-	-	-	-	-.0942548**	-2.01
							(.0468164)	
Constant	1.529965***	4.29	1.986021***	3.22	1.981236***	3.17	2.152596***	3.43
	(.3564481)		(.6174494)		(.6255179)		(.627591)	
R^2	0.09		0.10		0.10		0.12	
Prob>F	0.0007		0.0012		0.0026		0.0007	
No. of obs.	169		169		169		169	
F (5, 163)	4.52		F (6,162)	3.87	F (7,161)	3.31	F (8,160)	3.59
AIC Score	60.410			61.601	63.122			60.749

Source: Survey data 2014-15

Note: 1. ***, **, * represent significance at 1%, 5% and 10% level respectively;

2. Figure in parentheses indicates standard errors of the coefficient

Table 10: Village-wisePer Capita Food Expenditure on Heme and Non-Heme Food Product at Monthly Basis during 2014-15

	Non-Heme product		Heme product			Total food expenditure
Villages	Cereals	Vegetables	Fish	Meat	Others	
Muhimari	273.68	109.14	52.11	36.12	42.76	513.82
Patgaon	257.45	125.96	68.09	54.79	50.64	556.91
Janzimukh	238.30	111.70	49.04	50.43	57.45	506.91
Lepetkatta TE	205.33	117.73	39.60	36.67	61.33	460.67
Kadamoni	221.95	119.88	65.73	59.51	51.22	518.29
Shakumato TE	290.20	101.67	31.23	25.00	56.67	504.75
Silcoori TE	243.16	130.32	27.89	23.47	56.53	481.37
Motinagar	264.71	116.86	25.88	23.73	55.20	486.37

Table 11: Distribution of Sample Household According to their Ownership of Land

Landholding	No.	%
No landholding	86	50.89
above 1 acres	33	19.53
less than 1 acres	50	29.59
Total	169	100

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IMPACT OF MEDICAL EDUCATION IN PROMOTING HEALTHY LIFE OF MEDICAL STUDENTS

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Abstract: Education represents an important aspect of public awareness. It is expected that medical education has a great effect in promoting healthy life of medical students. This paper represents a comparison between senior students in faculty of medicine and senior students in non-medical faculty "faculty of business" to find out whether medical education has contributed in improving quality of life of medical students or made no difference. Our questionnaire-based study was conducted on 600 students (300 from each faculty). Dietary habits, healthy habits, Sports and exercise, free time and bad habits were included according to Health Behavior in School-aged Children (HBSC) study protocol questionnaire. Although medical students showed higher level of knowledge about healthy lifestyle, we reported an insignificant difference between lifestyle of medical and non-medical students. Establishment of a behavior towards health-related issues requires more than presence of knowledge. Therefore a complete health programs are needed to raise awareness and encourage behavior development among university students in Egypt.

Keywords: Medical Education, Health behavior, senior students

Introduction

Personal, cognitive and social skills are the keys to understand and use information to enhance and maintain good health. (Nutbeam, 2006). The link between health and education has been under scope for many years. The lifestyle of population can be improved by promoting the lifestyle of the young (Sakamaki et al., 2005). Although, it is expected that the more the health awareness, the better the behavior, Lin et al reported weak correlation between nutritional knowledge and behavior. Moreover it is not necessary that children with better nutrition should have better behavior (Lin et al., 2017). Another literature reflected that changing attitude and behavior cannot be achieved by knowledge only (Schmidt et al., 2010). This questionnaire-based study focused on the relation between education and healthy lifestyle among university students. It aimed to assess effect of medical education on health behavior through a comparison between medical and non-medical students in different health related habits.

Subject and Methods

The study followed Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines during preparation and reporting of this study (Vandenbroucke *et al.*, 2007). A comparative, cross-sectional, questionnaire-based study was conducted in Mansoura University, Egypt. Target group was recruited and data collection was done from February 2017 to April 2017. The final year students registered in Mansoura faculty of medicine and Mansoura faculty of business – English section were included.

Students at any other semester, any other medical, paramedical or non-medical students, students whose study was in Arabic and students who were not registered at Mansoura University were excluded.

A self-administered questionnaire was distributed among target group students. It was available in both online and printed forms in English language. The questionnaire was divided into five sections [dietary habits, healthy

habits, Sports and exercise, free time and bad habits] with a total of 30 questions as shown in [Appendix1]. We used Health Behavior in School-aged Children (HBSC) study protocol questionnaire and a previous questionnaire by Schmidt et al., after obtaining their permission ('HBSC_Study_Protocol_2013-14.pdf', no date; Schmidt *et al.*, 2010).

A convenient sample was collected from the study population. Participants were assured that participation was voluntary and no personal data were required. An oral consent was obtained before filling the printed form. In addition, filling the online form was considered consent from participants. Data were collected using Microsoft Excel and statistically analyzed by (IBM SPSS v.16). Categorical data were analyzed by Pearson chi-square tests in comparison between two groups. p value < 0.05 was considered significant. Missing data was defined as fixed values and handled statistically by SPSS.

Results

A random sample of 300 students in each faculty filled out the questionnaire. One-hundred thirty-three medical students and 68 business students filled the online version, in addition to 167 medical students and 232 business students filled the printed version. Gender was the only the demographic information required. Out of 600 respondents, there were 92 male and 208 female medical students compared to 120 male and 179 female business students. [Table1]

The dietary section was the biggest section in the questionnaire as it included 14 out of 30 questions. In having breakfast in weekdays, most of medical students (61.3%) never have breakfast during the week. This percentage was more than the business students' percentage which was (51.0%) However, during weekends a percentage of (88.6%) medical students had breakfast while among business students the percentage was (77.4%) [Table2].

In eating junk food, the majority in both ate junk food one day or more a week [Table4]. Moreover, (57.7%) of medical students and (47.4%) of business students were overweight and obese [Table4]. In eating food elements like fruits and vegetables, most of students ate those elements at least more than two days a week [Table5,6]. They ate also sweets like candy and chocolate at least two days a week [Table7].

Our results showed that business students consumed more soft drinks than medical students. Highest percentage of soft drinks consumption among business and medical students was more than five days per week (35.6%) and less than once a week (24%) respectively. [Table8].

Only (18.9%) of medical students and (25.3%) of business students reported that they had lunch with their family more than 3 days a week [Table9]. These percentages declined down to (10.1%) of medical students and (18.0%) of business students in having breakfast with family [Table10].

In Sports & exercise, both students showed a low physical activity. Only (16%) of medical students and (16.6%) of business students were doing exercise regularly [Table11]. In joining sport club, business students joined clubs more than medical students by a percentage (21.0%) in comparison with (14.7%) of medical students [Table12].

According to Healthy habits like brushing teeth, it declared that percentage of business students who brushed their teeth more than once a day was (75.8%). However the percentage of medical students was (73.0%) [Table13]. In addition, (52.5%) of medical students and (55.1%) showed that they had dental problem in the last year.

In spending free time, social media like Facebook and twitter had been widely used by both medical and business students. However, the number of business students using them more than four hours a day was much more than medical students [Table14]. In addition, business students were also spending more time than medical students in watching TV [Table 15].

Although, the percentage of medical students smoking was less than those in business students, the number of medical students who started to smoke in college was more than business students [Table16].

Discussion

Education represents an important factor in development of societies; however it is insufficient alone for changing the attitude of students. The study used the medical education as an example and studied its effect on medical students, through a comparison between medical students and business students in their health related habits. Our present study showed no difference between lifestyle of medical and business students, however, medical students' knowledge about ways of healthy lifestyle and the harm of bad habits was higher. Thus, the study suggests that knowledge only was not enough to change attitude and behavior.

Many studies have focused on the quality of life of university students. They reported negative correlation between effects of university life and their habits. Percentage of adolescents doing exercise regularly decreased after they enrolled in college as 70% when they were 12-year-old compared to 42% only at the age of 21-year-old (Tiggemann and Williamson, 2000).

Dietary habits of students in US universities were unpleasant. They consumed a little amount of fruits and vegetables but huge amounts of junk food (Silliman, Rodas-fortier and Neyman, 2004). In addition 32.9% of American college students are either overweight or obese , according to the American College Health Association (2007) (American College Health Association, 2008). the results were very similar. For example, both medical and business students ate junk food heavily. This could be due to spending a lot of time in university and the easy availability of fast food. Nevertheless, medical students had higher knowledge about the harmful effects of high fat food, they showed higher consumption of fast food than business students. Medical education indicated good impact on spending free time. Most of medical students showed that they spent a little time on social media, watching videos or playing games. This could be explained by the nature of their study life.

To the best of our knowledge we did not find much literature comparing between medical and non-medical student. Moreover, the study compared in five different aspects which represent almost all of the students' habits. One of the study limitations was the small size of the sample. In addition, the study was held on two faculties only. Another limitation was that there was no assessment to check duplicated responses in the questionnaire online and printed versions.

Thus, the study encourages further studies to focus on relation between level of education and healthy lifestyle with larger sample size and broad inclusion criteria. As changing the adults' behavior starts from changing the students' behavior, also recommends that universities should help their students to have a healthy life by increasing their behavior-changing awareness. There should be programs and courses beside their study curriculum helping them to change their attitudes and behavior.

In conclusion, the study reported an insignificant difference between lifestyle of medical and non-medical students, however medical students had higher level of knowledge about healthy lifestyle. Knowledge alone is not sufficient for changing behavior towards health-related issues, thus a complete health programs are needed to raise awareness and encourage behavior change among university students in Egypt.

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Conflict of interest

All authors confirm no financial or personal relationship with a third party whose interests could be positively or negatively influenced by the article's content.

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Table 1Gender:

Gender	Medicine (n=300)	Business (n=300)
Male	92 (30.7 %)	120(40.1%)
Female	208 (69.3%)	179(59.9%)
Missing data	0(0.0%)	1 (0.9%)

Table 2Having breakfast in weekdays &weekends:

Breakfast	Medicine (n=300)	Business (n=300)
Weekdays		
Never	184 (61.3%)	149 (49.7%)
One day	24 (8%)	23 (7.6%)
Two days	24 (8%)	42 (14.0%)
Three days & more	68 (22.7%)	78 (26.0%)
missing data	0(0.0%)	8 (2.7%)
Weekends		
Never	34 (11.3%)	66 (22.0%)
Usually	263 (87.7%)	224 (74.7%)
Missing	3(1.0%)	10(3.3%)

The breakfast in weekdays, the X2 was (9.188) ,df (3) with p-value (.027) .thebreakfast in weekends, theX2 was (13.282), df (1) with p-value (.000).

Table 3Eating junk food in weekdays &weekends:

Junk food	Medicine (n=300)	Business (n=300)
Weekdays		
Never	50 (16.7%)	60 (20.0%)
One day	102 (34.0%)	76 (25.3%)
Two days	49 (16.3%)	55 (18.3%)
Three days	44 (14.7%)	45 (15.0%)
Four days	25 (8.3%)	22 (7.3%)
Five days	29 (9.7%)	37 (12.3%)
Missing data	1(0.3%)	5(1.8%)
Weekends		
Never	219 (73%)	174 (58%)
Usually	76 (25.3%)	101 (33.7%)
Missing data	5(1.7%)	25(8.3%)

the X^2 was (6.199) , df (5) with p- value (.287).

Table 4 Body Mass Index:

BMI	Medicine(n=300)	Business (n=300)
<18	8 (2.7%)	11 (3.7%)
18-24	147(49%)	161 (53.7%)
25-30	85 (28.3%)	80 (26.6%)
>30	28 (9.3%)	18 (6%)
Missing data	32(10.7%)	30(10%)

Table 5 Eating Fruits:

Fruits	Medicine (n=300)	Business (n=300)
Never	4 (1.3%)	2 (0.7%)
Less than once a week	8 (2.7%)	15 (5%)
Once a week	55 (18.3%)	38 (12.6%)
About 2-4 days a week	102 (34%)	108 (36%)
More than 5 days	130 (43.3%)	132 (44%)
Missing data	1(0.3%)	5(1.7%)

The X^2 was (6.065), df (4) with p-value (0.194).

Table6 Eating vegetables

Vegetables	Medicine (n=300)	Business (n=300)
Never	5 (1.7%)	8 (2.7%)
Less than once a week	9 (3.0%)	16 (5.3%)
Once a week	53 (17.7%)	44 (14.7%)
About 2-4 days a week	81 (27%)	73 (24.3%)
More than 5 days	151 (50.3%)	154 (51.3%)
Missing data	1(0.3%)	5(1.7%)

Table 7Eating Sweets:

Sweets	Medicine (n=300)	Business (n=300)
Never	7 (2.3%)	18 (6%)
Less than once a week	61 (20.3%)	65 (21.7%)
Once a week	71(23.7%)	56 (18.7%)
About 2-4 days a week	94 (31.3%)	80 (26.7%)
More than 5 days	65(21.7%)	76 (25.3%)
Missing data	2(0.7%)	5(1.6%)

Table 8 Soft Drinks

Soft Drinks	Medicine (n=300)	Business (n=300)
Never	38 (12.7%)	39 (13%)
Less than once a week	72 (24%)	56 (18.7%)
Once a week	63 (21%)	38 (12.7%)
About 2-4 days a week	59 (19.7%)	54 (18%)
More than 5 days	66 (22%)	107 (35.6%)
Missing data	2(0.7%)	6(2%)

Table 9 Having lunch with family: Soft drinks like coke

Lunch	Medicine (n=300)	Business (n=300)
Never	106 (35.3%)	108 (36%)
Less than once a week	53 (17.7%)	44 (14.7%)
1-2 days a week	82 (27.3%)	67 (22.3%)
More than 3 days a week	56 (18.7%)	74 (24.7%)
Missing data	3(1%)	7(2.3%)

Table 10 Having breakfast With family"

Breakfast	Medicine (n=300)	Business (n=300)
Never	96 (32%)	88 (29.3%)
Less than once a week	90 (30%)	52 (17.3%)
1-2 days a week	82 (27.3%)	101 (33.7%)
More than 3 days a week	30 (10%)	53 (17.7%)
Missing data	2(0.7%)	6(2%)

Table11 Exercise in weekdays:

Exercise	Medicine (n=300)	Business (n=300)
4-7 days a week	48 (16.0%)	49 (16.3%)
1-3 days a week	115 (38.3%)	103 (34.3%)
Once or less a month	55 (18.3%)	51 (17%)
Never	82 (27.3%)	92 (30.7%)
Missing data	0(0%)	5(1.7%)

Table 12 Joining sports club:

Join a sport club	Medicine (n=300)	Business (n=300)
Yes	44 (14.7%)	62 (20.7%)
No	256 (85.3%)	233 (77.6%)
Missing data	0(0%)	5(1.7%)

Table 13 Brushing teeth:

Brushing teeth	Medicine (n=300)	Business (n=300)
More than once a day	219 (73.0%)	225 (75%)
Once a week or less	76 (25.3%)	57 (19%)
Never	5 (1.7%)	15 (5%)
Missing data	0(0%)	3(1%)

Table 14 spending free time in social media:

The X^2 was (7.780), df (2), p-value (0.020). Social media	Medicine (n=300)	Business (n=300)
Never	2 (0.7%)	5 (1.7%)
Half an hour to one hour a day	62 (20.7%)	48 (16%)
Two hours a day	76 (25.3%)	54 (18%)
Three hours a day	61 (20.3%)	40 (13.3%)
Four hours a day or more	98 (32.7%)	150 (50%)
Missing data	1(0.3%)	3(1%)

Table 15 Watching TV:

Watching TV	Medicine (n=300)	Business (n=300)
Never	13 (4.3%)	12 (4.0%)
Half an hour – three hours a day	151 (50.3%)	117 (39%)
Four hours or more a day	136 (45.3%)	168 (56%)
Missing data	0(0%)	3(1%)

Table16 Smoking cigarettes

Smoking	Medicine (n=300)	Commerce (n=300)
Never	286 (95.4%)	274 (91.3%)
19	2 (0.7%)	14 (4.7%)
20	3 (1.0%)	5 (1.7%)
21	1 (0.3%)	4 (1.3%)
22	3 (1.0%)	0 (.0%)
23	4 (1.3%)	0 (.0%)
Missing data	1(0.3%)	3(1%)

Q1 What is your Gender ?

- ☐ Male
- ☐ Female

Q2 what is your Faculty ?

- ☐ Medicine
- ☐ Commerce

Q3 How often do you have breakfast (junk food not included) ?
Please tick one box for Weekdays and one box for Weekend

Weekdays	**Weekends**
☐ I never have breakfast during the week	☐ I never have breakfast during the weekend
☐ One day	
☐ Two days	
☐ Three days	
☐ Four days	☐ I usually have breakfast during the weekend
☐ Five days	

Q4 How often do you eat junk food ?
Please tick one box for Weekdays and one box for Weekend

Weekdays	Weekends
☐ I never have junk food during the week	☐ I never have junk food during the weekend
☐ One day	
☐ Two days	
☐ Three days	

☐ Four days ☐ Five days	☐ I usually have junk food during the weekend

Q5 How many times a week do you usually eat or drink … ?

	Never	**Less than once a week**	**Once a week**	**About 2-4 days a week**	**About 5-6 days a week**	**Once a day , every day**	Every day , more than once
Fruits	☐	☐	☐	☐	☐	☐	☐
Vegetables	☐	☐	☐	☐	☐	☐	☐
Sweets (candy or chocolate)	☐	☐	☐	☐	☐	☐	☐
Coke or other soft drinks that contain sugar	☐	☐	☐	☐	☐	☐	☐

Q6 How often do you do the following? Please tick one box for each line

	Never	Less than once a week	1-2 days a week	3-4 days a week	5-6 days a week	Every day
Have an evening meal together with your mother or father	☐	☐	☐	☐	☐	☐
Have breakfast together with your mother or father	☐	☐	☐	☐	☐	☐

Q7How much do you weigh without clothes?

Q8 How tall are you without shoes?

Q9 How often do you brush your teeth?

- re than once a day
- Once a day
- At least once a week but not daily
- Less than once a week
- Never

Q10 Did you have dental problem in the last year ?

- s
- No

Q11 Outside university hours: how often do you usually exercise in your free time ?

- Every day
- 4-6 times a week
- 2-3 times a week
- Once a week
- Once a month
- Less than once a month
- Never

Q12 Are you a member at sport club or a gym?

Yes	☐
No	☐

Q13 How many hours a day, in your free time , do you usually spend watching TV , videos (including YouTube or similar service) ,DVD , and other entertainment on a screen ? Please tick one box for weekdays and one box for weekend .

Weekdays	**Weekends**
☐ None at all	☐ None at all
☐ About half an hour a day	☐ About half an hour a day
☐ About an hour a day	☐ About an hour a day
About 2 hours a day ☐	About 2 hours a day ☐
About 3 hours a day ☐	About 3 hours a day ☐
About 4 hours a day or more ☐	About 4 hours a day or more ☐

Q14 How many hours a day, in your free time , do you usually spend on social media (Facebook , twitter , instgram , etc) ? Please tick one box for weekdays and one box for weekend .

Weekdays	Weekends
☐ None at all	☐ None at all
☐ About half an hour a day	☐ About half an hour a day
☐ About an hour a day	☐ About an hour a day
☐ About 2 hours a day	☐ About 2 hours a day
☐ About 3 hours a day	☐ About 3 hours a day
☐ About 4 hours a day or more	☐ About 4 hours a day or more

Q15 At what age did you first smoke a cigarette (more than a puff) if you never have smoked a cigarette, choose the never category

- ☐ Never
- ☐ 19 years old or less
- ☐ years old
- ☐ 21 years old
- 22 years old ☐
- 23 years old ☐
- 24 years old ☐
- 25 years old ☐

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KAP STUDY ON HYGIENE AND SANITATION IN A SELECTED RURAL AREA OF BANGLADESH

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Abstract: UN General Assembly explicitly recognized the human right to water and sanitation which is also essential to achieve target six of sustainable development goals. This descriptive type of cross sectional study was carried out to observe knowledge, attitude and practice on hygiene and sanitation in a selected rural area with a sample size of 247 which was purposively selected. The age structure of the respondents showed that 47.4% belonged to 34-48 years and43.3% belonged to 19-33 years' age group with mean age 35.53 ± 9.11. Among the respondents 78.1% were Muslim, 62.8% and 37.2% were female and male respectively. Study revealed that of the respondents 56.3% thought germ free water as safe, 11.7% opined it as smell free,14.2% replied it as both smell and germ free but 17.8% didn't know about it. About sanitation, 48.2% mentioned hygienic latrine, 11.3% mentioned clean environment and 28.3% did not know about it. Among them 49.0% respondents cleaned drinking glass by only water, 32.0% by soap/detergent with water. Of them 80.6% cleaned water storage container by only water and 13.8%by soap/detergent along with water. Among respondents 36.8% had under five children in family, 30.4% defecated in open place, 6.4% used latrine for defecation and 30.4% didn't use soap after bottom cleaning. There was significant association between education and knowledge on sanitation and safe water (p=< 0.001).Bangladesh Poverty Reduction Strategy has included water and sanitation as an important issue which has got due attention by stakeholders and international development organizations.

Keywords: Knowledge, Practice, Sanitation, Hygiene

Introduction

A large fraction of the world's diseases and deaths are attributable to communicable diseases.1 This trend is especially notable in developing countries where acute respiratory and intestinal infections are the primary causes of morbidity and mortality among young children.2A survey showed that half the respondents drank water straight from the tap without filtering or boiling it, while 27% rated the water quality as poor.3Inadequate sanitary conditions and poor hygiene practices play major roles in the increased burden of communicable disease within these developing countries.

The effects of poor sanitation seep into every aspect of life - health, nutrition, development, economy, dignity and empowerment.4 With a little less than a year left to achieve the Millennium Development Goals (MDGs), 2.5 billion people are still out of improved sanitation facility.5,6The MDGs target 7.C called for halving the proportion of the population without sustainable access to basic sanitation between 1990 and 2015. But use of improved sanitation facilities rose from 54 percent to 68 percent globally at the end of MDGs period; which was less than the set global MDGstarget. Still 40% people of this region are using unimproved sanitation facilities.7

Globally, water and sanitation hygiene practice are responsible for 90% of diarrhea-related mortality, which is much higher than combined mortality from malaria and HIV/AIDS. Although piped water facility in the rural regions almost doubled in past two decades, there are still 171 million people in rural regions who use surface

water as the primary source.8Despite limited improvement in drinking water facilities in rural regions, 68% of the world's population had access to improved sanitation facilities in 2015.9

Bangladesh has experienced one of the highest urban population growth rates (around 7%) in the last three decades compared to a national population growth rate of about 1.5% per year. An estimated 3.4 million people live in the overcrowded slums of Dhaka, and many more live in public spaces lacking the most basic facilities.10

A large number of people in this country don't get access to potable drinking water. Among them, urban slum dwellers face the greatest challenges. Their water quality is affected by unsafesupply, poor sanitation, improper waste management, unhygienic practices particularly with regard to hand washing, poor socio-economic backing, and overcrowded living conditions.11 The people in these high-risk areas often suffer from diarrhea and other water borne diseases. Due to lack of education, knowledge and basic awareness, people often have a poor understanding of the relationship between health, hygiene, water and sanitation.12

Communicable diseases continue to be the major contributor to global morbidity and mortality.13 In Africa 62% and south-Asia 31 % of all deaths are due to infectious diseases.14 According to WHO estimates, 3.8 million children aged less than five die each year from diarrhea and acute respiratory tract infections.15 An estimated worldwide 88%deaths from diarrheal disease are attributable to unsafe water, inadequate sanitation and poor hygiene.16 Clean water and proper hand-washing are viewed as the most cost effective intervention for preventing diarrheal diseases.17 Various studies have highlighted that simple act of hand-washing and basic hygiene practice could prevent diarrhea, acute respiratory infection and skin infections.18,19Despite much evidence supporting the effectiveness of personal hygiene behavior, it is yet to be practiced widely.20

The research question of the study was, 'What isthe knowledge, attitude and practiceon Hygiene and Sanitation among people in a Selected Rural Area of Bangladesh'? and the objective of the study was, 'to assess the knowledge, attitude and practice on water and sanitation among the people residing ina selected Upazilla (sub-district) under Gaibandha District'.

Materials and Methods

It was a descriptive type of cross sectional study with a sample size of247, selected from Sadullapur Upazilla of Gaibandha district from August to November in 2016.

The objective to plan the study was to assess the knowledge, attitude and practice of water and sanitation among the people residing in the Sadullahpur Upazilla (sub-district) under Gaibandha District'. A non-randomized, purposive sampling technique was applied by the investigator. A semi-structured, pre-tested and modified questionnaire was used to collect data.

A written consent form was obtained from every respondent before data collection. Permission from ethical committee was also duly obtained. Physically and mentally handicapped persons were excluded from the study.

All data collected were checked and entered into software SPSS 16.0. It was then analyzed. Cross tabulation and association was determined by using Chi-square test. And the results were presented in tabulated/ graphic forms.

Results

Table 1: Distribution of the respondents by Socio-demographic variables (n=247)

	Variables	Frequency	Percent
Age	19-33	107	43.3
	34-48	117	47.4
	49-62	23	9.3
	Total	247	100.0
	Mean ± SD=35.53 ± 9.110		
Religion	Muslim	193	78.1
	Hindu	41	16.6
	Christian	4	1.6
	Others	9	3.6
	Total	247	100
Gender	Male	92	37.2
	Female	155	62.8
	Total	247	100.0

From Table-1 it was found that 47.4% of the respondents belonged to 34-48 years 'age group,43.3 % belonged to 19-33 years and 9.3% belonged to 49-62 years' age group with mean age 35.53 ±9.11 years. Majority of the respondents were Muslim (78.1%), 16.6 % were Hindu, 1.6% were Christian and 3.6 % were from other religions. Among them 62.8% were female and 37.2% were male.

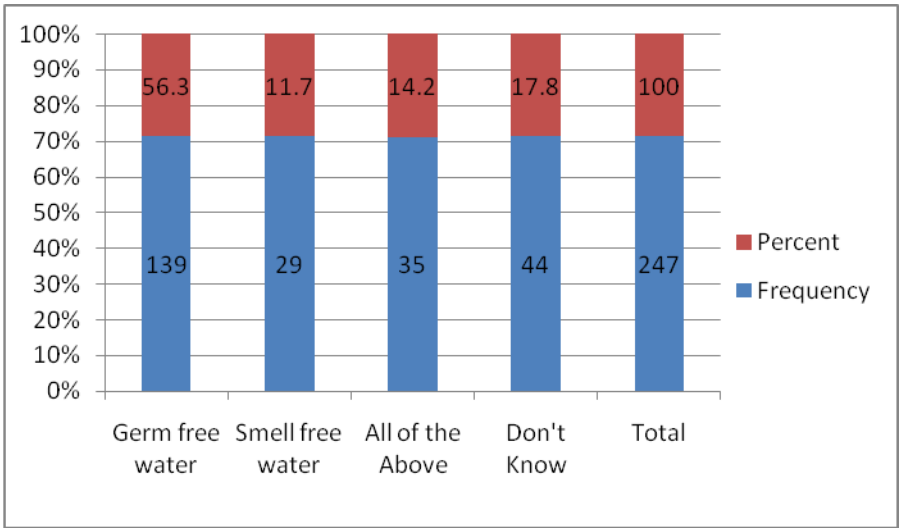

Fig. 1 Distribution of the respondents by Knowledgeabout safe water

Figure no 1 finds the knowledge about safe water where majority of the respondents (56.3 %) opined safe water as germ free water, 11.7% opined it to be as smell free, 14.2% opined it to be both germ and smell free but 17.8 % did not know about it.

Table: 2 Distribution of the respondents by knowledge about sanitation (n=247)

Knowledge about Sanitation	Frequency	Percent
Hygienic Latrine	119	48.2
Clean Environment	28	11.3
All of the Above	30	12.1
Don't Know	70	28.3
Total	247	100.0

Table-2 shows that 48.2% of the respondents had opined sanitation is to be hygienic latrine, 11.3 % opined as clean environment, 12.1 % replied it to be both hygienic latrine and clean environment. But 28.3 % did not have any knowledge about it.

Table: 3 Distribution of the respondents by practice related variables (n=247)

	Practice related variables	Frequency	Percent
Water Container cleaning materials	Only water	199	80.6
	By Soap/Detergent	34	13.8
	By Straw/Leaf with ash	14	5.7
	Total	247	100.0
Glass Cleaning Materials	Only Water	121	49.0
	Soap/Detergent	79	32.0
	Straw/Leaf with ash	47	19.0
	Total	247	100.0

From table no 3,it is found that 80.6% of respondents cleaned water pot by only water, 13.8% used soap/detergent and 5.7 % did it by straw/leaf. It was also revealed that 49.0 % of the respondents cleaned glass by only water, 32.0% used soap/detergent and 19.0 % did it by straw/leaf.

Table 4: Distribution of the respondents by under five children in the family (n=247)

Under-five children in the family	Frequency	Percent
Yes	91	36.8
No	156	63.2
Total	247	100

It was found from table 4 that 36.8% of the respondents had Under 5 children in the family and the rest did not have under-five children in the family.

Table 5: Distribution of the respondents by place of defecation and hand washing after defecation (n=247)

Place of Defecation	Open Place	76	30.8
	Latrine	16	6.4
	Not Applicable	156	62.8
	Total	247	100.0
Hand washing after defecation	Yes	16	6.4
	No	75	30.4
	Not Applicable	156	63.2
	Total	247	100.0

It is revealed from Table-5 that 30.8% of the respondents used open place and 6.4% used latrine for defecation. Hand washing practice was observed by 6.4% respondents while 30.4% did not do so.

Table 6: Distribution of the respondents by defecation related variables

	Defecation related variables	Frequency	Percent
Respondents works in field	Yes	127	51.4
	No	120	48.6
	Total	247	100.0
Defecation during field work	Open Place	127	51.4
	Use of latrine	0	0

It was also found from the study that 51.4% of the respondents used to work in the field and all of them who worked in the field used to defecate in an open place during field work. (Table-6)

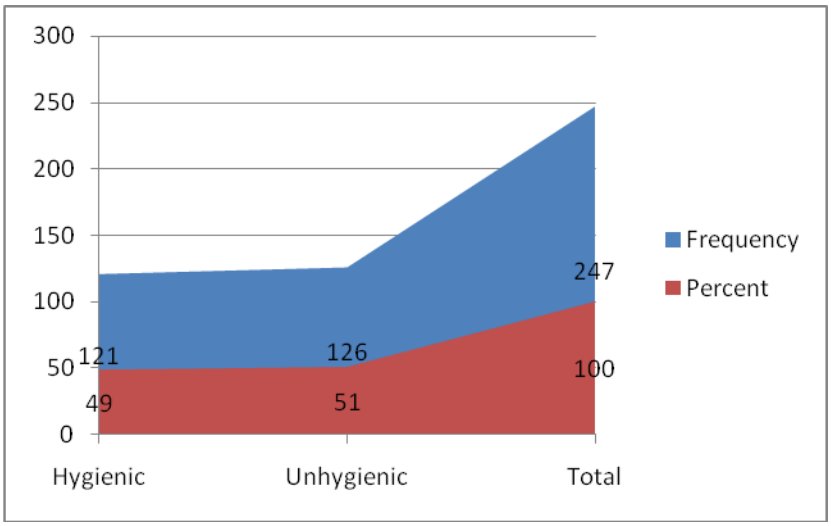

Figure 2: Distribution of the respondents' latrine by sanitation status (n=247)

During observation it was found that more than half of the respondents' latrine (51%) were in unhygienic condition and it was determined by stinky smell, clay water around pan, feces were present in some toilet but 49% were in hygienic condition (Fig-2)

Table 7: Distribution of the respondents by association between level of education and knowledge on sanitation (n=247)

Level of Education of the respondents	Knowledge on Sanitation				p- value
	Hygienic Latrine	Clean Environment	Both 1 & 2	Don't Know	
Primary	37	7	5	14	0.001
Secondary	44	5	6	37	
HSC	29	16	19	15	
Graduation & Above	9	0	0	4	
Total	119	28	30	70	

A significant association is found between education level and knowledge on sanitation with a p-value=0.001.(Table-7)

Table8: Distribution of the respondents by association between level of education and knowledge on Safe Water (n=247)

Level of Education	Knowledge on Safe Water				p- value
	Germ free water	Smell free water	Both 1 & 2	Don't Know	
Primary	28	5	13	17	0.001
Secondary	64	11	3	14	
HSC	35	13	19	12	
Graduation & Above	12	0	0	1	
Total	139	29	35	44	

Similarly, a significant association between level of education and knowledge on safe water is also found with p-value= 0.001. (Table-8)

Discussion

This descriptive type of cross sectional study was conducted in order to find out the knowledge, attitude and practice on sanitation and hygiene in a selected rural area of Gaibandhadistrict in Bangladesh. It was found that 47.4% respondents belonged to 34-48years' age group, followed by 43.3 % with 19-33years age group with mean age 35.53 ± 9.110 years. Among them 62.8% and 37.2% were female and ma**l**e respectively. These findings are close to the findings of a study in carried out in India in 2015.[8]

Study also revealed that 56.3 % of the respondentsopined safe water as germ free water, 11.7% opined smell free water, 14.2% opinedboth germ free and smell free and rest of them (17.8%) did not have any knowledge about it. Among respondents 87% used latrine for defecation and 13% did it in open places. A similar cross-sectional study was conducted in Thandalam village, Chennai, India and the findings were closer the findings of the present study.[8]

The present study revealed that 49.0% of the respondents cleaned drinking glass by only water, 32.0 % used soap/detergent and 19.0 % did it by straw/leaf. These results are consistence with the study findings which was conducted Bhopal City in India in 2014.[21]

Present study further found that only 36.8% of respondents had under-five children, 30.8% defecated in open place and did not use soap after bottom cleaning but only 6.4% used latrine for defecation and used soap. This is supported by a study in Karachi, Pakistan.[18]Among the respondents 46.2% had knowledge that diarrhea is water borne diseasesand this finding is supported by a report of WHO in 2003.[20]

Conclusion

Bangladesh is committed to achieve SDG target 6: Ensure availability and sustainable management water and sanitation by all. The findings of the present study reflected of a real scenario of Water, sanitation and hygiene in rural Bangladesh and knowledge and practice on water and proper sanitation appear behind the target. Further attention and efforts are in this sector to achieve it in time.

Recommendations

Health education should be launched covering general mass in Bangladesh.

Community Mobilization through Community Participation with promotion of hygiene should be emphasized.

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APPENDIX-A

INFORMED CONCENT

I……have read or have had read out for me all the statements in the consent form and I agree voluntarily to participate as a subject in the study of "**KNOWLEDGE, ATTITUDE AND PRACTICE OF SANITATION AND HYGIENE IN A SELECTED RURAL AREA OF GAIBANDHA DISTRICT.**" I have clear idea of this research including its purpose, duration, and the procedures to be followed. I have understood that all information will be keep confidential. My name will not be published in the study report and I will not be entertained with any financial benefits or incentives. I have been given opportunity to ask questions concerning research procedures and for further Questions I may contact the research workers. I have also been given information on the risk and discomforts for participating in this research. I understood that I have the right to leave or cancel my consent and withdraw myself from the study at any time for any reason without penalty. I have been informed that I shall be given a copy of the signed consent to keep. I the undersigned, certify that I have signed this document willingly to participate in the said research work myself or in presence of the following witness.

.....	.....
Participant's signature/Thumb prints	Witness signature
Name:	Name:
Date:	Date:

.....

Investigator's signature

Name:

APPENDIX-B

QUESTIONNAIRE

KNOWLEDGE, ATTITUDE AND PRACTICE OF SANITATION AND HYGIENE IN A SELECTED RURAL AREA OF GAIBANDHA DISTRICT

Name of Interviewer: Name of Interviewee:

Designation: Husband/Wife: Father's Name &

Address:

Socio-Demographic Factors

1. Age :

2. Gender : a. Male b. Female:

3. Educational Qualification:

a. Primary: b. Secondary: c. HSC: d. Graduation & above

e. Illiterate

4. Monthly Family Income:

5. Religion:

a. Muslim b. Hinduism c. Christianity d. Buddhism

Knowledge Related Variables:

6. What is safe water?

a. Germ free water b. Smell free water c. both a & b d.don't know

7. What is Sanitation?

a) Hygienic Latrine b) Hygienic environment c) both a & b d) don't know

8. What are the water borne diseases? ……..

Attitude Related Variables:

9. Do you think it needs to wash water glass regularly? a. Yes b. No

10. Do you use a latrine for defecation? a. Yes b. No

11. Do you think to use open place for defecation? a. Yes b. No

12. Do you think that personal hygiene should be maintained? a. Yes b. No

Practice Related Variables:

13. How often do you wash water container:

a. Regularly b. After one or two days c. Occasionally

14. What type of Material do you use to clean it?

a. Only water b. Soap/Detergent c. Straw/leaf d. Soil

e. Any other

15. How often do you wash water glass?.....

16. What type of material do you use to clean water glass?

a. Only water b. Soap/Detergent c. Straw/leaf d. Soil e. Any other

17. How often do youclean kitchen floor? ……

18. What type of place do you for defecation?

a. Open place b. Latrine

19. If use latrine---what is the condition of the latrine?

a. Hygienic b. Not Hygienic

20. Who is responsible for maintenance the latrine?

a. Wife b. Husband c. Any other

21. Is there any person who work in field for a long time? a. Yes b. No

If Yes

22. Where does he/she defecate? a. Open place b. Latrine

23. Is there any organization or team for follow-up the latrine condition in your village?

a. Yes b. No

24. Have you any under-five children a. Yes b. No

If Yes

a. Where does your baby defecate? a. Open Place b. Latrine

b. Do you use soap after bottom cleaning of your child?

a. Yes b.No

IEC Related Variables:

25. Did you hear about knowledge, attitude and practice on water, hygiene and sanitation?

a. Yes b. No

26. If yes…. what is the source of your information?

a. TV b. Radio c. Peer feedback d. Group discussion

e. NGO worker f. Any other

Signature of the Interviewer:

Date:

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DEVELOPMENT OF STROKE PREVENTIVE CARE MODEL FOR OLDER PERSONS IN A PRIMARY CARE CONTEXT

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Abstract: Stroke is a major cause of long-term disability among Thai older persons. Stroke prevention at a primary care level is an effective solution to this problem. This action research aimed to develop stroke preventive care model for older persons in the primary care context. Forty three participants were stakeholders of a community health system in the northeastern part of Thailand. Data were collected through in-depth interviews, and focus group discussions. They were analyzed using content analysis, and were validated through data triangulation. The research process comprised of 3 phases: situation analysis; development process and model synthesis. Results showed "The Integrated Stroke Preventive Care Service Model (ISPCSM)" comprised of 7 keys preventive activities which were: 1) community awareness raising and proactive screening; 2) risk behaviors modification; 3) proactive NCDs clinic; 4) stroke warning management; 5) strengthening stroke fast track; 6) stroke rehabilitation; and 7) integrated home care. The ISPCSM for community elders required the integration of care services among stakeholders of the primary care context at all stages of stroke prevention (primary, secondary, tertiary).

Keywords: action research, model development, older person, stroke prevention

Introduction

Stroke is a main cause of health burden in Thailand. It is the leading cause of death and long term disability in Thai elders both men and women. (Thammarungsri, 2014) These problems influence on health care services those are more focusing on treating disease and disabilities. Trend of stroke in Thailand was rising steadily every year. In 2013-2015, the mortality rates of stroke per 100,000 populations were 36.13, 38.66 and 42.62 respectively (Bureau of Non-communicable Disease, 2015). The average of age with stroke onset was 65 years (Suwanwela, 2011). It showed that older persons were the target group that effected from stroke more than other groups. While Thailand is moving towards to aged society; that meant stroke will be the serious problem in older persons.

Stroke is a dangerous disease for global and the Thai population. The World Stroke Organization (WSO) has put the emphasis on three pillars of the Global Agenda for Stroke: prevention, acute care, and long-term management. Prevention was focused on three main issues: raising awareness, promoting access to healthcare services and taking action to control disease (World Stroke Organization, 2016).

Developed countries, searched for how to achieve health problems from stroke. For example, The United Kingdom (UK) achieved stroke problems by integrating health and social care sectors in all levels of care service (Department of Health, 2007). In Japan, the government issued the long-term care policies for the elderly aimed to create multifaceted care integration at local communities. With respect to the value of

continuity of life in the community for the elderly, Japan attempted to build a community-based integrated care system in order to support the care delivery for elders in community (Okmoto et al, 2011).

In Thailand, the mortality rates of stroke increases each year; Thus, the Thai National Health Security Office (NHSO) offers health care services via an ongoing network of highly qualified "Stroke Fast Track" (SFT) as the choices of good care services in an acute stage (Sakunphanit et al, 2008). However, some studies showed that more than 75% of stroke patients could not get access to SFT system within golden periods. (Limpawattananon et al., 2014). Most of these were older persons in rural areas due to the traveling problems, financially constraints, and caregiver limitations, etc. (Goins et al, 2015).

Stroke warning signs could be recurrent in stroke survivors. Prevention of stroke recurrence as well as curative action within acute phase was important. Healthcare providers should not only provide curative care in acute stages, but also provide care covers all of healthcare stages and at all dimensions of care. Development of stroke preventive care model for older persons at all preventive care levels (primary, secondary, and tertiary) within the context of primary care services were suggested as the most effective solutions (Pinyo et al., 2015).

Therefore, this study aimed to develop stroke preventive care model for older persons within a primary care context in order to improve health and social care services for community elders with stroke. It is expected to be beneficial to clients (elders & their families), community stakeholders, and primary care organizations.

Methodology

The mutual collaborative action research was used in order to allow all key participants getting involve in the development process of stroke prevention model for older people.

Study setting: The study area was one community under a primary care unit (PCU) in the northeastern part of Thailand. The PCU was an extended primary care services of a district hospital that providing care for 5,999 people in its catchment area. This PCU had the second rank of stroke prevalence in elders, and the highest number of the risk group of stroke in the district. Most of clients had health care insurance under the universal coverage scheme. The study's setting provided variety of care services for stroke clients at the non-communicable diseases (NCDs) clinic and at home.

Participants: A total of 43 participants engaged in the study, including, older persons (OPs) (N=12), family caregivers (FCGs)(N=12), healthcare providers (HCPs) (N=9), social care providers (SPs) (N=4), and key persons (KPs) in the community (N=6). Ops of both sexes, suffered from stroke and received stroke care service for at least one year, able to understand and speak Thai, had no communication disorder and willing to participate were recruited in this study. FCGs participated in this study were persons who lived in the same homes with older persons, had experiences of taking care stroke elders for at least one year, and volunteered to be research participants. HCPs and SPs were persons who had experiences of working with stroke elders. KPs were the villagers living in the studied community, and had experiences in working with HCPs and SPs in providing care for stroke elders.

Research procedure: The research process consisted of three phases: situational analysis; developmental process; and model synthesis phases. The action cycle based on Kemmis and McTaggart (2005) including, Plan; Act; Observe; Reflect; and Re-plan or revision, was used to guide the development phase. The 3 phases of the research process were described as follow:

Phase 1: Situation analysis phase lasted for 5 months, (from October 2015 to February 2016) aimed to analyze the situation of existing stroke care services for elder patients in the studied PCU. Data were collected from 43 stroke care providers using in-depth interviews, focus group discussions, participant observations, and field-note takings. Participants were encouraged to share their experiences on the existing stroke care services for elder clients. The researcher analyzed and categorized data in order to gain understanding about the situation of existing care services provided for stroke prevention in community elders. The interview guidelines regarding situation of stroke and care services provided for stroke elders in the study setting, were reviewed by three experts. Example of the questions as in Table1.

Table1. Examples of the interview guidelines

Topics/ questions
1. Could you tell me about your experience in stroke care? (receive caring or care giving)
- What you think about it?
2. Tell me what you felt and what you think about the existing care services for stroke elders?
- Could you identify it?
3. What is your perception of stroke prevention?
- Could you tell me? Could you elaborate more?
4. What are your needs of healthcare services for stroke prevention?
- I would like to know more details, could you tell me?
5. In your opinion, what are conditioning factors related to stroke prevention in the elderly?
- Could you identify it?
- Could you tell me more details?

Phase 2: Development process phase of the stroke prevention care service model lasted for 7 months (from March 2016 to September 2016). The information from the first phase was used to start the action cycle (Plan, Act, Observe, Reflect, and Re-plan). Principles of health prevention, and recommendations from previous studies were used as the input of the formal meetings. The researcher, research participants, and stakeholders met regularly in order to answer the question of; "What activities should be done for improving stroke preventive care services?" until planning and actions on the reoriented preventive care services were emerged. Data (Observe & Reflect) were collected through workshops, group discussions, and natural interviews to monitor the outcomes of stroke prevention care services plans and actions.

Phase 3: Model synthesis phase: this phase lasted for 3 months (from October 2016 to December 2016). Two focus group meetings and workshops were conducted to formulated model synthesis. The practical stroke prevention model for older persons was approved by the healthcare provider's team**.**

Data collection: Data were collected through in-depth interviews, natural interviews, focus group discussions (meetings & workshops), participant observations and field-note taking**.**

In-depth interviews: Forty three stakeholders were interviewed 45-60 minutes each. Interview guideline approach focus on finding out problems and needs for reorienting care services to prevent stroke in community dwelling elders.

Focus group discussion: Four focus group discussions were held in the studied sites by 9 health providers. They met and discussed until stroke preventive care services and action plans emerged. After action reviews were conducted in order to reflect the performances and to address the plan improvements at all steps of the model development process. The researcher took role as facilitator to the healthcare provider's participated in the study. Data from each focus group discussion was digitally recorded in 60 -90 minutes length. The focus group discussions guidelines were develop by researcher and 2 faculty members and 2 healthcare providers who expert in stroke care system. The probing questions were used to obtain more detail of the data, included; *"Please tell me more about what the social care providers and stakeholders do to help you in stroke care services for older persons?"* and *"Please tell me more about your problems in using stroke care services?".*

Participant observation and field note taking, were used in all phases of research process: in situation analysis phase, the researcher used participant observation and field note taking in the focus group discussions; in model development process, the researcher participated and took field-note on in group discussions and group activities; and in the model synthesis phase, participant observations and field note taking were used in data collection from focus group discussions.

Data analysis: Qualitative data were analyzed using content analysis. All transcripts from in-depth interviews, focus group discussions, observation and field notes, were read to obtain a general overview of the content of the session. The transcribed sessions, then, were organized by way of coding content that appeared to fall under a distinct theme. As the themes emerged, data were categorized, interpreted, and identified for the major themes according to the research objectives.

Rigor and trustworthiness: This research employed Lincoln and Guba's principles of trustworthiness, including, creditability, dependability, conformability and transferability to ensuring the rigorous of the study (Lincoln and Guba, 1985). All three phases of this study used more than one data collection method, such as; in-depth interviews, focus group discussions, participant observations and field note taking. The research findings were returned to participants to recheck for their interpretation and to verify the findings.

Ethical Considerations: Research approval was obtained from the Ethics Committee for Human Subjects of the Researchers' Academic Institution on 14th September 2015 (approval number: HE 582226). All participants were informed about the purpose of the study; their involvement in the study; confidentiality and anonymity; and their withdrawal at any time without repercussions. All participants consenting to take part in the study were asked to sign a consent form.

Research Findings

Results of the three phases are presented in this section: situational analysis, the development, and the model synthesis phases.

Situational analysis: The forty three participants reflect two views of understanding about the existing stroke care services: client's view and health care provider's view. Stroke care services of both views comprised of five components: screening and surveillance services for NCDs and cardiovascular disease (CVD) risk groups; NCDs clinic services; stroke fast track networks and referral system; continuing care services; and outcomes of the services (Table 2).

Table 2. Finding of the situational analysis

Objective	Stroke care services	Clients' vs. Healthcare providers' views
To analyze the situation of existing stroke care services for elders patients	1. Screening and surveillance services for NCDs and CVD risk groups	The risk groups were normal groups, but patient groups needed treatment (Clients' view)
		Followed the Policies: Screening & surveillance for finding NCDs/CVD risk groups in the NCDs patients (healthcare providers' view)
	2. NCDs clinic services	NCDs patients needed treatment at NCDs clinic (Clients' view)
		NCDs clinic was provided for NCDs patients (healthcare providers' view)
	3. Stroke fast track network and referral system	Emergency services were for stroke patients with serious health problems (Clients' view)
		Referring patients for treatment via stroke fast track (healthcare providers' view)
	4. Continuing care services	Home visiting services were for vulnerable groups (Client's view)
		Home health care was provided for stroke patients with bed bound/ complex problems (healthcare providers' view)
	5. Outcomes of services.	Clients, especially elders could not get access to stroke prevention care service
		Clients, especially elders delayed getting access to stroke care service provided at PCU

Clients' view and health care providers' view are different, but both views were focusing more on the curative dimension than preventive dimension of stroke care. Clients' viewed stroke care as the curative services provided for stroke patients. In contrast to health care providers, they perceived stroke care as the curative services for CVD risk groups through stroke groups. For screening services, clients perceived as the services for separating normal and treatment groups, while health care providers perceived as the services for classifying NCDs, CVD risk, and treatment groups. For the NCDs clinic, both of them perceived as the service for NCDs patients only. For stroke fast track and referral services, clients perceived as the services for patients with stroke symptoms who needs upper levels of care. While providers perceived as an urgent services for patients with stroke. However, both of them did not aware of the stroke warning sign management. For continuing care services, clients perceived as the home visiting services for vulnerable stroke patients at home; while providers

perceived as the home care services for bed ridden and patients with complicated health problems. As the results of these, clients, especially elders were not aware of the risk and the warning signs. They tended to get delayed access to stroke care services. Health care providers were less aware of providing preventive/proactive services. Thus, there are the needs to develop prevention care services for elders at the primary care level.

Clients and healthcare providers stated their views as followed:

One client described that *"Dependence on curative when got illness"*.

One stroke patient said *"I did screening every year. After screening, it's up to the healthcare providers" Female CHV-aged 62)*

The head nurse said, *This PCU, we used SERVICE PLAN as the policy to perform and we set*

the key performance indicators (KPIs) of working in relation to the policy."

The results of situation analysis phase were used as input for the second phase: development of stroke prevention care service model for older persons by stakeholders' participation.

The development phase: development process consisted of 3 steps: raising awareness towards stroke prevention, community participation and involvement, and integrating health and social care services.

The first step, raising awareness towards stroke prevention: the researcher and research assistants used strategies to raise awareness on stroke prevention and the need for development by presenting the situation of stroke and existing stoke care service of the study site to the stakeholders of the primary care unit. At this step, stakeholders volunteered to join the research project as the research participants. Then, the focus group discussions were conducted among researcher, research assistants and participants in order to share experiences on *"how to set up the guideline for stroke prevention and exploring problems and needs in developing health services to prevent stroke for the elderly?"*

At this stage, healthcare providers were aware of needs for reorienting healthcare services towards prevention of stroke at all stages. They were mutually agreed on developing stroke preventive care model for older persons. Results of this step, revealed key persons who were responsible for conducting stroke prevention care services at each stage.

The second step, community participation and involvement:

At this step, the collaboration among health and social care providers, clients (older persons and their

families) and research participants from the first step were formed. The strategies used consisted of: informal conversation, brainstorming, focus group discussion among stakeholders. Stakeholders shared ideas and provided feedbacks regarding new healthcare services for older persons at all stages/levels of stroke prevention. The result of this step, innovative preventive care services were developed, such as, stroke awareness, stroke

warning sign management, and home care support services. The roles and activities of keys stakeholders in providing stroke preventive care services for elders within their own contexts were developed.

The third step, integrating health and social care services:

The development of innovative preventive care services needed the collaboration of the social care and community care sectors. At this step, collaboration was expanded to social sector organization, especially, the local government organization (LGO). The researcher played the facilitator roles in the collaborative process among health and social care sectors, as well as, community care sectors to take parts in networking activities based on the action plans. Community leaders, elderly club members, care givers and social care providers were also taken parts in the development process.

The researcher employed informal interviews and focus group discussions for data collection methods in order to reflect stakeholders' views. Results of this step, continuing care services and long term care services of both health, social, and community care sectors were integrated and provided for stroke dependent patients who needed long-term care supports in community.

The model synthesis: Results of the development revealed the model of stroke prevention, *"the integrated stroke preventive care service model*, (ISPCSM)" (Figure 1) included 3 levels of stroke prevention.

1) Primary prevention was the health care services for all people and NCDs risk groups. Among those were people who had high blood pressure, and those who were stroke at risk or CVD risk groups of level 1-5. There were 3 primary preventive health care services: 1) awareness raising and proactive screening services for target groups in the community; 2) health behavior modification of the target groups by community involvement within cultural contexts, such as CVD risk groups; 3) NCDs clinic services provided by multidisciplinary care team. Primary preventive care could be work collaboratively among providers and clients.

2) Secondary prevention was service provided for stroke warning signs groups. The services consisted of stroke warning signs management and stroke fast track system. The stroke warning signs management was carried out primarily by community people, especially community volunteers and networking. They help managed stroke warning signs by educating stakeholders regarding the warning signs, the risks, and the management of the risk through stroke fast tract networks. Participation of community stakeholders was the key strategy of secondary prevention.

3) Tertiary prevention was the service provided for people suffered from stroke and dependent patients after stroke. This level of prevention was implemented through the involvement of all relevant sectors consisting of two services of care: **1)** rehabilitative service after discharge provided by physical therapists and **2)** integrated continuing care. Expected outcomes of tertiary prevention were disability reduction and patient's safety from complications. Collaboration and participation among three main sectors, health, social, and community sectors were the key strategies of the tertiary prevention.

Conditioning Factors: The integrated stroke preventive care service model could be successful upon 4 conditioning factors, consisting of '3 P&1R': Policy, Process, People, and Resources.

1): Policy; there were 2 policies that promote and support the stroke prevention model development. These were "service plan" and "long term care" policies: 1) The "service plan" focused on screening, the risk group surveillance and promotion of stroke fast track system. The key performance indicators were: to reducing mortality rate and increase access to health care service within golden period;

2) the "long term care" policy promoted the work integration among 3 sectors aimed at enhancing the stroke survival's quality of life.

2) Process; the 2 concepts of working process were, community participation and integrated care: 1) Community participation focuses on working together on problem analysis, service planning, and problem solving to achieve continuity and sustainability of the service model; 2) the integrated stroke preventive care service" consisted of teamwork from 3 key sectors (health, social and community). Nurse stroke case managers need was the key coordinators of the teamwork.

3) People; the integrated stroke preventive care team comprised of 3 main sectors (health care team; social care team; and community care team). They worked collaboratively by the coordination of the stroke nurse case manager.

4) Resources; the model could be sustained based on resources within and outside community.

The resources within community, such as, the model elder, who act as an educator in primary prevention. The elders practice the eight precepts in Buddhist Lent period who took role as the leader in spiritual health promotion. Resources outside community, such as the financial support from other organization, good health model volunteers, etc.

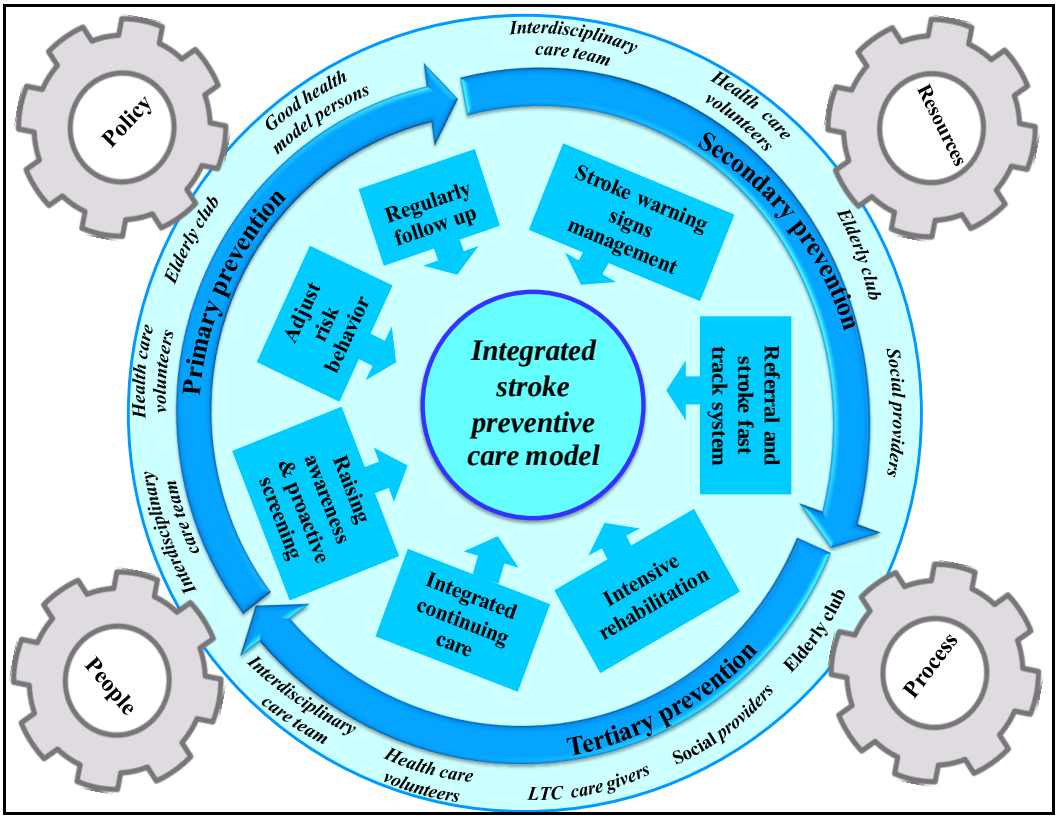

Figure1: The integrated stroke preventive care service model

Discussion

Results showed that stroke care services for older persons focused on curative rather than prevention. The existing stroke health services in this study setting were more focused on curative than prevention, and health-oriented services for the elders were not clear. The different views between providers and clients reflected the needs for reoriented health care service that promote access to services for older persons.

The existing stroke health care consisted of 4 services: 1) NCDs screening that could reduce factors of stroke (Assantachai, 2011); 2) NCDs clinic services that were the one stop service for risk group provided by multidisciplinary teams. However, the health care services for stroke prevention need the proactive service in community so that clients could equality getting access to health care services (Silpasuwan P, et al. 2012; Nualnetr N et al., 2015); 3) Stroke fast track services, were those services that could reduce the severity of stroke. But getting access to this service was limited in older people who live in community (Limwattananon et al, 2014; Nualnetr et al., 2015); 4) Continuing care after discharge, especially, rehabilitative service after discharge was still lacking. This could affect stroke patients suffering from complications.

This finding highlighted the need to develop stroke services to address the problems and the need for the elderly, a key risk group of stroke. The role of the health providers such as the nurses in the primary care unit should cover all dimensions of health care. They should coordinate operations that link health care networks with stakeholders from other sectors of primary care in order to provide equality of health care services for older persons with stroke. (Srisupan and ChanThai, 2013)

The integrated stroke preventive care service model: care services covered 3 levels of prevention. The outcome of the development process provided a stroke prevention model for older persons in the context of primary health care was the "Integrated stroke preventive care service model, ISPCSM". This model covered all levels of stroke prevention; primary prevention, secondary prevention and tertiary prevention through the use of collaborative action research. The community stakeholder's participation set up from three main actors: 1) health sector such as health care providers, multidisciplinary team, 2) Social sector by local government organization, such as sub-district municipality and 3) Community/People's sector, which were clients and their family, people and organizations in the community. The community participation could contributing to the value of existing social capital in the study setting, leading to the solution of people's health care needs in accordance with needs within their social and cultural context (Nantabut, 2008; Casey et al., 2015). The key success of this model is the cooperation of the key actors of three main sectors in primary care context, including, health, social and community sector. This will contribute to the sustainability and continuity of the integrated care model.

Conclusions

The ISPCSM had been developed as a guideline for all groups of older persons with stroke, including, the risk groups of stroke, stroke warning signs group, and the stroke group. The developed model had comprehensive coverage at each level of stroke prevention and linked the integrated operational between health and social services in order to provide coverage services for community elderly. This model covers services at all levels of prevention; primary prevention, secondary prevention and tertiary prevention. It was practical for community elders and required the integration of services among stakeholders of the primary care context. Community collaboration and involvement was the key concept of networking in order to develop the stroke prevention model for the older persons in the context of primary care. This study suggests that stroke prevention model in community requires the collaborative of key actors among three sectors, including, health, social and community sectors.

Limitation and Recommendations

This study was conducted in the context of a primary care unit in the Northeast of Thailand. Therefore, the users must take into account the nature of the primary care unit that is similar to the study area. Future research needs to consider the study of multiple primary care units and sites that are located in various geographical areas.

Acknowledgements

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The volunteers' consent form

For the volunteers who answer the in-depth interviews

First Name (Mr., Mrs., Miss)……. Last Name……. Age……..Years

Address….. Tambon…… District …… Province……..

When I received any description in this research from Miss Sakorn Intolo to be a volunteer in the research project which has title as the "Development of Stroke Preventive Care Model for Older Persons in a Primary Care Context."

A statement to the informant scribes that asked permission to take note and record audio and use the time approximately 45-60 minutes. This data will obtain to develop stroke preventive care model for older persons in the primary care context. The researcher will be certified that the information which received from you will be kept confidential. The interview Tape will be destroyed when the study ended. The researcher will present research findings in an all overview picture only. That will not cause more damage, but any. The researcher will use the code instead your real first and last name in the research's record and will be used for academic purposes only

"Participation in research projects as a volunteer. I joined voluntarily I can withdraw from the study at any time, if I want, and if there are unwanted events."

I have read and understand, as described above, and have signed consent to join this research project.

Signature…….volunteer

(……..……)

Signature ……..Witness

(……..)

Date…….Month……Year…

I can't read this consent by myself, but the researcher has read this consent for me to listen and understand well. I was pleased to participate as a volunteer in this study. Printed my right hand's thumb and put wholehearted on this consent by myself.

Signature
……..Researcher

The volunteers' consent form

For the volunteers who answer the Focus Group Discussions

First Name (Mr., Mrs., Miss)……. Last Name……. Age……..Years

Address….. Tambon…… District …… Province……..

When I received any description of this research from Miss Sakorn Intolo to be

a volunteer in the research project which has title as the "Development of Stroke Preventive Care Model for Older Persons in a Primary Care Context."

A statement to the informant describes that asked permission to take note and record audio for and use the time approximately 60–90 minutes. This data will obtain develop stroke preventive care model for older persons in the primary care context. The researcher will be certified that the information which received from you will be kept confidential. The interview Tape will be destroyed when the study ended. The researcher will present research findings in an all overview picture only. That will not cause more damage, but any. The researcher will use the code instead your real first and last name in the research's record and will be used for academic purposes only.

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Signature…….volunteer

(……..……)

Signature ……...Witness

(……..)

Date…….Month……Year……

I can't read this consent by myself, but the researcher has read this consent for me to listen and understand well. I was pleased to participate as a volunteer in this study. Printed my right hand's thumb and put wholehearted on this consent by myself.

Signature

……..Researcher

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PERCEIVED BENEFIT CHANGE TO SELF-SCREENING BREAST CANCER DISEASES AMONG YOUNG MOTHER WITH HEALTH BELIEF MODEL APPROACH

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Abstract : **Background** : Breast cancer is one of the main causes of death that resulted by cancer in women. Self-screening breast cancer a significant action to decrease mortality among young mother form breast cancer diseases. Primary prevention breast cancer disases include: mammografy, clinical breast examination, and self-screning. The purpose of this study is to analys a perceived benefit change to self-screening breast cancer disease among young mother with Health Belief Model approach. **Research Method:** Design this study is quasi-experiment one group pretest-posttest approach. This experiment during one week on June 2016. The subject of this experiment were 60 woman by using Purposive Sampling. The data analyzed by computerize system by SPSS version 20 by wilcoxon and significant level was 0,05. **Result :** The result analysis was p = 0,000 and then p<0,05, so the hypothesis was accepted. It can concluded there was perceived benefit change to self-screenig breast cancer diseases among young mother with health belief model approach. **Conclusion** : Perceived benefit change can be lead positive behavior among young mother to take action self-screening breast cancer diseases.

Keyword: Perceived benefit, young mother, self-sreening

Introduction

Breast cancer is the fifth cause of the death in women (14% of deaths due to cancer in women per year) (Casmir, e. c., i. Anyalewechi, n. e., Onyeka, i. n., Agwu, a. c. o., & Regina, 2015). The prevalence of breast cancer in various countries are reported as follows: in Malaysia there are 3525 women with breast cancer who registered in NCR (National Cancer Registry) (Zavare, m. a., June, m. h., Ismail, i. z., Said, s. m., & Latiff, 2015), while in Europe, there are 425,147 women were suffering from breast cancer and 128,737 of them were died, moreover the most prominent feature from Europe can be seen from the Greece, it has population of 10.5 million people and there are 4349 new cases of breast cancer and 1927 of them died (Birhane , N., Mamo, a., Girma, e., & Asfaw, 2015). The prevalence of tumors/cancer in Indonesia is 1.4 per 1000 inhabitants, or about 330,000 people. Indonesia's highest cancer in women is breast cancer and cervical cancer. Breast cancer stays in the first position for the new cases (43.3%) as well as the deaths (12.9%). The incidence of breast cancer by 40 per 100,000 women (Indonesia Cancer Foundation Brochures, 2012).

Breast cancer can be prevented by performing early detection or screening include; mammografi, clinical breast examination (CBE), breast self-examination (BSE) (Erbil, n., & Bolukbas, 2014). Breast self-examination is a technique in which a woman checking her own breasts by looking and feeling with her fingers to detect breast lumps. This examination is conducted each month between 7 to 10 days of the menstrual cycle (Casmir, e. c., i.

Anyalewechi, n. e., Onyeka, i. n., Agwu, a. c. o., & Regina, 2015). BSE which is part of the screening method is highly recommended because of cost-free, easy, simple, non-invasive action, without the use of special equipment and performed by the woman's self (Nde, f. p., Assob, J. C. N., Kwenti, t. e., Njunda, a. l., & Tainnebe, 2016). BSE as one of the most feasible approach in the early detection of breast cancer, effectively improve the knowledge and practice of women for early detection of breast cancer (Shahrbabaki, P. M., Farokhzadian, a., Hanasabadi, z., & Hojjatoleslami, 2012).

One of the important factors in performing BSE is the perception of the individual about its benefit, or it can be said as perceived benefits in Health Belief Model (HBM). HBM is one theory that is used to determine a person's activities to prevent against disease and health promotion activities (Akey, Rintamaki, & Kane, 2013), it explains why a person change or maintain specific health behaviors (James, Pobee, Oxidine, Brown, & Joshi, 2012; Poortaghi et al., 2015), it also describes why someone failed to participate in certain kind of activities that are intended to detect or prevent disease (Borowski & Tambling, 2015), it also predicts a person to take action in prevention, screening, conduct or control the condition of the sick (Glanz, Rimer, & Viswanath, 2008). The conclusions of the concepts above is the theory underlying the HBM is individual to behave well in the level of prediction, action, and change behavior towards healthy and ill conditions.

The main concept in HBM consists of 5 factors, it is including health-related attitudes, namely belief in vulnerability (perceived susceptibility), belief in the severity of (perceived severity), belief in the advantages (perceived benefits), the faiththat will be the barriers (perceived barrier) and the belief of action (perceived self-efficacy) (Glanz et al., 2008; Rahmati-najarkolaei, Rahnama, Fesharaki, & Behnood, 2016; Shumaker, Ockene, & Riekert, 2009). Perceived benefit is a thought about the advantage of something perceived by someone about the effectiveness of various action in reducing the threat of disease (Sarver, Cichra, & Kline, 2015; Surdej, 2016). Acceptance of advantages (Perceived benefits) is the emergence of perception to alter behavior due to an BSE of the seriousness of the vulnerability against the health condition (perceived threat). Behavior that is done of course beneficial behaviour to reduce the risk or the threat of the disease. It also applies on the perception that there is no direct relationship with health (such as: saving associated with quitting smoking or allowing a family member to do the inspection of mammografi). Several studies have used a theoretical framework as the HBM to learn about breast self examination and behavior of early detection of breast cancer more. This model is used in identify factors that are associated with the assumption the women about breast cancer and breast cancer screening behavior.

Gave rise to a perception of women who have breast cancer risk to do BSE it takes the efforts of health promotion. One of the promotional efforts of health that can be used is with multimedia learning with video (MLV). MLV is very effective in increasing women's knowledge to do BSE (Kuriakose, 2014). The benefit is based on the concept of multimedia acquisition experience someone through the multimedia learning is used, the more concrete a multimedia learning is used, the higher the value of experience gained (Munir, 2013). The aim of this study were to analyze the effectiveness of health promotion using multimedia learning with video (MLV) towards the perceived benefit in breast self-examination (BSE).

Method

A quasi experimental with one group pretest posttest design was employed to evaluate the effectiveness of the intervention. Moreover, there are 120 women use contraceptives in District 48 Sepinggan-Balikpapan who became the population of the study, and the sampling techniques used in this research is purposive sampling (n = 60), and the sample size calculation was based on the boundary 50% of the population. The inclusion criteria included: a married woman, contraceptive user, willing to be the participants of the study. Perceived benefit in this study is the perception about the advantage of BSE after the intervention. The intervention was given to the sample is a health promotion using Multimedia Learning with Video. The parameters of the perceived benefit consists of 5 questions using the ordinal scale with range 1-4 (strongly disagree – strongly agree). There are 3 categories of perceived benefit, there are high perceived benefit= > 18, moderate perceived benefit =12-18, and low perceived benefit< 12. Before conducted the intervention, all the participants were asked to do a pre-test to evaluate their prior perceived benefit of BSE. After that, all participants receive a health promotion using Multimedia Learning with Video within 10 minutes, and a week later it conducted a post test.

Discussion

It has been collected data from 60 women who join with this study. The majority of participants` level of education wereJunior High School (50%), with their majority job were housewife (82%), and the main contraceptive use are the pills (60%), as shown in table 1.

Tabel 1 Women Characteristicat Sepinggan Distrik Balikpapan City on Juni 2016 (n=60)

No	Karakteristik	Frekuensi	Prosentase
1	Pendidikan		
	SD	3	5%
	SMP	30	50%
	SMA	25	42%
	Diploma	2	3%
2	Pekerjaan		
	Ibu Rumah Tangga (IRT)	49	82%
	Wiraswasta	8	13%
	Pegawai Negeri	3	5%
3	Kontrasepsi		
	Pil	36	60%
	Suntik	19	32%
	IUD	3	5%
	Steril	2	3%

Moreover, from the table 2 it can be seen that perceived benefit before and after the intervention indicated an increase in the value of the mean from 10.68 became 15.82. It means that most of women after the intervention were agree to the beneficience of BSE as the prevention efforts of breast cancer. This is in accordance with the theory of Lawrence Green in Notoatmojo (2010), the change in behavior of a person or the public about health is determined by the knowledge, attitude, availability of facilities, behavioral health officer will support the formation of behavior. Knowledge can be gained from a variety of ways such as TV, radio, magazines or other sources of information (Ekanita & Khosidah, 2013).

Tabel 2 : Influence Of Health Promotion Using Multimedia Learning With Video (MLV) Towards The Perceived Benefit

	video learning multimedia intervention		*p*
	Before	After	
High	40 (67%)	4 (7%)	0,001
Moderate	12 (20%)	37 (61%)	
Low	8 (13%)	19 (32%)	
Mean	10,68	15,82	
SD	3,7	2,7	
Varian $_{\text{min-max}}$	6 - 19	10 - 20	

Another finding of this study found that there is influence of health promotion using multimedia learning with video (MLV) towards the perceived benefit (p = 0.001). Perceived benefit is the belief that makes someone will feel easy in doing something that can reduce the risk or severity of the disease (Lee, c., & Wu, 2014). Perceived benefit is subjective assessment of the value or benefits obtained in determining the behavior of healthy behaviors to reduce the perceived threat (Orji, r., Vassileva, j., & Mandryk, 2012). Individuals must understand that behavior change will give a strong positive benefits. If the individual feels that BSE can detect breast cancer early, as a result they will do BSE regularly each month (Carpenter, 2010). Increasing perceived benefit can provide individual motivation to make changes towards a more positive in this case is by performing BSE (Akhigbe, a., & Akhigbe, 2013).

Conclusion

Finally, the findings of the study indicated the health promotion especially using Multimedia Learning with Video (MLV) could increase the belief of women who high risk of breast cancer for doing BSE. In addition, Breast Self-Examination is the secondary prevention behavior, as it is an early detection of the breast cancer. Accordingly, promoting and maintaining this behavior among high risk women until it could be the independent-behavior, is the important step to be taken to reduce the prevalence of breast cancer.

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