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# Internship nursing students and faculty perception of medication errors: A descriptive qualitative study

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## Abstract:

**BACKGROUND:** Medication safety is an integral dimension of patient safety and one of the 11 principles in the World Health Organization Patient Safety Curriculum Guide. Medication errors can occur by all members of the health care provider; however, they are prevalent in nurses and nursing students. This study aimed to explore and describe medication errors from the perspective of Iranian internship nursing students and faculty.

**MATERIALS AND METHODS:** The present study was done in 2023 using a descriptive qualitative method. Seventeen internship nursing students and five faculty were selected using a purposeful sampling method. Data were collected through in-depth, semi-structured interviews. We used qualitative content analysis for data analysis.

**RESULTS:** Data analysis revealed three categories, namely, determinants of error, disclosing/conceal, and psychological consequences of the error, and 12 subcategories.

**CONCLUSION:** Inadequate medication knowledge and students' inattention to the principles of medication administration have paved the ground for medication errors by internship nursing students, thus threatening patient safety. Effective clinical supervision and training by instructors experienced in teaching and clinical practice can help address this challenge. Reassuring the students and creating a safe and anonymous reporting climate encourages students to report errors.

## Keywords:

Faculty, internship, medication errors, nursing, students

## Introduction

Medication safety is an integral dimension of patient safety<sup>[1,2]</sup> and one of the 11 principles in the World Health Organization Patient Safety Curriculum Guide. Since March 2017, the WHO has focused on medication without harm, highlighting medication safety<sup>[3]</sup> to reduce preventable medication errors by 50% by 2022.<sup>[4]</sup>

Medication error is defined as any preventable event that may cause or lead to inappropriate medication use or patient

harm while the medication is in the control of the healthcare professional, patient, or consumer.<sup>[5]</sup> These errors can lead to adverse consequences for patients, such as an increased length of hospital stay, increased hospitalization costs, distrust of the healthcare system, severe injuries, or even death. Studies show that out of approximately 44,000 to 98,000 deaths caused by medical errors, 7,000 have occurred due to medication errors.<sup>[6-8]</sup> In the United States, medication errors result in the injury or death of 1.5 million individuals and approximately 400,000 side effects, leading to a \$3.5 billion increase in medical costs<sup>[6]</sup> According to reviews, the prevalence of

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medication errors in Middle Eastern countries, including Iran is 7–90%,<sup>[9,10]</sup> while according to studies, more than one-third of medication errors are preventable.<sup>[7]</sup>

Medication errors can occur at all stages, including prescribing, transcribing, preparing, and administering, as well as monitoring the patient after administration.<sup>[11,12]</sup> Errors can occur by all members of the health team; however, they are prevalent in nurses and nursing students<sup>[11,13–15]</sup> since 40% of their time is spent on medication administration.<sup>[16]</sup> In addition to harming patients, these errors harm nurses and nursing students and disrupt their personal and professional lives.<sup>[6]</sup> In a study, Jones and Treiber referred to novice nurses with medication errors as the “second victim.”<sup>[17]</sup>

In Iran, second-year undergraduate nursing students take pharmacology and, in subsequent semesters, during the training, perform it practically, which is the fundamental part of their education. However, the evidence indicates that they lack efficiency in the field of medicine.<sup>[13]</sup> Despite the fact that, to date, few studies have investigated the errors and mistakes of nursing students, the available evidence indicates a high incidence of medication errors.<sup>[16]</sup> In a study in Indonesia, the rate of medication errors among nursing students was reported to be 44.8%, ranking second in medical errors.<sup>[18]</sup>

In a study using the direct observation method with final-year nursing students, in 372 recorded observations, 153 errors were identified, in 139 of which there was at least one error.<sup>[19]</sup> However, the rate of student reporting on medication errors is very low, and nearly one-fourth of these errors are not reported.<sup>[20]</sup> One of the primary reasons for not reporting medication errors is the fear of being punished by the clinical educator; as a result, the causes of the error remain unidentified, and corrective and preventive measures cannot be designed.<sup>[21]</sup> Due to the diversity of medication errors, their negative consequences for patients and students, and inadequate relevant studies and planning to prevent errors, it is essential to investigate the underlying causes of errors.<sup>[11,16,21,22]</sup>

In Iran since 2018 in Isfahan, final-year nursing students spend their internship as internship nurses and reside in the hospital, work 20 shifts per month (morning, evening, and night), provide care to four patients independently, and are supervised by clinical professors in different shifts. The professors provide feedback to the students and answer their questions. Because medication errors are the most significant and frequent event threatening patient safety, it is crucial to identify the underlying causes of medication errors committed by internship nursing students. There are a limited number of qualitative studies on medication errors

of nursing students in Iran,<sup>[23]</sup> and most studies have been carried out quantitatively.<sup>[19,24]</sup> In recent studies on students' medication safety, qualitative studies to discover the causes of medication errors have been recommended.<sup>[25]</sup> Compared to quantitative studies, qualitative research provides more opportunities for researchers to discover and explain the facts about the clinical environment, and in fact, to better understand various aspects of health care. In this regard, Mairead Moloney *et al.*<sup>[26]</sup> (2020) conducted a qualitative study on pharmaceutical management among final-year nursing students. However, the approach to conducting the internship course in Isfahan, Iran, differed from other countries. This study aimed to explore and describe medication errors among nursing internship students in Isfahan, Iran. This is the first study to examine the medication error experiences of nursing students in this course, which represents a new educational approach.

## Materials and Methods

### Study design and setting

This descriptive qualitative study was done in 2023. In the descriptive qualitative method, the researcher provides a comprehensive summary of a phenomenon or related events in a common language but does not go into the deep phase of interpretation and is less interpretive compared to other qualitative studies.<sup>[27,28]</sup>

### Study participants and sampling

The participants were selected among internship nursing students and faculty of the Isfahan University of Medical Sciences, Isfahan, Iran. The inclusion criteria for internship nursing students included at least three months of an internship in hospital, having experiences with medication errors, and willingness to participate in the study. Inclusion criteria for faculty included at least one year of teaching and supervision experience of internship nursing students, encountering students' medication errors, and willingness to participate in the study. Sampling was performed using purposeful sampling with maximum variation. Those who did not fully share their experiences were excluded.

### Data collection and technique

We contacted the participants. If they wanted to participate in the study and had experience of medication errors, the interview time and place were determined. Data collection was done using in-depth, semi-structured interviews. All interviews were conducted by the corresponding author (SF). On average, the interviews lasted 30–45 minutes. All interviews began with a general question to establish a close rapport with the participants. An example of an interview question is provided in Table 1. Participant selection and sampling continued until data saturation was achieved.

## Data analysis

We used the qualitative content analysis approach proposed by Graneheim and Lundman for data analysis.<sup>[29]</sup> Recorded interviews were transcribed verbatim. Transcribed interviews were read by the researchers several times, and meaning units were extracted. The identified meaning units were condensed, abstracted, and coded. Finally, similar codes were grouped under subcategories, and categories were formed using the inductive process.

## Rigor

Rigor was ensured using the confirmability, credibility, dependability, and transferability criteria.<sup>[30]</sup> The confirmability was enhanced by bracketing and keeping a clear audit trail of all research activities. To ensure credibility, member check and peer check methods were used. To this end, participants were provided with the extracted codes and results to confirm the consistency between the codes and their experiences. In addition, the resulting codes and categories were presented to colleagues. Dependability was achieved through the participation of more than one researcher in data analysis. Selecting participants with different demographic characteristics enhanced the transferability of the results.

## Ethical considerations

This study has been approved by the ethics committee of the Isfahan University of Medical Sciences (IR.MUI.NUREMA.REC.1400.138). All methods were performed in accordance with the relevant guidelines and regulations. Informed consent was obtained from the participants. We used numeric codes in place of personal names to secure the confidentiality of the interviews. The participants were free to withdraw from the study at anytime.

## Results

Participants in this study were 17 internship nursing students and five faculty. The demographic characteristics are presented in Table 2. After analyzing the data, the three categories, namely, determinants of error, disclosing/conceal, and psychological consequences of the error, and 12 subcategories were extracted from the participants' experiences in Table 3.

### Determinants of error

Numerous factors are involved in medication errors committed by internship nursing students. This category includes five subcategories: "insufficient medication knowledge and skills," "inattention to principles of medication administration," "poor communication with the healthcare team," "poor clinical supervision," and "inadequate clinical training."

**Table 1: Samples of interview questions**

Questions
Have you ever encountered medication error?
Can you share your experience with an example of these errors?
In your opinion, why do medication errors occur? Please explain more.

**Table 2: Participants' characteristics**

Participants	Gender	Age range (years)	Work experience range (years)
Student	Male: 3	22–26	-
	Female: 14		
Faculty	Male: 1	30–55	3-30
	Female: 4		

**Table 3: The categories and subcategories**

Categories	Subcategories
Determinants of error	Insufficient medication knowledge and skill
	Low attention to medication administration's rules
	Weak communication with the healthcare team
	Weak clinical supervision
	Insufficient clinical education
Disclosing/conceal	Fear of humiliation and reprimand
	Fear of losing grades and the professor's reprimand
	Advice on secrecy from the nurse
Psychological consequences of the error	Persistent fear
	Helplessness
	Decreased self-confidence
	Self-condemnation/self-blaming

Participants' experiences show that some internship nursing students lack sufficient medication knowledge and skills for drug administration, and in some cases, they ignore the principles of medication administration. One of the students stated in this regard: *"Amp Vancomycin had been prescribed for a patient. I gave it to the patient by an infusion over 30 minutes. When the nurse noticed, she got very angry and said: 'Don't you know you should give an infusion in two hours?' I didn't know that Vancomycin must be infused in two hours"* (seventh-semester student, 22 years old, female).

Another student said, *"I think some high-risk drugs and the ones that have a look alike should be re-taught to students before they enter the internship course, and the principles of medication administration should be repeated for them. I've already made medication errors due to poor knowledge"* (eighth-semester student, 24 years old, male).

For safe medication administration, inter-professional collaboration is critical since the participants' experiences showed that most medication errors occurred due to poor communication between students and healthcare team members, including physicians, nurses, and pharmacy technicians.

In this regard, one of the educators said, *"A student had given the wrong medication to the patient. When I talked to him about the error, he said that he couldn't read the drug order due to the illegibility of the prescription in Kardex, and because the nurse didn't have a good relationship with internship students, he hadn't asked him. After administration, he had found out that he had given the patient Ceftriaxone instead of ceftriaxone"* (female professor with 20 years of work experience).

Internship nursing students should be regularly evaluated and supervised by faculty and provided with the necessary feedback. The participants' experiences revealed that there was not adequate clinical supervision by professors and even ward nurses, and in the ward rounds, insufficient attention was paid to medication administration.

A student stated, *"I was taking care of three patients with complex problems. One of the nurses told me to inject 12 units of regular insulin into one of her patients; she only pointed with her finger. I injected insulin to the wrong patient, and she developed hypoglycemia"* (seventh-semester student, 24 years old, male).

One of the educators stated: *"Most of the time, the nurse prepares the medication and asks the student to inject into the patient. Well, the student does it. It's wrong. The faculty should have more supervision to know the principles of medication administration and provide the necessary training to students and nurses"* (female professor with 15 years of experience).

Participants' experiences showed that some internship nursing students lacked sufficient medication knowledge and did not acquire the necessary information due to poor communication with healthcare team members, especially nurses. However, inadequate clinical supervision, particularly of internship nursing students' medication administration, has provided the ground for error. Internship nursing students felt abandoned and lonely in the clinical setting and expected to receive more medication training in the internship course. In the first three years of the nursing course, each student cares for a patient under the professor's direct supervision. However, in the final year, they are responsible for three to four patients under the professor's intermittent supervision. The faculty should help prevent medication errors and improve medication safety by regularly supervising students, conducting training and error detection rounds, and sharing medication error experiences.

### Disclosing/conceal

According to professional and ethical principles, the patient has the right to be informed of receiving the wrong care or error. However, the participants concealed

the error for various reasons after the medication error. The disclosing/conceal category includes three subcategories: "fear of humiliation and blame," "fear of losing grade and professor's reprimand," and "presenting students as inattentive and careless."

Participants' experiences indicated that fear of being blamed and judged by others and low self-confidence were among the reasons for the medication error concealment. In some cases, after a medication error, the head nurse or nurse required the student to conceal the error to avoid legal consequences. In addition, when the student reported the error to the nurse, they were conveyed that the error was insignificant. As a result, the student preferred concealing the error over reporting it.

One student said, *"I administered the medicine route wrongly and gave intramuscular injection instead of subcutaneous. But I didn't report it. I was so scared that I didn't inform anyone, even the professor. I was worried about losing grade and that the professor might punish me in front of my classmates and the patient, and I'd get disgraced"* (eighth-semester student, 23 years old, female).

Another participant stated, *"I mistakenly injected a medicine. I told the nurse worriedly. I was expecting her to intervene. But she smiled and said: 'Where was your mind? Were you tired? Forget about that. Don't tell anyone. Nothing has happened yet'"* (seventh-semester student, 25 years old, female).

One of the professors said, *"I came to the ward to supervise the students. The nurse told me that one of the students had injected diazepam into the wrong patient, and the patient's caregiver informed us about that"* (professor, male, six years of work experience).

Participants' experiences revealed that most students did not report medication errors. Educators should use an incentive and non-punitive system to improve students' medication error self-reporting. In addition, root cause analysis with the participation of professors, ward nurses, and students may help identify the causes of the error and design preventive strategies. The error can be prevented if sufficient information on the medication errors is available. Conducting training courses on error reporting methods can be advantageous.

### Psychological consequences of the error

In addition to the harmful consequences for the patient, medication errors have negative impacts on the student who commits the error. The category, psychological consequences of the error, includes the following four subcategories: "persistent fear," "helplessness," "decreased self-confidence," and "self-condemnation/self-blaming."



According to participants' experiences, anxiety and helplessness after the error, self-blame, and feeling guilty conscious create an indescribable state and an unpleasant feeling for students.

One student said, *"After error, I felt like I was dying. I even accompanied the patient to the operating room to watch for bleeding due to my mistake. I was constantly blaming myself. I was worried that if something bad happened, what I would do. I thought I was really incapable, and I couldn't do anything right"* (eighth-semester student, 24 years old, female).

Another student stated, *"I was very tired and nervous. I was afraid that the patient would take a high dose of medicine and something would happen to him. I felt a pang of conscience. I put myself in the patient's caregiver's shoes. It was a terrible feeling. I was completely helpless. What would I do if something bad happened to the patient?"* (seventh-semester student, 26 years old, male).

The participants' experiences showed that to be released from the negative feelings resulting from the medication error, the students attempted to normalize the error, feel innocent, and complain about the ward routine and their lack of independence.

A student stated, *"I told the nurse that I had made a medication error, and she said: 'it's common for everyone. You reported it because you're a student and inexperienced. If you were a nurse, you wouldn't do that.'" I thought that it was very common, and it could happen to everyone because of fatigue, but it was a bad feeling. I should concentrate more"* (seventh-semester student, 23 years old, male).

Negative feelings and self-blame lead to feelings of self-insecurity, low self-esteem, and accusations of incompetence. Therefore, supervising professors and clinical preceptors should provide psychological support to students who have experienced medication errors and take corrective action to prevent negative consequences and unsafe student performance.

## Discussion

For the first time, this study aimed to explore and describe medication errors among nursing internship students in Isfahan, Iran. There is a probability of medication errors in internship nursing due to less work experience, more independence, and less supervision. According to the study by Khalili (2018), out of 87 students, 13 committed a medication error during the three months of field internship, which is a significant rate.<sup>[31]</sup> One way to reduce the error is to discover its causes.

One of the causes of medication error in this study from the participant's point of view was a "lack of knowledge

and awareness." In this regard, a descriptive-analytical study investigating the causes of medication errors among internship nursing students pointed to a lack of knowledge as one of the most significant causes.<sup>[31]</sup> In the study by Musharyanti et al.<sup>[18]</sup> (2019), the majority of participants stated that a lack of knowledge and skills in medication safety could cause medication errors. Nurses should have not only pharmacological knowledge but also clinical reasoning competencies; for instance, when a patient has low blood pressure, he or she should no longer be given antihypertensive pills. Besides, nurses are expected to have the ability to decide how much analgesia their patient can take, or, when the patient vomits, the given medications may not be effective; therefore, the nurse should consult a physician.<sup>[32]</sup>

In the present study, inattention to "the principles of medication administration" was another cause of medication error. The students believed that if the eight rights of medication administration were followed accurately, the rate of medication errors would be greatly reduced. In this regard, in one study, students' incorrect labeling was considered a cause of medication error since they wrote only the patient's bed number on the label, thus interfering with the correct identification of the patient.<sup>[18]</sup> In another study, the highest number of medication errors was related to medication administration by students at the wrong time.<sup>[31]</sup> In the mentioned studies, medication errors occurred due to violating one of the eight rights. Therefore, it is essential to teach nursing students to observe the eight rights of medication administration.

Another cause of medication errors in our study was "poor communication with the healthcare team." Most students did not ask the nurses if they had a problem reading the Kardex and acted on their presumption, which increased the error probability. However, safe medication administration requires teamwork improvement.<sup>[33]</sup> Studies have likewise pointed to poor communication between nurses and patients and between nurses and other healthcare team members. In one of the qualitative studies, it was stated that nurses refused to contact the physicians due to their misbehavior and acted on their presumption and experience when they had doubts about the doctor's medication order. This factor increases the likelihood of medication errors.<sup>[34]</sup>

According to clinical professors, "poor clinical supervision" of students was another cause of medication errors made by internship nursing students. Proper monitoring leads to the prevention and reduction of medication errors and is beneficial for correcting behaviors.<sup>[35]</sup> According to the study by Dolansky et al.<sup>[21]</sup> (2013), if professors closely monitor students,

the likelihood of medication errors is reduced. In this regard, in the study by Reid-Searl *et al.*<sup>[36]</sup> (2010), one-third of students had committed medication errors; the most important reason was the lack of educators' and nurses' proper supervision. In the study by Musharyanti (2019) *et al.*,<sup>[18]</sup> students stated that supervising nurses lacked the opportunity to monitor and supervise students' performance due to their busy schedules, which was one of the main reasons for their medication errors.

In the present study, another cause of medication errors was "inadequate clinical training." Students believed that they were not provided with the necessary training on medication safety by professors and nurses in the clinical setting. Inadequate experience and a lack of medication training have been reported in various studies as the leading causes of medication error<sup>[37-39]</sup> Ozkan *et al.*<sup>[38]</sup> (2011) state that the acquisition of knowledge and experience is not an individual task, and organizations must train individuals properly. In this regard, in Musharyanti *et al.*'s<sup>[18]</sup> study (2019), students stated that medication safety is mostly trained in the early years, and in the final semesters, when students are present in the clinical setting, reviewing and training them is marginalized. Therefore, clinical professors should include medication safety training in the clinical environment for final-year nursing students in their training programs.

Participants' experiences indicated that students often did not report a medication error to the instructor and supervisor due to "fear of humiliation and blame" and "fear of losing grade and professor's reprimand." Similarly, in a study, due to lack of support from hospital managers, degradation and unprofessional reactions from colleagues, workplace change, a ban on medication administration,<sup>[40]</sup> and fear of losing their job, the nurse preferred to remain silent and not report the medication error.<sup>[41]</sup> Students' experiences in other studies showed that the professor mistreated them, labeled them as unintelligent, and supervised them severely after a medication error, which was a devastating feeling for the student.<sup>[42]</sup> In addition, according to the participants' experiences, students sometimes concealed the error by considering reporting as insignificant. In this regard, in the study by Mohammadnejad *et al.*,<sup>[43]</sup> one of the reasons for the refusal to report medication errors by nurses was their insignificance from the nurses' perspective. Professors and head nurses should provide an opportunity to report errors by creating an atmosphere of mutual respect and support for students. In addition, teaching the importance of reporting and its methods is beneficial. The instructor should provide the opportunity to discuss with the student and analyze the root cause of the error to reduce the likelihood of medication errors.

The results showed that students experienced emotions such as "persistent fear," "helplessness," "decreased self-confidence," and "self-condemnation/self-blaming" following committing a medication error. In other studies, students experienced negative feelings such as incompetence, embarrassment, and decreased self-esteem; some of them contacted their close friends and cried.<sup>[42]</sup> Nurses likewise felt guilty and ashamed in front of caregivers and colleagues after making a medication error. Feelings such as depression, sleep disorders, post-traumatic stress disorder (PTSD), and suicidal ideation are negative consequences of medication errors in the wrongdoer. For some nurses, this traumatic experience has never healed.<sup>[40]</sup> Following a medication error, in addition to managing the patient, attention should be paid to the wrongdoer to reduce their negative emotions and psychological problems. The professor's reassurance and support for the student are of particular importance.

### Limitations

We selected participants from Isfahan, which may limit the generalizability of the findings. However, we aimed to achieve maximum variation with an appropriate number of participants.

### Conclusions

Inadequate medication knowledge and students' inattention to the principles of medication administration have paved the ground for medication errors by internship nursing students, thus threatening patient safety. Effective clinical supervision and training by instructors experienced in teaching and clinical practice can help address this challenge. However, fear of reprimand and concern about the consequences of medication errors have caused nursing internship students to frequently conceal errors. Reassuring the students and creating a safe and anonymous reporting climate encourages students to report errors. In addition, considering the harm of medication errors and their impact on patient safety, as well as the increasing economic burden, conducting root cause analysis by the faculty clinical education committee can be advantageous in implementing corrective and preventive measures based on the causes of the errors. Faculty should consider providing adequate psychological support to the student so that, following the error, they will not suffer from complications such as depression, sleep disorders, and consequently impaired performance.

### Acknowledgement and ethical-moral code

This study has been approved by the ethics committee of Isfahan University of Medical Sciences (IR.MUI.NUREMA.REC.1400.138). All methods were performed in accordance with the relevant guidelines and

regulations. Informed consent was obtained from the participants. We used numeric codes in place of personal names to secure the confidentiality of the interviews. The participants were free to withdraw from the study at anytime.

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### Conflicts of interest

There are no conflicts of interest.

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