THE PERCEIVED EFFECTS OF SOLID WASTE ON HUMAN HEALTH IN KEFFI, NIGERIA

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Abstract

Solid wastes are being disposed indiscrimately in residential areas and this has left many residents exposed to the risks of infections from diseases. The aim of this paper is to examine the perceived effects of solid waste on human health in Keffi town. The data for the paper were generated from primary sources through the use of questionnaire and field measurement of distances of solid waste disposal sites from residential households. Makwalla area was purposively selected for this study, because it is highly congested and is also characterized by different human activities which create waste generation and dirtier environment. The data were presented in tabular form and use was made of the simple percentages and the chi-square statistical techniques. The results showed that majority of the respondents in Makwalla disposed solid waste in open dumps and allow it to decompose naturally while others disposed waste by burning them in the open air. The results also revealed that majority of the residents, admitted suffering from environmentally related health problems ranging from malaria, diarrhea, dysentery, cholera, cough and soar throats, among others. The significant relationship between the methods of solid waste disposal and health conditions of the people is also presented. It is recommended that government should introduce house to house sanitary inspection, monthly environmental sanitation with stiff penalties against defaulters. Similarly, government should provide waste collection and disposal facilities located farther away from residential areas, but accessible to the residents to guide against indiscriminate waste collection and disposal with its attendant consequences.

Keywords: Wastes, disposal, perceived effects.

INTRODUCTION

Human activities suwh as commerce, agriculture and industry, among others, have become a major SVUfW of coiwwn to the world, in terms of their effects on the environment and human health, The resulting effects of human activities on the earth's surface *tux* devastating to the global ecosystem and marti The human societies today are faced with so many environmental problems, prominent among Which 18 pollution that is release of unclean or Impure elements into the environment (Richard, 1995). According to Richard (1995), pollution rvvuU* from human activities and these affect the quality of air, water and land.

ThC foCUS Of this paper is on solid waste which is a **major form of. land pollution. Solid WdStCS are** generated from homes, commercial aruas like ni«ul'.uU and frum a«;t.iblisrimeiits, and these may constitute health hazards to man, if not properly diypvuytt. Billions ojf tons of wastes are generated annually on the global level and according to the Ttawl rnnveriLion, an estimated 338 million tons of waytgy wury ^unyr^lyd In 7001 In the same year, the Organization for Economic Cooperation and Development (OECIJ) estimated about *1* billion ton *ot* uj^stps wonlrl DH generated from its member countries (Wikipcdia, 2009),

Solid wastes can take the form of used tyres, cans, scraps, metals, plastics garbage, human faeces and animal dung. Most of these wastes end up littering roadsides and floating in streams and rivers, while some end up in open dumps, located within residential areas. The dumps provide ground for disease vectors such as rats, flies, cockroaches and mosquitoes to bread (Suresh, 2007). Solid waste management is the supervised handling of wastes materials from their sources through recovery process to disposal. The functional element of collection includes not only the gathering of solid waste and recyclable materials, but also the transport of these materials after waste collection vehicle is emptied. Thus, Proper solid waste collection is important for protection of public health, safety, and environmental quality (Encyclopedia Britanica, 2009). Solid wastes disposal is a universal problem and is more serious in the developing countries, where the rate of urbanization is very high. Most towns and cities in the developing countries lack planning and basic facilities for waste management. Ironically, most of these towns and cities are in total mess as they are polluted by all sort of solid wastes ranging from human feces, garbages, rubbish and trash which destroy the aesthetic quality of the environment

and expose man to many health hazards. Solid waste disposal in the developing country is rooted in the content and context of the wastes themselves. Most of the generated wastes are mixtures of both biodegradable and non-biodegradable wastes which pose the greatest problems of disposal (Oyriayo,2000).

The problem of solid waste management in Nigeria is rooted in the level of societal development. Oyelayo (2000) asserted that, with the present level of development in tihe country, urban centres are bound to be threatened by population congestions, unsanitary environments as well as environmental hazards resulting from unprecedented rate of urbanization and industrialization. Urban centre are both centres of population concentration as well as centres of environmental problems. Thus, there is a direct relationship between population growth and environmental problems and this explains why pvpul»Hon growth in urban centre is proportional to environmental problems (Oyelayo, 2000).

It la quite obvious that the problems of solid wastes diuposal and pollution in most Nigeria towns and eitiea have come to stay and require urgent attention in order not to jeopardize the quality and sanity of the urban environment. Ultimately, how the environment ifi managed has a direct bearing on the quality 6f life of every living being (Lawrence el alu 2004), According to Lawrence et fll. (2004) a poor, degenerated and polluted environment is bound to **do irreparable damage to human existence and** *could make the earth uninhabitable to man if nwaauryv «i«*re not taken to bring the whole sihidhon under control Therefore, maintaining a cleiitwr environment especially in urban centres, where MfirC than 60 per cent of the world's population livea_r should ttOt be Considered a thing nf luimy butneeessity.*

The greatest oh3taclfi to effective management of iSOlld Wavtww In most townS and cities in the developing countries purtipuiariy Nigeria, is lack of **'management facilities and ret'nrds of waste in and disposal activities, In consequence,** *i, quality nf the, urban environment is fast deteriorating and thuy, posing a serious health hvi^nli in man. ol which many people, still remain ignorant Thw aim uf this paper is to examine the lurcolvnd effects of solid wastes disposal on human in KrlH, Nigeria The Study area, which is in fti2K4rAwa ^itntc, north-central Nigeria, is located vrtlMft latitudes R047 lo 8055'N and longitudes 7050 In 7U55'E. It is bounded by Karu, Local*

Government Area to the west, Kokona Local Government Area to the east and Nasarawa Local Government Area to the south.

The region experiences different weather conditions in a year which are the warm rainy season, which starts from the month of May and ends in October and the cold dry season that begins in November and ends in February of the following year. The hot dry season in the area starts in March and ends in April, with a sunshine duration of 8 to 9h per day. The average day-time length is 8.5h for most of the dry season. Temperatures in this area are generally high because it experiences the overhead sun twice a year. The major river in the area is the Antau River which rises from the Kaduna hills and flows south to Kogin Koto near Nasarawa Local Government Area, where its empties its contents in River Benue. Minor streams and pools also exist in isolated parts of the town. The settlement pattern is nucleated in the core of the town and has high congestion of buildings that lack modern planning, while the outskirts are sparsely populated with modern buildings that are relatively planned. The highly congested areas of the town consist of both the medium and low income earners while sparsely populated area consists of the relatively high income earners.

discriminate dumping of solid waste in Keffi, particularly in the congested areas of the town, is a common practice, and solid wastes could be seen on streets, marketplaces, restaurants, abattoirs, residential areas and in drainage channels. Ironically, such unwholesome practice has rendered most of these affected areas totally unfit for human habitation. Unfortunately, many residents of these affected areas seem to leave in total ignorance of the health implications of such deplorable environmental conditions or at least, have no other option to choose from. Many of the residents are exposed on daily basis, to so many health risks which could have been prevented if well informed of the consequences of their waste disposal attitudes

RESEARCH METHODS

A reconnaissance survey was first conducted in the study area to identify the specific study location and to map out strategies for the actual field exercise. During the reconnaissance survey, field observations were made about the sanitary conditions of the study area and, households were identified and marked for the administration of questionnaires.

For the purposes of this paper, the instruments used for data collectionwere basically questionnaires, measuring tape and camera. The questionnaires were designed to extract information on socio-demographic data, solid waste generation and disposal, perceived effects of solid waste disposal on health and the responses to problems of solid waste disposal. Measuring tape was used to measure distance between refuge disposal sites and households. Makwalla residential area of Keffi town was chosen as a sample for the study, using purposive sampling technique. The choice of Makwalla became necessary because it is one of the most congested and polluted areas with indiscriminate disposal of solid wastes.

A total of two hundred and eight five copies of the questionnaires were administered in Makwalla areas in a systematic non-random sampling method, that is, every fifth household on the selected major streets was picked for questionnaire administration. The administration of the questionnaires was done in such a way that, the research assistant issued copies of the questionnaire and waited for its completion. In cases where the respondents were found to be illiterates, in western education, the research assistant read and interpreted the questions, and the responses recorded.

RESULTS AND DISCUSSION
The results of the investigation have identified five main types of solid wastes in the study area and these include domestic, commercial, agricultural, medical and industrial wastes (Table 1). The results in Table 1 show that 43.1 per cent of the respondents were of the opinion that domestic wastes were most commonly generated within their residential areas, while 40.7per cent believed that commercial wastes were common in their areas. This contrasts to the 12.3 per cent who believed that agricultural wastes were most common, and the 1.1 per cent who believed that medical wastes were most common. The dominance of the domestic waste was not unusual since the area is largely residential and commercial with little urban farming activities taking place, mostly along the River Antau, which flows through the town.
The solid waste storage equipments identified in the study area include plastic containers, polythene bags, sacks and dustbins, among others (Table 2). The use of polythene bags and sacks is due to its relative availability and affordability by local

residents. None of these storage facilities were provided by either the State government or municipal authorities. The other storage facilities include damaged buckets, drums and empty sacks. Three categories of refuge collectors, identified in the study area, include the Local Government refuge collectors, household members and hired labour. Table 3 shows that the Local government is not a significant agent for collecting refuse in the area. The households were directly, in the absence of the local government efforts, responsible for collecting and disposing of their refuse.

Three periods of refuse collection and disposal observed in the study area include daily, weekly and monthly collections (Table 4). The results in Table 4 showed that refuse collection were mostly done daily and this involves the personal involvement of the households. For those who did not fall under this category, operational problems in terms of conventional place to dispose of the waste might have explained their frequencies of weekly and monthly waste disposal.

The distances of refuse disposal sites from households were classified as less than 20 m, 21- 40 m, 41 60 m and above, as presented in Table 5. Table 5 shows that most of the households were located less than 20m away from the dump sites. This implies the closeness of the households to the dump site, suggesting higher probability of bearing the perceived health effects of wastes dumped. The quantities of refuse generation per day per household were categorized as less than 10 kg, 10-20 kg, 21-30 kg and above 30 kg.

Five refuse disposal methods were identified in the area, with the open dumping method being the dominant (Table 7).
The results in Table 8 showed that majority of the respondents disposed the refuse they generate in the open fields and streets, while others disposed the refuse the generate in dug pits and water bodies. It was observed that the improper wastes disposal in the study area had perceived effects on the health of the people in the area. Table 8 shows the results of the perceived effects of the wastes dumping on the peoples' health. Table 8 shows that 79,6 per cent of the people perceived that refused disposal had affected their health. Table 8 shows that majority of the people believed they were affected by the perceived effects of the indiscriminate dumping of wastes.

Perceived common health risks of improper refuse disposal

The perceived common health risks observed due to the improper refuse disposal in the area include discomfort, suffocation, infections, bites and stings of insects (Table 9).

Table 9 shows that the commonest perceived health ailments associated with improper waste disposal are infections followed by bites and sting of insects. open dump sites provide good breathing for flies and insects, and thus the bites and stings that the people commonly experience. The perceived infections that the people, more often than not, complained about are mostly dysentery, diarrhea and malaria (Table 10).

Table 11 shows that from January to June 2009, the period of the field survey, 9.5 per cent of the people did not visit hospital for any of the health problems and infections identified in Table 11. Those who visited the hospital more than twice and who are the dominant, have their houses close to the open dump sites

Th« reUiiAnehlp between the solid wastes collection and <li5pocal_r and the perceived health Wndirians of the people in the area was statistically tested, usm_K the ChUquare statistical technique,

$$\sum \frac{(O-E)}{E}$$

Where *'=Chi" square O - Observed frequency g • Fvpooted (theoretical) frequency

The values in Tables 8 and 12 were used in the application of the Chi-square statistical test and it produced the values in table 12. The value of the calculated Chi-squre is 7.08, which is lower than the critical value of 13.28. This, statistically, implies that there is a significant relationship between solid waste generation and disposal and perceived health of the people in the area.

This also implies that the methods of waste disposal used by the residents determine the level of exposure to health risks. This is particularly so when the waste dumps are closer to residential households as it was the case in Makwalla area of keffi town. The paper reveals that the open dumping of solid waste in the residential areas is a serious health hazard, because majority of the people, who dispose solid wastes in open dumps around their residential households, admitted being infected with malaria, diarrhea or cholera, considered as threats to their health. It was observed that garbage dumps and human feaces around the residential households in the Makwalla area constitute serious threats to the health of the residents. This is because wastes dump openly would always attracts flies and insects, capable of transmitting germs from the garbage dumps and human faeces to human food, water and eating dishes.

Table 1: Types of solid wastes generated

Types of Solid Wastes	Number of Respondents	Percentage
Domestic	123	43.1
Commercial	116	40.7
Agricultural	35	12.3
Medical	3	1.1
Industrial	8	2.8

Source: Fanen, 2009.

Table 2: Wastes storage facilities

Facilities	Number of Respondents	Percentage
Plastic containers	59	20.7
Polythene bags and Sacks	77	27.0
Dustbins	38	13.3
Others	111	38.9
Total	285	100.0

Source: Fanen, 2009.

Table 3; Refuse collection agents

Solid Wart* Collector	Number of Respondents	Percentage
Local Government	13	4.6
Household Members	201	70.5
Hired Labour **Total**	71	24.9
Source: Fanen, 2009.	**285**	**100.0**

Table 4i Frequencies of refuse collection and disposal

Enquwncle*	Number of Respondents	Percentage
Daily	145	50.9
WwUy	108	37.9
Monthly	32	11.2
Total	38S	100.0

Source :Fanen

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Distance (M)	Number of Households	Percentage
Less than 20 21-40 41-60	95 84 68 68	
Beyond 60	285	
Total		

Source: Fnrien Table 6:

Quantities of

	105_ 68 74 285	36.8 23.9 26.0 100.0

SUUIMV: Fwwn, 2009.

Table 7. Refuse disposal methods

DUpP**1 Method	Number of Households	
Open Dumping	127 21 36 98 3 285	44.6 7.4 12.6
Pit Dumping Stream		34.4 1.1 100.0
Dumping Burning Burying		
Tctai		

Source: Foncn. 2009

RI^IIU ftispnud Method ,	Rnpandcnt total	Health nf the YVnple %	Effects Affected	Not Affected
UWftyumpmg Pit IViinpinf	i»-	44.6	101	26
3ticnm ftumplng:	36	126	31	5
1 Ruining	98	34.4	77	21
uumns	3	1.1	0	3
] 16141	M1	100.0	227	58

Hoiircc: Fanott, SOW

Table 9: Perceived common health risks linked with improper refuse disposal

Health Risk	Number of Affected Respondents	Percentage
Discomfort Suffocations Infection Bites and Stings Injuries Total	49 68 74 58 10 227	21.6 18.1 30.4 25.6 4.4 100.0

Source: Fanen, 2009

Table 10: Perceived common infections associated with refuse disposal

Common Infections	Number of Affected Respondents	Percentage
Malaria Cough and sore throats Dysentery and Diarrhea Cholera	79 28 102 7	34.8 12.3 45.0 3.1
Skin and Infections	11 .	4.8
Total	227	100.0

Source: Fanen, 2009

Table 11: Frequency of hospital visits, January June, 2009

Freuuencv of husuiUI visits	Number of Respondents	Percentage
Nil	27 One*	9.5 18.9 38.3 22.9 7.9
43 Twic*	87 Three Time	100.0
52 More than three times	18 Total	
227		

Source: Fanen, 2009.

Table 12: Chi Square Statistics

R	C	O	E	O-E	$(O-EO)^1$	(O-E)VE
1	1	' 101	101	0	0	0.00
1	2	26	26	0	0	0.00
2	1	18	17	1	1	0.06
2	2	3	4	−1	1	0.25
3	1	31	29	2	4	0.14
n	2	5	7	2	4	0.57
ij	1	77	78	−1	1	0.01
4	2	21	20	1	1	0.05
5	1	0	2	−2	4	2.00
5	7	3	1	2	4	4.00
					X^J=7.08	

N

CI- Column Total N = Urand Total The calculated value of the Chi-square (X^2) is 7.U8.

CONCLUSIONS

Indiscriminate dumping of solid wastes is a serious problem which requires urgent attention, if it is to be tackled. This becomes critical when we consider the fact that it destroys the quality of the environment and constitutes health hazards to human beings. Based on the submission of the pap«v it is concluded that perceived effects caused by improper dumping of solid wastes in the Makwalla and indeed in all the neighbourhoods in Kefn[1], with similar characteristics, is tremendous There is thus, the need to pay urgent attention to issues of waste management by the governments; state and local, Non-Governmental Organizations (NGO's) and residents, the generators of wastes. If wastes are generated, collected and disposed without proper care and concern to the health conditions of the people and the environment, then both of them (people and the environment) would continue to experience an unsustainable existence.

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