

ASSESSMENT OF SOLID WASTE MANAGEMENT FINAL TREATMENT IN SHENDI TOWN, RIVER NILE STATE SUDAN

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Abstract

This paper reports the finding of community based cross sectional study conducted to assess solid waste management final treatment in Shendi city, in order to regulate the services of solid waste management in the city. Specifically it aims to know methods used to dispose solid waste in Shendi city, determine options to be deal with when there is absence of locality truck, and determine the potential impact which might be associated with condition of this waste. Multistage stratified system of proportional allocation sampling was followed to select the samples units from the households. Questionnaire, observations and interviews were used with household to collect the data of this study. Data was analyzed using computer using both Microsoft Excel and Statistic Package for Social Sciences program (SPSS).The main results showed that Most of the population depend on locality trucks for their solid waste transportation (54%), while 26% transported their solid waste by cart, beside 17% of them used other options including left on street ,drains and burns. The study also revealed several ideas towards improvement of solid waste management where 28% of the population believes that they need new concept ,while 24% think that they can improve it via giving attention to solid waste management, while the opinion of 20% of them to form new independent body ,beside, 18% requested to share with private sectors The study conclude that population know that an open burning is the dominant method used in final disposal site in the study area creating health problems, that it may provide breeding sites for insect and it can cause a risk to public health.

Keywords: Solid waste, Final treatment, Potential Impact, Shendi city

INTRODUCTION

Environment can be defined as the aggregate of all the external conditions and influences affecting the life and development of Persons 'organization and society (W.H.O 2002).Environmental health has been defined by world Health organization (W.H.O) as the ecological balance that must exist between man and his environment in order to ensure his well being which concerns the " whole man" not only his physical health ,but also his mental health and the optimum social relations within his environment. In the same way it concerns the 'whole environment ,from the individual human dwelling to the entire atmosphere. Solid waste is non-liquid waste generated in homes ,workshops , farms ,industries and else (W.H.O 2002).The unsanitary disposal of solid waste generates health problems. Leach ate from landfills can pollute ground water and this is a

major health concern. Rain penetrates the soil covering solid waste in land fills, thus contribute to ground water pollution problem. Organic materials can become food and 'or breeding site for flies and rats 'creating vectors for many diseases. Additionally, solid waste can cause fire , flooding and dangerous situation when there is lack of waste management (W.H.O 2002). The management dilemma of solid waste has been recognized and tackled seriously worldwide.

However, in developing countries the problem is still hindered by social and economic predicaments and priorities. In our country , the generation of solid wastes has become increasingly an important environmental issue over the last decade, due to the escalating growth in population s and the changing life Style, leading to new trends of un sustainable consumption Patterns Concomitant with inflation in waste production (Basil 2004).

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Solid waste collection ,transportation and disposal constitute the most substantive means for cleaning which became the predominant in environmental sanitation (Khartoum cleaning project 2005).Most human activities create waste. the majority of these waste are not ,in themselves, potential threat to health but their current management can help to minimize or avoid associated risks .

PROBLEM STATEMENT

Fate of solid waste starts from generation, collection, transportation and final disposal and shown obviously in direct disposal by open dumping left un collected and at river side's or disposed in open area. (Abu Obeida, 2010). Shendi town is of 9000 houses which are distributed in twenty nine Blocks (districts) , only twenty-four Blocks are covered with solid waste services (Shendi, locality2011).The town produces forty five tons of waste daily, only eighteen tons (40%) of this amount is collected and transported to burning Area which represent the final disposal area of the town, it is located about 2 km. from the residential area.(Shendi Locality.2011)

MATERIALS & METHODS

This observational community based cross sectional study was conducted in Shendi city, the capital of Shendi locality , River Nile State at north of Sudan. A multistage stratified system of proportional allocation sampling was followed to select the sample units from household. The required sample size was determined using the formula:

$$n = \{ 2\sigma^2 (Z_0 + Z_p)^2 \} / d^2$$

Where $\sigma = 7.14$

Z_0 = the value of standard normal variable corresponding to 95% confidence level = 1.96

Z_p = is the false negative probability = 1.282

d = is the smallest difference we wish to detect = 3

Sample size of 119 households was appointed accordingly. The amount of average per capita solid waste production estimated by collecting the waste generated in the selected sample units once a day at fixed time for 8 successive days to allow variation in waste generation over a week.

Also solid waste segregation was conducted, that separates the waste into different types and put it into different Buckets for weigh measurement. The weight of each type was measured and recorded it in the data sheet. For safety and a ethical consideration we disposed and dump all the samples of the waste properly and clean the equipment used for its measurement and segregations. Also the below tools were used to collect the data of this study:

- An interview was done with locality Public Health Officers.
- Questionnaire : standard questionnaire was designed for found heads of households of both class two and three.
- Observations: data about sanitation status 'presence of solid waste facilities was collected through researcher observation.
- An intervention to collect waste generated from targeted households was done once a day at fixed time for 8 successive days to allow variations in types and composition of waste generation over a week

Data analysis

Data was analyzed using computer, both Microsoft Excel and Statistic Package for Social Sciences program (SPSS), and the results were presented by percentage tables, cross tables and other statistical test of the significance between different factors were examined.

RESULTS

Table1: shows the mean of transportation of solid waste of different residential class levels in Shendi town:

Methods of improvement for solid waste management	Second Class		Third Class		Total	
	Frequency	%	Frequency	%	Frequency	%
Form new independent body	02	05	22	27	24	20
need new concept	08	22	25	30	33	28
Share private sectors	05	13	17	21	22	18
Give attention	15	41	13	16	28	24
Others	07	19	05	06	12	10
Total	37	100	82	100	119	100

Table 2: Shows possible improvement to solid waste management in different residential class levels in Shendi town

Methods of improvement for solid waste management	Second Class		Third Class		Total	
	Frequency	%	Frequency	%	Frequency	%
Form new independent body	02	05	22	27	24	20
need new concept	08	22	25	30	33	28
Share private sectors	05	13	17	21	22	18
Give attention	15	41	13	16	28	24
Others	07	19	05	06	12	10
Total	37	100	82	100	119	100

Table 3: Shows Population knowledge of solid waste final disposal location in different residential class levels in Shendi town

Final disposal site	Second Class		Third Class		Total	
	Frequency	%	Frequency	%	Frequency	%
Far away from the town	27	73	35	43	62	52
Near resident area	04	11	11	13	15	13
In the town	00	00	06	07	06	05
don't know	06	16	30	37	36	30
Total	37	100	82	100	119	100

Table 4: Shows Population knowledge of methods of solid waste final disposal in different residential class levels in Shendi town

Final disposal methods	Second Class		Third Class		Total	
	Frequency	%	Frequency	%	Frequency	%
Sanitary land filling	00	00	00	00	00	00
Spread on land	03	08	18	22	21	18
Incineration	10	27	04	05	14	12
Open burning	13	35	34	41	47	39
Others	11	30	26	32	37	31
Total	37	100	82	100	119	100

DISCUSSION

Most of the population depend on locality trucks for their solid waste transportation (54%), while 26% transported their solid waste by cart, beside 17% of them used other options including left on street ,drains and burns,(table, 1). Due to previous facts the local health authorities tend to concentrate their limited services mainly in the central districts which have better access. in this context the study showed several ideas towards improvement of solid waste management where 28%of the population believes that they need new concept ,while 24% think that they can improve it via giving attention to solid waste management, while the opinion of 20% of them to form new independent body ,beside, 18% requested to share with private sectors ,(table, 2) .These because there is no sustainable system of solid waste management applied in the study area ,and the locality have become economically constrained in offering efficient management of municipal solid waste and now more willing to embrace new idea that can improve the situation

The study showed that 52% of the population know that the final disposal site is located far away from the town , while 30%of them don't know and 13% think that the location of final disposal site is near residential area (table 3).In this context 39% of the population know that an open burning is the dominant method used in final disposal site in the study area while 12% of them thought that the method used is land spreading (table 4), an open dumping was an old

method correlate without regard to safety ,health or esthetic . And applied without proper environmental pollution control and monitoring, if one would have a look, he could have observed uncompleted burning remains, which pollute environment, harbors insect and rodent (appendix 2).

All types of solid waste were collected and mixed together and transported to final disposal site without weighbridges facilities, this can't give correct picture of waste generation quantity, area and source of such solid waste (appendix No.2)

RECOMMENDATION

Government of local authorities must developed and adopt an action plan of solid west management, River Nile state should made sufficient funding available for solid west management and crud dump open burning site must be replaced by sanitary landfills.

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APPENDIX



Figure 1: Map of Shendi town (the study area)



Figure 2: Plates, Final disposal area of Shendi town (an open burning is the main method used)



Figure 3: Disposal of waste in absence of the truck (Outside on the street near houses)