

## NURSES' KNOWLEDGE REGARDING SAFE ADMINISTRATION OF PARENTERAL MEDICATIONS IN PUBLIC SECTOR HOSPITALS OF PESHAWAR

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### Abstract

**Background:** Safe parenteral medicine administration is an essential component of quality nursing care and plays a vital role in the treatment of illness, prevention of complications, and promotion of patient safety. Nurses are directly responsible for medication administration, and any error during parenteral drug delivery may lead to serious adverse outcomes, including infection, hypersensitivity reactions, prolonged hospital stay, morbidity, and mortality. Therefore, adequate knowledge regarding safe administration of parenteral medications is crucial for nurses working in clinical settings.

**Objective:** The objective of this study was to assess nurses' knowledge regarding the safe administration of parenteral medications in public sector hospitals of Peshawar.

**Methods:** A descriptive cross-sectional study design was used to evaluate nurses' knowledge regarding safe administration of parenteral medications. The study was conducted in public sector tertiary care hospitals of Peshawar. A total of 152 registered nurses were selected using a convenience sampling technique. Data were collected through a structured questionnaire adapted and modified according to the study setting. The questionnaire consisted of demographic characteristics and knowledge-related items regarding safe parenteral medication administration. Data were analyzed using SPSS version 20, and descriptive statistics were used to summarize the findings.

**Results:** The findings of the study revealed that 47.1% of nurses agreed on the use of gloves while administering parenteral medications. About 51.3% of nurses emphasized the importance of aseptic technique during parenteral drug administration. Furthermore, 76.31% of participants reported that hand washing before and after medication administration is necessary. Overall, 88.81% of nurses demonstrated sufficient knowledge regarding the safe administration of parenteral medications.

**Conclusion:** The study concludes that nurses working in public sector hospitals of Peshawar possess adequate knowledge regarding the safe administration of parenteral medications. However, despite sufficient knowledge, gaps in actual practice still exist, indicating the need for continuous education, regular training

*programs, and strict adherence to standard medication administration protocols to enhance patient safety and quality of care.*

## INTRODUCTION

Medication errors are a persistent and significant threat to patient safety, often leading to serious complications, unnecessary suffering, delayed recovery, or clinical deterioration. The National Coordinating Council for Medication Error Reporting and Prevention defines these incidents as the preventable misuse of a drug, whether through faulty professional administration or patient consumption. Such errors typically arise when healthcare providers fail to adhere to the strict protocols, regulations, and standard operating procedures established within their institutions for safe medication practices (1,2).

For nurses, administering medication is not merely a routine task but a core professional responsibility. Their education, ethical code, and professional accountability are all directed toward the safe execution of this duty (3). In practice, this responsibility consumes a substantial portion of the working day; studies employing time-motion analysis and observation report that medication-related activities account for 27% to 40% of a nurse's time (4,5). The complexity of this process should not be underestimated, particularly for parenteral routes like intravenous injection, which demand a high-level integration of nursing skills and carry inherent risks (6). Any lapse during preparation or administration can precipitate severe adverse drug events—such as thrombosis, anaphylaxis, or infection—with potentially fatal consequences (7). Indeed, research indicates that prescription and administration errors are directly responsible for death in 0.9% of affected patients and cause permanent harm in others (8). Beyond the human cost, these mistakes burden healthcare systems by prolonging hospital stays and inflating treatment costs (8), and they can even jeopardize staff safety through incidents like needlestick injuries (9).

Analyses of why these errors occur point to a confluence of factors. Prominent conceptual frameworks highlight individual attributes like a clinician's knowledge and skills, systemic challenges related to policies and procedures, and

broader communication or workflow issues (10). Common errors made by nurses include administering the incorrect drug or dose, using the wrong route or rate, administering at the wrong time, or giving medication to the wrong patient, alongside failures in documentation and monitoring (11). Data from the Turkish Ministry of Health's 2016 Safety Reporting System statistics reveal a pattern of specific error types, including incorrect dosing, preparation errors, storage control lapses, mistakes in electronic selection and transfer, hand hygiene breaches, packaging problems, illegible orders, and wrong-drug administration. Notably, this report attributed 33.08% of all recorded drug errors to nursing practice (2).

The accurate performance of this high-stakes duty is fundamentally linked to a nurse's confidence in their own capability, a concept known as self-efficacy. Derived from Bandura's (1977) social-cognitive theory, self-efficacy represents an individual's belief in their ability to organize and execute the actions required to manage a specific situation (12). It influences how challenges are approached, how much effort is expended, and how long one persists in the face of obstacles. A strong sense of self-efficacy is therefore closely associated with successful performance, professional resilience, and personal development (13,14).

Within nursing, a nurse's task-specific self-efficacy for medication administration their belief in their capacity to perform this complex duty safely directly influences their clinical behavior and outcomes (15). It logically follows that a high degree of this specific self-efficacy is a prerequisite for safe medication practice. Crucially, self-efficacy is understood to be the critical mediator that translates knowledge into action (16). Despite its apparent importance, a review of available literature found no existing instrument designed specifically to measure this precise construct. While tools like the general Nursing Profession Self-Efficacy Scale (NPSES) exist, their developers

have noted that broad scales are often inadequate for pinpointing competence in discrete clinical tasks, advocating instead for the development of task-specific measures (17). Examples of such targeted scales exist in other nursing domains, such as for managing pressure ulcers or providing nutrition to older adults (18,19). The absence of a parallel scale for the critical task of medication administration represents a significant gap in the tools available for nursing education, professional development, and patient safety research.

## Materials and methods:

### Study Design:

The descriptive-cross-sectional design was used in order to measure the existing knowledge of nurses.

### Study Setting:

The study was conducted at the two major Tertiary care hospitals in Peshawar over the duration of approximately 6 months.

### Study Population:

The study population for this research was all nurses working in tertiary hospitals in Peshawar.

### Sampling Technique & Sample Size:

Convenient sampling technique was used to recruit the participants. The sample size was 152, which was calculated by using the online Raosoft calculator considering total number of 250 nursing students with a 95% confidence level and a 5% margin of error.

### Inclusion criteria:

The subjects included in the study were all the Registered Nurses who were working in public sector hospitals in Peshawar.

### Exclusion criteria:

The subjects who were excluded from the study were:

Nurses who are unwilling to participate in the study will be excluded from our study.

Nurses who are on any kind of leave or absent on the day of data collection.

Those who are not directly involved in the health

care.

### Ethical Consideration:

The informed consent will be obtained from each participant in written form before data collection to ensure the protection of the privacy and confidentiality of participants. The participants would be autonomous in whether, to be a participant and have the right to withdraw their participation at any time. A permission letter will be signed from the head of each hospital from where data will be collected.

### Data Collection Procedure:

Data was collected through a structured questionnaire which will be modified according to the context and setting of the study. The questionnaire consisted of two parts. Part I comprised of demographic variables of the participants and part II included closed-ended questions on the knowledge level of nurses regarding the safe administration of parenteral medicines. All the selected participants were informed prior regarding the date and time of data collection.

### Data Analysis:

The data was analyzed through the latest version of SPSS-22. The descriptive statistics were calculated for demographic variables like age, gender, and years of experience. The mean knowledge level of nurses regarding the safe administration of parenteral medicines were measured accordingly. The inferential statistic was used to find the association between knowledge level with years of experience and the educational qualification of participants.

## RESULTS

In the current descriptive cross-sectional study, a total of 152 individuals were selected through convenient sampling technique. 74.34 % of them were females while 25.65 % male participants. There were 40.13 % of them were from 26-30 years of age, moreover, 32.23 % were from 31-35 years of age. 64.47 % and 35.52 % were single and married accordingly. 31.37 % had 3 to 4 years and 28.28 % had 5-6 years of experience.

Table 1: Demographic Characteristics

| Characteristics           | Number | Frequency |
|---------------------------|--------|-----------|
| <b>Gender</b>             |        |           |
| Male                      | 39     | 25.65 %   |
| Female                    | 113    | 74.34 %   |
| <b>Age</b>                |        |           |
| 21-25                     | 17     | 11.18 %   |
| 26-30                     | 61     | 40.13 %   |
| 31-35                     | 49     | 32.23 %   |
| 36-40                     | 11     | 7.23 %    |
| 41-45                     | 9      | 5.9 %     |
| 46-50                     | 5      | 3.28 %    |
| <b>Marital status</b>     |        |           |
| Single                    | 98     | 64.47 %   |
| Married                   | 54     | 35.52 %   |
| <b>Experience (years)</b> |        |           |
| 1-2                       | 36     | 23.68 %   |
| 3-4                       | 48     | 31.37 %   |
| 5-6                       | 43     | 28.28 %   |
| > 6                       | 25     | 16.44 %   |

The pie chart represents the knowledge regarding the risk-free manner of injection. 87.36 % of the participants agreed and strongly agreed about the manner of injection.

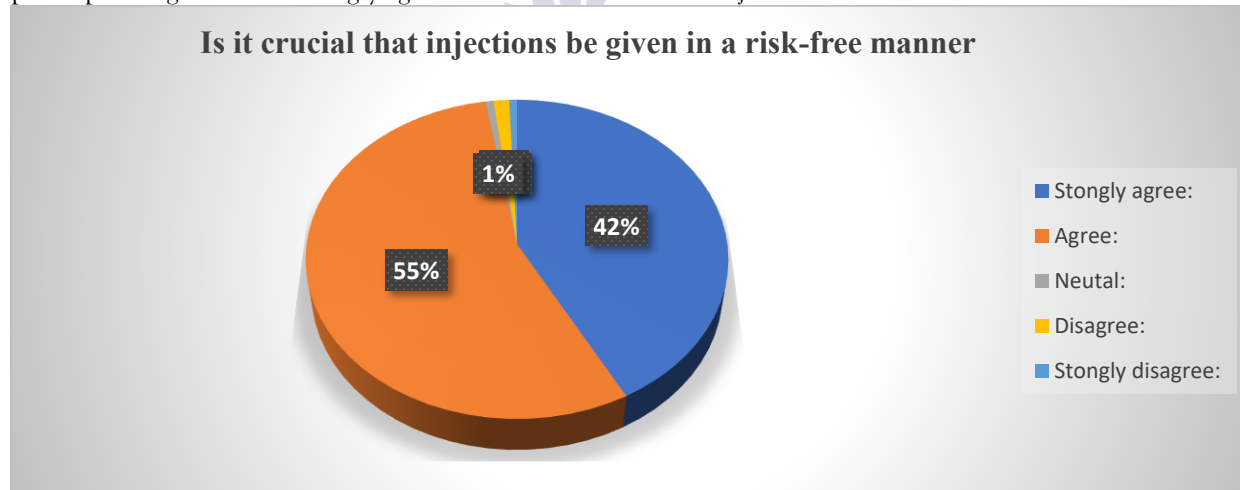


Table 3 highlights that injury can occur due to incorrect administration of drugs which 67.76 % of the individuals agreed and 30.26 % strongly agreed. Moreover, table 4 indicates the use of gloves while administering parental medication.

46.71 % of them agreed and 34.21 % strongly agreed regarding their use. More importantly, 12.50 % of the participants were neutral about them.

**Table 3: Do injuries occur because of incorrect drug administration?**

|                   | Number | Frequency |
|-------------------|--------|-----------|
| Strongly disagree | 0      | 0 %       |
| Disagree          | 1      | 0.65 %    |
| Neutral           | 2      | 1.31 %    |
| Agree             | 103    | 67.76 %   |
| Strongly agree    | 46     | 30.26 %   |

**Table 4: You agree that using gloves is crucial when administering parental medication.**

|                   | Number | Frequency |
|-------------------|--------|-----------|
| Strongly disagree | 3      | 1.97 %    |
| Disagree          | 7      | 4.60 %    |
| Neutral           | 19     | 12.50 %   |
| Agree             | 71     | 46.71 %   |
| Strongly agree    | 52     | 34.21 %   |

Table 5 highlights the importance of aseptic while giving parental medications. 51.31 % of them agreed and 40.78 % of them strongly agreed regarding the aseptic methods application during parental medicine. Table 6 indicates the

understanding of nurses regarding the route of administration of drugs and the angle of injection while giving medicine. 48.68 % of them agreed and 36.84 % strongly agreed.

**Table 5: Are aseptic methods crucial while giving parental medicine?**

|                   | Number | Frequency |
|-------------------|--------|-----------|
| Strongly disagree | 0      | 0 %       |
| Disagree          | 1      | 0.65 %    |
| Neutral           | 11     | 7.23 %    |
| Agree             | 78     | 51.31 %   |
| Strongly agree    | 62     | 40.78 %   |

**Table 6: Do you believe that nurses have an understanding of the site, route, and angle of injection?**

|                   | Number | Frequency |
|-------------------|--------|-----------|
| Strongly disagree | 1      | 0.65 %    |
| Disagree          | 3      | 1.97 %    |
| Neutral           | 18     | 11.84 %   |
| Agree             | 74     | 48.68 %   |
| Strongly agree    | 56     | 36.84 %   |

Table 7 highlights the knowledge of nurses regarding the importance of hand washing before and after the medication. 45.39 % of the individuals agreed and said that hand washing is necessary, furthermore, 30.92 % of them strongly agreed about the importance of hand washing.

Table 8 indicates that the nurses wash their hands regularly. In which 37.50 % of the individuals disagreed, 13.81 % disagreed that nurses always wash their hands. However, 30.26 % of them agreed and 15.78 % disagreed.

Table 7: Is it necessary to wash your hands before and after taking medication?

|                   | Number | Frequency |
|-------------------|--------|-----------|
| Strongly disagree | 0      | 0 %       |
| Disagree          | 8      | 5.26 %    |
| Neutral           | 28     | 18.42 %   |
| Agree             | 69     | 45.39 %   |
| Strongly agree    | 47     | 30.92 %   |

Table 8: Do you think that nurses always washed their hands?

|                   | Number | Frequency |
|-------------------|--------|-----------|
| Strongly disagree | 21     | 13.81 %   |
| Disagree          | 57     | 37.50 %   |
| Neutral           | 04     | 2.63 %    |
| Agree             | 46     | 30.26 %   |
| Strongly agree    | 24     | 15.78 %   |

Table 9 shows the understanding of nurses regarding the use various types of needles according to the medication. 57.89 % were agree

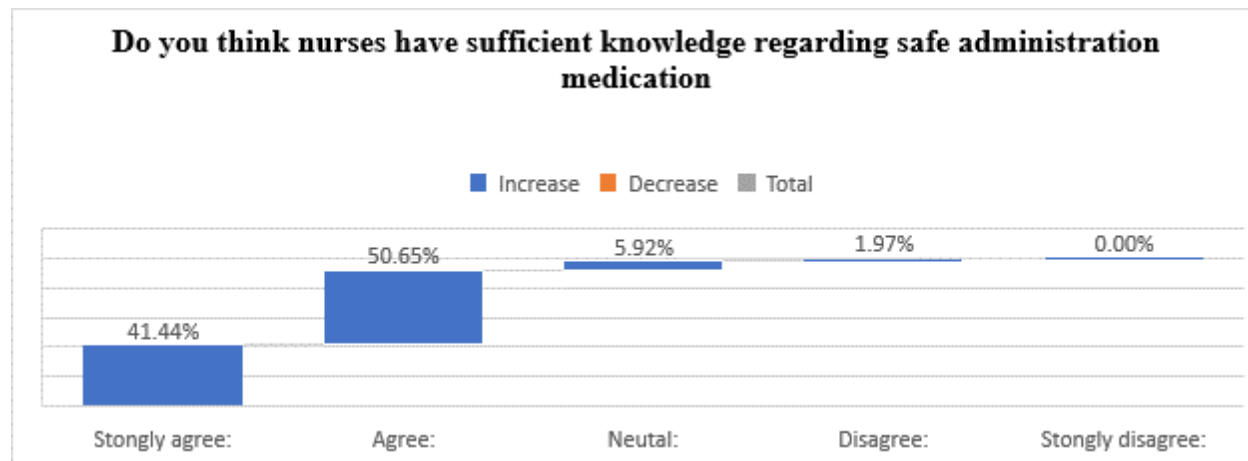
and 30.92 % were strongly agree, while only 1.97 % of the participants disagree.

Table 9: Do you believe that various medications should be administered with different needles?

|                   | Number | Frequency |
|-------------------|--------|-----------|
| Strongly disagree | 0      | 0 %       |
| Disagree          | 3      | 1.97 %    |
| Neutral           | 14     | 9.21 %    |
| Agree             | 88     | 57.89 %   |
| Strongly agree    | 47     | 30.92 %   |

The following bar chart highlights the opinion of nurses regarding the knowledge about the safe administration of medicines. In which the participants have the following responses about them: strongly agree (41.44 %), agree (50.65 %),

and neutral (5.92 %). That shows that 92.09 % have knowledge regarding the safe administration of medicines.



## Discussion:

Safe administration of parenteral medication is very important and crucial for the effective management of high-quality treatment for the patient. This is done to prevent the transmission of infectious microorganisms and to lessen the likelihood of the patient being injured. According to the Food and Drug Administration (FDA), approximately 1.3 million injuries occur annually in the United States as a direct result of the administration of medication that contains the incorrect drug, incorrect dose, incorrect timing, or incorrect route [39]. The present concluded that injury can occur due to incorrect administration of drugs in which 67.76 % of the individuals agreed and 30.26 % strongly agreed. Moreover, the use of gloves while administering parental medication. 46.71 % of them agreed and 34.21 % strongly agreed regarding their use. More importantly, 12.50 % of the participants were neutral about them. According to Aad et al. (2014), nurses play an important part in the safe administration of medication. Nurses and health care agencies can work together to improve the safe administration of parental medication, which can decrease the likelihood of error. However, unsafe administration of parenteral medicine may put a patient's life in jeopardy, so it is vital for every individual nurse to be aware of the correct route and dosage for the administration of drugs [36]. The results of this study indicated that nurses have sufficient knowledge concerning the safe administration of parenteral medication and were well aware of the correct route and needle requirement for the administration of parenteral medication. The findings of this study were presented in the form of a conclusion. In the current descriptive cross-sectional study, a total of 152 individuals were selected through a convenient sampling technique. 74.34 % of them were females while 25.65 % male participants. There were 40.13 % of them were from 26-30 years of age, moreover, 32.23 % were from 31-35 years of age. 64.47 % and 35.52 % were single and married accordingly. 31.37 % had 3 to 4 years and 28.28 % had 5-6 years of experience. 87.36 % of the participants agreed and strongly agreed about the manner of injection. According to a study by

Hatzivassiliou et al. (2010) [40], cleaning one's hands before handling and administering any form of medication is very important. However, washing one's hands before administering parenteral medication is very necessary. According to the current knowledge of nurses regarding the importance of hand washing before and after the medication. 45.39 % of the individuals agreed and said that hand washing is necessary, furthermore, 30.92 % of them strongly agreed about the importance of hand washing. A similar study conducted by Parveen NA et al, 2019 concluded that 92 % of the nurses felt that it is very necessary to wash one's hands before administering parenteral medication, as well as, the results of the survey indicated that 52% of the people who participated in the study agreed with the statement, and 39% of those people strongly agreed with the statement, that using aseptic practices is very important while administering parenteral medication in order to avoid the spread of infection. [41]. These findings align with the findings of Anderson et al. (2010), which say that it is essential for nurses to ensure the safe administration of parental medications in order to prevent the spread of infection between patients and other healthcare professionals. Aseptic technique is essential to lowering the overall morbidity and mortality rate, which can be accomplished by preventing the spread of germs [42]. According to a current study, nurses wash their hands regularly. In which 37.50 % of the individuals disagreed, 13.81 % disagreed that nurses always wash their hands. However, 30.26 % of them agreed and 15.78 % disagreed. Furthermore, the current also concluded that 51.31 % of them agreed and 40.78 % of them strongly agreed regarding the aseptic methods application during parental medicine. In addition, understanding of nurses regarding the route of administration of drugs and the angle of injection while giving medicine. 48.68 % of them agreed and 36.84 % strongly agreed. According to the conducted by Zyoud SE et al 2019, the study included a total of 280 nurses, all of whom were actively employed in either the emergency room (ER), intensive care unit (ICU), pediatric, or medical wards of the hospital. The percentage of

people who replied was 93%. It was discovered that nurses lacked adequate information regarding High alert medications (HAMs); 67.1% of participants had a score that was lower than 70%, with a mean total score that ranged from 59.9 to 15.1. Training in HAMs and training in the ICU were factors linked with sufficient knowledge among nurses. Both of these factors had p-values of 0.002 for their associations. The most informed categories of nurses were those with a master's degree, those working in the intensive care unit (ICU), head nurses, and male nurses, all of whom had p-values that were less than 0.001. Eighty-one-point-eight percent of respondents expressed an interest in acquiring additional training. Inconsistent viewpoints held by medical professionals, such as doctors and nurses (37.9%), as well as the absence of a predetermined standard operating procedure for HAMs, accounted for 37.1% of the identified challenges [43].

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