



# Knowledge of Maternity Healthcare Waste Management Practice to World Health Organisation Guidelines among Midwives in Nnamdi Azikiwe University Teaching Hospital

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

The study assessed the Assessing Knowledge of Maternity Healthcare Waste Management Practice to W.H.O Guidelines among Midwives in Nnamdi Azikiwe University Teaching Hospital, Nnewi. A sample of 70 midwives and nurses were used for the study. Descriptive research design was used for the study. The study used one research question with one hypotheses. One research instruments was used to collect the data. The research question was answered using descriptive statistics of percentage, mean and charts while the hypothesis was tested using t-test. The results revealed that out of 70 respondents, 55.7% were between the age of 18-28years, 25.71% of them

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were between 29 – 39 years while 18.6% within the range of 40 – 50 and none fell within 51 years and above, 16% of the respondents were male and 84% were female, doctors were 34%, nurses were 34%, waste handlers were 16% while lab scientists were 16%, the study further revealed that majority (85.7%) of the respondents had high knowledge on HCW management while only few (14.3%) of them had low knowledge on it. The study concluded that the study on waste management practices among midwives and nurses at Nnamdi Azikiwe University Teaching Hospital, Nnewi, was in alignment with WHO guidelines. The study therefore, recommend that hospital management should implement comprehensive and regular training programs for midwives focusing on WHO guidelines for healthcare waste management. Training should cover proper waste segregation, handling, disposal, and the effective use of personal protective equipment.

*Keywords: Healthcare waste; healthcare management; biomedical waste; waste generation; healthcare.*

## 1. INTRODUCTION

The dangerous nature of healthcare wastes makes them a greater priority in waste management. Healthcare waste is waste produced by different health care operations in labs, research centers, and healthcare settings. The remaining 10 to 25% of healthcare waste — known as biological waste — is hazardous, while the remaining 75 to 80% of trash are general and non-hazardous. Any waste produced during the diagnosis, treatment, or vaccination of humans or animals, as well as during related research operations or the creation of biological tests, including the generation of human anatomical waste, is referred to as biomedical waste. This includes wastes from animals, microbiology and biotechnology, sharps waste, abandoned medications and cytotoxic pharmaceuticals, solid trash, liquid waste, incinerator ash, chemical waste, etc (Bhanot, 2015).

Healthcare waste is any waste produced during the diagnosis, vaccination, and treatment procedures by hospitals, clinics, nursing homes, veterinary clinics, research centers, and labs, according to Guzder [1]. Due to the possibility of hazardous elements, healthcare waste (HCW) is a unique kind of trash. The management of healthcare waste has emerged as a crucial issue in developing nations. A tertiary health institution (Teaching Hospital) in Nigeria conducted a cross-sectional descriptive research from May to April 2020 to evaluate the existing risks of healthcare waste to public health because of its infectious nature. Since the majority of healthcare institutions are located in urban areas, improperly handled healthcare waste has the potential to spread hazardous infections and endanger the public, medical personnel, patients, and the surrounding environment (World Health Organization, 2017).

Like many developing nations, Ethiopia is currently lagging behind in adopting the advised healthcare waste segregation procedure. Furthermore, there has been relatively little focus on safe healthcare waste management, and many institutions do not adhere to the minimal criteria needed for processing healthcare wastes properly. The World Health Organization threshold is 80% general healthcare waste and 15% pathological and infectious waste, such as radioactive or cytostatic waste, pressurized containers, broken thermometers, and used batteries. Previous research has demonstrated that the proportion of healthcare waste generation is significantly higher than this threshold. An investigation carried out across six hospitals in Addis Ababa, Ethiopia, for instance, reveals that the percentage of hazardous medical waste varies from 29.5 to 53.12%. The percentage of infectious waste at Menelik II Hospital (Ethiopia) was 53.73%. Hospital infectious waste percentages in the North and South of Ethiopia were 34.3 and 53%, respectively. These numbers are often three to four times higher than the World Health Organization's suggested level. It is most likely the case that there is insufficient segregation of hospital waste streams, which accounts for the disparities in estimates of the proportion of general and hazardous elements in healthcare waste output. Furthermore, a dearth of public health rules enforcing the segregation of healthcare wastes might make the existing state of affairs worse (Andales, 2020).

Given that Nigeria is a developing nation with limited resources, it is not surprising that healthcare waste management does not get the priority and attention it deserves [2-6]. Therefore, the lack of institutional frameworks for healthcare waste management is a significant difficulty in underdeveloped nations. The open disposal of

clinical waste at the same dumpsite as municipal garbage gives community people access to it and increases the risk of infectious disease outbreaks [7]. Even while healthcare waste makes up a very tiny percentage of overall trash in the society, its management is nevertheless a major concern on a global scale.

According to a 2017 World Health Organization study, 15% of the trash produced in healthcare facilities is hazardous and has to be appropriately separated at the time of creation to keep the waste from becoming entirely dangerous. The World Health Organization projects that each year there will be between 8 and 16 million new cases of hepatitis B, 2.3 to 4.7 million cases of hepatitis C, and 80,000 to 160,000 cases of HIV. These numbers are mostly attributable to extremely inadequate waste management systems and unsafe injection disposal [8-11].

Only radiation waste is considered to be more harmful than healthcare wastes worldwide. Prioritizing healthcare waste management is necessary due to the dire consequences improper management can have on both the environment and public health. Healthcare personnel are essential to the handling of medical waste. The danger connected with healthcare waste is present all over the world, and midwives are vital healthcare professionals who assist with pregnancy, labor, and postpartum care. They also play a critical role in ensuring that waste created during maternity care is appropriately handled [12,13,14].

The research included a survey of midwives, nurse midwives, and intern nurse midwives to evaluate their understanding and use of the standards for healthcare waste management. Healthcare institutions can plan and budget appropriately for the management of hazardous waste if they are aware of the kinds and amounts of clinical waste that are created (Bongayi, 2018). The absence of a healthcare waste management strategy ultimately results in insufficient waste segregation throughout the points of use, collection, storage, and disposal. Patients, healthcare providers, and the environment are all at risk of illness as a result of this subpar waste management procedure. Hospitals with inadequate healthcare waste management are those with gaps in their operations, such as the absence of color-coded bags for the segregation of medical waste at the point of use and recommendations for medical

staff on disposal and segregation [15-17]. Healthcare institutions that inappropriately dispose of their waste may contaminate the land, water, and air, endangering not just the health of their patients and staff but also the visitors to the facility and the surrounding community. Healthcare facilities should not create possible health hazards for individuals; rather, they should safeguard people's health in their surroundings.

Moreover, a rise in patient attendance has led to a rise in the production of medical waste. Another finding by Sunder et al. (2015) was that as the population grows, so do the healthcare facilities, which in turn causes a rise in the production of medical waste. It is anticipated that this increase would result in more focus and importance being placed on appropriate healthcare waste management at Nnamdi Azikiwe University Teaching Hospital (NAUTH), particularly in the maternity section where wastes including as blood, bodily fluids, and sharps are constantly produced [18-21]. Healthcare waste management has become a worry due to the many issues it continues to offer, particularly as the nation's economic condition worsens on a daily basis. Healthcare waste management has been the subject of several studies, but the maternity department, which produces the majority of blood, bodily fluids, and sharps, has received little to no attention. Waste, which is essential to the management of healthcare waste (Mathanjan & Gupta, 2018). It is also important to emphasize the usage of personal protective equipment (PPE) while handling trash and raising awareness of the possible dangers connected with inappropriate healthcare waste management [1].

Untreated hospital waste dumped carelessly into municipal trash cans raises the likelihood that harmful microorganisms may survive and mutate there, increasing the risk of disease outbreaks and a rise in the prevalence of communicable diseases in the neighborhood. The improper segregation and disposal of hospital waste has also been linked to the incidence of infectious diseases such as cholera, measles, hepatitis B and C, AIDS, TB, chickenpox, and others. The constituted authority is not providing the materials needed for the segregation and disposal of these hospital wastes, which puts patients, healthcare personnel, the environment, and the community at large in grave danger. Health professionals have recently been hospitalized with infectious illnesses that have been linked to healthcare waste pollution. As a

result, several of these health workers have passed away prematurely (Fagbocyibo, Ojo, Sridhar, & Kannan, 2019).

In addition, the community's members may readily access hospital garbage due to its careless disposal amid residential waste. It is evident during a visit of these medical facilities that they lack waste management tools including microwaves, autoclaves, and incinerators. Since infectious disease outbreaks might result from the disposal of medical waste at municipal sites, this practice is most likely to occur. The researcher became interested in evaluating healthcare waste management procedures among health professionals in Anambra State because of the aforementioned issues. Therefore, the primary goal of this research is to evaluate the management techniques utilized by midwives and nurses at the Nnamdi Azikiwe Teaching Hospital in Nnewi.

### 1.1 Aim and Objectives of the Study

The aim of this study was to investigate compliance waste management practice to WHO. guidelines among Midwives/Nurses in Nnamdi Azikiwe University Teaching Hospital, Nnewi. The specific objective is to;

1. assess the level of knowledge of Maternity Healthcare Waste Management Practice among Midwives in Nnamdi Azikiwe University Teaching Hospital.

#### 1.1.1 Hypotheses

The following hypotheses were stated and will be tested at 0.05 level of significance.

**Ho<sub>1</sub>:** Midwives does not have significant knowledge of Maternity Healthcare Waste Management Practice in Nnamdi Azikiwe University Teaching Hospital.

## 2. METHODOLOGY

The study's research design was cross-sectional descriptive. The midwives and nurses who work in the maternity sector of NAUTH - Nnewi's wards and clinics make up the survey's target group. Seventy midwives and nurses who work in the maternity department of the Nnamdi Azikiwe University Teaching Hospital Nnewi make up the study's population. The research used the census sample approach, which included using all members of the population. The researcher used this approach because, after asking about the total number of midwives

and nurses in the maternity ward, she considered that 70 was a feasible number for the study given the time and resources available (Akunneh-Warriso and Nwokoro, 2023). The research used convenience sampling with non-probability quota sampling proportionate to size. Choosing one participant for the research from each cadre allowed for a fair representation of all cadres. As long as a response satisfied the inclusion requirements, they may all take part (Gizalew et al, 2018). A well-structured questionnaire written in an easy-to-understand language served as the data gathering tool. Knowledge of Maternity Healthcare Waste Management Practice to WHO Guidelines Among Midwives (KMHWMPWGM)" was the title of the instrument. There are four parts to it (A, B, C, D). Sections B, C, and D collected data related to the study aims, whereas Section A deals with social demographic data. The participant gave the questionnaires to the proper number of nurses and midwives at the clinic and wards, and the responders returned them. Survey (site inspection): Through direct observation (site visiting) and the use of questionnaires, the types of trash created at different maternity units and clinics were determined. The test-retest method was used to assess the instrument's dependability after it had undergone validation. There was a 0.87 dependability index. The approach for analyzing the data was descriptive statistics. Therefore, the study topics were addressed using basic percentages, charts, and measures of central tendency statistics (mean), while the t-test was used to assess the null hypothesis at the 0.05 level of significance. SPSS version 20 helped accomplish this.

## 3. RESULTS

### 3.1 Section A: Demographic Data

Fig. 1 shows that out of 70 respondents, 55.7% were between the age of 18-28years, 23.60% of them were between 29 – 39 years while 18.6% within the range of 40 – 50 and none falls within 51years.

The result in Fig. 2 shows that 16% of the respondents were male and 84% were female.

The result shows that 38.6% of the respondents were married, 61.4% were single.

Fig. 4 shows that nurses were 34%, waste handlers were 11%, midwives 41% while lab scientist were 14%.

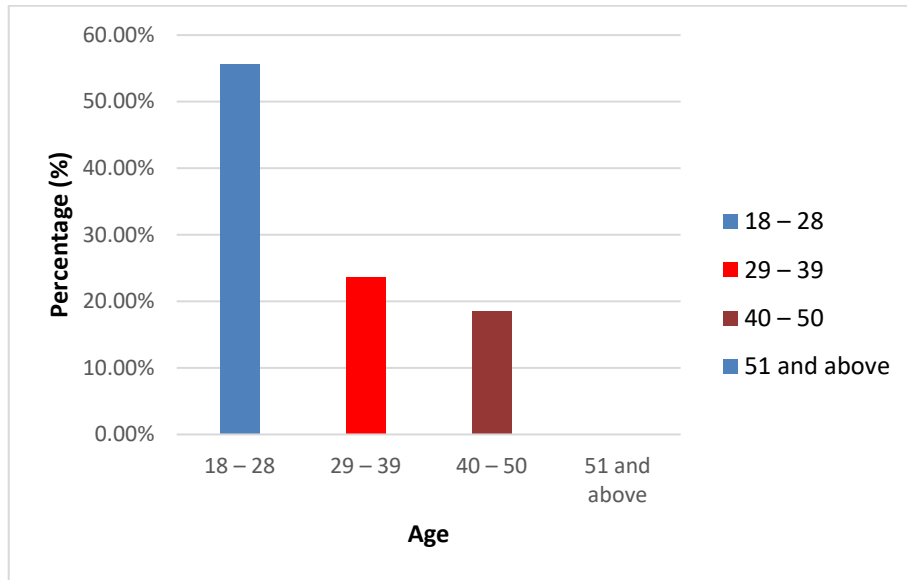


Fig. 1. Showing age distribution of the respondents

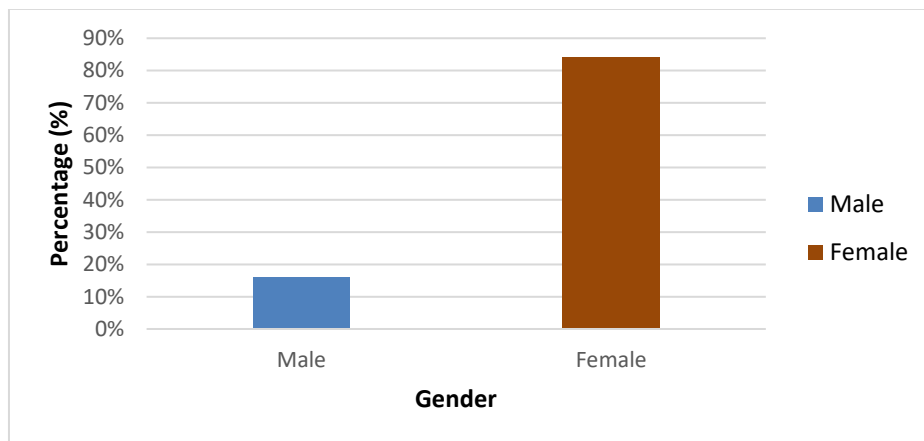


Fig. 2. Showing sex distribution of the respondents

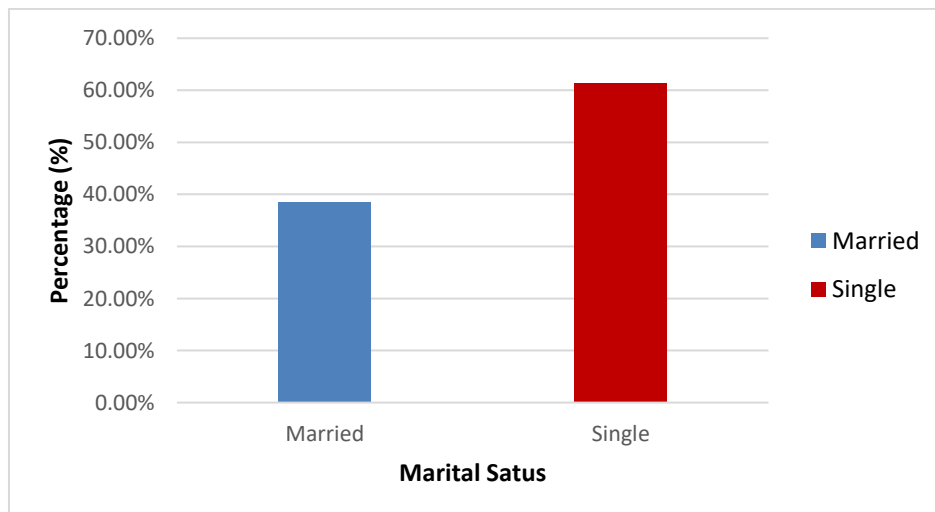


Fig. 3. Showing marital status of the respondents

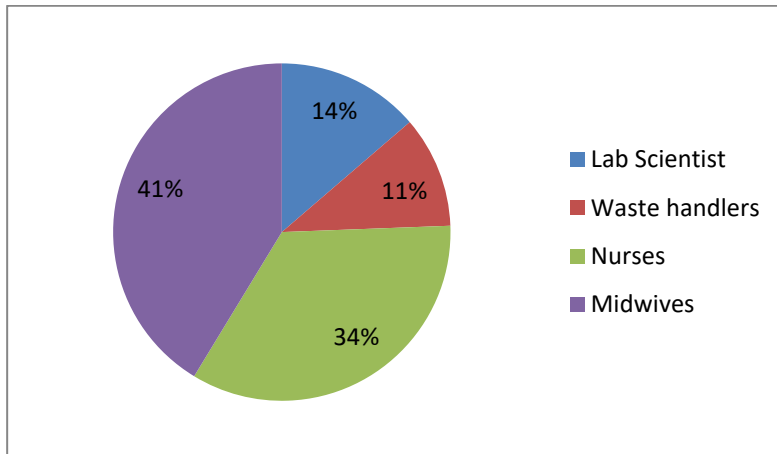


Fig. 4. Above is showing the designation of the midwives/Nurses

Table 1. Level of knowledge of maternity healthcare waste management practice among midwives in Nnamdi Azikiwe University teaching hospital

Variable	Categorization status	Frequency	Percentage (%)
Level of respondents Knowledge on HCW management	Low	10	14.3
	High	60	85.7

Table 2. Chi-square tests of the knowledge of maternity healthcare waste management practice in Nnamdi Azikiwe University Teaching Hospital

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	54.000 <sup>a</sup>	48	.256
Likelihood Ratio	34.005	48	.937
Linear-by-Linear Association	4.698	1	.030
N of Valid Cases	9		

<sup>a</sup>. 63 cells (100.0%) have expected count less than 5. The minimum expected count is .11

Table 1 revealed that majority (85.7%) of the respondents have high knowledge on HCW management while only few (14.3%) of them have low knowledge on it.

**Ho<sub>1</sub>:** Midwives does not have significant knowledge of Maternity Healthcare Waste Management Practice in Nnamdi Azikiwe University Teaching Hospital.

Table 2 show that the Pearson chi square statistic is 54.00 and the p value is 0.256. The likelihood chi-square is statistic is 34.005 and the p-value is 0.937. Therefore, at a significant level of 0.05, Hence we conclude that there is a significant midwives have significant knowledge of Maternity Healthcare Waste Management Practice in Nnamdi Azikiwe University Teaching Hospital.

#### 4. DISCUSSION

The study's conclusions showed that midwives and nurses had a high degree of waste management awareness. Midwives' and nurses'

degree of waste management expertise is a crucial factor that directly affects how well healthcare waste management procedures work. Numerous studies have shown that healthcare personnel' understanding of waste management procedures varies widely. Research has shown that a noteworthy proportion of healthcare personnel possess proficient understanding of healthcare waste management techniques (Letho et al., 2021; Musa et al., 2023; "undefined", 2022; Elsayed & Gab-Allah, 2019). Nonetheless, several findings suggest that healthcare workers, especially those in underdeveloped nations, have inadequate levels of expertise (Tadesse & Kumie, 2014; Kuchibanda & Mayo, 2015); [22,23]. According to Elsayed & Gab-Allah (2019) and Imchen et al. (2017), training programs are crucial interventions that may enhance healthcare personnel' understanding of waste management techniques. The proportion of healthcare professionals with strong waste management knowledge scores has significantly increased as a result of post-educational program

interventions (Elsayed & Gab-Allah, 2019). This lack of awareness is concerning as WHO emphasizes the importance of proper collection, handling, and disposal of healthcare waste to ensure the safety of both individuals and the environment (Ameer, 2024). Comparing these findings with existing literature, it is evident that the issue of inadequate knowledge and compliance with healthcare waste management guidelines is not unique to the study on midwives. Studies conducted in various countries have highlighted similar challenges across healthcare facilities, with a significant percentage demonstrating unsatisfactory waste management practices (Abah, 2020). The WHO has long advocated for healthcare waste to be treated as special waste, emphasizing the need for designated personnel or teams to oversee waste management plans in healthcare facilities (David & Wenchao, 2016; Ezirim & Agbo, 2018). Efforts to improve healthcare waste management practices have been ongoing globally, with updated guidelines released by WHO in 2014 to enhance waste management measures (Ezeudu et al., 2022). Studies have underscored the importance of promoting practices that reduce waste volume, ensuring proper waste segregation, and implementing strong oversight and regulation to meet national and international standards (Wassie et al., 2022). Additionally, the safe management of healthcare waste not only enhances patient and occupational safety but also plays a crucial role in protecting public health and the environment (Sapkota et al., 2015; G et al., 2020).

## 5. CONCLUSION

The study concludes that majority of the respondents have high knowledge on HCW management while only few of them have low knowledge on it. majority of the respondents reported high compliance on HCW disposal while only few of them reported low compliance on it and that some factors impact healthcare workers' adherence to waste management guidelines. Midwives and nurses may encounter barriers to compliance, such as resource availability, guideline accessibility, and healthcare system factors, which can affect their ability to adhere to standard precautions.

## 6. RECOMMENDATIONS

Recommendations for improving compliance of maternity healthcare waste management practices to WHO guidelines among midwives:

1. Enhanced Training Programs: Implement comprehensive and regular training programs for midwives focusing on WHO guidelines for healthcare waste management. Training should cover proper waste segregation, handling, disposal, and the effective use of personal protective equipment.
2. Resource Allocation: Ensure the availability of essential resources such as safety equipment, waste disposal containers, and appropriate waste treatment facilities to facilitate compliance with waste management guidelines.
3. Policy Formulation: Develop and enforce clear policies and guidelines on healthcare waste management in maternity settings. These policies should outline standard procedures, responsibilities, and best practices for waste disposal.
4. Supervision and Monitoring: Implement regular supervision and monitoring mechanisms to ensure adherence to waste management protocols. Supervisory visits and audits can help identify areas for improvement and provide feedback to enhance compliance.
5. Promote Awareness: Conduct awareness campaigns and educational sessions to increase knowledge and understanding of the importance of proper healthcare waste management practices among midwives. Emphasize the potential health risks associated with improper waste disposal.
6. Collaboration with Healthcare Providers: Foster collaboration between midwives, healthcare providers, and waste management experts to exchange knowledge, share best practices, and address challenges related to waste disposal in maternity care.
7. Continuous Quality Improvement: Establish a system for continuous quality improvement in waste management practices. Encourage feedback from midwives, monitor outcomes, and implement corrective measures to enhance compliance with guidelines.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

## CONSENT AND ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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