Assessment of Waste Management Practices among Residents of Benue South

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Abstract

This study aimed to assess waste management practices among residents of Benue South employing a descriptive cross-sectional approach. We investigated the sources and types of waste generated, the disposal methods used, residents' perceptions of current waste management practices, and the problems associated with these practices. Through a multi-stage sampling technique, a total of 440 residents were randomly selected and assessed using self and interviewer-administered questionnaires. The major types of household waste generated included food residues, agricultural waste, vegetables, ash, plastics, papers, and urine/excreta. Poor waste management practices were prevalent; 87% of residents engaging in open dumping and 88.6% resorting to burning. The primary challenges identified were lack of waste collection services, lack of funding, lack of environmental awareness, and ineffective enforcement of waste management regulations. The study revealed that the current waste management practices were not satisfactory, as majority of respondents reported encountering environmental problems. We identified gender-specific differences in awareness, knowledge, and attitude towards waste management practices. Education, income, and age were found to significantly impact awareness, knowledge, and attitude in waste management. Based on the results of the study, it is recommended that the local government should provide more adequate waste collection services, create awareness campaigns to educate the public on the importance of proper waste management, and strengthen the enforcement of existing waste management regulations. In conclusion, this study provides valuable insights into the waste management practices in Benue South.

Keywords: Awareness, Benue, education, knowledge, residents, waste

Introduction

Waste management is the process of gathering, transferring, processing, or disposal of waste materials, as well as managing and monitoring them [1]. Waste management is an important part of modern civilization, since it has a direct impact on public health, environmental sustainability, and overall quality of life [2]. As global populations continue to rise, so does the generation of waste, posing significant challenges for both developed and developing regions [3]. Among these regions is Benue South, a diverse and vibrant area in Nigeria. Waste management has become a major challenge in this region, as growing urbanization and economic growth have increased waste production and exacerbated environmental deterioration. Waste management is critical to protecting communities' well-being and sustaining the natural environment [4].

The growing population, increasing urbanization, and rising industrial activity have resulted in a significant rise in trash creation, making waste management a top priority for both citizens and municipal governments [5]. The most apparent and unpleasant environmental challenge confronting Nigeria is waste disposal [6]. The most envisaged harm that houses, towns, and cities elicit on the ecosystem at large is not in the consumption of resources but largely from generated waste [7]. Waste management is critical to ensuring community well-being and conserving the natural environment [8]. Poor waste management techniques can have a wide range of negative implications, from contamination of land and water bodies to the spread of illnesses [9], all of which endanger the health and prosperity of Benue South citizens. The current state of knowledge on waste management practices in Benue South is marked by a notable dearth of information, highlighting the urgent need for comprehensive research and data collection to better understand and address the existing challenges and opportunities in the region.

This research aimed to assess the current waste management practices among the residents of Benue South and explore the underlying factors influencing waste disposal habits in the region. By conducting a comprehensive assessment, we seek to identify the strengths and weaknesses of existing waste management systems, shedding light on the challenges faced by local authorities and residents alike.

Materials and Methods

Study area

The study was conducted in Benue South region of the state (Fig. 1) which is made up of 9 Local Government Areas of which three Local Governments were randomly chosen for the study (Oju, Ogbadibo and Otukpo). Oju has a Tropical Savanna Climate. Over the course of the year, the temperature usually varies from 63 to 89 °F and is seldom below 57 °F or above 93 °F. The rainy season of Oju starts in late March and ends in early November. It sees the most precipitation in September, with an average rainfall of 209 mm; and the least precipitation in December, with an average rainfall of 2 mm. Ogbadibo has an area of 598 km2 and a population of 189,100. Over the course of the year, the temperature typically varies from 6 to 87°F and is rarely below 54°F or above 92°F. The rainy period of the year lasts for 9.2 months, from February 19 to November 25, with a sliding 31-day rainfall of at least 0.5 inches. Otukpo local government area has a tropical savanna climate, there is about 244 inch of rain in a year, and it is dry for 169 days a year with an average humidity of 61% and an UV-index of 7. The climate is tropical in Otukpo. The average annual temperature in Otukpo is 27.2°C. Most of the people are farmers while the inhabitants of the riverine areas engage in fishing as their primary or important secondary occupation.
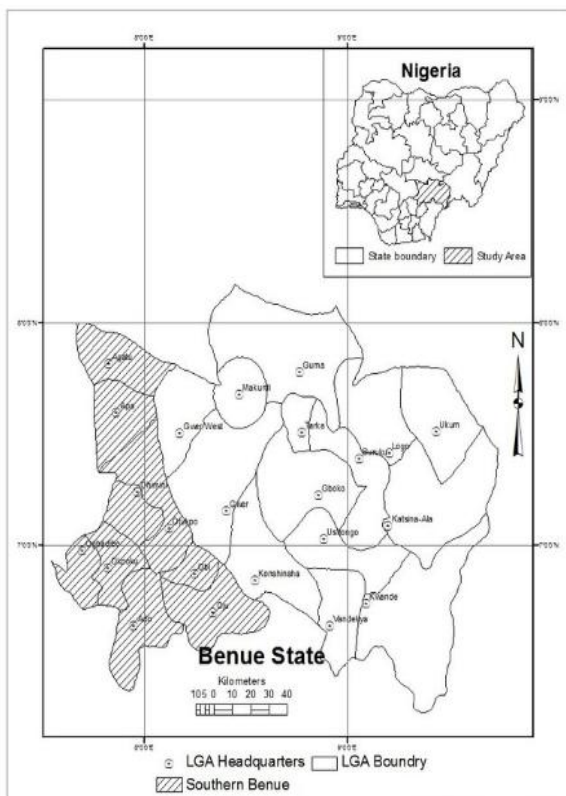

Figure 1: Map of Benue State showing the southern part of the state

Study population

The population comprises of members of about 440 households from the three Local Government Areas, (Oju (132), Ogbadigbo (106) and Otukpo (202)). The study comprises of households who were occupants in these areas for a period of not less than one year.

Sample size determination

The sample size was calculated using Cochrane formular:

$$N = z^2pq/d2;$$

Study design

A descriptive cross-sectional survey on the type of household waste management practices among residents of Benue South, Nigeria. Both self and interviewer administered semi-structured questionnaires were used.

Sampling techniques

The study was done using a multi stage sampling technique as follows: The 9 Districts of the three Local Government Areas served as the sampling frame from which 10 indigenous wards for each of the LGAs were selected using a simple random sampling technique (Table 1).

Table 1: Selected Wards in each LGA for the study

S/N	LGAs	Selected Wards
1	Oju	Okpokpo, Okwudu, Owo, Ukpa/ainu Ette, Ibilla, Idelle, Iyeche, Oboru/Oye, Oju
2	Otukpo	Adoka-icho, Allan, Entekpa, Ewulo, Okete, Otobi, Otukpo Town East, Otukpo Town West, Ugboju-ehaje, Ugboju-icho
3	Ogbadigbo	Ai-oono Ii, Ai-oono Iii, Ehaje I, EhajeIi, Itabono I, ItabonoIi, Olachagbaha, Orokam I, OrokamIi, Orokam Iii

Next, simple random sample technique was used to select two residential areas (RAs) from each ward, yielding a total of 20 RAs for each LGA. The first household in each residential area was chosen, and the households were then alternately followed until all of the number of households for each LGA were exhausted.

Materials and process

A semi-structured questionnaire was used as the research instrument for this study it was constructed based on the research topic and objectives: Section A consisted of bio-data of the respondent while section B consisted of questions to assess their level of awareness and knowledge of waste management. Section C consisted of sources of waste, Section D consisted of awareness of waste management, Section E consisted of knowledge of waste management practices, Section F consisted of overall attitude towards waste management, Section G consisted of attitude towards waste management, Section H consisted of type of waste management practice, Section I consisted of implication of effective waste management practices, Section J consisted of knowledge on the implication of improper waste disposal practices, Section k consisted of role of local authorities in solid waste management within the study area, Section L consisted of the process to disposal of the solid waste management practices from source.

Data analysis
Prior to processing, each completed questionnaire was verified for completeness using SPSS version 21 was used to sort and analyze the data collected. Tables, frequencies, and percentages were created as needed.

Ethical consideration
Permission for this study was obtained from the Ethics Committee of Federal University of Health Science, Otukpo through the Director of Research, of the Institution. Informed consent was gotten from the respondents and confidentiality of information was maintained.

Limitation of study
Some inhabitants refused to open their gates or engage with the interviewers, probably because the state was in a dangerous security situation at the time. The utilization of well-known indigenous individuals as interview guides helped to offset this setback.

Results and Discussion

Socio-demographic profiles of respondents
The age distribution predominantly features individuals within the 18-24 and 25-29 age brackets, with the highest frequency observed in the 18-24 group (Table 2). Educational attainment is largely concentrated in secondary (38.4%) and tertiary (44.3%) education. Marital status is predominantly married (57%), with 43% being single. Family size typically ranges from 0 to 5 individuals for the majority (72.3%). Religious affiliations primarily align with Christianity (86.1%), followed by Islam (12.7%), and a minority associating with Traditional beliefs (1.1%). Residential house types exhibit diversity, with semi-detached houses prevailing at 40.5%. Most participants reside in households accommodating 3 to 5 occupants (58.2%). Daily cooking is prevalent (79.5%), while a small fraction abstains from cooking entirely (3.6%). Regarding income, the distribution spans various categories, with the highest percentage falling within the 20k to 50k range (45.7%).

The availability of female respondents in this study is a reflection of higher level of interest expressed by the female gender as reported in a qualitative study of preference for house hold tasks [10]. Men commonly reported how they enjoyed being outside in the garden, or alternatively, how they did not expect their partners to be able to look after the grounds as well as them [10]. This result is in tandem with reports of Banga [11] in Kampala who indicated that participation in solid waste separation activities depended on the level of awareness of recycling activities in the area, household income, educational level and gender.

Table 2: Socio-demographic characteristics of respondents in Benue South in Nigeria

Variables	Frequency	Percent
Age		
18-24	106	24.1
25-29	76	17.3
35-39	74	16.8
40-44	65	14.8
45-49	44	10
50-54	51	11.6
55-59	14	3.2
65 and >	10	2.3
Total	**440**	**100**
Gender		
Male	162	36.8
Female	278	63.2
Total	**440**	**100**
Educational status		
No formal education	30	6.8
Primary School	46	10.5
Secondary school	169	38.4
Tertiary	195	44.3
Total	**440**	**100**
Marital status		
Single	189	43
married	251	57
Total	**440**	**100**
Family size		
0 - 5	318	72.3
>5	122	27.7
Total	**440**	**100**

Categories of waste generated
70.9% of respondents acknowledged the existence of vegetable waste emphasizing the substantial generation or management of vegetable waste (Fig. 2). A significant 88.9% of respondents confirmed the presence of food residues, underscoring the widespread occurrence of food residue generation. The majority (90.5%) of respondents reported the presence of bottles, glasses, or plastic waste and 94.3% of respondents acknowledged the presence of paper or carton waste. 95.0% confirmed the presence of urine or excretal waste indicating the common generation of human waste among respondents.

This is similar to findings of the work done by Modebe *et al.* [12] on household solid waste management in Awka in which the commonest type of waste generated was garbage (100%), followed by cellophane bags (99%). It is however different and higher than the household waste generated in the City of Johannesburg, South Africa in which 67% were household wastes, 23% from commercial activities and 10% industrial activities [13].
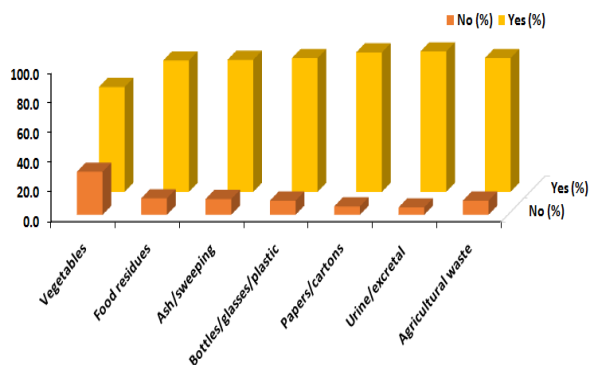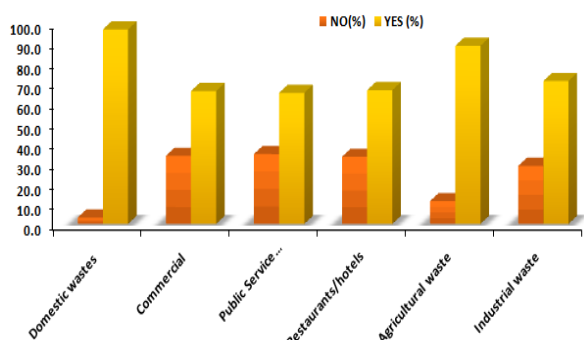
Figure 2: Types of waste generated

Figure 3: Sources of waste

Sources of waste
96.8% of respondents acknowledged the presence of domestic waste illustrating the nearly ubiquitous nature of domestic waste in the surveyed community (Fig. 3). 66.1% of respondents reported the existence of waste from commercial sources and waste from public services was affirmed by 65.2% of respondents, with 34.8% reporting its absence, indicating the common occurrence of waste from institutions like hospitals, clinics, and schools. 66.6% of respondents acknowledged the presence of waste from restaurants and hotels and 88.6% of respondents confirmed the presence of agricultural waste. Furthermore, 71.1% of respondents reported the existence of waste from industrial source emphasizing the substantial impact of industrial activities on waste generation.

Table 3: Implication of effective waste management practices

S/N	Statement	SD	D	A	SA
1.	Good/ effective Waste management leads to good health	0	20(4.5%)	245(55.7%)	175(39.8%)
2.	Good/ effective Waste management leads to healthy environment	0	10(2.3%)	207(47%)	223(50.7%)
3.	Good/ effective Waste management leads to increased productivity	6(1.4)	40(9.1%)	253(57.5%)	141(32%)
4.	Poor waste management contributes to air pollution	0	32(7.3%)	233(53%)	175(39.7%)
5.	Poor waste management do not affect aquatic animals	165(37.5%)	85(19.3%)	161(36.6%)	29(6.6%)
6.	Good/effective Waste management practice can affect the economic development of our State	96(22%)	148(34%)	119(27%)	77(17%)

SD: Strongly Disagree, **D**: Disagree, **A**: Agree, **SA**: Strongly Disagree

Implication of effective waste management practices
The findings as presented in Table 3 suggest a general awareness and acknowledgment among respondents regarding the positive implications of effective waste management on health, the environment, and productivity. However, there are differing opinions on whether poor waste management affects aquatic animals and the potential economic impact of waste management practices on the state's development. For instance, 50.7% of the respondents strongly agree that effective waste management leads to healthy environment while 55.7 and 57.5% of the respondents agree that good waste management leads to good health and effective waste management leads to increased productivity respectively. Furthermore, this result is in line with the findings of work done by Adeyemo and Gboyesola [14] on knowledge, attitude, and practices on waste management of people living in the university area of Ogbomoso which indicated that the respondents were knowledgeable in refuse management.

Attitude towards waste management
Attitudes towards waste management are generally positive, with a majority considering their attitudes as either fair or good (85.5%). The majority of respondents perceive their attitude as either fair or good, with a smaller percentage considering it excellent while only a minimal percentage of respondents view their attitude as poor (Fig. 4).
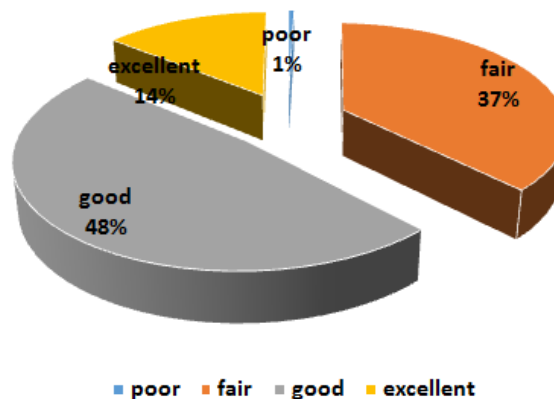

Figure 4: Overall attitude towards waste management

Conclusion

The study was carried out in Benue South and considered the waste management practices among the residents. The study found that large numbers of the residents were aware of waste management and also knowledgeable about various methods of waste disposal. Majority of the residents had a positive attitude towards proper waste management, even though there was evidence to the contrary considering the discovery that the most pre- valent methods of disposal were open dumping and burning. These are inappropriate as they pollute and constitute aesthetic blithe in the environment. Despite a generally positive attitude towards proper waste management, the prevalent methods of open dumping and burning contradicted this stance. These practices, deemed inappropriate due to their environmental pollution and aesthetic impact, raised concerns. Recognizing the importance of proper waste disposal is crucial for maintaining a healthy living environment. Strict adherence to suitable waste management practices within a community serves as a protective measure against detrimental and hazardous environmental conditions, ultimately contributing to an improved quality of life for the residents.

Conflict of interest: The authors declare that no competing interest to disclose.

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