

## KAP Analysis of Nurses Regarding Biochemical Waste Management at Nishtar Hospital, Multan

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**Abstract:** Effective management of biochemical waste is crucial in preventing hospital-acquired infections and ensuring environmental safety. Nurses play a central role in this process, yet gaps in knowledge, attitude, and practice (KAP) may hinder safe waste disposal. **Objective:** To assess the knowledge, attitudes, and practices (KAP) regarding biochemical waste management among nurses in a tertiary care hospital. **Methods:** An analytical cross-sectional study was conducted in the Nursing Department of Nishtar Hospital, Multan, from January 2024 to January 2025. A total of 200 permanently employed nurses were selected using non-probability sampling. Data were collected using a structured questionnaire consisting of 13 knowledge items, 28 attitude items, and 24 practice items. Demographic data included age, gender, job experience, designation, marital status, and departmental assignment. Statistical analysis was performed using SPSS version 25, with associations evaluated using Chi-square tests and  $p \leq 0.05$  considered significant. **Results:** Half of the participants (50%) demonstrated unsatisfactory knowledge regarding biochemical waste management, and 90% reported no prior education or training on the topic. Unfavorable attitudes were found in 82% of nurses, and 50% showed poor practices. Nurses aged 30–45 years were more likely to have satisfactory knowledge (80%,  $p = 0.001$ ). Higher knowledge scores were also observed among nurses in the emergency department (73%,  $p = 0.03$ ) and maternity ward (90%,  $p = 0.001$ ). Nurses with over 10 years of experience showed significantly better knowledge (75%) compared to those with less experience (44%). **Conclusion:** This study revealed a significant deficiency in knowledge, attitudes, and practices related to biochemical waste management among nurses. Targeted training and continuous education programs are crucial for enhancing compliance and maintaining safe healthcare environments.

**Keywords:** Biochemical, Knowledge, Nurses, Nursing

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### Introduction

Biomedical waste management (BMWM) is a critical aspect of healthcare that ensures the safe disposal of medical waste, preventing potential health hazards to healthcare workers, patients, and the community. The management of biomedical waste is crucial to mitigate risks associated with infectious diseases and environmental contamination. Several studies have highlighted the importance of effective BMWM practices and the role of healthcare professionals, particularly nurses, in this process (1, 2).

Proper knowledge, attitudes, and practices (KAP) among nurses are essential for effective BMWM. A study by Dalui et al. found that only 60% of nurses had adequate knowledge about the categorisation and disposal methods of biomedical waste (3). Another research by Mohan et al indicated that continuous training programs significantly enhance the knowledge levels of nurses regarding BMWM (4). A survey conducted by Rao et al. revealed that a positive attitude towards BMWM correlates with better compliance with waste management protocols (5). However, Perumal et al. reported that despite having a positive attitude, nurses often face barriers such as a lack of resources and institutional support, which impede effective waste management (6).

The practical aspects of BMW are often hindered by inadequate infrastructure and improper waste segregation. According to a study by Singh and Sonkar, only 50% of healthcare facilities had proper waste disposal systems in place (7). This study aims to assess the KAP regarding BMWM among nurses in a tertiary care hospital.

### Methodology

An analytical cross-sectional study was conducted in the Nursing Department of Nishtar Hospital, Multan, from February 2024 to February 2025. A total of 200 nurses, who were permanent employees, were

included in the study. Non-consenting nurses, students, and internees were excluded. All nurses implicitly agreed to participate in the study. Ethical approval was obtained from the ethics committee to participate in the study.

Data collection was conducted using a structured questionnaire and interviews. Demographic variables, including age, gender, experience, job position, marital status, and department, were recorded. Nurses' knowledge was assessed using 13 items, attitudes using 28 items, and practices using 24 items. A knowledge score of 7 or higher indicated good knowledge, while a score of 7 or less indicated poor knowledge. An attitude score of 14 or higher indicated a favorable attitude, while a score of 14 or less indicated an unfavorable attitude. A practice score of 12 or higher was considered good practice, while a score of 12 or less indicated poor practice.

Data analysis was done by SPSS version 20. The association between demographics, job parameters, and knowledge was determined by simple logistic analysis. Multiple logistic analysis was performed to determine the association between KAP variables. A p-value of 0.05 or less was taken as statistically significant.

### Results

A total of 100 nurses were included in the analysis, with an average age of 28 years. The majority of nurses (90%) were female, and 10% each belonged to the medicine and surgery departments. 85% of nurses had less than 10 years of experience, among whom 55% had 1-4 years of experience. The basic information of participants is shown in Table 1. Of the 85 nurses (85%), 85% answered that biomedical waste was unrecyclable material. Only 30% (30%) of the nurses were aware of regulations regarding it, 35% (35%) were familiar with WHARI, and 50% (50%) knew correctly how to handle a blood exposure incident. Only 10



(10%) received prior information and training for management of biomedical waste. 20 (20%) reported that they have a source for gaining information. Sixty (60%) nurses reported that they had not received any vaccines for diseases transmitted by biomedical waste. Forty (40%) nurses disposed of waste properly, while 65% were not satisfied with biomedical waste management at their institute. Overall, unfavorable practices were reported in 50% of the nurses. Knowledge of nurses regarding biomedical waste management is illustrated in Table 2. Among the age groups, nurses between 30 and 45 years old (80%) had a higher likelihood of possessing satisfactory knowledge ( $p = 0.001$ ).

Similarly, nurses working in the emergency department and laboratory (73%,  $p = 0.03$ ) and maternity ward (90%,  $p = 0.001$ ) were more aware. Nurses with more than 10 years of experience (75%) were more likely to have higher knowledge scores than nurses with less experience (44%). A satisfactory knowledge score was positively associated with a favorable attitude (5.08, 95% CI: 3.06-8.47) and good practices (5.32, 95% CI: 3.22-8.64). Similarly, nurses with favorable attitudes were also more likely to exhibit good practices (4.62, 95% CI: 2.91-7.74) (Table 3).

**Table 1: Personal and Job Characteristics of Nurses**

Characteristics	N (%)
Age	
18-29	70 (70%)
30-45	20 (20%)
45-59	10 (10%)
Gender	
Male	10 (10%)
Female	90 (90%)
Marital status	
Single	50 (50%)
Married	50 (50%)
Department	
Medicine	20 (20%)
Surgery	20 (20%)
Laboratory	10 (10%)
Emergency	5 (5%)
Maternity	10 (10%)
Experience	
Less than 10 years	85 (85%)
More than 10 years	15 (15%)

**Table 2: Knowledge about Biomedical Waste Management**

Statements	Correct answer N (%)
How do you define 'waste'	85 (85%)
Are you aware of regulations for biomedical waste?	30 (30%)
Can you recycle biomedical waste?	15 (15%)
Are you familiar with WHARI?	35 (35%)
How do you deal with a blood exposure incident?	50 (50%)
Do you possess any prior knowledge about biomedical waste management?	10 (10%)

**Table 3: Association between KAP Parameters**

	Attitudes (OR (95% CI))	P	Practices (OR (95% CI))	P
Knowledge				
Satisfactory	5.08 (3.06-8.47)	0.04	5.32 (3.22-8.64)	<0.001
Attitudes				
Favorable			4.62 (2.91-7.74)	<0.001

**Discussion**

This study was conducted to analyse the knowledge, attitudes, and practices of nurses regarding biowaste management. The results showed unsatisfactory levels of knowledge, unfavorable attitudes, and poor practices among nurses. These findings are similar to those of developing countries and significantly lower than those of developed countries (8-10).

Fifty percent of the nurses had an unsatisfactory knowledge score, and 90% had not received any prior education or training. Lack of nurse training on management and disposal has been reported by Jalal et al and Shekoohiyan et al with a 50% and 74% rate, respectively (11, 12). 82% of the nurses had unfavorable attitudes, which is similar to 66% as reported by Mitiku et al, but significantly lower than a French study (13,

14). Only 40% of the staff were vaccinated against biochemical disease, which also reflects poor training, similar to Motlatla et al (15).

Fifty percent of the nurses exhibited poor practices, which may be attributed to a lack of resources and workforce at the hospital. Insufficient staff and the heavy workload of nurses make it impractical to dispose of waste properly. Additionally, the lack of suitable equipment can also contribute to poor management. In Pakistan, not many healthcare centers have facilities for disposing of waste; hence, 70% of the nurses in our study were not aware of it. An African study also reported that only 53% of nurses sorted waste at work (16).

Nurses between 30 and 45 years old (80%) had a greater likelihood of possessing satisfactory knowledge ( $p = 0.001$ ). Nurses with more than 10 years of experience (75%) were more likely to have higher knowledge

scores than nurses with less experience (44%). Previous studies have verified these findings.

## Conclusion

Lower knowledge levels, unfavorable attitudes, and poor practices were noted in nurses regarding biochemical waste management. This highlights the need for educational and training programs to make improvements.

## Declarations

### Data Availability statement

All data generated or analysed during the study are included in the manuscript.

### Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-MMNCS-927w3-24)

### Consent for publication

Approved

### Funding

Not applicable

## Conflict of interest

The authors declared the absence of a conflict of interest.

## Author Contribution

**MA** (Charge Nurse)

*Manuscript drafting, Study Design,*

**SM** (Nursing Instructor)

*Review of Literature, Data entry, Data analysis, and drafting an article.*

*Conception of Study, Development of Research Methodology Design,*

**MZ** (Charge Nurse)

*Study Design, manuscript review, and critical input.*

*All authors reviewed the results and approved the final manuscript version. They are also accountable for the integrity of the study.*

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