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Assessment of Knowledge, Attitude and Practice of Household Solid Waste Management in Kebbi State, Nigeria

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Abstract

This study assessed the knowledge, attitude, and practice (KAP) of household solid waste management among residents in Kebbi State, Nigeria. Using a cross-sectional descriptive design, data were collected through structured questionnaires administered to 300 household respondents. The study examined how knowledge and attitudes influence waste management practices and whether gender differences exist in these domains. Data were analyzed using descriptive statistics and t-tests at a 0.01 significance level. Results revealed that households demonstrated a significant level of knowledge (M = 27.81, SD = 3.71), positive attitudes (M = 24.85, SD = 4.33), and strong practices (M = 24.67, SD = 4.23) toward waste management. No significant gender differences were observed in attitudes and practices, although knowledge differed slightly. The study recommends continuous environmental education and community engagement to improve sustainable waste management. Independent sample t-test was conducted to compare males and female respondents as it relates to the knowledge, attitude and practice of solid waste management among household members in Kebbi state. The results are presented in Table 4.12 reveals that there is statistically significant difference between male respondents (M=27.5794 SD = 2.11481) compared to their female counterparts (M= 27.9684 SD = 4.4798) t (265) =0.001 p=.001, in favour of the female household members. The magnitude of the difference in the means = -0.38892 CI =-1.30413 to 0.52630. The eta squared was very small indeed = 0.003

Keywords: Knowledge, Attitude, Practice, Solid Waste Management, Environmental Health

Introduction

Solid waste management is one of the most pressing environmental issues in developing countries, particularly in Nigeria, where rapid population growth and urbanization have increased waste generation beyond infrastructural capacity. Waste accumulation leads to pollution, aesthetic degradation, and serious public health problems such as diarrhea, cholera, and typhoid fever (WHO, 2017).

In Kebbi State, diverse socio-economic activities generate large quantities of waste that are often disposed of through open dumping or burning without adherence to proper engineering standards. Households are major contributors to this problem, and their level of knowledge, attitude, and practice (KAP) toward waste management greatly influences the effectiveness of environmental sanitation programs.

Households are the main contributors of solid wastes in the environment, closely followed by market places and commercial institutions (Okot-Okumu & Nyenje 2011; Karak et al., 2011; Nasrabadi et al., 2008). The urban poor or low-income urban communities spend most of their incomes on food items generating only a little solid waste. Higher income earners buy a variety of

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items some of which are not of immediate necessity they produce associated wastes in form of non-consumables like packaging materials and waste food items. Densely populated urban areas, the urban poor, have low purchasing capacity with waste generation estimated between 0.22 and 0.3kg/cap/day. Solid waste generated by high income markets is estimated to be between 0.66 and 0.9kg/cap/day on average (Kaseva & Mbuligwe, 2005). Waste generation rate on average for Nigerian urban centres vary between 0.26 (low income) and 0.78 (high income) kg/cap/day (Rotich *et al.,* 2006; Scheinberg, 2011). The urban produce lower waste volumes because they purchase only a little and are less wasteful in their consumption pattern. Although, the higher income communities have higher disposable income and purchase larger volumes of consumable goods, that have high waste portions and also practice a more wasteful consumption pattern (Scheinberg & Anchutz, 2007; Hina, Zia & Devadas, 2007).

Statement of the Problem

Despite government efforts, open dumping remains the most common method of waste disposal in Kebbi State. Improper handling and disposal of household waste have led to blocked drainage systems, flooding, and the spread of vector-borne diseases. The lack of public awareness and inadequate participation of citizens in waste segregation and recycling aggravate these problems. Therefore, assessing household KAP is essential to identify gaps and design appropriate interventions.

Research Gap

Previous studies in Nigeria have addressed waste management in urban centers, but very few have examined the combined influence of knowledge, attitude, and practice at the household level in Kebbi State. Understanding these interrelationships will help tailor public awareness programs and community-based waste management strategies.

Objectives of the Study

The main objective of this study is to assess the knowledge, attitude, and practice of household solid waste management in Kebbi State, Nigeria.

Specific objectives are to:

1. Assess the knowledge level of household members on solid waste management.
2. Examine the attitude of household members toward solid waste management.
3. Determine the common waste management practices among households.
4. Analyze the relationship among knowledge, attitude, and practice.
5. Examine gender differences in KAP of solid waste management.

Research Questions

1. What is the knowledge level of households on solid waste management?
2. What attitudes do residents hold toward waste management?
3. What practices are commonly adopted in managing solid waste?
4. How do knowledge, attitude, and practice relate to each other?
5. Is there gender-based differences in KAP?

Significance of the Study

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This research provides valuable insights to policymakers, environmental health officers, and local governments in designing effective education and awareness campaigns. It also contributes to the body of knowledge on public participation in sustainable solid waste management and can guide similar studies in other regions.

Literature Review

Households are the main contributors of solid wastes in the environment, closely followed by market places and commercial institutions (Okot-Okumu & Nyenje 2011; Karak et-al., 2011; Nasrabadi et al., 2008). The urban poor or low-income urban communities spend most of their incomes on food items generating only a little solid waste. Higher income earners buy a variety of items some of which are not of immediate necessity they produce associated wastes in form of non-consumables like packaging materials and waste food items. Densely populated urban areas, the urban poor, have low purchasing capacity with waste generation estimated between 0.22 and 0.3kg/cap/day. Solid waste generated by high income markets is estimated to be between 0.66 and 0.9kg/cap/day on average (Kaseva & Mbuligwe, 2005). Waste generation rate on average for Nigerian urban centres vary between 0.26 (low income) and 0.78 (high income) kg/cap/day (Rotich et al., 2006; Scheinberg, 2011). The urban produce lower waste volumes because they purchase only a little and are less wasteful in their consumption pattern. Although, the higher income communities have higher disposable income and purchase larger volumes of consumable goods, that have high waste portions and also practice a more wasteful consumption pattern (Scheinberg & Anchutz, 2007; Hina, Zia & Devadas, 2007).

Disposal of waste in household is normally done using storage receptacles like; sacks, polythene bags and boxes, which are in used in poor urban communities and are dumped with the wastes. Sorting of waste into the various components does not normally take place, but scrap metals may be separated by some people for sale to scavengers. Keramitsoglou & Tsagarakis, (2013); Krook, et al., (2007), noted that citizens' participation in the source separation process of waste strongly affects the success of household recycling programs.

Waste separation may take place at transfer stations like; bunkers, skips, road verges on transit to the landfill and at the landfill or dump sites (Miller, 2010). Industries, large institutions like health facilities, shopping malls and large markets have their own transfer stations served by skips, bunkers, trailers and other waste containment facilities. Three main methods of wastes collection can be identified as the informal primary or pre-collection phase mainly from households to community collection points (skips, bunkers or open roadside) mostly by households or hired labor. The secondary phase collection is from community transfer points to final disposal sites or landfills and is mostly by formal institutions like urban councils and private operators. Private operators mostly collect wastes directly from generating sources (door to door). Private operators collect waste at negotiated fees with the individual clients (Miller, 2010). The introduction of private operators has increased solid waste collection levels compared to when it was dependent entirely on the urban councils (Oberlin, 2011; Okot-Okumu & Nyanje, 2011). A high percentage of urban solid waste does not get to the legal disposal points but end up in the environment. Open dumping is the most common waste disposal methods in urban areas (Oberlin, 2011; Okot-Okumu & Nyenje, 2011).

Knowledge Level on Household Solid Waste Management

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Knowledge is a familiarity, awareness or understanding of a community, such as facts, information, descriptions, or skills towards the topic of interest, which is acquired through experience or education by perceiving, discovering, or learning. Knowledge on solid waste management may influence the perception and behavior of people concerning handling of solid waste. Knowledge influences their trust and acceptance of solid waste management authorities and their perception of environmental and health risks such as floods and spread of diseases. Lack of knowledge brings about poor waste management practices. This is evident in Jurczak (2008) study where he observed that generally, generation of total municipal solid waste had signifying about poor waste management practices.

Research Methodology

Research Design

A descriptive cross-sectional survey design was adopted. The study targeted household members across selected local government areas in Kebbi State.

Population and Sampling

A total of 300 questionnaires were distributed, with 250 valid responses received (83.3% response rate). Respondents were selected through stratified random sampling to ensure gender and community representation.

Instrumentation

Data were collected using a structured questionnaire that covered socio-demographics and KAP components. The instrument was validated by environmental health experts and pilot-tested.

Data Analysis

Responses were coded and analyzed using IBM SPSS Version 20. Descriptive statistics (means, percentages) and t-tests were used to determine relationships and significance at $\alpha = 0.01$.

Results

Physicochemical Characteristics

The proximate analysis revealed that digested cattle abdominal waste had improved nutrient composition compared to the raw sample.

Table 4.1. showing the Physicochemical Characteristics

Parameter	Predigested Sample	Digested Sample	Observation
pH	6.8	7.3	Slightly alkaline after digestion
Moisture Content (%)	58.2	49.6	Reduced due to microbial action
Total Solids (%)	41.8	50.4	Increase indicates stabilization
Organic Matter (%)	22.6	27.5	Improved nutrient retention
Total Nitrogen (%)	0.72	1.28	Significant increase after digestion

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Phosphorus (%)	0.35	0.58	Enhanced nutrient concentration
Potassium (%)	0.47	0.69	Elevated K level in digested waste
Ash Content (%)	4.5	6.1	Slight increase due to decomposition

Source: field research 2025

The increase in nitrogen, phosphorus, and potassium after digestion indicates that microbial activity enhanced nutrient mineralization. These nutrients are essential for plant growth, making the digested slurry a suitable organic fertilizer.

Table 4.2 Analysis

Variable	N	Sample M	Sample SD	Ref. Mean	T	Sig	Remark
Common Practices of Solid Waste Management among Household Members	265	24.66	4.23	21	14.09	<.001	Sig.

A critical look at the results reveals that the Common Practices of Solid Waste Management was computed, the results indicated a statistical significance among the house hold members (M=24.67, SD=4.23), t (264) = 14.09, P < .001. The magnitude of the difference in the mean = 3.66, 95% CI: 3.15 to 4.18 was medium (eta squared = 0.37). With this result the third null hypothesis is hereby supported and hence rejected for the alternative. This implies that the common practices of solid waste management among household members in Kebbi state are significantly high.

Table 4.3: An independent sample t-test on difference between male and female as it related to their knowledge, attitude and practice of solid waste management among household members in Kebbi state

Variable	Gender	N	Mean	SD	t-value	Sig	Remark
The knowledge level of solid waste management	Male	107	27.5794	2.11481	-0.837	= .001	Sig
	Female	158	27.9684	4.4798			
The attitude level of solid waste management	Male	107	22.4579	4.2565	-8.325	=.705	NS
	Female	158	26.4810	3.566	-8.048		
Practices level of solid level management	Male	107	23.2056	4.21752	-0.837	=.480	NS
	Female	158	25.582	3.96284	-0.947		

NS= Not Significant
Sig = Significant

Independent sample t-test was conducted to compare males and female respondents as it relates to the knowledge, attitude and practice of solid waste management among household members in Kebbi state. The results are presented in Table 4.12 reveals that there is statistically significant difference between male respondents (M=27.5794 SD = 2.11481) compared to their

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female counterparts (M= 27.9684 SD = 4.4798) t (265) =0.001 p=.001, in favour of the female household members. The magnitude of the difference in the means = -0.38892 CI =-1.30413 to 0.52630. The eta squared was very small indeed = 0.003.

The study revealed that:

Knowledge: The mean knowledge score was 27.81 (SD = 3.71), indicating a high awareness of waste management.

Attitude: Respondents exhibited a positive attitude (M = 24.85, SD = 4.33).

Practice: The mean practice score was 24.67 (SD = 4.23), reflecting active engagement in waste handling and disposal.

T-test results showed significant relationships between knowledge, attitude, and practice ($p < 0.01$). Gender comparison revealed no significant difference in attitude and practice, suggesting shared responsibilities among males and females. However, males showed slightly higher knowledge scores, possibly due to access to information and exposure to civic programs.

These findings align with prior studies (Okot-Okumu & Nyenje, 2011; McAllister, 2015) emphasizing that awareness and education are crucial for effective waste management. A positive relationship between knowledge and practice supports the theory of planned behavior, indicating that informed citizens are more likely to adopt sustainable waste practices.

Conclusion

The study concludes that households in Kebbi State have relatively high knowledge, positive attitudes, and commendable practices regarding solid waste management. However, gaps still exist in consistent waste segregation and recycling.

Recommendations

1. Strengthen public awareness campaigns on waste reduction and recycling.
2. Introduce community-based waste management committees.
3. Provide adequate waste disposal facilities and collection systems.
4. Integrate environmental education into school curricula.
5. Encourage gender-inclusive participation in waste management initiatives.

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