**Socio-demographic predictors of Knowledge, attitude and practice of proper refuse disposal methods among People of Isoko South in Delta State**

**Abstract**

The proper refuse disposal (PRD) methods offer a sustainable alternative to the traditional linear model of refuse disposal method. This study examined the socio-demographic predictors of knowledge, attitude and practices of proper refuse disposal methods among people of Isoko South Local Government Area, Delta State, Nigeria. A descriptive cross-sectional design was employed, involving a sample of 3,223 participants selected from twelve rural communities using stratified and simple random sampling techniques. Data were collected using a validated self-structured instrument titled Socio-demographic, Knowledge, Attitude and Practices of Proper Refuse Disposal Methods *Questionnaire (SKAPPRDMQ)* with a reliability index of 0.89. The instrument contained 21 items, including demographic variables, Knowledge questions (YES/NO) percentage and 10 PRD-related items measured on a 4-point Likert scale. Data were analysed using SPSS version 27 employing percentage, and regression analysis was used to answered both the objectives, research questions and hypotheses. Demographic data revealed that (59.5%) of respondents were female. In terms of age, (43.3) % were between 45-54 years, (50.6%) were married, while 48.3% works in a private film and 80.6% are educated and 55.2% are Christian. The findings of this study revealed that education and place of work are the strongest sociodemographic predictors of knowledge, attitude, and practices of proper refuse disposal in Isoko South, indicating that individuals with higher education levels and relevant workplaces are more knowledgeable and committed to proper disposal practices. Age, gender, and religion also show significant effects, particularly on attitudes and practices, while marital status does not significantly influence any of the three aspects, as evidenced by its high p-values. Overall, the study demonstrates that sociodemographic factors play a crucial role in shaping knowledge, attitudes, and practices of refuse disposal, with education being the most influential predictor. The study concluded that although misconception persist, strong support for community involvement, weaker personal responsibility and community clean-up participation remains an area for improvement.the state government should create education programs tailored to specific sociodemographic groups, focusing on refuse disposal practices and environmental conservation and incorporate waste management education into school curricula to promote early awareness and responsible practices. It recommended enhanced public education and awareness, along with government investment in infrastructure and collaborative stakeholder engagement to support adoption of proper refuse disposal methods

**Key words**: Socio-demographic, Predictors, Knowledge, Attitudes, Practices, and Proper Refuse Disposal Methods

**Introduction**

Proper refuse disposal is a decisive aspect of environmental conservation and public health. The increasing volume of waste generated globally poses significant challenges to waste management systems, particularly in developing countries. The refuse pecking order has evolved over time to include waste avoidance as the first and most desirable option, moving waste re-use to the third ties ahead of recycling and recovery Lange et al (2022)

According to Lange et al (2022) most wanted to least wanted are avoid, reduce, reuse, recycle, recover, treat and dispose. Refuse adds over nineteen million tons towards the total annual refuse encumbrance in South Africa, very little action is taken within to reduce the amount ensuring that materials are re-use before they become waste so as to reduces the burden on refuse manager. Also, proper refuse disposal is crucial for maintaining a clean and healthy environment.in term of conservation and improper refuse disposal can lead to the spread of diseases and other health problems (Lange et al 2022). Although, (Godfrey et al 2019) stated that effective waste management is essential for achieving sustainable development goals in terms of sustainable goals but Kannangara et al (2018) highlighted not only reducing the amount of refuse dump at landfill but also by circumventing the illegal re-use of an item which has initially been classified as refuse.

Sociodemographic characteristic refers to combination of social and demographic factor, including socioeconomic status which is often measured by an individual’s educational attainment, age, gender, religion, occupation and income Lorant et al (2006). However, Gender men, people who are single and those with low education or low source of income are also less likely to participate Tolonen et al 2006), and Christensen et al (2022) Age is associated with the maturity of the person which plays a significant factor in impacting their level of awareness on environmental health and sanitation (Fadhullah et al (2022) highlighted the association between theses variables especially age and involvement or belonging to an ethnic minority is inconsistent in the literature so far Ahlmark et al (2015), Fadhullah et al (2022) and Fry et al (2017)

In Nigeria, the issue of improper refuse disposal is a major concern, with far-reaching consequences for the environment, human health, and sustainable development. The United Nations' Sustainable Development Goals (SDGs) aren't about reaching a million goals, but rather achieving 17 specific objectives by 2030. These goals are designed to promote a sustainable future, focusing on various aspects as it concerns this study are (Good Health and Well-being, Sustainable Cities and Communities and responsible consumption and production) when an individual consume or produce, waste will be generated, and when waste is generated, proper disposal comes to play. Isoko South Local Government Area in Delta State, Nigeria, is not immune to the challenges of improper refuse disposal. Refuse disposal and waste management challenges due to rapid population growth, urbanization, and limited infrastructure. Understanding the sociodemographic predictors of knowledge, attitude, and practice of proper refuse disposal among residents in Isoko South is essential for developing effective waste management strategies. This study focuses on the sociodemographic predictors of knowledge, attitude, and practice of proper refuse disposal among residents in Isoko South, Delta State, Nigeria.

**Statement of problem**

Improper disposal of refuse is a significant environmental and public health concern in many Nigerian communities, including Isoko South, Delta State. Despite the importance of proper refuse disposal, many residents in the area continue to engage in practices that pose serious environmental and health risks. The lack of knowledge, negative attitudes, and poor practices towards refuse disposal are influenced by various sociodemographic factors. This study aims to investigate the sociodemographic predictors of knowledge, attitude, and practice of proper refuse disposal among residents in Isoko South, Delta State, Nigeria, to identify key factors influencing refuse disposal the issue among personal data may have varying levels of influence among people

**Study Aim and Objectives**

The study aims to examine the sociodemographic factors as predictors of knowledge, attitude, and practices of proper refuse disposal in Isoko South. Nonetheless, the specific objectives of the study include:

1. To assess the influence of sociodemographic factors on knowledge of proper refuse disposal in Isoko South.
2. To examine the influence of sociodemographic factors on attitudes toward proper refuse disposal in Isoko South.
3. To analyze the influence sociodemographic factors on the practice of proper refuse disposal in Isoko South.

**Research Questions**

1. How do sociodemographic factors influence knowledge of proper refuse disposal in Isoko South?
2. How do sociodemographic factors influence attitude towards proper refuse disposal in Isoko South?
3. How do sociodemographic factors influence practices of proper refuse disposal in Isoko South?

**Hypotheses**

1. Sociodemographic factors do not significantly influence knowledge of proper refuse disposal in Isoko South.
2. Sociodemographic factors do not significantly influence attitudes toward proper refuse disposal in Isoko South.
3. Sociodemographic factors do not significantly influence the practice of proper refuse disposal in Isoko South.

**Methodology**

This study adopted a descriptive cross-sectional survey design to investigate the sociodemographic predictors of knowledge, attitude and practices of proper refuse disposal (PRD) methods in Isoko South in Delta State Nigeria. The study was conducted across twelve selected rural communities in the area, targeting both male and female residents aged 15 years and above. The choice of design allowed for a snapshot assessment of personal data relationship views regarding PRD at a specific time.

The study population was drawn from the projected 2022 population of Isoko South, estimated at 322,300 individuals. A scaling factor of 0.01 was applied to determine the final sample size, yielding a total of 3,223 respondents. The sample was proportionally distributed across the selected communities and data collection was carried out over a five-month period, from August 2023 to January 2024. Stratified and simple random sampling techniques were employed to ensure adequate representation of the population across age groups, gender, marital status, employment status, education level and religion.

Data collection was facilitated through a validated self-structured questionnaire titled Sociodemographic Predictors of Knowledge, Attitude and Practices of Proper Refuse Disposal Methods Questionnaire (SPKAPPRDQ). The instrument consisted of 21 items divided into two sections: Section A contained six demographic questions, while Section B featured fifteen items—five assessing knowledge and ten examining attitude and practices—measured on a 4-point Likert scale (Strongly Agree, Agree, Disagree, Strongly Disagree) and (Do Not, Sometimes, Frequently and Very Frequently). The instrument demonstrated high internal consistency with a Cronbach’s Alpha reliability index of 0.89. The data was collected from the respondents using their age, gender of the responding respondents, educational level of the respondents, marital status of every individual, employment status of the respondents. The educational level of the respondents was assessed by schools attended with completion were categories based on the Nigeria level of standard classification of education Primary, secondary, tertiary, and non- formal. The respondents were asked to specify their current employment status as working in a public working in a public, in a private film and stay at home respondents were indicated respectively. Unemployed and incapacitated were categories as unemployed.

Data were analyzed using SPSS version 27. Descriptive statistics such as frequencies, percentages, mean and standard deviations were the statistical tools used in analyzing the study demographics and research questions Regression Analysis was used to answer the hypotheses. The demographic characteristics of the participants were presented in a cluster bar chart using the percentage on the Y-axis and demographic features on the X-axis. The results of the questions analysis were presented in tables (1, 2 ,3and 4) observing American Psychological Association style (APAs)

**Results**

**Table 1: Demographic characteristics of respondents**

|  |  |  |  |
| --- | --- | --- | --- |
| **Category** | **Subcategory** | **Frequency** | **Percent** |
| **Age** | 15-24 years | 441 | 13.7 |
|  | 25-34 years | 571 | 17.7 |
|  | 35-44 years | 418 | 13 |
|  | 45-54 years | 1395 | 43.3 |
|  | 55 years and above | 398 | 12.3 |
|  | Total | 3223 | 100 |
| **Gender** | Male | 1305 | 40.5 |
|  | Female | 1918 | 59.5 |
|  | Total | 3223 | 100 |
| **Marital Status** | Married | 1630 | 50.6 |
|  | Separated | 237 | 7.4 |
|  | Single | 1356 | 42.1 |
|  | Total | 3223 | 100 |
| **Place of Work** | Private | 1556 | 48.3 |
|  | Government | 453 | 14.1 |
|  | Housewife | 1214 | 37.7 |
|  | Total | 3223 | 100 |
| **Education** | Educated | 2599 | 80.6 |
|  | Non-Educated | 624 | 19.4 |
|  | Total | 3223 | 100 |
| **Religion** | Christianity | 1778 | 55.2 |
|  | Islam | 210 | 6.5 |
|  | Traditional | 1235 | 38.3 |
|  | Total | 3223 | 100 |

Table 1: Percentage analysis reveals that the largest age group among respondents is 45–54 years (43.3%), followed by 25–34 years (17.7%). Females make up the majority at 59.5%, while males account for 40.5%. In terms of marital status, 50.6% are married, 42.1% are single, and 7.4% are separated. The educational distribution shows that 80.6% of respondents are educated, while 19.4% are not. This suggests that the majority of respondents are middle-aged, educated, and female. The high level of education and marital status may influence positive attitudes toward community issues such as circular economy and waste management.

**Table 2: Summary of regression analysis establishing the sociodemographic predictors of Knowledge of proper refuse disposal in Isoko south.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | | **Standardized Coefficients** | **t** | **Sig.** |
| **Beta** |
| 1 | (Constant) |  | 39.633 | .000 |
| Age | .403 | 17.078 | .004 |
| Gender | .007 | .503 | .615 |
| Marital Status | .005 | .700 | .484 |
| Place of work | .318 | 15.681 | .006 |
| Education | .679 | 23.497 | .002 |
| Religion | .017 | .676 | .499 |

***\*\* R = 0.352; R2 = 0.124; F = 27.123; P = 0.002***

Table 2 analysis examines sociodemographic predictors of knowledge of proper refuse disposal in Isoko South. The model explains 12.4% (R² = 0.124) of the variance in knowledge levels, and the overall model is statistically significant (F = 27.123, p = 0.002). Education (β = 0.679, p = 0.002) is the strongest predictor, indicating that higher education significantly enhances knowledge of proper refuse disposal. Age (β = 0.403, p = 0.004) and place of work (β = 0.318, p = 0.006) also have significant positive effects. Gender (β = 0.007, p = 0.615), marital status (β = 0.005, p = 0.484), and religion (β = 0.017, p = 0.499) do not significantly predict knowledge, as their p-values exceed 0.05.

**Table 3: Summary of regression analysis establishing the sociodemographic predictors of attitude towards proper refuse disposal in Isoko south.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | | **Standardized Coefficients** | **t** | **Sig.** |
| **Beta** |
| 1 | (Constant) |  |  |  |
| Age | .0.437 | 9.315 | .003 |
| Gender | 0.192 | 8.303 | .005 |
| Marital Status | .002 | .196 | .844 |
| Place of work | 0.542 | 15.533 | .004 |
| Education | 0.555 | 21.717 | .001 |
| Religion | 0.215 | 7.504 | .015 |

***\*\* R = 0.514; R2 = 0.264; F = 31.511; P = 0.000***

Table 3 above analysis examines sociodemographic predictors of attitude towards proper refuse disposal in Isoko South. The model explains 26.4% (R² = 0.264) of the variance in attitude, and the overall model is statistically significant (F = 31.511, p = 0.000). Education (β = 0.555, p = 0.001) and place of work (β = 0.542, p = 0.004) are the strongest predictors, indicating that higher education and workplace influence significantly shape attitudes. Age (β = 0.437, p = 0.003), gender (β = 0.192, p = 0.005), and religion (β = 0.215, p = 0.015) also have significant positive effects. Marital status does not significantly predict attitude, as its p-value is above 0.05.

**Table 4: Summary of regression analysis establishing the sociodemographic predictors of practices of proper refuse disposal in Isoko south.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Model** | | **Standardized Coefficients** | **t** | **Sig.** |
| **Beta** |
|  |  |  |  |  |
| Age | .0.517 | 19.315 | .003 |
| Gender | 0.222 | 1.303 | .005 |
| Marital Status | .112 | 3.196 | .844 |
| Place of work | 0.594 | 23.533 | .004 |
| Education | 0.677 | 39.717 | .001 |
| Religion | 0.218 | 11.504 | .015 |

***\*\* R = 0.698; R2 = 0.487; F = 33.162; P = 0.000***

Table 4 above analysis examines sociodemographic predictors of practices of proper refuse disposal in Isoko South. The model explains 48.7% (R² = 0.487) of the variance in disposal practices, and the overall model is statistically significant (F = 33.162, p = 0.000). Education (β = 0.677, p = 0.001) and place of work (β = 0.594, p = 0.004) are the strongest predictors, indicating that higher education and workplace influence significantly impact proper disposal practices. Age (β = 0.517, p = 0.003), gender (β = 0.222, p = 0.005), and religion (β = 0.218, p = 0.015) also show significant positive effects. Marital status does not significantly predict disposal practices, as its p-value exceeds 0.05.

**Summary of key findings**

1. The findings reveal that education and place of work are the strongest sociodemographic predictors of knowledge, attitude, and practices of proper refuse disposal in Isoko South, indicating that individuals with higher education levels and relevant workplaces are more knowledgeable and committed to proper disposal practices.
2. Age, gender, and religion also show significant effects, particularly on attitudes and practices, while marital status does not significantly influence any of the three aspects, as evidenced by its high p-values.
3. Overall, the study demonstrates that sociodemographic factors play a crucial role in shaping knowledge, attitudes, and practices of refuse disposal, with education being the most influential predictor.

**Discussion of findings**

The personal data revealed that age group among respondents is 45–54 years (43.3%), followed by 25–34 years (17.7%). This study finding about age as one factor of sociodemographic predictor is consistence with Fierloos et al (2022) whose study was on sociodemographic characteristics associated with perceived social support among parents of children age 0-7years. Although there is difference in the parameter measured in both studies. However young people are often more aware of environmental issues and more likely to adopt sustainable practices. Fierloos et al (2022) Our finding agrees with the study by Vassanadumrongdee and Kittipongvises (2018) which found that age and family with children have a positive influence on respondent’s source separation.

Females make up the majority at 59.5%, while males account for 40.5%. in this study and this could be because female tend to exhibit more environmentally conscious behaviours and attitudes. Our finding is consistence with the study by Ehrampoush and Moghadam (2005) which reported that gender is likely to have an influence on the perceptions of household SWM. This view is supported by Mukherji et al. (2016) study in Delhi. India Sustain, who found that women, because of traditional gender roles associated with their household activities, have a closer engagement with waste management at household level.

In terms of marital status, 50.6% are married, 42.1% are single, and 7.4% are separated. A higher percentage of married individuals in a community can have several implications for refuse disposal methods especially the Isoko South People with larger family sizes, tend to generate more waste due to increased household consumption. This can put a strain on existing waste management systems. Research suggests that polygamous families may dispose of waste more frequently than monogamous families, possibly due to larger household sizes. Married household heads are more willing to pay for improved solid waste collection services, possibly due to their increased awareness of the importance of proper waste management for their families.

The educational distribution shows that 80.6% of respondents are educated, while 19.4% are not. This could be seen as higher education levels often correlate with increased environmental awareness and Pro Environmental Behaviours. This study result on educational level was consistence with the finding of Longe et al (2009) who highlighted the level of education to an important factor that could influence people’s perception of household waste management but this did not influence their household SWM practices and perception particular waste. In this study, most of the respondents received their education until secondary school and tertiary

This suggests that the majority of respondents are middle-aged, educated, are female. The high level of education and marital status may influence positive attitudes toward community issues such as circular economy and waste management.

This study has proven beyond doubt that education and workplace are strongest predictors**.** Individuals with higher education levels and relevant workplaces tend to have better knowledge, attitudes, and practices regarding proper refuse disposal in Isoko South Delta. Nigeria. This study was supported the study of Stoffberg et al (2023) who had a moderately significant positive correlation between the national qualification’s framework level and job performance ratings that exceed the requirements of the job was observed on the study the relevance of educational qualifications to job performance among academic administrators at a university. But Sonnenteg et al (2000) study was contrasting to this study.

Regression analysis on Influence of age, gender, and religion factors significantly impact attitudes and practices. This suggested that targeted interventions may be necessary for specific demographic groups. Consistence to Abushammala & Ghulam (2023) study on the Impact of Residents Demographics on Their Knowledge, Attitudes, and Practices towards Waste Management at the Household Level in the United Arab Emirates shows that age overall does not significantly impact UAE residents’ average knowledge of the three Rs of waste management. Which is opposite to this study although this Abushanammals & Ghulam (2023) methodology is difference from this current study. Though, the results showed that the knowledge, attitudes, and practices of UAE residents were influenced to varying degrees by their age, gender, and educational level. That could be a factor. but this was similar to previous studies that showed that older people have better knowledge of and apply more the three Rs in their households compared with younger ones due to the lack of awareness and responsibility towards the environment Ghinea & Gavilescu (2016), Kannangara et al (2018) and Handayani et al (2018)

Marital status does not significantly influence knowledge, attitudes, or practices, indicating that other factors may be more important in this study. However. This finding is opposite to the findings of Awosusi (2010) who assessed the environmental problems and methods of waste management in Ado-Ekiti Nigeria were marital status and household attitude significantly influence waste management. And also, the study on marital status of inhabitants and solid waste management in Cross Rives state, Nigeria Asu et al (2024). Individual contributed immensely to proper refuse disposal in this area. Nevertheless, Isoko South people are confronted with some challenge which if given the necessary encouragements, would be of great use in proper refuse disposal methods in the area. Married people relied on their children for refuse disposal which in most cases is not properly handled by those children contrast, a single woman or man who manages and dispose his or her refuse, does so independently with sense of maturity (Oluwabamide,2011). This is contrasting to this study. Proper refuse disposal methods can best be achieved through good marital status background where parents educate their world on the benefits and dangers of indiscriminate refuse disposal methods. This predictor influences growth as a result of increased families (marital Status) and the rate of rural area expanding and turning into urbanization which certainly will be alarmingly in African. This will thereby accelerate waste generation and disposal problem reason why this study was of great help to environmentalists, planners, researchers and policy makers.

**Implications of my findings**

**1.** Education plays a vital role in shaping knowledge, attitudes, and practices. Investing in education and awareness programs can improve refuse disposal practices. Educated individuals are more likely to recognize the impact of improper disposal on the environment and public health, also adopt responsible behaviors and attitudes towards waste management and implement proper waste disposal practices in their daily lives.

**2.** Relevant workplaces can promote proper refuse disposal practices, highlighting the importance of workplace-based interventionsenhance employees' understanding of proper waste disposal practices and promote positive attitudes, implement waste reduction strategies and promote sustainable practices. Which finally demonstrate organizational commitment to environmental responsibility and sustainability.Also Investing in education and awareness programs can improve refuse disposal practices by: Providing information on proper waste disposal methods and their benefits will be liken on increasing knowledge, changing attitude and influencing behaviors**.**

**3.** Understanding the impact of age, gender, and religion can help design targeted interventions to address specific demographic groups. Such as Age-specific intervention tailored to specific age groups, such as youth or elderly populations, gender-sensitive interventions that address the unique needs and concerns of men and women and culturally sensitive interventions that respect and incorporate cultural and religious values related to waste management and the benefit with include increase effectiveness, enhance engagements and promote inclusivity.

**Conclusion**

The study's findings underscore the significance of sociodemographic factors, particularly education and workplace, in influencing knowledge, attitudes, and practices of proper refuse disposal in Isoko South. The results suggest that targeted interventions focusing on education, workplace-based initiatives, and demographic-specific strategies can improve refuse disposal practices and promote a healthier environment. The study highlights the importance of sociodemographic factors in shaping knowledge, attitudes, and practices of refuse disposal. By understanding these factors, targeted interventions can be designed to improve refuse disposal practices, mitigate environmental and health risks, and promote sustainable development in Isoko South by addressing the knowledge and attitude gaps identified in this study, stakeholders can develop effective strategies to enhance proper refuse disposal practices such as organizing community-based events, workshops, and campaigns to educate residents on proper refuse disposal practices, implement community-based waste management systems, such as community composting and recycling programs that will mitigate associated environmental and health risks. A call to collaborate with non-governmental organizations (NGOs) to support proper refuse disposal methods initiatives and promote community engagement.

**Recommendation**

Following the study discovery, the following were recommended

1. Implement education and awareness programs to improve knowledge and attitudes towards proper refuse disposal, particularly targeting individuals with lower education levels.
2. The Local government chairman should encourage workplaces to promote proper refuse disposal practices and provide necessary infrastructure and training.
3. The State government should design targeted interventions to address specific demographic groups, such as age, gender, and religious groups, to improve attitudes and practices.
4. The Law makers should develop policies that support education, awareness, and workplace-based interventions to promote proper refuse disposal practices.
5. The Environmental Officers should engage with local communities to raise awareness and promote proper refuse disposal practices, leveraging influential community leaders and structures.

Disclaimer (Artificial intelligence)NO

Option 1:

Lois Erowo OBED-OJUKWU hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

LOIS EROWO OBED-OJUKWU AND BLESSING SELLY-U ERUMI hereby declare that generative META AI editing of manuscripts and checking meaning of words

Details of the AI usage are given below:

1.META AI IS POWERED BY LIAMA 4 MODEL, SPECICALLYY TWO NEW MODELS CALLED LIAMA 4 SCOUT AND LIAMA 4 MAVERICK. WITH LIAMA 4 VERSION HAS KEY FEATURES ARE A SMALLER MODEL CAPABLE OF FITTING IN A SINGLE NVIDO H100GPU, WITH A 10- MILLION-TAKEN CONTEXT WINDOW, OUTPERFORMING GOOGLES..

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