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Household Solid Waste Management, Attitude and Practices: A Case Study of Residents in the University of Nigeria Nsukka Staff Quarters.

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Abstract

The study investigated attitudes and practices of households towards solid waste management within the University of Nigeria, Nsukka staff quarters. Specifically, the study determined: attitude of the households towards solid waste management and their solid waste management practices. The study adopted survey research design. Population for the study consisted of 599 households in 517 senior staffs and 82 junior staff quarters. Questionnaire was used for data collection. Mean, standard deviation, frequency, percentages, ANOVA and Chi-Square were used for data analysis. Results show five negative attitude indicators, including, among others, " being willing to pay a fee or contribute towards improved waste management services within the staff quarters (**x** =2.44), feeling satisfied with the current solid waste practice of open dumping within the University of Nigeria Nsukka staff quarters (**x** =1.73). Households had moderate practice on three indicators including waste segregation (54.5%), open disposal of waste (42.4%), and high practice on three items, namely storing waste in plastic bag before disposal (75%). There was a significant difference in households' attitude towards solid waste management based on household size (F-value= 7.077, p-value= .000). There was no significant difference in household solid waste management practices based on household size (χ^2 = .970, P-value = .809). The study concludes that households in UNNSQs have more negative attitude indicators and moderate practice towards solid waste management. The study recommends provision of conveniently accessible public bins within the staff quarters by the school management will improve solid waste management practices. Households should be involved in the planning and implementation of solid waste management initiatives to help households develop more positive attitude towards solid waste management.

Keywords: Household, Solid, Waste, Management, Attitudes, Practices, Staff Quarters

Introduction

Solid waste management has been of research interest globally due to its detrimental effects on public health and environment. In 2016, global waste generation was estimated at 2.01 billion tonnes, and projected to surge to 3.4 billion tonnes by 2050, with the majority of it coming from households (World Bank, 2018). Africa generates 62 million tonnes of solid waste annually as stated by Hoornweg, et al. (as cited in Orhorhoro & Oghoghorie, 2019). Nigeria with a population estimated at 200 million has been regarded as one of the Africa's largest producers of solid waste, and generates more than 30 million tons of solid waste annually, mostly by households (Dada & Righelato, 2022). Household solid waste comprises of garbage, rubbish, ash and residues, dead animal, agricultural waste, animal faeces and hazardous wastes (Hadi, Ghasem & Rama, 2021). Waste generation is completely unavoidable, and when indiscriminately disposed, it can be a breeding site for mosquitoes, disease causing organism, and vectors with the tendency of disease outbreaks, poor quality of health and life of families within the community.

Waste is primarily classified into liquid, solid and gaseous forms and can be categorized by sources of generation as domestic (household), industrial, institutional, municipal, health-care waste among others (Adeniyi, 2019). The study focuses on household solid waste because it is the major source of domestic solid waste in the society (World Bank, 2018). Household waste connotes waste generated by households and small businesses. Daily, households constitute a significant portion of the overall sources of domestic solid waste (Bushara, et al, 2022), generated from activities, such as cleaning, cooking, gardening and sweeping. It includes used products or material, such as plastics, polythene bags, cloths, cans, food residues, milk cartons, appliances, glass and paper. Items discarded by families as part of their daily activities should be properly collected, stored and disposed in such a way that family health is persevered. The activities that constitute proper household solid waste management practices include: source separation, storage, waste collection, transportation, recycling or processing and disposal of solid waste (Eshete, et al, 2023; Laor et. al. 2018). Indiscriminate disposal of household waste can attract insects and rodents, vectors which can transmit diseases like cholera and dengue fever (Adetokumbo & Herbert as cited in Omang, et. al. 2021). Hence, proper solid waste management is necessary in reducing the rate of infectious diseases, mortality rate as well as improving quality of life (Omenka, 2016) of families and communities.

Communities like the University of Nigeria Nsukka staff quarters, household solid waste management is the responsibility of each family resident in the quarters. There are undesignated open dumpsites where different households dispose waste which is burnt after a while. During open burning of waste, fire may escape sometime, and endanger the families. Household solid waste management

practice of open dumping and burning among households in the quarters not only constitute to pollution, it is a potential source of health risks. Odiana and Olorunfemi (2021) posited that in most Nigerian communities, solid waste management is not carried out adequately. Olukanni, et al, (2020) posited that insufficient environmental policies, and a lack of awareness among the public contributes to waste management problems, as well as negative attitudes and practices. Enumah, et al, (2022) reported negative attitude towards solid waste management by respondents. Mahajan and Sudan (2022) reported poor household solid waste management practices among household in Jammu City, India. Hassan and Elsery (2022) reported unsatisfactory household solid waste management practices among majority of rural women in Egypt. Stewart, Micheal and Walters (2022) reported poor solid waste management among residents in Abua/Odual LGA, River State, Nigeria. Sultana, et al, (2021) reported moderate level practice of household solid waste management among Dhaka community people. Omar, et al, (2018) reported positive attitudes towards solid waste management among households in et al, (2008) established that household size is very significant in the management of solid waste. Fadhullah, et al, (2022) reported respondents' background (household size) influenced the household solid waste practices and perceptions in Panji sub-district, et al,(2022) assessed household's practices towards solid waste management to be high.

The management of solid waste is a pressing concern within the University of Nigeria staff quarters. Inefficient household solid waste management has far reaching physical, biological, health and psychological consequences. For example, indiscriminate dumping of household solid waste leads to land degradation, soil contamination, air and water pollution as well as providing breeding cites for disease causing organisms such as flies, rodents and insects pests which cause many diseases such as diarrhoea, dysentery, gastrointestinal problems, worm infection, food poisoning, dengue fever, cholera, leptospirosis and bacterial infection ; irritation of the skin, nose and eyes; as well as respiratory symptoms (Gutberlet & Uddin, 2017; Maheshwari, et al, 2015; Mamady, 2016; Norsa'adah, et al, 2020). Studies have estimated that the pollutions from the dumpsites might cause cancers of different types such as liver, kidney, larynx, pancreas, and non-Hodgkin lymphoma (Ncube, et al, 2017), birth defects, preterm babies, congenital disorders and Down's syndrome (Ncube, et al, 2017; Norsa'adah, et al, 2020) and some psychosocial effects such as disturbing odour, unsightly waste, and thinking, cognitive and stress-related problems (Aminuddin & Rahman, 2015; Ncube, et al, 2017; Norsa'adah, et al, 2020). Again, household waste management practices at the staff quarters have a direct impact on the immediate living environment and the broader University community. Research has shown that attitude and practices of residents toward waste influences

waste management. Attitude can be positive or negative. Positive attitude are those disapproval of unfavourable waste practices and handling waste appropriately through proper collection and storage of waste in a covered waste bin and disposing the waste in such a way that it does not constitute harm to health and environment. Negative attitude are those approval of unfavourable waste practices such as indiscriminate waste disposal, littering of surroundings with waste, open burning of waste, not using designated dumpsites for waste disposal, among other negative attitude towards waste. Fadhullah, et al, (2022) noted that poor waste disposal practices hampers progress towards an integrated solid waste management in households. The study therefore sought to determine attitude and practices of households in UNN staff quarters towards solid waste management.

Purpose of the Study

The general purpose of the study was to investigate attitude and practice of households towards solid waste management in the University of Nigeria Nsukka UNN Staff Quarters. Specifically, the study determined:

1. attitude of households towards solid waste management in UNN staff quarters; and
2. practices they adopt in solid waste management in UNN staff quarters.

Research Questions

The following research questions guided the study.

1. What is the attitude of households towards solid waste management in University of Nigeria Nsukka staff quarters?
2. What practices do households adopt in their solid waste management in University of Nigeria Nsukka staff quarters?

Hypotheses (HOs)

The following null hypotheses were postulated for the study.

HO_1. There is no significant difference in the mean responses on attitude indicators of households towards solid waste management in University of Nigeria Nsukka staff quarters based on household size.

HO_2 There is no significant difference in the percentage responses of households on their solid waste management practices in University of Nigeria Nsukka staff quarters based on household size.

Methodology

***Design of the Study*:** Survey research design was utilized for the study.

***Area of the Study*:** The study was conducted within the University of Nigeria Nsukka staff quarters (UNNSQs). UNNSQs is divided into senior staff quarters (SSQs) and junior staff quarters (JSQs). There are dumpsites in the staff quarters where households dump their solid waste. Some streets with many blocks of flats, created undesignated dumpsites. Thus, solid waste litter around some parts of the quarters.

***Population of the Study*:** The population of the study comprised of all the 599 households resident in

UNNSQs (517 senior staff and 82 junior staff) (Personnel Services Department & Council Unit, University of Nigeria Nsukka, 2023). The respondents for the study were home-makers in the households. This is because it assumed that they are the home-makers in charge of the operations of the home including how household waste was managed.

The entire population was involved in the study. This is because the population size was considered manageable. Hence, there was no sampling technique used in this study.

***Instrument for Data Collection*:** The instrument for data collection was questionnaire. It was developed from literature based on the objectives of the study. The instrument had a 4- point scale of Strongly Disagree= SD (1), Disagree = D (2), Agree = A(3) to Strongly Agree = SA (4). It was validated by three university experts in health education. Reliability of the instrument was established using split-half method of reliability. Spearman-Brown correlation formular was used to determine internal consistency of section C while Cronbach Alpha was used for section B because the responses were polychotomously scored. Reliability coefficient of 0.71 and 0.70 was obtained for sections B and C, indicating a satisfactory acceptance level based on Cohen, Manion and Morrison (2011) guidelines.

***Data Collection Method*:** A total of 599 copies of the questionnaire were distributed by hand to home-makers in the households. A total of 371 copies were returned, giving a return rate of 62 percent.

***Data Analysis*:** Data were analyzed using mean, standard deviation, frequencies, and percentages to answer the research questions. ANOVA and Chi-square were used to test the hypotheses. Attitude indicators were interpreted as positive and negative based on the mean scores. Criterion mean for decision making was 2.50. Mean scores of less than 2.50 were interpreted as negative attitude while mean score equal to or greater than 2.50 were interpreted as positive attitude. Practices were interpreted using percentages. Percentage scores below 20%=very low practice; 20-39%=low practice; 40-59%= moderate practice; 60-80%=high practice; 80% and above= very high practice.

RESULTS

Table 1: Mean Responses on Attitude Indicators of Households towards Solid Waste Management in University of Nigeria Nsukka Staff Quarters (n = 371)

S/N	Attitude Indicators	$\bar{X}_1$	SD_1	$\bar{X}_2$	SD_2	$\bar{X}_3$	SD	$\bar{X}_4$	SD	$\bar{X}_g$	D
1.	I am willing to pay a fee or contribute towards improved waste management services within the staff quarters.	2.82	0.88	2.69	0.89	2.48	1.02	1.75	1.06	2.44	NA
2.	I am willing to invest time and effort in adopting sustainable waste management practices in my household.	3.13	0.77	3.18	0.77	3.30	0.74	3.42	0.90	3.26	PA
3.	I believe that my household size influences the amount of waste generated.	2.91	0.97	2.92	1.02	3.21	0.95	2.58	1.31	2.91	PA
4.	I feel satisfied with the current solid waste practice of open dumping within the University of Nigeria Nsukka staff quarters.	1.94	1.02	1.93	0.97	1.98	1.06	1.08	0.29	1.73	NA
5.	I believe that disposing my solid wastes through burning is good and less stressful.	2.31	0.93	2.52	0.89	2.56	1.06	1.67	1.15	2.27	NA
6.	I don't feel that recycling of solid waste is a good practice.	1.91	0.93	1.87	0.89	1.60	0.86	1.33	0.65	1.68	NA
7.	I feel I can reduce my solid wastes by reusing some solid waste materials (e.g., nylon bags, cartons, plastic containers).	2.81	0.98	2.87	0.88	3.04	0.85	2.67	1.15	2.85	PA
8.	I don't feel that getting rid of my food and vegetable waste (e.g., remains of cooked rice, orange peels) by composting is good.	1.99	0.87	2.08	0.93	1.98	1.00	2.08	1.24	2.03	NA
9.	I feel that there is need for a public bin within the staff quarters to enable me dispose my waste properly.	3.07	1.08	3.45	0.85	3.55	0.82	2.92	1.31	3.25	PA

$\bar{X}_1$= mean for size 1-3; $\bar{X}_2$= Mean of 4-6; $\bar{X}_3$= Mean of 7-9; $\bar{X}_4$= Mean of 10+; $\bar{X}_g$ = Grand mean. Positive Attitude (PA)= equal to >2.5; Negative Attitude (NA)= <2.5; x = mean score; SD= Standard Deviation; D=Decision.

Table 1 shows the grand mean responses of households towards solid waste management in UNNSQ on all the attitude indicators. On attitude indicators 1, 4, 5, 6 and 8, households had negative attitude towards waste while on attitude indicators 2, 3, 7 and 9, households had positive attitude towards waste management. This shows that the households slightly had more negative attitude indicators towards solid waste management.

Table 2: Responses on Selected Solid Waste Management Practices (SWMP) among the Households in University of Nigeria Nsukka Staff Quarters (n =371)

S/N	Selected SWMP	Yes $f(\%)_1$	Yes $f(\%)_2$	Yes $f(\%)_3$	Yes $f(\%)_4$	Overall $f(\%)_0$
1	Do you store your household waste in a plastic bag before disposal?	54(79.4)	150(77.3)	58(59.8)	10(83.3)	68(75.0)
2	Do you separate recyclable materials (e.g., paper, plastic, glass) from non-recyclable waste (e.g., food waste, fruit/vegetable peels, batteries)?	39(57.4)	98(50.5)	42(43.3)	8(66.7)	47(54.5)
3	Do you dispose hazardous waste (e.g., batteries, chemicals) separately from regular waste?	37(54.4)	83(42.8)	33(34.0)	7(58.3)	40(47.4)
4	Do you use composting methods to manage organic waste (e.g., food leftovers, fruit or vegetable waste)?	37(54.4)	116(59.8)	63(64.9)	8(66.7)	56(61.5)
5	Do dispose your solid waste indiscriminately without minding if it's a designated refuse dump or not?	15(22.1)	29(14.9)	27(27.8)	1(8.3)	20(18.3)
6	Do you reduce the amount of solid waste you generate by practicing methods such as reusing or repairing items?	42(61.8)	112(57.7)	69(71.1)	8(66.7)	58(64.3)
7	Do you dispose your household waste in a public bin?	47(69.1)	128(66.0)	70(72.2)	8(66.7)	63(68.5)
8	Do you dispose your household waste in a pit in your compound?	21(30.9)	53(27.3)	21(21.6)	1(8.3)	24(24.)
9	Do you dispose your household solid waste in open spaces/dumping grounds.	36(52.9)	94(48.5)	50(51.5)	2(16.7)	46(42.4)
10	Do you burn your household waste in open areas?	25(36.8)	61(31.4)	34(35.1)	3(25.0)	31(32.1)

**Yes $(f\%)_1$ = responses of family size 1-3; $(f\%)_2$= responses of family size 4-6; $(f\%)_3$ responses of family size 7-9; $(f\%)_4$= responses of family size 10+; $f(\%)_0$ = overall, Below 20%=very low practice; 20-39%=low practice; 40-59%=moderate practice; 60-80%= high practice; 80% and above= very high practice.*

Table 2 shows the overall solid waste management practices of households in UNNSQs. Households had moderate solid waste management practice for items 2, 3 and 9 while for items 1, 4, 6, and 7, households have high practice. However, households in UNNSQs had very low practice for item 5 and low practice for item 10.

Table 3: Summary of ANOVA Analysis for the Difference in the Mean Responses on Attitude Indicators of Households towards Solid Waste Management in University of Nigeria, Nsukka Staff Quarters Based on Household Size (N= 371)

Variable	Sum of squares	Df	Mean square	F	Sig	Decision
Between groups	208.412	3	69.471	7.077	.000	S
Within groups	3602.419	367	9.816			
Total	3810.830	370				

***** *Significant (p<.05) **Not significant (p>.05)*

Table 3 shows that there is a significant difference in the attitude towards solid waste management among households in University of Nigeria Nsukka staff quarters based on household size (F-value= 7.077, p-value= .000), since the p-value is less than .05 level of significance. This implies that a significant difference exists between household size and households' attitude towards solid waste management in University of Nigeria, Nsukka staff quarters. Therefore, the null hypothesis is rejected.

Table 4: Summary of Chi-Square Statistics of Percentage Responses on the Difference in the Solid Waste Management Practices among Households in University of Nigeria Nsukka Staff Quarters Based on Household Size (n=371).

S/N	Variable (Household size)	Yes O(E)	No O(E)	x^2value	Df	*P*-Value	Decision
1	1-3	42(40.1)	26(27.9)				
2	4-6	110(114.5)	84(79.5)	.968	3	.809	NS
3	7-9	60(57.3)	37(39.7)				
4	10 and above	7(7.1)	5(4.9)				

*Key: NS= Not significant; S=Significant * The P value is significant at 0.05 level; O(E) = Observed frequency(Expected frequency)*

Table 4 shows there is no significant difference in the percentage responses on solid waste management practices among households in University of Nigeria Nsukka staff quarters based on household size as shown by the Chi Square of independence test (x^2 = .970, P-value = .809)

Discussion

The findings of the study in table 1 indicate that households in UNNSQs have slightly negative attitude indicators towards solid waste management-SWM. The findings of the study were not expected because the households residing at the staff quarters are educated and are expected to be environmentally conscious, having positive disposition towards SWM. The result aligns with the findings of Aderounmu (2022) who reported that households struggle to adequately manage waste, and those of Enumah et al. (2022) who reported negative attitude towards solid waste management among respondents, but contradicts the findings of Omar, Hossain and Parvin (2018) who reported positive attitudes towards solid waste management among households in Mogadishu, Somalia. However, table 1 shows that household in UNNSQs had some positive attitude indicators towards SWM. This finding agrees with the reports of Ugwu, et al, (2020) which highlighted a general positivity and willingness to engage in waste management practices and those of Rawat and Daverey (2018) indicating a willingness among people to segregate waste. This willingness signifies a proactive approach towards responsible waste management and is indicative of a positive attitude towards the subject, suggesting that awareness of the environmental impacts of improper waste disposal is necessary in UNNSQs to reawaken and bring to consciousness, the adverse health and environmental effects of improper SWM.

Findings of the study in table 2 show the solid waste management practices-SWMP of households in UNNSQs. Households had moderate solid waste management practices for items 2, 3 and 9 while for items 1, 4, and 6, households have high practices. However, households in UNNSQs had very low practice for item 5 and low practice for item 10. This shows an overall moderate SWMP among households. This result is unsatisfactory and shows that households dispose waste mostly inappropriately, supporting Muiruri, et al, (2020) assertion that the challenges associated with waste management practices are more of improper disposal in open areas. Findings of the study align with studies of Sultana, et al, (2021) who reported moderate level practice of household solid waste management among households in Jammu City, India; Hassan and Elsery (2022) who reported unsatisfactory household solid waste management practices among majority of rural women in Egypt; Stewart, et al, (2022) who reported poor solid waste management among residents in Abua/Odual LGA, River State, Nigeria. Bushara, et al, (2021) and Omang, et al, (2021) highlighted that despite some positive attitudes, actual waste management practices are often less than optimal, suggesting that although households in UNNSQs has some positive attitude indicators towards SWM, waste practice is not optimal. Nonetheless, it is important to note that inadequate infrastructure and lack

of convenient disposal options can hinder households' ability to translate those some positive attitude indicators into effective practices. The findings therefore underscore the need for education, awareness campaigns, supportive policies and provision of effective SWM system within the quarters to improve waste management practices. Studies such as Ugwu et al. (2020) and Enumah, et al, (2022) highlight the role of awareness campaigns and training in motivating individuals to engage in proper waste disposal.

Table 3 indicates a significant difference in the mean responses on attitude indicators towards solid waste management based on household size (F-value= 7.077, p-value= .000). This suggests that the number of factors within a household may influence attitude towards waste management. This finding is not surprising because Afon (2008) established that household size is very significant in the management of solid waste. This result is in line with the study by Mahajan and Sudan (2022) which demonstrated that the size of a household can impact waste generation and disposal practices. Larger households might generate more waste, face challenges in waste storage, or hold varying perceptions of waste management needs. The result of this study is also similar to that of Chikowore (2020), which discussed how household characteristics influence waste management practices and those of Fadhullah et al. (2022) who reported that respondents' background (household size) influenced the household solid waste practices and perceptions. Thus, waste management strategies should consider household size variations, tailoring education and initiatives accordingly. This implies that households with more members might require more comprehensive waste management solutions.

The finding in table 4 shows that there is no significant difference in the percentage responses on solid waste management practices among households in University of Nigeria Nsukka staff quarters based on household size. The Chi –Square statistics of independence indicated that there is no significant difference between the household sizes (χ^2 = .970, P-value = .809) and solid waste management. The finding contradicts those by Chikowore (2020) which suggests that smaller households may find it easier to manage waste due to lower waste generation rates. However, it is important to note that the findings might be influenced by factors beyond household size. Socioeconomic factors, cultural norms, and access to waste collection services can also play a significant role in waste management practices. The study by Opaleye (2021) on the perception of undergraduate students towards waste disposal emphasizes that even within a specific demographic group, waste management practices can vary widely based on factors such as education and awareness.

Conclusion

Solid waste management is a critical issue that affects both the environment

and public health. This study highlighted the attitudes indicators and practices of households toward solid waste management in UNN staff quarters. The findings show that households in UNNSQs have slightly negative attitude indicators towards SWM and moderate solid waste management practices. The implication of this finding is that SWM is not taken seriously among the residents in the quarters which can poses health risks to families in the quarters and the University at large.

Recommendations

Based on the findings of the study the following recommendations were made,

1. conveniently accessible public bins should be provided within the staff quarters by the school management to improve SWMP;
2. residents should be involved in the planning and implementation of solid waste management initiatives in the campus.
3. SWM system should be put in place for proper collection and disposal of waste in the quarters

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