Strategies for Improving Solid Waste Disposal Practices of Households in Urban Slums in Enugu Metropolis

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Abstract

The purpose of the study was to find out the strategies for improving the solid waste disposal practices of households in urban slums in Enugu metropolis. Specifically, the study identified facilities used in waste disposal by the households, determined problems encountered in waste disposal and ways of improving the waste disposal practices of households in urban slums. Research design adopted was descriptive survey. Population for the study consisted of households in urban slums. Multi- Stage sampling technique was used to select 300 residents. Sampling occurred in three (3) stages. Convenience sampling technique was used to select three (3) slum areas in Enugu urban metropolis of Enugu State. Simple random sampling technique was used to select fifty (50) households from each of the selected slums. A total of three hundred (300) residents of the slums, one hundred (100) residents from each of the three (3) slum areas were the respondents for the study. The target sample was selected using convenience sampling technique based on accessibility and willingness of the residents to participate in the study. The instrument used for data collection was a questionnaire designed by the researchers. Mean and standard deviation were the techniques that were employed for the analysis of the data collected. Findings show eight (8) facilities used by slum households in disposal of waste, eighteen (18) problems slum households encounter in waste disposal and twenty – two (22) ways of improving the waste disposal practices of slum households. Based on the research findings, some recommendations were made for improving the sanitary conditions of residents in urban slums.

Keywords: Strategies, Improving, Sanitary, Residents, Urban, Slums

Introduction

The environment encompasses all living and non-living things occurring naturally on earth or some region thereof; it encompasses the interaction of all living species. It is the sum of conditions in which an organism has to survive or maintain its life process. The simplest explanation about why the environment matters is that the environment is the home of humans. This is because the day-to-day activities of every family and individual are carried out in the environment. It is where households live, breathe, eat, raise their children, etc. It is no gainsaying the fact that the environment influences every facet of

the life of the individual and the society at large. When a person lives in an unhealthy environment, the effect it has on the individual's health is adverse.

Living in an unhealthy environment has serious health implications for the individuals or families' resident in that immediate environment. This is often caused by their ways of life and the facilities obtainable in the environment. The facilities available are affected by factors such as rapid urbanization, rural-urban migration, steady economic downturn, decay of urban infrastructure, poor quality of original construction, lack of integrated planning, negligent urban housekeeping, preservation of historic value, disaster and war (Pat-Mbano & Nwadiaro, 2012; Emodi, 2013; Islam & Islam, 2016). Aside all these outlined factors, another hydra headed monster troubling governments both in developed and developing nations, is the uncontrollable solid waste problem. However, this problem seems to be more serious in developing nations.

The management of waste remains in developing nations for the most part, are both inefficient and inadequate causing numerous adverse environmental, social and sustainability impacts (Elgizawy, El-Haggar & Nassar, 2016). This problem is mostly evident in urban centres than rural settlements. This can be attributed to the fact that the sources of solid waste generation which are residential waste, commercial waste, institutional waste, construction and demolition waste, municipal solid waste, industrial waste, agricultural waste and treatment plant wastes, are all accessible in urban centres rather than rural settlements (Tchobanoglous & Kreith in Elgizawy, El-Haggar & Nassar, 2016). However, due to the recent rise in urban populations due to rural – urban migration, the solid waste management of this ever-increasing population and changes in their consumption patterns gives rise to one of the greatest environmental health challenges and continues to overwhelm sanitation facilities and staff at both local and national levels (Cecilia, 2012; Marshall & Farahbakhsh, 2013). Proper sanitation is therefore needed in all areas of the environment including the urban slums.

Urban slums as settlements, neighborhoods, or city regions that cannot provide the basic living conditions necessary for its inhabitants, or slum dwellers, to live in a safe and healthy environment (Fisher, 2012). The United Nations Human Settlements Program (UN-HABITAT 2012) defined a slum settlement as a household that cannot provide one of the following basic living characteristics:

✦ Durable housing of a permanent nature that protects against extreme climate conditions.
✦ Sufficient living space, which means not more than three people sharing the same room.
✦ Easy access to safe water in sufficient amounts at an affordable price.
✦ Access to adequate sanitation in the form of a private or public toilet shared by a reasonable number of people.
✦ Security of tenure that prevents forced evictions.

Slums are unplanned, unorganized, and clustered residential areas in urban centers mostly as a result of high influx of migrants for rural areas (Phanuel & Glanda, 2016). More recently, Mufti, Golam & Sayed (2017), a slum is seen as an unhealthy area where basic amenities such as water supply, drainages and other basic necessities for a standard living are lacking. Slum settlements are mainly known for building structures in an unplanned and haphazard manner, with little or no recourse to better planning to ensure better living standards. This is perhaps the reason why development and upgrade of slum settlements requires high investments for providing necessary infrastructure facilities (Gowda, Chandrashekar, Sridhara & Hemalatha, 2013; Adedayo & Malik, 2016).

In all, adequate sanitation and municipal solid waste collection are the most critical lacking public services in slum areas (Mukama, Ndejjo, Musoke, Musinguzi, Halage, Carpenter…,2016). The state of sanitation in urban slums are nothing to write home about, and this affects the health of the slum dwellers. This is because dense and overcrowded living quarters creates a breeding ground for transmittable diseases, which can lead to the rise of an epidemic. Slum dwellers most times, do not have access to clean and affordable drinking water and as a result, they are at a risk of waterborne diseases and malnutrition, the same is to be said for slums with no access to adequate sanitation, such as proper plumbing and garbage disposal (Monney, Odai, Buamah, Awuah & Nyenje, 2013;

Emodi, 2015). Significantly, there is a need for components of sanitation practices in urban slums such as refuse generation and disposal practices to be reviewed and lasting solutions provided to their waste disposal problems.

The slum areas in Enugu (the study area) include the settlements in Ugbo Fred, Ugbo Odogwu, Nkpologwu, Ugbo Chime, Ugwu Fred, Ugwu Aaron, parts of Abakpa and Emene (Emodi, 2017). The author further stated that very few residents in these settlements practice proper sanitation, some have access to electricity, and homes constructed entirely from concrete are infinitesimal if not non-existent. In these settlements, most homes are constructed from fragile, recycled metals or even zinc sheets that are not even secured to a permanent foundation. In these parts, there is an evident lack of some very essential basic amenities, and inadequacy of facilities when available. For instance, residents have limited access to working toilets and therefore they resort to relieving themselves in the nearby stream and bushes.

The effects of these sanitation practices in these slums are threatening to both human life and the environment. The repercussions of these actions range from flooding, water pollution, and spread of diseases and ugly sights of stinking and pest-infested piles of solid waste in urban slums (Marshall & Farahbakhsh, 2013; Adedayo & Malik, 2016; Mukama et. al., 2016). The slum-dwellers appear to be more susceptible to various waterborne diseases such as typhoid, diarrhoea,

hepatitis and so on (Mufti, Golam & Sayed, 2017). This could be attributed to the fact that refuse disposal in these areas are very irregular as households' dump refuse by the road sides, in the nearby bushes and even in the nearby stream. Unfortunately, the nearby stream also serves as a source of drinking water to some others. Emodi (2015), conducted a study of the impacts of industrial discharges on surface water and a case study of the Ekulu river that runs through Emene and Abakpa axis. For the author, the impacts of the industrial effluents on the receiving Ekulu river were manifested in various dimensions; high level of turbidity (72mg/l) was observed among other issues.

High turbidity of this river is a dangerous phenomenon as most slum households in these areas use the river as a source of drinking water. For clarity, it bears mentioning, the serious effects of this phenomenon on the environment and ecosystem. It can increase the cost of water treatment for drinking and food processing, harm fish and other aquatic lives by reducing food supplies, degrading spawning beds and affecting gill functioning, high turbidity diffuses sunlight and slows photosynthesis, plants begin to die, reducing the amount of dissolved oxygen and increasing the acidity (Emodi, 2017). This stresses the need to adequately provide better sanitation facilities in these slum areas.

In areas in which sanitation facilities are present, there is utter disregard or abuse of these facilities. According to Sankoh, Yan, & Tran (2013), waste in slum areas is ultimately thrown into municipal disposal sites and due to poor and effective management, the dumpsites turn to sources of environmental and health hazards to people living in the vicinity of such dumps. For an instance, dumpsters are present in some places but not to equate the number of residents using it. Even when filled up, there are not disposed of immediately. These practices enable bacteria proliferate in the environment. Bacteria are disease causing organisms that can cause food poisoning and a host of other health problems if left to proliferate. Therefore, there is a need to keep the home exceptionally clean. This is because, a clean environment limits the breeding of bacteria and other disease – causing organisms that are known to flourish in unhygienic places. Hence, there is a need for improved sanitation in these slum areas.

Purpose of the Study
The general purpose of the study was to find out strategies for improving the sanitary conditions of residents in urban slums. Specifically, the study identified;
1. Identified facilities used by slum households in disposal of waste.
2. Identified problems slum households encounter in waste disposal.
3. Determined ways of improving the waste disposal practices of slum households

Methodology
Research Design: The study adopted survey research design.
Area of the Study: The area was carried out in Enugu urban metropolis in Enugu state. Enugu metropolis is one

the urban areas of Enugu state which comprises of an estimate of about seven hundred and seventeen thousand, two hundred and ninety-one people (717,291) (NPC, 2010). It covered Ugbo Fred, Ugbo Odogwu, Nkpologwu, Ugbo Chime, Ugwu Fred, Ugwu Aaron, parts of Abakpa and Emene quarters of Enugu urban metropolis. These are the slum areas of Enugu metropolis constantly plagued by solid waste management problems as seen in the study.

Population for the Study: The population for this study comprised of all urban slum households in Enugu metropolis of Enugu State. Members of the households were the respondents. According to the report of the National Population Commission (NPC) Priority Table Volume III, Enugu metropolis comprises of an estimate of about seven hundred and seventeen thousand, two hundred and ninety-one people (717,291) (NPC, 2010).

Sample and Sampling Technique: Multi-Stage sampling technique was used to select 300 residents. Sampling occurred in three stages. In the first stage, convenience sampling technique was used to three slum areas in Enugu urban metropolis of Enugu State. In the second stage, simple random sampling technique was used to select fifty (50) households in each of the selected slum areas. In the third stage, one hundred residents were selected from each of the slum areas. Hence, a total of three hundred (300) residents of the slums made up of one hundred (100) residents from each of the three (3) slum areas were the respondents for the study. The target sample was selected using convenience sampling technique based on accessibility and willingness of the residents to participate in the study.

Instrument for Data Collection: The study utilized questionnaire as the instrument for data collection. The questionnaire was made up of three clusters. The first cluster (Cluster A) sought for information on the the facilities used by slum households in waste disposal. Cluster B and C elicits information on both the problems encountered by households in waste disposal and the ways of improving waste disposal practices of households respectively. The questionnaire items were drawn from the reviewed literature. The questionnaire was structured and developed by the researcher. The instrument adopted a four-point Likert scale with response options of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). The questionnaire was validated by three experts in the Faculty of Vocational Technical Education. A final copy was then produced based on the corrections and inputs made by the validators.

Method for Data Collection: Three hundred copies of questionnaire were distributed by hand to the respondents. These were also collected by hand after distribution. Three hundred (300) copies of the questionnaire were distributed and the 300 copies were filled and returned.

Method of Data Analysis: The completed copies of the questionnaire were examined for completeness. The mean was used to determine the agreement and disagreement levels of the items on the strategies, problems

and solutions. In line with the four-point Likert scale adopted on the questionnaire, nominal values assigned to the different scales were as follows SA = 4, A = 3, D = 2, and SD = 1. Therefore, any response that falls within 3.0 and above was taken as agreed, while the ones that fell within 0.5 to 2.5 was taken as disagreement on the items.

Findings
The following findings were made:
Facilities Used by Slum Households in disposal of waste?

Table 1: Mean Responses on Facilities used by slum households in disposal of waste

S/N	Facilities Used by Households in Waste Disposal	$\overline{X}$	SD	Remarks
1.	Reusable clothe bags	2.20	1.14	Not Used
2.	Dust bins	2.96	0.97	Used
3.	Paper bags	2.56	1.07	Used
4.	Dumpsters	3.00	2.04	Used
5.	Plastic waste bins	2.87	0.98	Used
6.	Plastic bags	2.84	1.05	Used
7.	Incinerators	2.22	1.17	Not Used
8.	Garbage trucks	2.81	1.12	Used
9.	Disposal drums	0.90	2.95	Not Used
10.	Empty cartons	2.70	0.93	Used
11.	Raffia Baskets	0.98	2.60	Not Used

Key: $\overline{X}$ = Mean responses of Slum Residents, SD = Standard Deviation of the responses

Table 1 shows that seven (7) items out of eleven (11) items had a mean score ranging from 2.56 to 3.00. All these means are above the cut-off point of 2.50. There are termed as agreed. This shows that seven (7) out of eleven (11) items were agreed upon by the respondents as the different facilities used by households in disposal of waste the urban slums. The fourth item – use of dumpsters scored the highest mean of 3.00. Therefore, the respondents saw this as the one of the most common facility used by slum households in disposal of waste. The table also shows that four (4) items out of the eleven (11) items had a mean score ranging from 0.90 to 2.22. This shows that five (5) out of the twelve (12) items for this research question were disagreed upon by the respondents. Also, the degree of agreement with item 9 which was 0.90 was the least mean in the table. This further emphasizes that the respondents preferred certain items to others.

Problems slum households encounter in waste disposal

Table 2: Mean Responses on problems slum households encounter in waste disposal

S/N	Problems Encountered by Households in Waste Disposal	$\overline{X}$	SD	Remarks
1.	Waste bins are not enough.	3.24	1.08	Agree
2.	Waste bins/ dumpsters are easily and always filled up.	2.94	0.77	Agree
3.	Lack of waste disposal facilities.	2.67	1.05	Agree
4.	Distance of dumpsters, and other waste disposal facilities from the home.	2.93	1.04	Agree
5.	Lack of information on proper waste management.	2.98	1.06	Agree
6.	Delays in waste collection leading to overflow of dumpsters and other disposal facilities.	3.06	0.98	Agree
7.	Roads to dumping sites are always too bushy.	2.74	0.98	Agree
8.	Dumping of refuse in drainages leading to choking of drainages.	2.99	1.03	Agree
9.	Emission of foul smell from garbage.	3.06	0.98	Agree
10.	Dump sites attracts stray animals, birds and dogs.	2.72	0.92	Agree
11.	Generation of a very large quantity of waste in the home e.g. plastics, paper etc.	3.04	0.83	Agree
12.	Access roads to dump sites being lonely and insecure.	2.59	1.14	Agree
13.	Lack of adequate manpower on the part of the waste management authorities.	3.17	1.01	Agree
14.	Dumping of refuse in the stream or bushes causing pollution.	3.08	0.80	Agree
15.	Non-maintenance of compost site leading to infestation by disease vectors.	2.40	1.46	Disagree
16.	Lack of waste management initiatives at the community level.	3.01	0.98	Agree
17.	Improper disposal of biodegradable and non-biodegradable waste.	2.82	0.96	Agree
18.	Poor enforcement on the part of sanitation agents.	2.94	1.01	Agree
19.	Corruption of waste disposal agents that affect their performance on the job.	2.75	1.10	Agree

Key: $\overline{X}$ = Mean responses of Slum Residents, SD = Standard Deviation of the responses

Table 2 shows that eighteen (18) items out of nineteen (19) items had a mean score ranging from 2.59 to 3.24. All these means are above the cut-off point of 2.50. There are therefore termed as agreed. This shows that eighteen (18) out of nineteen (19) items were agreed upon by the respondents as the problems households in slums encounter in waste disposal. The first item – indicating that waste bins are not enough, scored the highest mean of 3.24. Therefore, the respondents saw this as the one of the most common type of problem encountered by the households in slums in waste disposal. The table also shows that one (1) item out of the nineteen (19) items had a mean score of 2.40. This shows that this item was disagreed upon by the

respondents. Also, the degree of agreement with item 15 which was 2.40 was the least mean in the table.

Ways of Improving the Waste Disposal Practices of Slum Households

Table 3: Mean Responses on ways of improving the waste disposal practices of slum households

S/N	Ways of Improving Waste Disposal Practices of Households	$\overline{X}$	SD	Remarks
1.	Provision of waste disposal facilities to equate the number of the households using it.	3.53	0.78	Agree
2.	Provision of more waste bins to equate waste generated in the household.	3.27	0.63	Agree
3.	Provision of proper waste disposal facilities by the government.	2.91	0.99	Agree
4.	Placement of bins at appropriate distance from the home.	3.19	0.99	Agree
5.	Educating households on proper waste management practices.	3.09	0.85	Agree
6.	Timely disposal of waste from dump site by the waste management authorities.	3.11	0.87	Agree
7.	Provision of good access roads leading to dump sites.	3.05	0.89	Agree
8.	Avoid dumping refuse in the drainages to avoid blockage.	3.56	0.80	Agree
9.	Properly covering the waste disposal facilities to reduce the foul smell it emits.	3.12	0.75	Agree
10.	Proper disposal of waste inside the dumpsters, waste bins and covering them properly to avoid access to stray animals.	3.49	0.78	Agree
11.	Minimal use of cellophane bags e.g. the use of reusable clothes bags instead of plastic bags in shopping.	2.88	1.09	Agree
12.	Reduction of paper usage.	2.75	0.96	Agree
13.	Buying food in bulk to reduce waste.	2.40	1.00	Disagree
14.	Buying foods that have less packaging and reusing of containers.	2.83	1.05	Agree
15.	Siting of disposal sites to areas less lonely.	2.87	1.06	Agree
16.	Recruitment of more workers to aid waste collection and disposal.	3.24	0.93	Agree
17.	Disposal of waste at designated waste disposal points.	2.88	1.05	Agree
18.	Maintain compost site and use compost once ready.	2.98	0.99	Agree
19.	Creation of effective waste management initiatives at the community level.	3.13	0.95	Agree
20.	Use of separate bins for biodegradable and non-biodegradable waste to ensure proper disposal.	3.05	0.99	Agree
21.	Ensuring an increase in enforcement on the part of the sanitation agents.	3.11	0.83	Agree
22.	Re-orientation of waste disposal agents to shun corruption.	2.91	0.93	Agree
23.	Using law enforcement agencies to ensure strict adherence to proper waste disposal.	2.91	1.17	Agree

Key: $\overline{X}$ = Mean responses of Slum Residents, SD = Standard Deviation of the responses

Table 3 shows that twenty-two (22) items out of twenty-three (23) items had a mean score ranging from 2.75 to 3.56. All these means are above the cut-off point of 2.50. There are therefore termed as agreed. This shows that twenty-two (22) out of twenty-three (23) items were agreed upon by the respondents as the ways of improving the waste disposal practices of households in slums. Item 8 – indicating that avoiding dumping refuse in the drainages to avoid blockage is a way of improving waste disposal, scored the highest mean of 3.56. Therefore, the respondents saw this as the one of the ways of improving the waste disposal practices of households in slums. The table also shows that one (1) item out of the twenty (23) items had a mean score of 2.40. This shows that this item was disagreed upon by the respondents. Also, the degree of agreement with item 13 which was 2.40 was the least mean in the table.

Discussion of Findings

The findings of the study revealed that there are about ten (10) types of facilities used by slum households in disposal of waste. The facilities used by slum households in disposal of waste include dust bins, paper bags, dumpsters, plastic waste bins, plastic bags, garbage trucks, and empty cartons. This is in line with findings in studies conducted by Nirgude, Naik, Prasad & Nagaraj (2014), Gowda et. al. (2013) and Adedayo & Malik (2016). The authors findings are in line with the findings of the present study on the different types of waste disposal facilities available to slum households and most frequently utilised by slum households.

Across reviewed studies, the problems slum households encounter in waste disposal are quite numerous. However, the problems that are mostly experienced by residents of slum areas include lack of waste disposal facilities, lack of information on proper waste management, lack of adequate manpower on the part of the waste management authorities, dumping of refuse in the stream or bushes causing pollution, lack of waste management initiatives at the community level, improper disposal of biodegradable and non-biodegradable waste, and poor enforcement on the part of sanitation agents. These outlined problems are the seen in several studies including this current study. This study's findings on problems encountered by slum households in waste disposal are in line with studies conducted by Monney et. al. (2013); Sankoh, Yan, & Tran (2013); Emodi (2015); Phanuel & Glanda (2016); Emodi (2017); Mufti, Golam & Sayed (2017), among others. However, the other findings on problems encountered by slum households were identified in this present study but not seen during literature review.

Studies reviewed were also in agreement of several solutions to waste disposal problems of slum dwelling households as seen in the findings of the current study. Such common solutions as seen in previous studies include provision of proper waste disposal facilities by the government, educating households on proper waste

management practices, recruitment of more workers to aid waste collection and disposal., disposal of waste at designated waste disposal points, creation of effective waste management initiatives at the community level, use of separate bins for biodegradable and non-biodegradable waste to ensure proper disposal. These findings were in line with studies conducted by Emodi (2015); Elgizawy, El-Haggar & Nassar (2016); Phanuel & Glanda (2016); Adedayo & Malik (2016); Emodi (2017). Aside these outlined solutions, other findings as seen in the present study were not found in studies reviewed by the researchers during the course of this study.

Conclusion
Presently, in order to have a good state of health, we must be clean ourselves; work areas must be kept clean; all utensils used in the home must be spotless. If we do not observe the rules of sanitation and healthy living, we may become ill or cause others to become sick from either food poisoning or any illness arising from ill kept surrounding and unhealthy living. That is to say that unhealthy living exposes us to a large variety of diseases and ill health. Bacteria are disease causing organisms that can cause food poisoning and a host of other problems if left to proliferate over a long period of time. Therefore, the home and its surrounding environs must be kept especially clean. A clean environment limits the breeding of bacteria and other disease-causing organisms as they are known to proliferate in unhygienic

places, hence the important of good hygiene and sanitation practices.

Recommendations
Based on the findings of this study, the following recommendations are suggested,
1. Homemakers should teach their children or wards these strategies so that they can adopt them when they become homemakers.
2. Extension workers that work with people in both rural and urban areas especially the slums, should provide them with the knowledge and information they need to make maximum use of our local materials available to improve their sanitary lifestyle
3. The home economics teacher should also extend the knowledge of this study to students in secondary schools who will benefit from this study as the future homemakers.
4. Also, the knowledge of this study can be extended to people through the mass media by the way of creating awareness to the masses on the effects of living in ill-kept environment/surroundings.

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