



## Original Research Article

## Expired medicine storage and Disposal: A descriptive cross sectional, questionnaire-based study to assess Knowledge, Attitude and Practice among medical and nursing students of Bankura Sammilani Medical College Hospital

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### Abstract

**Background:** Expired medicines are a source of environmental hazards leading to public health problems if not dispose according to guideline. It is expected from future healthcare professionals that they could give the leadership to other parts of the society in managing the issue more sensitively. This study among medical & nursing students will help to estimate the base line understanding for further course of cations.

**Aim and Objectives:** To assess Knowledge, attitude and practices of storage and disposal of expired medicine, among medical & nursing students of Bankura Sammilani Medical College Hospital.

**Materials and Methods:** A descriptive cross-sectional study was conducted among 250 medical and nursing students of Bankura Sammilani Medical College hospital in westbengal. Out of 250 only 122 had given the consent for taking part in the study. They were provided a pre validated structured questionnaire set in Google Form to assess their knowledge, Attitude and Practices regarding expired and leftover medicine as per WHO guideline within 4 days window to respond. Study was started after taking approval from Institutional Ethics Committee. Data collection, tabulation and analysis and report generation took one month to complete. (May- June'2023).The data were entered and analysed in excel sheet using Descriptive statistics and results were presented in the form of percentage using bar & pie diagram with statements.

**Results:** 92% cases, students responded in favour of having adequate knowledge about expired medicine. 100 students (68%) responded that there is no "Medicine take back System" in place in their city. 70% cases students had shown right attitude about expired medicine. 109 students (89%) said they use to store "Over the counter" drug prior hand.68% cases, students affirmed right practice about expired medicine.85 students (70%) responded that they would like to return back expired medicine to the pharmacy if opportunity exist.

**Conclusion:** The major study participants dispose expired medicine with household waste against recommended. Though adequate knowledge is there, deficit seen in practices and in attitude.

**Keywords:** Expired medicine, Environmental hazards, Pharmaceutical waste

**Received:** 28-09-2025; **Accepted:** 30-12-2025; **Available Online:** 02-02-2026

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### 1. Introduction

Proper storage and disposal of expired medications are crucial aspects of pharmaceutical waste management, with significant implications for public health and environmental safety. Improper handling of expired medicines can lead to accidental ingestion, drug abuse, and environmental contamination. Medical and nursing students, as future healthcare professionals, play a vital role in promoting safe medication practices. Their knowledge, attitudes, and practices regarding expired medicine storage and disposal are essential for ensuring patient safety and environmental protection.<sup>1-5</sup>

Bankura Sammilani Medical College Hospital, as a healthcare education institution, provides an ideal setting to assess the current understanding and practices among the medical and nursing students in this area. Evaluating their knowledge, attitudes, and practices can help identify gaps in education and take necessary targeted interventions to improve waist medication management practice.

A descriptive cross-sectional questionnaire-based study is conducted on this topic. This approach allows for the collection of information from a large number of participants at a single point of time, providing a snapshot. The questionnaire is designed to assess various aspects of expired

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medicine storage and disposal in light of WHO recommendation, including Knowledge of proper storage conditions for different types of medications, understanding of expiration dates and their significance, awareness of potential risks associated with expired medications, familiarity with recommended disposal methods, attitudes towards the importance of proper medication disposal, current practices in handling and disposing of expired medications.

The results of this study can provide valuable insights into the preparedness of future healthcare professionals in managing expired medications. This information can also be used to identify areas of strength and weakness in their current curriculum, develop targeted educational interventions to address knowledge gaps, raise awareness about the importance of proper expired medicine storage and disposal, contribute to pharmaceutical waste management practice in healthcare settings. This study ultimately contributes to improve patient safety and environmental protection.<sup>6-7</sup>

## 2. Aim and Objectives

To assess Knowledge, attitude and practices of storage and disposal of expired medicine, among medical & nursing students of Bankura Sammilani Medical College Hospital. To Assess the common causes for expired medicine accumulation in household.

## 3. Materials and Methods

### 3.1. Study design

This study employs a descriptive cross-sectional design using a google questionnaire-based approach. This method allows for the collection of data anonymously from a large number of participants.

**Table 1:** Study tool questioner

S/L NO	Questions (Knowledge)	Yes/NO	Additional Remarks
1	Do you think that every medicine should have an expiry date?		
2	Do you believe taking medicine beyond expiry date may cause harm?		
3	Do you have "Medicine take back system" in place in your city / institution?		
4	Do you think medicines are to be stored in specified environmental condition?		
5	Do you think expired medicines should have different policy from general waste for disposal?		
S/L NO	Questions ( Attitude)	Yes/NO	Additional Remark
1	Would you like use expired medicine to treat pet animal?		
2	Would you like to return back the medicines to chemist before expiry if remain unused?		
3	Is it okay to you for using the medicine which expired one or two days back?		
4	Would you like to accept the short expiry (< 3month) medicines from chemist?		
5	When do you discard any expiry medicine?		
6	What is the most common cause of accumulation of expired medicine in your house?		

### 3.2. Study setting

The study has been conducted at Bankura Sammilani Medical College Hospital, a healthcare education institution in Bankura, West Bengal, India.

### 3.3. Timeline

Data collection, tabulation and analysis and report generation took one month to complete. May'2023to June2023.

### 3.4. Study population

The target population includes medical and nursing students enrolled at Bankura Sammilani Medical College Hospital. Participants are been recruited from various years of study randomly to ensure a representative sample.

### 3.5. Inclusion criteria

Undergraduate students of MBBS and Bsc Nursing of either gender, studding at Bankura Sammilani Medical College Hospital.

### 3.6. Exclusion criteria

Who are not willing to take part in the study and refuse to consent.

### 3.7. Sample size

250 medical and nursing students were approached. Out of 250 only 122 had given the consent for taking part in the study. All the consented participants are being included in the study.

## 4. Ethical Approval

The data was collected after taking approval from Institutional Ethics committee.

S/L No	Questions (Practice)	Yes/No	Additional Remarks
1	Do you check "date of expiry" before purchasing medicine from Chemist?		
2	Do you used to store medicines (pain killers, antibiotics, vitamins, enzymes etc) at home for need prior hand?		
3	Have you ever used expired medicine for gardening as insecticide/ fertilizer?		
4	When do you discard expired medicines?		
5	Have you ever used expired medicine?		

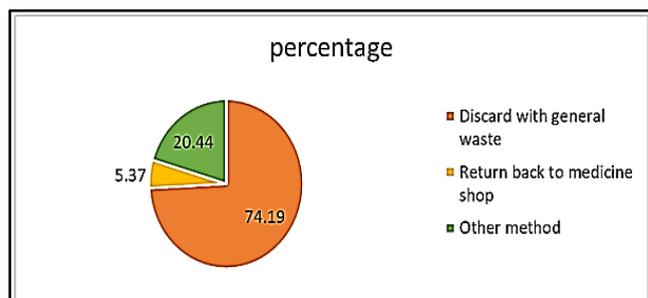


Figure 1: Method of discarding expired medicine

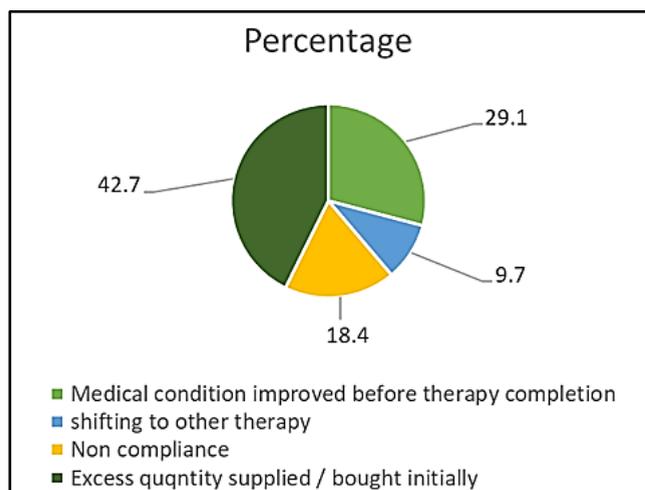


Figure 2: Common causes of accumulation of expired medicine

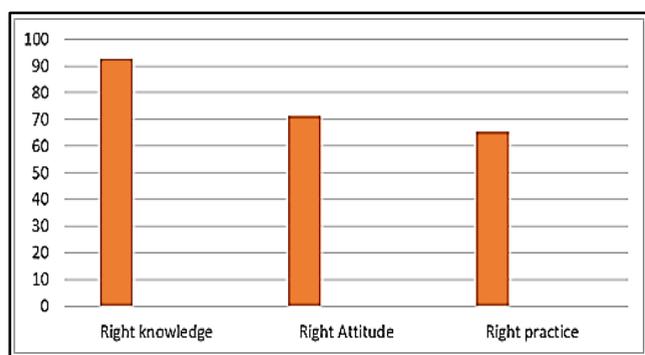


Figure 3: Percentage distribution of knowledge, attitude, practices

Table 2: Demography of the participants

	Total	Male	Female
MBBS Students	97	66	31
BSc Nursing Students	25	-	25
	Total participants = 122		

4.1. Data collection

A structured questionnaire has been developed based on a comprehensive literature review and expert consultation. The questionnaire consists of three main sections: Knowledge assessment, Attitude evaluation, Practice assessment. The knowledge, attitude, and practice sections include five questions each which are mix of close ended and open-ended scenario-based questions, to assess various aspects of expired medicine storage and disposal. The questionnaire was undergone content validation by a panel of experts in pharmacology department.<sup>8-9</sup> A pilot study was conducted with a small group of students to assess the clarity, comprehensibility, and time required to complete the questionnaire. Necessary modifications were made based on the pilot study results. Four days window time was given to collect their responses. The study was completed within a one-month period. Ethical approval was taken before commencement of the study from Institutional Ethics Committee. Informed consent was obtained from all participants before conducting the study. The questionnaire was administered in person on a secure online platform and the responses were recorded anonymously. Participants were given clear instructions and adequate time to complete the questionnaire. Confidentiality and anonymity of responses was ensured throughout the data collection process.

4.2. Data analysis

Collected data were entered into an excel sheet for statistical analysis. Descriptive statistics is being used and result expressed in percentages using bar & pie diagram with statements. Results are prepared on proportional estimate and percentage.

5. Result

Out of total 122 participant's student, 79.5% were MBBS students (total 97) and 20.5% were BSc nursing students (total 25).

According to 91.8% of total participants, expired medications require a special regulation for disposal. There is no "medicine take-back system" in their city, according to 68.6% of participants. During buying of medications, 99.1% of participants look for the date of expiration (DOE) as per response recorded. Whereas 12.7% of individuals reported, they had used expired medicine ever. It is reported that 26.9% of participants don't hesitate to take expired medicines till 1-2 days after the DOE. 21.1% of participants said they would want to utilize outdated medications as fertilizer or pesticides in their gardens. Data reveals that 92% of participants, know adequately about expired medicine disposal. When it came to about right practice, 70% participants showed the proper attitude where as 68% of participants complied with the proper procedures of medicine disposal.<sup>11-13</sup> Among them 70% of participants stated they would prefer to return expired medications to the pharmacy if scope is there.

## 6. Discussion

Present study is a descriptive cross-sectional study to assess the knowledge, attitude and practice among medical and nursing students of a medical college towards disposal of waste medicine. Improper discarding of medicine is a potential cause of environmental pollution, associated with increased incidence of antibiotic resistance. This study will enlighten the awareness among future medical paramedical work force who are currently in learning stage of their life and they will show the right path to rest of the society regarding environmental safety and as well patient safety by preventing environmental contamination with medicines. In KAP scale their knowledge, attitude and practice is 92%, 70%, 68%, respectively whereas it has been seen elsewhere 24.5%, 22.6% and 21% in a study by Aline Hajj, Souraya Domiati, Chadia Haddad et al.<sup>2</sup> There is a significant gap between knowledge and attitude which is the major lagging. To tackle this challenge, it is suggested that more sensitisation and regulation should be endorsed at every level of patient care setting. The clear policies on medication disposal have to be displayed in hospitals and the teaching institutes, while expanding educational initiatives to increase disciplined attitude among future professionals.<sup>3,4</sup>

## 7. Limitation

This study could be of robust result generating if conducted in a greater number of students and with an elaborative questioner.

## 8. Conclusion

Knowledge about expired medicine and its disposal is adequate among the participants but in practice and actions doesn't follow the knowledge due to short fall in attitude part among participants and regulatory coercion. A significant number of the study participants dispose unused and expired medicine in household garbage which is not at par national and international policies and guidelines on safe and

appropriate pharmaceutical waste disposal which is a major concern scope of rectification. Excess medicine purchase/supply is one of the common reasons of leftover medicine generation, followed by early recovery before therapy completion. There is an innate practice of storing medicine prior hand.

## 9. Acknowledgments

I am thankful for the guidance and encouragement that I have from my senior faculty members and colleagues of Department of Pharmacology, Bankura Sammilani Medical College & Hospital, Bankura, West Bengal.

## 10. Source of Funding

The study is conducted on academic interest; no sponsor was there for funding from outside.

## 11. Conflict of Interest

There is no conflict of interest in any part of the study.

## 12. Ethical Approval

The data is collected anonymously; no IEC approval is required as per ICMR guideline.

## 13. Authors' Contributions

1. Dr Koushik Mazumder is the first author and is responsible for drafting the article or revising it critically for important intellectual content, data collection, research tool development, study tool application, consent taking, analysis and manuscript writing.
2. Dr Sonai Mandal is the second author responsible for the conception and design of the study, idea generation, study tool evaluation, protocol development and final approval of the version to be submitted.
3. Dr. Koushik Mazumder, is the corresponding author here.

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**Cite this article:** Mazumder K, Mandal S. Expired medicine storage and Disposal: A descriptive cross sectional, questionnaire-based study to assess Knowledge, Attitude and Practice among medical and nursing students of Bankura Sammilani Medical College Hospital. *Indian J Pharma Pharmacol*. 2025;12(4):235-239.