



Assessment of Knowledge and Attitude of Household Waste Disposal in Ezianya, Aba North Local Government Area, (LGA) Abia, State

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Abstract

Background: Refuse is a term covering all type of substances generated from living activities of humans and other animals. It is anything that is not wanted by a person and is thrown away because of reduced value of the substance. Refuse includes garbage or kitchen waste, paper, empty cans, broken bottles, glass, iron scraps, plastic, etc. Indiscriminate disposal of waste results in unsightly appearance, foul smelling environment and spread of diseases. Refuse management involves huge sum of money, materials and manpower for proper treatment.

Objective: Assessment of knowledge and attitude of Household solid waste disposal in Ezianya, Aba North Local Government Area, Abia State, Nigeria.

Materials and Methods: A cross-sectional study performed in Ezianya Community in Aba North Local Government Area in ABA, Abia State, Nigeria. Self-administered semi-structured questionnaires were administered to 465 household heads for the study.

Result: A total of 465 household heads were selected by systematic sampling methods with response rate of 15 (2.4%). Mean age was 35 ± 6.421 . Level of good knowledge and positive attitude on waste management are 283 (62.9%) and 210 (46.7%) respectively. The relationship between the socio-demographic variables (age group, marital status and level of education) and level of knowledge and attitude of solid waste management were statistically significant, at p-value of <0.05 .

Conclusion: The level of knowledge is high 62.9% and that of attitude is low 46.7%. The association between the level of knowledge and attitude and age group, marital status and level of education of the respondents was statistically significant respectively. The major source of information (40%) was from the community leader. The correlation ($r = 0.076$) between knowledge and attitude is not statistically significant at p-value of 0.01.

Keywords: Assessment; Knowledge; Attitude; Household; Solid Waste Disposal; Aba North; Abia State; Nigeria

Introduction

Background

Refuse which is man-made and also known as solid waste is a term covering all type of substances generated from living activities of humans and other animals [1]. It is anything that is not wanted by a particular person and who throws it away because of reduced value of the substance. Refuse is continually being generated daily from the activities of man such as washing, cleaning, recreation, cooking and serving of food and other items or the waste resulting from such activities [1]. They include garbage or kitchen waste, paper, empty cans, broken bottles, glass, iron scraps, plastic, etc. [2]. Indiscriminate disposal of waste results in unsightly appearance, foul smelling environment and spread of communicable diseases. These diseases include diarrheal diseases, dysentery, cholera, typhoid and paratyphoid, poliomyelitis, leptospirosis, infectious hepatitis, plague, mosquito borne diseases such as malaria, yellow fever, filariasis and dengue hemorrhagic fever and Lassa fever [2]. They are acquired by ingestion of contaminated water or food or can be transmitted by insect vectors and unhygienic practices.

Refuse management involves huge sum of money, materials and manpower for proper treatment and disposal of waste. Refuse management is a global and growing concern that it was captured in Sustainable Development Goals in (Goal 6: Water - Ensure availability and sustainable management of water and sanitation for all.) in United Nation Summit in September 2015 New York [2]. In small-and-medium-income countries, the major drawbacks on waste management are lack of fund, ineffective waste collection strategies, lack of manpower and lack of disposal sites [3]. People dispose refuse indiscriminately on property such as empty plot or piece of land that does not belong to them and the volume of waste is directly related to the population density. A study carried out by Uchegbu [4] in Lagos showed that two-third of the gutters had become free-range part dumping grounds, part peeing and part defecation with its attendant health problems. This scenario is not far-fetched with what is obtainable in Aba North Local Government Area (LGA) of Abia State.

Waste management is the process of collecting, transporting, processing or disposing and monitoring of waste materials [5]. The term usually relates to materials produced by human activity and the process is generally undertaken to reduce their effect on health,

the environment or for aesthetics [5]. The management of waste is another key element in the protection of public health. Different types of waste pose different problems but in general failure to manage and dispose waste properly exposes people to increased risk of diseases [6].

The waste management hierarchy is made up of four levels ordered from most preferred to least preferred methods based on their environmental soundness: sources reduction and refuse; recycling or composting; energy recovery; treatment and disposal [7].

The steps involved in waste management include, waste generation, separation and storage, collection, transport, disposal. People residing in communities must have basic knowledge and good attitude on segregation and disposal of household waste and lack of which will affect the efficiency and effectiveness of refuse disposal and by extension public health. Refuse disposal methods include: open dumping, sanitary landfill, composting, incineration, mechanical destruction, burning and recycling [2]. Open dumping with all its health hazards should not be encouraged, sanitary landfill is suitable in areas where there are sufficient land for the operation [2]. The choice of any of the methods of disposal is determined by the population of the users, money, material and manpower.

Globally, 2.6 billion people or 39 percent of the world population do not use proper method for waste disposal. Some 1.1 billion people still disposed of waste in the open places [8]. Globally, every year, millions of people die due to mismanaged of waste and waste dumping. About 2.4 billion people will likely face the risk of needless disease and death because of bad sanitation" [9]. With rapid population growth and urbanization, annual waste generation is expected to increase by 70% from 2016 levels to 3.40 billion tons in 2050 [9].

One should mention briefly, what knowledge and attitude are with regards to refuse disposal and what happens to refuse disposal in Ezizama Urata Aba North LGA where the study was carried out.

Materials and Methods

Study area

Aba is a city in the southeast of Nigeria and the commercial center of Abia State. Upon the creation of Abia state in 1991,

Aba was divided into two local government areas namely; Aba South and Aba North. Aba North is a Local Government Area of Abia State in the city of Aba. The postal code is 450 and the headquarter is Ezianya [10]. It lies along the west bank of the Aba River, and is at the intersection of roads leading to Port Harcourt, Owerri, Umuahia, Ikot Ekpene, and Ikot-Abasi. The city became a collecting point for agricultural products following the British made railway running through it to Port Harcourt. Aba is a major urban settlement and commercial centre in a region that is surrounded by small villages and towns. The indigenous people of Aba are the Ngwa [10]. Aba is well known for its craftsmanship and also the most populous city in the South Eastern Nigeria. Aba North LGA has a population of 154,083 according to the National Population Census (2006) projected to 234,800 up to March 2019 with annual population change of 2.7% (2006 - 2019) [11].

Study population

The study population comprised of heads of households (2,000) [11] in Aba North LGA.

Inclusion criteria

All Households in the selected villages that consented to participate in the study.

Exclusion criteria

Households outside the study area and those who didn't give consent to participate.

Study design

A descriptive cross-sectional study of household refuse disposal in using pretested semi-structured self-administered questionnaire to obtain information from consenting participants. Information was collected on the basis of knowledge and attitude of heads of household in the refuse disposal and confidentiality was maintained. This was used to assess the knowledge and attitude of household solid waste disposal in Ezianya, Aba North LGA, Abia state, Nigeria.

Sample size determination

Calculation was done using the formula below [12]

$$N = z^2PQ/D^2$$

Where N = minimum sample size

Z = standard normal deviation (1.96)

P = prevalence (0.50 used for sample size)

$$Q = 1-p$$

$$= 1 - 0.5 = 0.50$$

D = degree of accuracy = 0.05(constant)

$$N = [1.96^2 \times 0.5 \times 0.5] / (0.05)^2$$

$$= 3.8416 \times 0.25 / .0025$$

$$= 0.9604 / 0.0025$$

$$= 384.16$$

Hence to correct for non-response rate; 20 per cent of sample size was added to the simple size.

$$20\% \text{ of } 384.16 = 76.832 = 77$$

Therefore, total number of sample size collected was 384.16 + 77 = 461 which was approximated up wards to 465 since 461 is minimal sample size.

Sampling technique

Multi-stage probability sampling technique was used.

- **First step:** Five wards was randomly selected, out of the ten wards in Aba North LGA. this included; Ama-asaa, Ama-Asato, Osokwa ward, Umunneise and Uratta.
- **Second step:** Three villages were selected in each of the five wards giving a total of 15 village.
- **Third step:** Each village is taken as a cluster and 31 heads of households were randomly chosen and interviewed. In 15 villages randomly selected gave a total household heads of 465 and questionnaires were produced for the same number of heads of household.

Tool for data collection

Data were collected using a pretested semi-structured questionnaire developed by the researchers and were interviewed by self-administered.

Data analysis

Data collected were analysed using Statistical Package for the Social Sciences (SPSS) software version 26.0. Data were presented

in frequency tables. Chi-square was used to test association between categorical variables, P - value of <0.05 was taken to be a statistically significant. Pearson’s correlation test at p-value of 0.01 was used to determine the correlation between knowledge and attitude in the waste disposal management.

Data presentation

Data generated were summarized using tables and frequency distribution of variables. Descriptive analysis was done by calculating relevant means and standard deviation for quantitative variables, while qualitative variables were analyzed using proportions.

Ethical consideration

Informed consent of the study was obtained from Abia State University Teaching Hospital, Aba, Informed consent was also obtained from the Aba North LGA Chairman, Ward Councilors of the selected wards and 465 heads of the households and they were briefed on the objectives of the study. They were counseled and confidentiality of the information given was assured.

Results

Variables		Frequency	Percentage (%)
Age group	20 - 24	35	7.8
	25 - 29	50	11.1
	30 - 34	55	12.2
	35 - 39	150	33.3
	40 - 44	68	15.1
	45 - 49	58	12.9
	50 - 54	26	5.8
	>55	8	1.8
Total		450	100.0
Gender	Male	285	63.3
	Female	165	36.7
Total		450	100.0
Educational level Of the respondents	Primary education	108	24.0
	Secondary education	150	33.3
	Tertiary education	192	42.7
Total		450	100.0

Marital status	Single	40	8.9
	Married	410	91.1
Total		450	100.0
Tribe	Igbo	420	93.3
	Hausa	9	2.0
	Yoruba	21	4.7
Total		450	100.0
Religion	Christianity	415	92.2%
	Islamic	15	3.3
	African traditional	20	4.5
Total		450	100.0
Occupation	Teaching	68	15.1
	Farming	86	19.1
	Government employee	118	26.2
	Business owners	98	21.8
	General contractors	80	17.8
Total		450	100.0
Types of homes	Village House	86	19.1
	Two bed-room flat	106	23.5
	Three bed-room flat	183	40.7
	Duplex	75	16.7
Total		450	100
Monthly income in Naira	<30,000.00	88	19.6
	30,000.00 - 40,000.00	104	23.1
	41,000.00 - 50,000.00	190	42.2
	>50,000.00	68	15.1
	Naira Mean = 45,000 ± 14,000		
Total		450	100.0
Number of household members	1 - 5	188	41.8
	6 - 8	190	42.2
	>8	72	16
Mean = 4.82 ± 3.16			
Total		450	100.0

Table 1: Socio-demographic Characteristics of the respondents: Mean = 35.59 ± 6.421.

Four hundred and fifty respondents participated in the study giving a response rate of 97.6% and non-response rate of 15 (2.4%).

Table 1 shows that majority of the respondents 150 (33.3%) were in the age group of 35 - 39 while the least number of respondents were in the age group of >55 and above. Male consisted the majority of the gender with 285 (63.3%) while female the least with 165 (36.7%). Respondents with tertiary education 192 (42.7%) were in the majority, those with secondary education 150 (33.3%) and those with primary education 108 (24%) were the least. The respondents who were married 410 (91.1%) were in majority and those who were single 40 (8.9%) were the least. Respondent who were Igbos 420 (93.3%) were in majority followed by Yoruba 21 (4.7%) and Hausa 9 (2.0%). Respondents who were Christians 415

(92.2%) were in the majority followed by African traditional 20 (4.5%) and Islam 15 (3.3%). Respondents who were government employee 118 (26.2%) were in the majority followed by business owners 98 (21.8%), Farming 86 (19.1%), General contractors 80 (17.8%) and Teaching 68 (15.1%). Respondents who live three bed-room flat 183 (40.7%) were in the majority followed by two bed-room 106 (23.5%), village house 86 (19.1%) and Duplex 75 (16.7%). Respondents with monthly income in Naira 41,000.00 - 50,000.00 were in the majority followed by 30,000 - 40,000.00 88 (19.6%), and >50,000.00 68 (15.1%) with a Naira mean = 45,000 ± 14,000, Respondents with household size of (6 - 8) 190 (42.2%) were in the majority followed by household of 1 - 5 size 188 (41.8%) and household >8 72 (16%) . Mean of household size = 4.82 ± 3.16.

Variables		Frequency	Percentage (%)
Sources of waste management's information.	No information	20	4.4
	Brochures	55	12.2
	Social media	120	26.7
	Community leader	180	40.0
	Radio % Television	75	16.7
Total		450	100.0

Table 2: Sources of waste management's information.

Table 2 shows the sources of waste management's information, the major source was from the community leader 180 (40.0%)

followed by social media 120 (26.7%), brochure 55 (12.2%), 20 (4.4) respondents did not get any information and they participated.

Variables		Frequency	Percentage (%)
Level of knowledge on waste management	Good knowledge	283	62.9
	Poor knowledge	167	37.1
Total		450	100.0

Table 3: Level of knowledge on waste management.

Variables		Frequency	Percentage (%)
Level of attitude on waste management	Positive attitude	210	46.7
	Negative attitude	240	53.3
Total		450	100.0

Table 4: Level of attitude on waste management.

Variables Good knowledge N (%)		Knowledge of waste management		Total N (%)	χ ²	P - value
		Poor knowledge N (%)				
Age group	20 - 24	22 (4.9)	12 (2.7)	34 (7.6)	3.165	0.014*
	25 - 29	32 (7.1)	17 (3.8)	49 (10.9)		
	30 - 34	36 (8.0)	18 (4.0)	54 (12.0)		
	35 - 39	82 (18.2)	67 (14.9)	149 (33.1)		
	40 - 44	43 (9.6)	23 (5.1)	66 (14.7)		
	45 - 49	38 (8.4)	21 (4.7)	59 (13.1)		
	50 - 54	20 (4.5)	5 (1.1)	25 (5.6)		
	>55	10 (2.2)	4 (0.9)	14 (3.1)		
Total		283 (62.9)	167 (37.1)	450 (100.0)		
Marital status	Single	25 (5.6)	15 (3.3)	40 (8.9)	6.969	0.024*
	Married	258 (57.3)	152 (33.8)	410 (91.1)		
Total		283 (62.9)	167 (37.1)	450 (100.0)		
Educational level Of the respondents	Primary education	64 (14.2)	44 (9.8)	108 (24.0)	54.467	0.021*
	Secondary education	94 (20.9)	56 (12.4)	150 (33.3)		
	Tertiary education	125 (27.9)	67 (14.8)	192 (42.7)		
Total		283 (62.9)	167 (37.1)	450 (100.0)		

Table 5: Statistically significant association between socio-demographic characteristics and level of knowledge on waste management.

Table 5 shows association between level of knowledge and socio-demographic characteristics and association between level of knowledge and age group, marital status and level of education of the respondents was statistically significant at a p-value of 0.05.

Variables Good Knowledge N (%)		Knowledge of waste management		Total N (%)	χ ²	P - value
		Poor knowledge N (%)				
Sources of waste management's information	No information	16 (3.5)	4 (0.9)	20 (4.4)	4.215	0.10
	Brochures	35 (7.7)	20 (4.5)	55 (12.2)	18.531	0.08*
	Social media	73 (16.2)	47 (10.5)	120 (26.7)	21.832	.004*
	Community leader	106 (23.6.3)	74 (16.4)	180 (40)	22.546	.002*
	Radio and Television	53 (11.8)	22 (4.9)	75 (16.7)	21.465	.016*
Total		283 (62.9)	167 (37.1)	450 (100.0)		

Table 6: Statistically significant association between source of information and level of knowledge on waste management.

P-value at 0.05.

Table 6 shows association between level of knowledge and sources of information and level of knowledge between social media, community leader and radio/television were found to be statistically significant with p-values of 0.08, 0.004, 0.002,

0.016 respectively while association between no information and brochure with the level of practice was not statistically significant with p-values of 0.05.

Variables Positive Attitude N (%)		Attitude of waste management		Total N (%)	χ ²	P - value
		Negative Attitude N (%)				
Age group	20 - 24	13 (2.9)	21 (4.7)	34 (7.6)	3.765	0.012*
	25 - 29	24 (5.3)	25 (5.6)	49 (10.9)		
	30 - 34	28 (6.2)	26 (5.8)	54 (12.0)		
	35 - 39	77 (17.1)	72 (16.0)	149 (33.1)		
	40 - 44	36 (8.0)	30 (6.7)	66 (14.7)		
	45 - 49	18 (4.0)	41 (9.1)	59 (13.1)		
	50 - 54	10 (2.2)	15 (3.4)	25 (5.6)		
	>55	4 (0.9)	10 (2.2)	14 (3.1)		
Total		210 (46.7)	240 (53.3)	450 (100.0)		
Marital status	Single	19 (4.2)	21 (4.7)	40 (8.9)	7.869	0.026*
	Married	191 (42.4)	219 (48.7)	410 (91.1)		
Total		210 (46.7)	240 (53.3)	450 (100.0)		
Educational level Of the respondents	Primary education	50 (11.2)	58 (12.8)	108 (24.0)	48.567	0.028*
	Secondary education	70 (15.5)	80 (17.8)	150 (33.3)		
	Tertiary education	90 (20.0)	102 (22.7)	192 (42.7)		
Total		210 (46.7)	240 (53.3)	450 (100.0)		

Table 7: Statistically significant association between socio-demographic characteristics and level of attitude on waste management.

Table 7 shows association between level of attitude and socio-demographic characteristics and association between level of

knowledge and age group, marital status and level of education of the respondents was statistically significant at a p value of 0.05.

Variables Positive attitude N (%)		Knowledge of waste management		Total N (%)	χ ²	P - value
		Negative attitude N (%)				
Sources of waste management's information	No information	9 (2.0)	11 (2.4)	20 (4.4)	4.215	0.14
	Brochures	26 (5.7)	29 (6.5)	55 (12.2)	28.531	0.18
	Social media	56 (12.5)	64 (14.2)	120 (26.7)	24.732	0.24
	Community leader	84 (19.0)	96 (21.0)	180 (40)	21.546	.006*
	Radio and Television	35 (7.8)	40 (8.9)	75 (16.7)	3.465	.014*
Total		210 (46.7)	240 (53.3)	450 (100.0)		

Table 8: Statistically significant association between source of information and level of attitude on waste management.

P-value at 0.05.

Table 8 shows association between level of attitude and sources of information and level of attitude between community leader and radio/television were found to be statistically significant with p-values of 0.006, 0.014 respectively while association between no information with the level of attitude between no information, brochure and social media were not statistically significant with p-values of 0.14, 0.18, 0.24 respectively.

Variables	p - value	Pearson’s correlation (r)
Knowledge and attitude	0.048	0.076

Table 9: Correlation between knowledge and attitude of respondents on refuse management.

Knowledge; mean = 11.26; SD = 1.87.

Attitude; mean 18.84: SD = 2.34.

Significant at the 0.01 level and so correlation between knowledge and attitude is not statistically significant. From the tables above, it is found out the knowledge and attitude had significant influence on solid waste management, however the association between knowledge and attitude showed that there was no significant with Pearson’s correction (r = 0.076).

Discussion

The non-response rate for this study was 15 (2.4%) and mean age of the respondents was 35.59 ± 6.421, majority of the respondents 150 (33.3%) fell in the age group of 35 - 39 and this is in line with a study in Thalang Thailand [13] and this is similar to study conducted in Thailand [14] where the common age range was 20 - 29 years old (36.9%). This is also similar in a study in Northern Thailand [14] where most of the respondents were 20 - 40 years old, Male constituted the majority of the gender of 285 (63.3%) while in the study conducted in Thailand [14] female 63.2% constituted the majority and also in Thalang Thailand [13] female constituted majority (87.2%). This is similar in Northern Thailand [14] where 63.2% of the respondents were female. In this study, respondents with tertiary education was 192 (42.7%) and secondary education 150 (33.3%) while in Thailand [14] 37.5% of the respondents indicated that they had achieved a secondary education and 29.3% of the respondents with no education and also in Thalang in Thailand [13] where most of the respondents held at least bachelor’s degree. Married respondents were 410

(91.1%) and higher than in the study conducted in Thailand [14] in which married respondents accounted for 63.2%. Respondents with government employment were 118 (26.2%) business owners were 98 (21.8%) while in Thailand [14] majority of the respondents were merchants 33.0% followed by private employees (1.6%), respondents who live in three bed-room flat were 183 (40.7%) and 86 (19.1%) in village house while in Thailand [14], majority of the respondents 87.4% live in private house.

Majority of the respondents with monthly come in Naira 41,000.00 - 50,000.00(\$54.67 - \$66.67 for local exchange rate of \$1 to N750) were 190 (42.2%) while majority of the respondent in Thailand [14] had monthly income of 15,000 baht, (\$433.78, for exchange rate of \$1 to 34.58 Baht) respondents with household size of 6 - 8 were 190 (42.2%) while in Thailand [14] more than half of the respondent (51%) had the family size of five to eight persons in its household. The major source of information was from community leader 180 (40%) while in Thailand most of the respondents (42.6%) received information from the community leaders as in our study even theirs is higher. However, in our study 20 (4.4%) did not receive information at all while in Thailand [14] 25.1% of the respondents did not receive information at all.

In this study, the level of knowledge was good 283 (62.9%) and this agrees with the study in Abakiliki¹⁶ and also agrees with the study in Jos, Nigeria by Audu A. Jatau [16]. This correlates well with what was reported in Conakry, Guinea by Keita Mamay [17]. The knowledge level of our study is lower than that of Northern Thailand [14] where 73% of the respondents had high level of knowledge. Their result is similar to Garang, *et al.* [18] and Laabar, *et al.* [19]. In contrast, our study knowledge level is higher in a study in Nepal [20] where the knowledge level was low 41.7% which is similar with the research conducted in Peshawar Pakistan [21] which showed that 42% had low knowledge.

In this study, the level of attitude was poor 210 (46.7%) positive attitude while 240 (53.3%) of the respondents had negative attitude, demographic characteristics which affected the level of attitude included age, marital status, education and source of waste management’s information. However, in a study in Northern Thailand [14], they had three levels of attitude, their result showed that 2.9% of the respondent had positive attitude, 85.1% respondents had neural attitude and 12% of the respondents had

negative attitude. Their levels of attitude were also affected by age, educational and source of waste management's information. It was found that age and education levels were important factors. This finding was similar to the study of Panyako [22] and Barloa, *et al.* [23].

In this study, these results showed that knowledge and attitude had important influence on solid waste management, however it was found that there is no statistically significant with Pearson's correlation ($r = 0.076$). This result is consistent to with the study carried out in Northern Thailand [14] and that of Arora and Agrwa [24].

Conclusion

The finding of this study showed that respondent's knowledge of solid waste management is high, but the level of attitude is low. It showed that both knowledge and attitude have a very important influence on solid waste management but there is no statistically significant with Pearson's correlation test in the correlation between knowledge and attitude.

Recommendation

Aba North Local Government Area should prioritize health education in the way of training and retraining of citizenry on waste management so as to promote knowledge and attitude on effective solid waste management. Also, the source of waste management's information is crucial in order to provide waste management information. Appropriate and sufficient media should be selected for this exercise. There should be need to focus on the control of medical waste and offsite waste transportation to the final disposal destination.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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