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Abstract

Despite establishing waste management boards and environmental agencies across states in Southwest Nigeria, household waste disposal remains poorly managed, with low consideration given to its reuse and recycling. Previous research has established the menace of improper household waste disposal in Nigeria. This paper examines women's household waste disposal methods and their awareness, willingness, and interest in waste management and recycling. This study was conducted in November 2021 with a sample of 436 women selected across six communities in 3 States in Southwest Nigeria (Lagos, Osun, and Ekiti states). In each state, one rural and urban Community is selected. Descriptive analysis and the ordered logistic regression estimation method were used to estimate the likelihood of women's interest in waste management and recycling. The Odd Ratio and the probability value at a 95% significance level were considered a measure of the strength of association between the variables. Most households in the communities had no evidence of waste trolleys or waste containers. Only 28% of respondent indicates an awareness of waste recycling. At the same time, statistical regression reveals Christians have high chance (Odd Ratio 30, 95% $p<0.001$) than the Muslim women (Odd Ratio10, $p<0.001$), having secondary education (Odd Ratio 8.9) and working in the informal sector (Odd Ratio 11.9) have positive association with women interests in waste management and recycling. At the same time, social stigmatization exhibits a negative relationship. Government participation in waste management and recycling was found inadequate and need to be upgraded to help provide a clean environment and support for waste-wealth creation among women. This paper argues that women's interest in recycling for wealth creation and a good environment is to be incorporated into the waste management and recycling process with adequate support.

Keywords: Household waste; Women's interest; Waste recycling; Waste disposal; Waste management.

1. Introduction

The politics and the need for an effective waste management system across communities in developing countries have been recurring due to rising environmental hazards on people's health. Due to underdevelopment and poor governance, waste has become a severe

environmental challenge across cities and urban centres in Nigeria (Ezeah & Roberts, 2014; Ogbuene et al., 2013). It becomes a core function of the state and the local government for effective implementation of sanitation with the rise in urbanization and city growth. The increase in waste generated across cities in developing countries has been primarily attributed to rapid population growth, urbanization, modern consumable household items, and economic development (De & Debnath, 2016; Ogundele et al., 2018). The need to manage waste can be linked to advancing public health issues with the significant deep knowledge and understanding of human epidemiology, basic hygiene, and sustainable clean environments. The poor practice of waste disposal and sanitation persists in developing countries where poor people living in the slum areas of urban cities and rural communities have high levels of poor sanitation practices, especially across Asia and Africa (Kirama & Mayo, 2016; Momodu et al., 2011; Yadav & Samadder, 2018). As a result of the government's inability to properly manage households' wastes in developing countries such as Nigeria, concerns about poor waste disposal and its management emerges (Amasuomo & Baird, 2016) with limited public awareness of the importance of recycling and proper waste disposal.

In Nigeria, sanitation issues have become a significant challenge in most urban cities (Amuda et al., 2014; Daramola et al., 2017; Ogundele et al., 2018). Most wastes generated are from households, local industries, artisans, and traders, which litter the immediate surroundings. Waste is full of trash which litters the streets in the gutters, forming piles of heaps beside houses, marketplaces, stalls, and uncompleted buildings. Waste has a different meaning to many people; trash pickers and scavengers see it as a way of money-making, while it serves as the burdensome litter of debris, heaps of garbage, and uncollected trash, which pollutes the environment to others without a well-managed disposal system (Balwan et al., 2020; Pathak, 2023).

Nigeria's poor waste disposal system has led to the blockage of street gutters and drainage tunnels. Improper collection and disposal of community wastes are of high concern as it aids the spread of diseases having implications on the health of children and adults as diseases transmission by houseflies is associated with poor sanitation and refuse (Elkanah et al., 2020; Olukanni & Akinyinka, 2012). An inadequate sanitation system is also associated with low and poor environmental amenities, poor household sanitary behavior, and high population growth (Olowoporoku, 2017; Owoeye & Adedeji, 2013). Effects of sanitation such as community hygiene, household drainage, and waste disposal system have been found on children's health and growth, which also causes diarrhoea and acute respiratory infections among older people (Chand et al., 2020; Ogundele et al., 2018).

According to the World Health Organisation (2020), environmental sanitation challenges can be attributed to the collection of community waste, disposed of items, excreta, and urine in a hygienic way that does not hamper human and Community health, which can be done through various methods. Effective sanitation practices aim towards the prevention of widespread diseases through adequate waste disposal system and the proper handling of food and water (Islam et al., 2021). The practice of solid waste management varies across countries (Hoornweg & Bhada-Tata, 2012). For example, in developing countries, it is primarily done by dumping on open sites or burnt in households and street corners (Adetunji, et al. 2015; UNEP, 2013).

Studies show that more than thirty-two million tons of solid waste are generated in Nigeria annually, with only about 20–30 percent of it collected and recycled (Bakare, 2016). Indiscriminate practices involving dumping, and burning of refuse within the compound were observed (Agunwamba et al., 2003; Olukanni et al., 2020), which were carried out by

household women to keep the household clean. Solid waste management in Nigeria is characterized by a lack of funding, inefficiency, and inadequacy. Waste management challenges involve low operational capacity in the form of lack of basic waste carrier such as waste cans and bins; which has raised the poor sanitation habits across streets, especially in communities with poor and marginalized groups (Akpabio, 2012). Bakare (2016) affirmed the presence of poor environmental management in Nigeria with claims of low budgetary provisions for implementing integrated waste management programs in the Nigerian states. Olukanni and Mnenga (2015) also acclaimed that no investment is presently made in the existing development plan to initiate a modern waste collection system, thereby calling for innovative remedies to curb the problem.

Women mostly dispose of household wastes and the failure of government to include women as actors of waste disposal and sensitize them appropriately on ways to improve sanitation exercise through waste disposal constitutes significant environmental challenges. Recently, research studies consider improving public awareness and community participation in waste management as factors that enhance sustainable waste systems and promote environmental citizenship among community members (Brotosusilo et al., 2022; Bui & Tseng, 2022; Debrah et al., 2021; Muzvondiwa, 2021). Wealth creation from waste is carried out through a recycling process, which involves sorting and separating items such as plastic, metals, glass, and textiles from the collected waste, sold to a recycling company that process for other uses. Waste management and recycling actors are waste pickers, sorters, business owners, and disposal agents. Recycling remains low, with sorting of plastics and metals done mainly by male scavengers across streets searching for plastics and metals sold to intermediaries or recycling companies. Men's visibility in the waste recycling sector is higher than women's, whose little involvement is in picking up plastic and bottles.

In Nigeria, government officials manage public health policies in public health and environmental health and safety sectors (Igbinomwanhia & Ohwovoriole, 2012). The Federal Ministry of Environment manages waste, pollution, and other environmental sanitation issues. Established Waste Management Authorities in Southwest Nigeria include; Lagos State Waste Management Agency (LAWMA), Oyo State Solid Waste Management Board (OSSWM), Ondo State Waste Management Board (OSWM), Ekiti State Waste Management Authority (EKSWMA), Osun State Waste Management Agency (OWMA) and Ogun State Waste Management Authority (OGWAMA). Although these agencies have long been in existence with efforts put in place to manage wastes in the states, low awareness, poor linkage and network among public health agencies, waste management boards and households were parts of the reasons environmental regulations were unsuccessful due to its poor linkages among actors involved in mitigating waste management challenges (Olukanni & Akinyinka, 2012; Sridhar et al., 2017).

Household waste management in Nigeria calls for immediate attention to high street waste and a lack of disposal carriages in many houses. Public awareness and participation have been pointed out as a remedy to waste management problems as it can help increase women's participation in waste management. Amalu and Ajake (2014) pointed out the need for community education programs to adequately educate people on environmental issues. Ezeah and Roberts (2014) revealed low public education on municipal solid waste among the sampled population in Abuja. It proposed sustained public education on waste prevention, management and reuse. Also, Nwosu and Okoye (2019) identify sustainable public participation in waste management in line with other studies such as (Amuda et al., 2014; Maiyaki et al., 2018; Wahab & Kehinde, 2014), with identification of the role of the public participation, non-governmental participation, private sector participation, and stakeholders

participation in waste management. While previous studies in Nigeria focus on public education and the role of government in waste management, attention to the need for gender mainstreaming into waste management has been neglected.

Although the recycling of waste has been found to have the potential to reduce the improper disposal of waste (Gopinath et al., 2020) and women, as the primary users of waste management, found the potential of reusing waste for land compost and sorting of waste for it to be recycled (Almasi et al., 2019; Asteria et al., 2020). It has not been fully embraced in Nigeria despite its large household waste. For attaining a sustainable environment in Nigeria, proper handling of waste is essential, and it is crucial to understand the current waste management practices of households and the interest of women in waste recycling for wealth creation and ensuring adequate environmental practices.

This paper observes that waste management in Nigeria has not adequately considered women's role in wealth creation through recycling. It contributes to the waste disposal and management knowledge base. It raises concern about the need to incorporate women into managing the waste disposal board to effectively monitor households' disposal methods and techniques. This study, therefore, assesses women's waste disposal methods and their determinants, women's awareness of recycling, and their interest in waste management and recycling process using samples drawn from three states in Southwest Nigeria.

2. Methods

2.1. Study area

This study covers the southwest region of Nigeria with six states –Lagos, Ogun, Oyo, Osun, Ondo, and Ekiti which the Yoruba ethnic group predominantly dominates. In Nigeria, members of a region or zone are not entirely determined and classified based on location but comprise states having similar cultures, backgrounds, and historical heritage. Many people in southwest Nigeria live in rural areas within the state capitals and the few towns classified as urban communities.

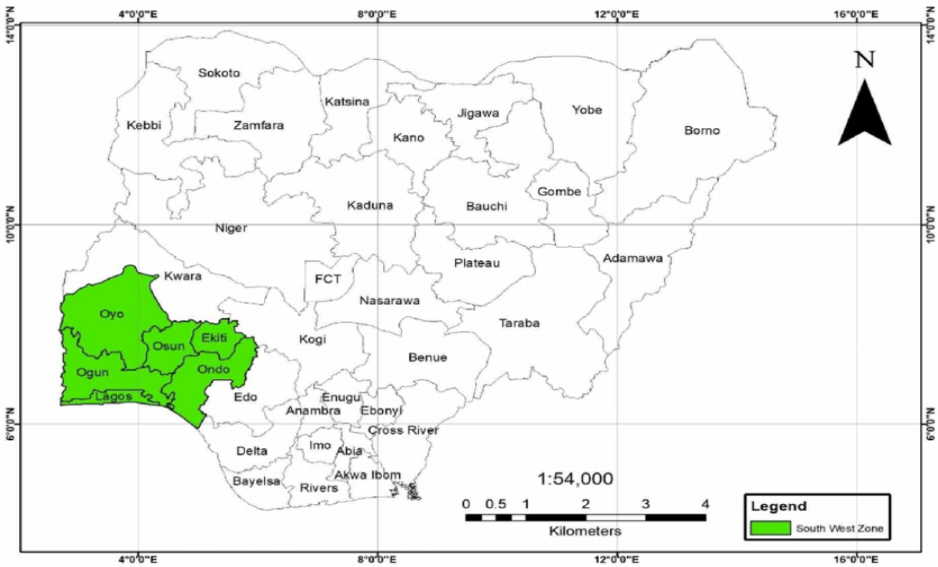

Figure. 1 A graphical picture of Southwest Nigeria

The selected places for this study are three states to represent the southwest region, namely; Ogun, Osun, and Ekiti, based on their cultural affiliation, historical relationship, geographical location, and proximity (Lagos State borders Ogun; Osun bordered by and

created out of Oyo state with features of close lifestyle and pattern of living while Ekiti state is the next door neighbour of Ondo state from which it was created thus making a good representation of the two states). These states have a common lifestyle and household living pattern, and towns and communities dominate the population of these states with a mixture of medium and high-density residential areas.

This study considered the state capital as an urban area and purposively selected a rural area from a local government area far from the state capital. The selected communities are Abeokuta and Ogere Remo in Ogun State, Osogbo and Esa Oke in Osun State, Ado-Ekiti and Ilasa Ekiti in Ekiti State. Individuals are randomly selected across households with consideration given to their level of employment as most people in the region are predominantly civil servants and informal sector workers who live in households that generate large waste. Government agencies and environmental boards manage waste management in these states. Figure 1 presents a graphical pictorial of states in southwest Nigeria.

2.2. Research design

This research paper uses a quantitative approach to data collection involving descriptive research design to form a compiled result. The data for the study was collected over the period 12 to 28 November 2021 using face-to-face interviews and administration of a structured questionnaire on 450 individuals considered as married and above the age of 20 years in different households selected randomly across rural and urban communities in 6 towns from 3 states in Southwest, Nigeria (Ogun, Osun, and Ekiti).

A pretested semi-structured questionnaire was first administered on women's knowledge, practice, and perception of waste disposal, reuse, and recycling on 20 individuals of different educational statuses and income levels to assess the questionnaire context validity to capture the research objectives. Respondents were selected from different socio-economic groups (informal sector: market women, farmers; civil servants: government workers and retired groups) in both rural and urban communities; the state capital was purposely selected being the most urbanized in most state while the rural Community considered is selected based on distance and proximity to the state capital. Four hundred fifty questionnaires were administered individually, with 436 returned and proved reliable (Ogun 145, Osun 144, and Ekiti 147). The responses from the returned 436 questionnaires were considered a dataset on which this study anchors.

The structured questionnaire, which provides relevant information on the research objective, is divided into three parts. First, the household characteristics provide brief demographic characteristics of the respondents on age, education, religion, income level, household population size, work status, and house ownership. Second, questions on activities involving household waste disposal practices with a focus on waste disposal methods, perceptions and interest in reuse and recycling processes, and Questions on the perception of women's neglect in waste management and the impact of governance on waste management. The gathered responses were transformed into data, coded, and analyzed statistically.

2.3. Data analysis

Data received were analyzed by categorization into descriptive and statistical analysis. Descriptive statistics involved count and percentage across all variables, with statistical analysis carried out using the ordered logistic regression estimation method. A summary of the in-depth interviews was presented as discussion-based evidence to support findings from research survey results. The statistical analysis was conducted using an ordered logistic

regression estimation method considering the odd ratio and the significance level. This method helps capture responses grouped into LIKERT format, which measures respondents' degree of attitude or feelings. LIKERT 5 frequency scale was considered and coded with: strongly agree (5 points), agree (4 points), neutral (3 points), disagree (2 points), and strongly disagree (1 point). The ordered logistic regression considers binary dependent variables with independent variables of many forms other than the binary responses. The results are presented using the Odd Ratio, standard error, and probability value, which signifies the degree of significance at 1%, 5%, and 10%. The descriptive and statistical analysis provides an adequate approach that helps capture households' patterns of life, perception and behaviour on household waste disposal and interest in recycling, which provides high data reliability.

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3. Results and Discussions

The demographic characteristic of respondents in Table 1 indicates that 436 of the 450 sampled households responded to the questionnaire. We considered only women married and above the age of 20 to ascertain their willingness in waste management and recycling processes for wealth creation.

The result presented in Table 1 revealed that up to 73% of respondents are willing to be included in waste management and recycling processes for wealth generation and ensuring adequate environmental sanitation in their communities. In comparison, the other 27% indicate no interest. Previous studies have shown that households' willingness to participate in waste management, separation, and recycling processes is anchored on factors of awareness and knowledge of recycling (Bahri et al., 2020; Oyekale, 2018; Volschenk et al., 2021), educational status, age of household members, individual's attitude on environmental issues, household income level, perceptions of littering, distance to the location of dumping sites, availability of waste collection facilities and the cost of disposal by waste collectors (Monella & Leyaro, 2017; Zeng & Li, 2016).

In line with other studies, these variables were considered in this study. The average age of the respondents is 41-46 years, with 56% of respondents within this age group. 54% are Christians, and 39% practice Islam (an indication that Christians are higher than Muslims in Southwest Nigeria). Data on educational attainment revealed that up to 68% had up to the secondary level of education, 13% attained a higher educational level, 15% with only primary

education and 4% without any form of education. The support for this inclusion is based on previous studies that indicate the close association between education and income level in waste management (Asteria & Haryanto, 2021; Brotosusilo et al., 2022; Sekito et al., 2013).

Table 1. Demographic characteristics of 436 respondents

Variables	Total	Percentage
Willingness to participate		
Yes	320	73%
No	116	27%
Age		
21-40	141	32%
41-60	243	56%
60+	52	12%
Religion		
Christian	237	54%
Muslim	170	39%
Traditionalist	29	7%
Education		
None	17	4%
Primary	65	15%
Secondary	297	68%
Higher education	57	13%
Monthly Income		
< ₦30,000	85	20%
₦30,000 - ₦60,000	180	41%
₦60,000 - ₦100,000	135	31%
>-₦100,000	36	8%
Family Size		
1-4	205	47%
More than 4	231	53%
Work Status		
Retired	38	9%
informal sector worker	208	48%
formal sector worker	190	43%
Housing		
owner of house	208	47%
rented apartment	228	53%

(Source: Authors' computation, 2022)

About 20% earn below ₦30,000 monthly, 41% of the respondents earn a monthly income level within the range of ₦30,000 - ₦60,000, 31% earning ₦61,000 – ₦100,000, while only 8% with income above ₦100,000; an indication that average income level of women in Southwest Nigeria tends to range mostly within ₦30,000 - ₦100,000. Earlier studies have indicated that women's being financially independent does not guarantee their participation in waste management (Salem et al., 2020). Also, household residence, size, and social status have been found to dictate lifestyle and environmental activities (Thøgersen, 2017).

'In Table 1, the women with a family size of not more than 4 are about 47% while those with more than 4 people are up to 53%; signifying that household size tends to be larger than

four for most households in the Southwest region of Nigeria. While this variable signifies the generation of large household waste, it includes ascertaining if household size influences women's interests and decisions on waste management. Work status indicates that about 48% of workers are in the informal sector, 43% are in the formal service sector, and 9% are retired. The inclusion of this variable is to showcase the influence of economic status and women's quality of work on decisions on waste management, sorting and recycling. On ownership of houses, 47% are house owners while 53% are those in rented apartments, this variable measures the behaviour of housing patterns with women's behaviour and decision-making on household waste management.

In Table 2, statistics revealed that only 16% out of the 436 respondents dispose of waste through a waste disposal agent who picks solid waste from their front yards, 18% indicate disposing of solid waste in a gutter, roadside and any place convenient, 26% indicated they burn their solid waste at home while about 40% dispose waste by dumping in landfill and bushes. These findings affirmed that household wastes are not properly disposed of and managed in Nigeria and are in line with studies in Africa and remote areas of developing countries (Ampofo et al., 2015; Azahar et al., 2021; Han et al., 2018; Mamady, 2016; Martey, 2022). Consequently, this raises the health hazard the people through pollution and incessant burning of refuse, as respiratory illnesses, especially in children, as attested to by studies such as (Manandhar et al., 2021; Rakib et al., 2022) in areas with open burning practices, the lack of adequate equipment for collection, transportation, and disposal of waste reduces the chances of improvement across the communities. Although waste disposal agencies exist, their activities have little effect on environmental sanitation in the communities due to the large population size of the communities relative to the available few waste disposal agencies whose activities are carried out with inadequate materials and equipment.

Responses related to women's perception of waste recycling indicate that awareness remains low on the benefits of recycling waste to generate wealth and create employment for the people, with the majority viewing waste as invaluable materials. This finding is like previous studies in developing countries and low-middle-income countries where the awareness of waste recycling is deficient (Debrah et al., 2021; Mak et al., 2021; Teshome, 2021).

On women's perception of waste's effect on health, the LIKERT Scale response indicates that about 88% agreed that waste constitutes health challenges. In comparison, 8% and 4% are neutral and disagree, indicating that women clearly understand waste health hazards as it aids the spread of disease with implications on the health of children and adults. Despite the awareness of health challenges, many households still dispose of their waste inappropriately, littering the environment. Previous studies in Africa and Asia have reported a similar trend, with many households unaware of waste recycling methods and reuse processes (Rakkini & Vincent, 2018). About 92% agreed that women are neglected in waste management despite being willing to participate in its management processes to enhance sanitation and health and generate wealth. The neglect of women may affect waste management programs across the selected states. Consequently, the need for their inclusion in waste management activities and segregation arises.

Table 2. Statistics on responses on waste management

Method of waste disposal	Total	Percentage
Dispose waste through waste collector	71	16%
Dispose waste by burning	112	26%
Dispose waste in gutter/roadside	78	18%

Method of waste disposal	Total	Percentage
Dispose waste in landfill/ bush/open dumping	175	40%
Perception on waste management	**Total**	**Percentage**
Waste can be recycled and create wealth		
Aware	120	28%
Unaware	316	72%
Believe waste constitute to health challenge		
strongly agree	295	67%
agree	90	21%
neutral	23	5%
disagree	21	5%
strongly disagree	7	2%
Believe women is neglected in waste management		
strongly agree	275	63%
agree	127	29%
neutral	22	5%
disagree	6	1%
strongly disagree	6	1%
Believe government effort in waste management is inadequate		
strongly agree	283	65%
agree	123	28%
neutral	15	3%
disagree	10	2%
strongly disagree	5	1%
Challenges to waste recycling or management		
Social stigma is a challenge to waste pickers(yes)	350	80%
Social stigma is a challenge to waste pickers (No)	86	20%
No adequate materials and support for waste handlers (Yes)	366	84%
No adequate materials and support for waste handlers (No)	70	16%

(Source: Authors' computation, 2022)

On government role in waste management, about 93% of 436 women believe government activities are ineffective; apparently, the solid waste disposal system is defective in most communities, especially in rural communities where no waste disposal agent operates. Similar findings are found in other studies in Africa, where the unconcerned attitude of households and corrupt practices by government officials and refuse disposal agencies have led to huge uncollected refuse and dumping sites found across cities and municipals (Gumisiriza & Kugonza 2020; Ojewale, 2014; Oyekale, 2018; Utami & Godjali, 2020).

Poor governance structure, low budgeting, and poor monitoring control of waste management boards and agencies can be attributed to the government agencies' ineffective and poor waste management. Previous studies indicated that limited budgetary allocation for waste management at local municipalities could be attributed to waste collection challenges (Dang et al., 2021; Tomic & Dimishkovska, 2021). In South Africa, the challenge of waste disposal and its reuse can be linked to the unequal distribution of waste management infrastructure which is associated with the country's historical politico-socio-economic inequalities (Niyobuhungiro & Schenck, 2022). Also, in Uganda, Gumisiriza and Kugonza (2020) attributed poor solid waste management to government officials and waste management bodies' corrupt practices. The rising population of Nigeria also has economic implications on waste management in line with the findings of Guo et al. (2021), which indicated that rising China's Population from 2004 to 2019 created challenges to the management of solid waste in China.

Around 80% indicate that social stigmatization creates challenges for women participating in waste separation and recycling for wealth. In comparison, about 84% believe that no adequate material and support is given to waste pickers and waste disposal workers. Studies on women's involvement in waste picking and sorting for money and other restriction on women's mobility in the entrepreneur business in India also indicated stigmatization is attached (Chakraborty & Chatterjee, 2021; Ghosh & Kumar, 2021; Wittmer, 2021), thus serving as an impediment to women participation in waste management and other labour-empowerments activities. 84% of the responses also indicated that no adequate materials and support are given to waste pickers who labour to provide through the business for their daily living. Materials are sorted through open dumping and disposal sites, which increases their exposure and risk to diseases without many considerations for occupational health and safety. The effect of the demographic and explanatory variables on women's interest in waste management is estimated using ordered logistic regression, as presented in Table 3.

Table 3 presents the report of findings using the ordered logistic regression estimation technique. Findings revealed that religion exhibits a positive relationship with women's interest in waste management; Christian women have a higher odd ratio of 30, while Muslim women have ten odd ratios with confidence interval values not passing through value 1, thus predicting stability at a 1% significance level. This signifies that Christian women have a higher chance of showing interest in waste management and recycling than Muslims, indicating that religious centres must be incorporated into the waste management schemes for women's interest in waste management to be altered and improved positively. This finding is like studies in India and Iran (Chakraborty & Chatterjee, 2021; Karimi et al., 2022). Muslim women's perception and interest in waste management can be aroused through sensitization messages from religious centres/homes through massive awareness campaigns, lectures, and educative talks.

On educational attainment, women with secondary education have the highest odd ratio of 8, which is statistically significant at a 1% significance level. Thus, it signifies that women with secondary education have more than eight times the chance of participating in waste recycling and management. Thus having at least a secondary level of education can help women understand the need for waste management and recycling for wealth creation. Previous studies found similar evidence (Asteria & Haryanto, 2021; Oyedotun et al., 2021). This result also indicates that women with a secondary level of education are more willing to involve in wealth-creation activities from waste than those with higher education. Although the effect of place of residence is found with women in urban communities exhibiting an odd ratio (1.17) more significant than the reference point (rural), the result is not statistically significant. Thus, no statistical significance difference exists between women's interest in waste management in rural and urban communities, even though urban women exhibit a higher chance of wealth creation and recycling intention. Previous studies found that employment positively correlates with willingness to participate in waste sorting and recycling (Labib et al., 2021; Chikowore, 2021).

Table 3. Ordered logistic regression of women's interest in inclusion in waste management.

female interest: waste management	Odd ratio	Std. Err.	t	P>|t|		[95%	conf. Interval.
age 21-40	1.200	1.151	0.19	0.849		0.182	7.899
age41-60	0.610	0.450	-0.67	0.503		0.144	2.596
age 60+	1.000	(reference)					
Christian	30.916	22.887	4.63		0.000***	7.216	132.462
Muslim	10.602	7.550	3.32		0.001***	2.615	42.976

traditionalist	1.000	(reference)				
no-education	0.644	0.618	-0.46	0.647	0.098	4.248
primary	1.273	0.789	0.39	0.697	0.377	4.304
secondary	8.906	4.031	4.83	0.000***	3.659	21.680
higher	1.000	(reference)				
Urban	1.197	0.668	0.32	0.747	0.400	3.576
Rural	1.000	(reference)				
income<30,000	0.908	0.727	-0.12	0.904	0.188	4.378
income30,000-60,000	0.910	0.616	-0.14	0.889	0.241	3.439
income 61,000-100,000	3.065	2.733	1.26	0.212	0.531	17.681
income >100,000	1.000	(reference)				
formal sector	2.127	1.508	1.07	0.287	0.528	8.566
informal sector	11.964	9.277	3.2	0.001***	2.606	54.920
retired	1.000	(reference)				
own house	0.561	0.428	-0.76	0.449	0.125	2.515
rented	1.000	(reference)				
household size <4	5.023	3.045	2.66	0.008***	1.526	16.533
household size>4	1.000	(reference)				
waste disposed of by the waste collector	15.547	17.145	2.49	0.013**	1.779	135.829
waste disposed of by burning	7.738	9.289	1.7	0.089	0.731	81.899
waste disposed of in gutter/roadside	16.905	19.610	2.44	0.015**	1.729	165.260
waste disposed of in the landfill, dumping	13.101	14.748	2.29	0.023**	1.433	119.739
awareness of recycling	0.363	0.231	-1.59	0.112	0.104	1.269
waste constitutes the health challenge	0.943	0.153	-0.36	0.716	0.685	1.297
waste management neglect women	1.579	0.325	2.22	0.027**	1.054	2.365
Govt. inadequate handling	1.215	0.286	0.83	0.408	0.765	1.929
social stigmatization	0.083	0.065	-3.16	0.002***	0.018	0.390
inadequate materials provided	0.049	0.038	-3.84	0.000***	0.010	0.228
/cut1	4.502	2.162	2.08	0.038**	0.253	8.752

*Observations =436, LR (24) =264.77, Prob >χ^2 = 0.0000, Pseudo **R2** = 0.52, Log Likelihood = −119.87*

, **, *** indicates 10%, 5%, and 1% level of significance.

This study also indicates that work status showcases a significant relationship, with female workers within the formal and informal sectors exhibiting a higher chance of interest in waste management than retired women. Evidence of a higher odd ratio of 11 by women in the informal sector revealed that women in the informal sector have more than 11 times the chance /likelihood of involving in waste recycling and management than those in the formal sector. It also indicates that a large proportion of workers can create wealth and improve their living standards through involvement in recycling if encouraged in the informal sector in Nigeria. Harnessing the strength of the large workers in the informal sector is essential for ensuring clean environment and promoting it sustainability. Although women in formal sector have higher than 1 odd ratio, the result is not statistically significant. Women with household sizes of not more than four also have a five times higher chance of interest in waste management and recycling than those with more than four family sizes. Previous work found that family size, income, and size of waste generated exhibit a significant relationship with willingness to pay for improved solid waste management (Massoud et al., 2021; Yasin, 2021). Waste disposal system also has a significant relationship with interest in waste

recycling and management; those that dispose of waste by burning it at home exhibit less likelihood than other means of waste disposal (waste collector, dumping, gutter, etcetera)

On women's perception of waste management, the belief that waste constitutes health challenges exhibits a lower odd ratio which is not statistically significant, signifying that although a large number are aware that waste poses challenges to human health yet, it is not sufficient for women to create interest in its recycling and management processes for wealth creation. Women that believe women are neglected in waste management have more than one odd ratio, which indicates that these women are willing to participate in wealth creation in waste management if incorporated appropriately. The challenge of social stigmatization attached to waste picking, separation, and collection coupled with inadequate provision of materials and equipment needed in waste collection and its management has a lower odd ratio of less than 1, an indication that these challenges have a negative association with women interest in waste recycling and management, thus serving as hindrances to women participation in the recycling processes.

These findings indicate, to a large extent, the political economy behind waste management with the poor handling of waste across streets and communities. The social stigmatization and use of inadequate materials by waste collectors were found to have a low odd ratio with women's interest in recycling and wealth generation. Curbing this requires strong government backing through adopting an environmental public policy on household waste disposal and its management by the disposal agents. Government participation in waste disposal and its management was found inadequate despite the establishment of various environmental boards and agencies to ensure cleanliness and adequate waste disposal in the communities. Government roles are found defective and need to be upgraded to help provide a clean environment and support for waste-wealth creation among women. It is evident in Table 3 that the *Likelihood Ratio Chi-Square* statistic of 264 with a degree of freedom of 24 is highly significant at *(p-value* < 0.0000), signifying that the model has predictive solid explanatory power to capture the dependent variable. The *Pseudo* $R2$ of 0.52 suggests that the independent variables account for about 52% of variation in women's interest in participating in waste recycling and management, thus showing a moderate relationship between the dependent and its predicting variable.

4. Conclusion

This paper concludes that there is a need to incorporate women into the waste management process in Nigeria as the sector can create wealth for the large proportion in the informal sector willing to generate income to improve their standard of living adequately. Waste management should be the collective effort of all; households, industries, institutions, organizations, community/state waste management agencies, state actors, government enforcement agents, etcetera towards improving the nation's poor solid waste management, which impedes rapid, sustainable development and creates environmental sanitation challenges. Communities and government agencies are to create awareness of waste management and recycling and ensure good sanitation practices by providing waste storage containers in open vicinity and on street corners. Removing the social stigmatization of waste collection as a job for low-income people is also necessary to encourage women in the informal sector to get involved without prejudice in waste separation and picking up trash or waste.

As countries worldwide strive to achieve sustainable development goals, states in Nigeria need to promote waste management to improve environmental air quality and facilitate sanitation. For achieving the SDG on sustainable cities and communities, implementing

adequate household waste management and recycling waste is crucial. Waste separation should be encouraged at the household and community levels, with sanctions imposed on default households. While recognizing that waste management requires finance, government efforts in implementing policies that can prevent open dumping burning of refuse and adopting strategies that can reduce household-generated waste will help ensure a sustainable waste management system in Nigeria.

Data limit this research work as only 436 individuals' responses were used. There is a need for an understanding of the disparity in waste disposal, its management, and reuse strategies across rural and urban communities using a large dataset. Also, this study concentrated only on waste generated at the household level. Other forms, such as industrial and agricultural waste management, can be examined further. Also, for further studies, Community and municipalities' participation in environmental management should be explored while more is needed on recycling and strategies to mobilize households into its processes in African countries. At the same time, the reuse of recyclables and the composting of organic waste should be encouraged.

Conflicts of Interest

The authors declare no conflict of interest.

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Author Contribution

Conceptualization, K.F.A. and F.O.; Methodology, K.F.A.; Software, K.F.A.; Validation, K.F.A. and F.O.; Formal Analysis, K.F.A.; Investigation, K.F.A.; Resources, K.F.A.; Data Curation, K.F.A.; Writing – Original Draft Preparation, K.F.A.; Writing – Review & Editing, K.F.A. and F.O.; Visualization, K.F.A.; Supervision, K.F.A.; Project Administration, K.F.A.; and Funding Acquisition, K.F.A.

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