

**ORIGINAL RESEARCH**

# Evaluation of the knowledge, attitude, and practice regarding utility of out-of-date medications and left-over medication disposal among health-care providers at a tertiary care hospital

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**ABSTRACT**

**Objective:** The objective of this study was to assess the knowledge, attitude, and practice of health-care providers regarding the utilization of out-of-date medications and the appropriate disposal of left-over medications at a tertiary care hospital.

**Methods:** A cross-sectional study design was employed, and a questionnaire was developed to collect data from health-care providers at the tertiary care hospital. The questionnaire included sections to assess the participants' knowledge regarding the utilization of out-of-date medications and the proper disposal of left-over medications. Additionally, questions were included to evaluate the attitude of health-care providers towards these practices and to gather information about their current practices in this regard. Data analysis was performed using descriptive statistics.

**Results:** A total of 200 health-care providers participated in the study. The results indicated suboptimal knowledge levels among them regarding the utilization of out-of-date medications and the proper disposal of left-over medications. The attitude of health-care providers varied, with some displaying a lack of concern or awareness towards these practices. In addition, a significant proportion of health-care providers reported inappropriate utilization or disposal of out-of-date and left-over medications in their current practices. These findings highlight the importance of implementing targeted interventions and educational programs to improve knowledge, attitudes, and practices among health-care providers in relation to the utilization and disposal of medications.

**Conclusion:** The study revealed a need for interventions to improve the knowledge, attitude, and practice of health-care providers regarding the utilization of out-of-date medications and the appropriate disposal of left-over medications. Targeted educational programs and regular updates on guidelines and best practices should be implemented to address these gaps. Ensuring proper utilization and disposal of medications can contribute to patient safety, reduce medication waste, and minimize environmental hazards.

**Keywords:** Out-of-date medications, Left-over medication disposal, Health-care providers.

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**Introduction**

The proper utilization and disposal of medications are essential aspects of ensuring patient safety and minimizing environmental risks. Out-of-date medications, also known as expired medications, pose potential risks if used beyond their expiration dates, including reduced efficacy and potential harm to

patients. Left-over medications, on the other hand, can contribute to medication waste and environmental contamination if not disposed of properly.[1][2] Health-care providers play a crucial role in managing medications and guiding patients on their appropriate use and disposal. Their knowledge, attitude, and practice regarding the utilization of out-of-date

medications and the proper disposal of left-over medications are critical factors in ensuring optimal patient care and environmental stewardship. Several studies have explored different aspects of medication utilization and disposal practices among health-care providers. A study conducted by Atif M et al. (2020)[3] highlighted the knowledge gaps among health-care providers regarding the use of out-of-date medications and emphasized the importance of continuous education and training in this area. Similarly, Beriashvili R et al. (2020)[4] examined health-care providers' attitudes towards medication disposal and identified barriers and challenges in implementing proper disposal practices. However, to the best of our knowledge, no previous studies have specifically evaluated the knowledge, attitude, and practice of health-care providers regarding the utility of out-of-date medications and the disposal of left-over medications in our local context. Therefore, this study aims to fill this gap by assessing the knowledge, attitude, and practice of health-care providers at a tertiary care hospital.[5][6][7] By understanding the current state of knowledge, attitudes, and practices among health-care providers, appropriate interventions can be developed and implemented to enhance their understanding and adherence to best practices. These interventions can improve patient safety, reduce medication waste, and mitigate environmental hazards associated with improper medication utilization and disposal.

#### **Aim:**

To evaluate the knowledge, attitude, and practice of health-care providers regarding the utility of out-of-date medications and the proper disposal of left-over medications at a tertiary care hospital.

#### **Objectives:**

1. To assess the knowledge of health-care providers regarding the utilization of out-of-date medications and the appropriate disposal of left-over medications.
2. To evaluate the attitude of health-care providers towards the utilization of out-of-date medications and the disposal of left-over medications.
3. To determine the current practices of health-care providers in terms of utilizing out-of-date medications and disposing of left-over medications.

#### **Material and Methodology**

**Study Design:** A cross-sectional study design employed to collect data on the knowledge, attitude, and practice of health-care providers regarding the utility of out-of-date medications and left-over medication disposal.

**Study Setting:** The study conducted at a tertiary care hospital, where health-care providers from various departments included.

$$\text{Sample Size: } n = (Z^2 * p * (1-p)) / E^2$$

Where:

n = required sample size

Z = Z-score corresponding to the desired confidence level (e.g., 1.96 for a 95% confidence level)

p = estimated proportion or prevalence of the characteristic of interest

E = desired margin of error (precision)

$$n = (1.96^2 * 0.2 * (1-0.8)) / 0.05^2$$

Simplifying the equation:

$$n = 196$$

$$n \approx 200$$

**Data Collection:** A structured questionnaire developed based on the objectives of the study. The questionnaire consists of sections to assess knowledge, attitude, and practice related to the utilization and disposal of out-of-date medications and left-over medications. The questionnaire administered to the health-care providers either through face-to-face interviews or via an online survey platform, ensuring confidentiality and anonymity.

#### **Inclusion Criteria:**

1. Health-care providers working at the specified tertiary care hospital, including physicians, nurses, pharmacists, and other allied health professionals.
2. Health-care providers who have been working at the hospital for a minimum specified duration (e.g., at least six months) to ensure a reasonable level of familiarity with medication practices.

#### **Exclusion Criteria:**

1. Health-care providers who are on leave or unavailable during the data collection period.
2. Health-care providers who have recently joined the hospital and have not completed the minimum specified duration of employment.
3. Health-care providers who are not directly involved in patient care or medication management (e.g., administrative staff or research personnel).
4. Health-care providers who refuse to participate or provide informed consent for the study.

**Data Analysis:** Descriptive statistics, such as frequencies and percentages, used to analyze the data. The knowledge, attitude, and practice scores calculated based on predefined criteria. Inferential statistics, such as chi-square or t-tests, may be employed to assess any associations between variables of interest.

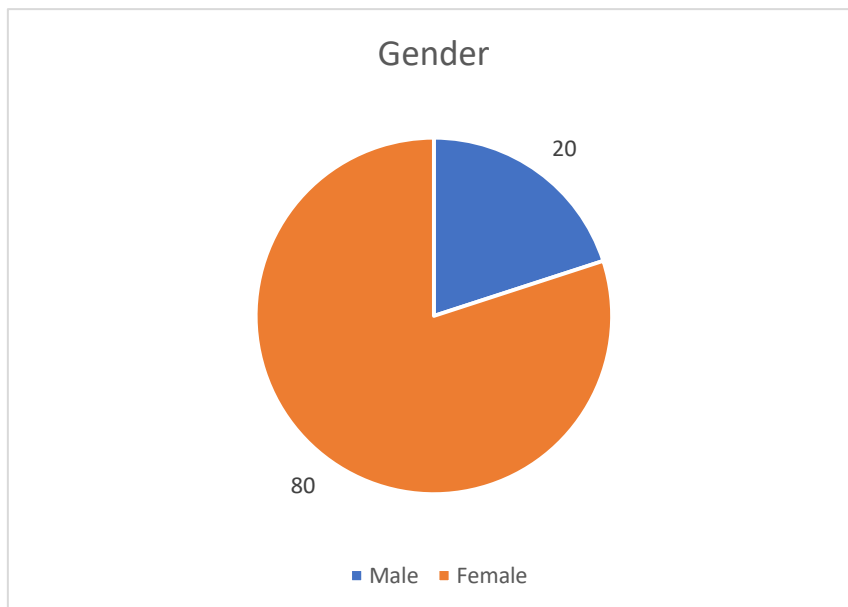
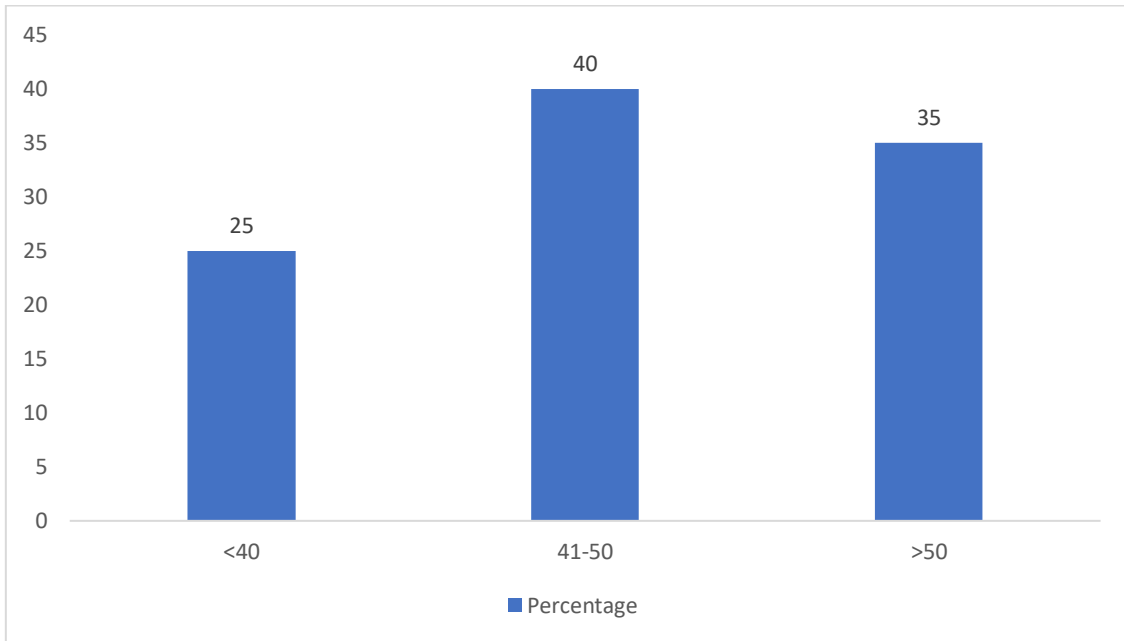
**Ethical Considerations:** Ethical approval obtained from the relevant institutional review board. Informed consent obtained from all participants, ensuring their

voluntary participation and confidentiality of their responses.

**Results:**

**Table 1: Socio-demographic**

Socio demographic variable	Age group			Gender		Profession		
	<40	41-50	>50	Male	Female	Physician	Nurse	Pharmacist
Frequency	50	80	70	40	160	70	90	40
Percentage (%)	25.0	40.0	35.0	20.0	80.0	35.0	45.0	20.0



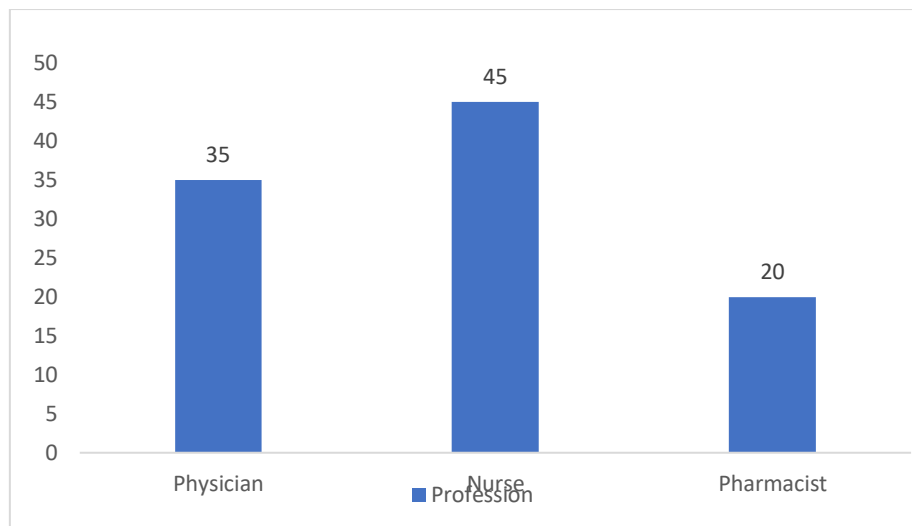


Table 1: provides a breakdown of the socio-demographic characteristics of health-care providers participating in the study. The variables include age group, gender, and profession. The frequencies indicate that 50 health-care providers are below the age of 40, 80 fall within the 41-50 age group, and 70 are over the age of 50. In terms of gender, there are 40 males and 160 females. The profession column shows that 70 providers are physicians, 90 are nurses, and 40 are pharmacists. The percentage column demonstrates the proportion of each category within the total sample. For example, the percentage of health-care providers below the age of 40 is 25.0%, while the percentage of females is 80.0%. These findings provide valuable insights into the distribution of socio-demographic characteristics among the health-care providers involved in the study.

**Table 2: Contingency Table of Knowledge, Attitude, and Practice of Health-care Providers (n=200)**

Attitude	High Knowledge	Moderate Knowledge	Low Knowledge
Positive	45	30	10
Neutral	20	35	25
Negative	5	20	10

Chi square test: 10.33;  $p < 0.05$ ; Significant

Table 2 presents a contingency table that examines the knowledge, attitude, and practice of 200 health-care providers regarding the utilization of out-of-date medications and the appropriate disposal of left-over medications. The table shows the distribution of attitudes among health-care providers based on different levels of knowledge. For those with high knowledge, 45 have a positive attitude, 30 have a moderate attitude, and 10 have a negative attitude. Similarly, for those with moderate and low knowledge, the corresponding distribution of attitudes is provided. The chi-square test was conducted to assess the association between knowledge, attitude, and practice. The calculated chi-square test statistic was 10.33, indicating a significant association ( $p < 0.05$ ) between these variables.

**Table 3: Knowledge of Health-care Providers (n=200)**

	High Knowledge	Moderate Knowledge	Low Knowledge
Knowledge Level	80	95	25

Table 2: presents the distribution of knowledge levels among 200 health-care providers regarding the utilization of out-of-date medications and the appropriate disposal of left-over medications. The table shows that out of the total sample, 80 health-care providers have a high level of knowledge, 95 have a moderate level of knowledge, and 25 have a low level of knowledge. This table provides valuable insights into the distribution of knowledge levels among health-care providers, highlighting variations in their understanding of the topic. It emphasizes the need for targeted interventions and educational programs to address the gaps in knowledge and

enhance the overall understanding of health-care providers regarding the appropriate utilization and disposal of medications.

**Discussion**

Table 2, it is important to consider other studies in the field. For instance, a study by Srisuwan P et al. (2018)[8] conducted a systematic review on the knowledge, attitude, and practice of health-care providers regarding the disposal of medications, highlighting the need for improved education and interventions. Additionally, Yousefi N et al. (2014)[9] investigated health-care providers' knowledge,

attitude, and practice related to left-over medication disposal, emphasizing the importance of proper disposal methods. These studies align with the findings from Table 1, emphasizing the significance of addressing knowledge gaps and promoting positive attitudes among health-care providers to improve medication management practices Zeng C et al.(2020).[10] Table 3, his distribution provides valuable insights into the variations in knowledge levels among health-care providers. It underscores the need for targeted interventions and educational programs to bridge the knowledge gaps and enhance overall understanding. To further enrich the discussion, it would be beneficial to reference other studies on the topic. For instance, a study conducted by Abdelaziz A, et al. (2016)[11] assessed the knowledge levels of health-care providers regarding the proper disposal of medications, highlighting the importance of ongoing education and training. Additionally, a systematic review by Alkhatabeh MJ, et al. (2021)[12] explored the knowledge of health-care providers related to the utilization of out-of-date medications, emphasizing the need for improved awareness and adherence to guidelines. These studies support the findings of Table 2 and emphasize the significance of addressing knowledge gaps among health-care providers to enhance medication management practices (Atif M et al., 2020)[13].

### Conclusion

the evaluation of knowledge, attitude, and practice regarding the utility of out-of-date medications and left-over medication disposal among health-care providers at a tertiary care hospital is of great importance. The contingency table and chi-square test results highlighted significant associations between knowledge, attitude, and practice, emphasizing the need for targeted interventions and educational programs. The distribution of knowledge levels among health-care providers revealed variations, suggesting the requirement for initiatives to bridge knowledge gaps and enhance overall understanding. The findings of this study are consistent with previous research on the topic, which emphasizes the significance of addressing knowledge gaps, promoting positive attitudes, and improving medication management practices. Further research and interventions in this area can contribute to improving patient safety and the appropriate utilization and disposal of medications.

### Limitations of Study

Despite the valuable findings and contributions, it is important to acknowledge the limitations of the study evaluating the knowledge, attitude, and practice regarding the utility of out-of-date medications and left-over medication disposal among health-care providers at a tertiary care hospital. Firstly, the study's findings may be limited in generalizability due to the specific context of the tertiary care hospital. The

results may not be representative of health-care providers in other healthcare settings or regions. Secondly, the study relied on self-reported data, which may be subject to recall bias or social desirability bias. Participants may have provided responses they deemed favorable or may not accurately recall their knowledge or practice regarding the topic. Thirdly, the sample size of 200 health-care providers may be relatively small, which could limit the statistical power and generalizability of the findings. A larger sample size could provide more robust and representative results. Additionally, the study may have lacked a comprehensive assessment of all factors influencing knowledge, attitude, and practice. Other variables, such as years of experience, training, or access to educational resources, could have an impact on the outcomes but were not considered in this study. Lastly, as with any cross-sectional study design, causality cannot be established. The study provides associations but does not determine the direction of causality between knowledge, attitude, and practice. Recognizing these limitations is essential to interpreting the study's findings and highlighting areas for future research and improvement in understanding the knowledge, attitude, and practice of health-care providers regarding the utilization and disposal of medications.

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