

Iranian Nurses' Experiences on Obstacles of Safe Drug Administration: A Qualitative Study

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Abstract

Background: Safety maintenance and prevention of damage to patients caused by errors in nursing have a special importance, and a lack of sufficient attention to the correct principles of drug administration can lead to the patient's health threats and reducing safety.

The administration of drugs is complex and influenced by many factors, particularly in pediatric wards; thus, the present study aimed to explain pediatric nurses' experiences on obstacles to safe drug administration.

Methods: In this study, the qualitative approach and content analysis method were used. Twenty pediatric nurses involved in medication administration were selected for participation using purposive sampling. Data was collected through semi-structured interviews. Using continuous analysis, data collection and comparison were performed at the same time.

Results: From the data analysis, 4 main themes were extracted. Working pressure, lack of drug resources, insufficient colleague performance, and lack of experience and knowledge in drug administration were four main themes obtained from study.

Conclusion: Care managers can identify obstacles to safe medication administration to improve patient safety. For which necessary measures must be taken to remove them and to enhance patient safe care provided by nurses.

Keywords: safety, nursing, drug administration, nurses, qualitative study

1. Introduction

One of the most prominent human rights is to stay safe from injury and risk when receiving health services and the goal of nursing is to provide patients with the safest care. Nurses are guardians of patients, keeping them from harm, and as such, they are in a unique position to develop safety procedures (Dykes, Rothschild, & Hurley, 2010; Wagner, Damianakis, & Tourangeau, 2012).

Patient safety is a critical component of health service quality and a main concern for health care professionals; it means to avoid introducing any injury to the patient while providing health care (Luk et al., 2008; Nash & Goldfarb, 2005; Stratton et al., 2004).

Care providers are inherently motivated to improve patient safety due to their professional standards, and expectations. Because of the complexity of service delivery following the recent decade's promotion of knowledge and technology, however, many factors influence patient safety. Therefore, the risk of danger in providing health services is increased. Nurses must play their role in preventing injury to the patient and providing safe care, especially as a medication administrator. Drug administration is an important part of

treatment and patient care and is a major responsibility of nurses in the clinical setting (Mark & Belyea, 2009; Schelbred & Nord, 2007). It may appear to be a basic, routine, and repetitive task, but in fact, it is a reflection of the complex interactions, multiple functions, and special decision making that require a nurse's full attention to prevent the occurrence of any medication error (Ahmed, Adam, & Al-Moniem, 2011; Eisenhauer, Hurley, & Dolan, 2007).

Medication errors are the most common medical errors and probably preventable risks that, because of the high prevalence rate, are used today as indicators of patient safety levels in hospitals and identifying them can lead to error prevention and patient safety (Kohn, Corrigan, & Donaldson, 2000; Rattanarojsaku & Thawesaengskulthai, 2013; Stratton et al., 2004).

Regardless of the creativity of different institutions, there is insufficient evidence to name the best drug safety method used by health systems. The number of deaths from medication errors ranges 44000-98000 cases per year, which is more than the number of deaths from accidents, breast cancer, and AIDS in the United States (Raduenz et al., 2010). Medication errors occur in most health centers around the world and in 3%-8% of all administrations. (The Joanna Briggs Institute, 2010) Studies have shown that in America, medical errors caused thousands of deaths and close to \$77 billion in costs associated with drug events annually (Grissinger & Kelly, 2005).

In Iran, findings from disparate studies have reported different percentages of medication errors (Seidi & Zardosht, 2012). The problem of nursing and medical errors, as in European and American countries, exists also in Iran; the root causes need to be found and solutions offered to control it (Anoosheh et al., 2007). In Iran, increased instances of medical errors and the subsequent attention paid this matter by the Ministry of Health and Medical Education has made the issue of patient safety a priority. The introduction of clinical governance in health centers that have patient safety as one of its axes reflects the importance of this issue (Mohebi et al., 2015).

There is consensus among professionals in the health area that errors resulting from medication therapy represent a problem that has reached high proportions over the last few decades. In pediatrics, this fact has even greater impact (Harada, Chanes, Kusahara, & Pedreira, 2012). There is a possibility of error in all hospital wards; however, administering medications in pediatric wards is more complex for nurses because of multiple affecting factors (Armitage & Knapman, 2003; Valizadeh et al., 2008).

Medication errors in pediatric patients are a daily phenomenon (Koumpagioti et al., 2014). One of the factors that resulted in a higher frequency of medication errors, particularly errors in drug dosing in children can be traced to the complexity of drug calculation based on age, height, weight and medical condition of the child, because the attributes of drug absorption, distribution, metabolism and excretion of drugs in infants, adolescents and adults are different (Harada et al., 2012).

Because of the need to prescribe medication based on weight, the likelihood of zero-point errors, the need to dilute the drugs, a lack of development in physiological buffer responses, and limited communication skills for reporting symptoms and complications, children are more prone to the occurrence of medication errors (Kaushal, 2001; Koren, 2002; Simpson et al., 2004). Health care providers should give particular attention to specific conflicts related to child patients.

Therefore, it is necessary to identify the obstacles to safety in medication administration by nurses. Additionally, an understanding of nurses' experiences on medication errors is important; because it will help organizations identify the factors that threaten patient safety (Balas, Scott, & Rogers, 2004).

By determining the root causes of errors and understanding working conditions, a protective system can be created to prevent the recurrence of such cases. Most studies on patient medication safety have focused on adults and used a quantitative method; few have focused on pediatric wards and employed a qualitative approach. No qualitative study on obstacles to safe drug administration by nurses in pediatric wards has been done in our country.

Because of our county's socioeconomic cultural differences with other countries, the current study, conducted, explored pediatric nurses' views on the obstacles to safe drug administration.

2. Method

2.1 Data Collection

In this study, purposive sampling was conducted in the children's wards of Namazi hospital, a well-equipped hospital that eventually became a major teaching hospital of Shiraz University of Medical Sciences with variety

of clinical wards. It is ranked first in southern Iran and is located in Shiraz, one of the oldest cities of both ancient Persia and modern-day Iran.

In-depth semi-structured interviews were used to gather information. The analysis of data from each interview was a guide for the next interview, so sampling was continued until data saturation. From interview 18 onward, there was no data or new code and previous codes were repeated. However, 2 additional interviews were conducted for surety, but not to receive new information that would lead to the formation of new coding and classification. A total of 20 participants were interviewed. Selection criteria for participation were employment in a pediatric ward, having an administration task in different shifts, and a willingness to participate and recount experiences.

Semi-structured interviews were conducted with individuals in a conference room of a pediatric ward. Before the interview, participants were informed of the study's purpose, that interviews would be recorded, and that all information would be kept confidential.

The main interview questions included, but were not limited to, the following:

"Please explain your safe practices during drug administration in the pediatric ward."

"What factors contribute to your safe drug administration practice in the pediatric ward?"

"Please explain what factors prevent safe drug administration during a shift in which you are responsible for medication administration."

"Please describe the obstacles you have faced while administering drugs to children."

Next, follow-up questions were asked to clarify the concept under study in accordance with the replies received during the interview based on the information that was provided by participants, such as: "Would you please explain more?" "What do you mean by that?" "Would you give me an example?" "Would you explain the situation clearly?" "May I ask you to discuss your experience?"

Interviews lasted an average of 55 minutes and ranged between 40 and 90 minutes.

2.2 Data Analysis

All interviews were done and recorded at the same time by the study's principal investigator. Then, for immersion in data, the researcher listened carefully to the interviews, and the typed text was coded and analyzed several times. Content analysis was used in the current study. This research method is the subjective interpretation of the content of text; through a systematic classification process, themes or overt and covert patterns are identified in the text. The qualitative content analysis was continuous and concurrent with data collection; the analysis was conducted according to the purpose of the research in accordance with conventional content analysis methods (Hsieh & Shannon, 2005).

Using content analysis, words, sentences, or paragraphs pertinent to obstacles to safe drug administration were selected from the nurses' statements and described as meaning units. Then, the initial codes were extracted by meaning units, and based on the similarities and differences in the initial codes, classifications were done. Finally, based on the interpretation, careful thinking, and continuous comparison of data, categories and key concepts were extracted.

To ensure the rigor and trustworthiness of the qualitative data, Lincoln and Guba's Evaluation Criteria, such as creditability, dependability, transferability, and conformability, was used (Streubert & Carpenter, 2010).

For creditability of findings the long-term involvement of the researcher with the research and data and control by the participants were done. The congruence between ideas derived from the data by the researchers and the opinions of the participants was compared. For data triangulation, interviews with nurses were held at different times of the morning, afternoon, and evening. The sampling technique used included maximum variations in age, experience of the participants, and type of pediatric ward worked by the nurses. Conformability was also assessed by external checkers familiar with qualitative research, who studied and confirmed the interviews with their codes and classifications. For dependability, the researcher accurately recorded and reported the research process so as to allow for follow-up research by others.

For transferability of findings, quotes from the participants were reported and the demographic characteristics of participants and studied areas explained in detail, so readers of this study can decide how to use the results.

2.3 Ethical Consideration

After the study proposal was adopted by the Research Council and before data collection began, permission to enter clinical areas was obtained from the Ethics Committee of Shiraz University of Medical Sciences and

hospital chiefs. The principles of research ethics, such as informed consent, maintaining anonymity, confidentiality, and freedom of participants to leave the study, were considered.

3. Results

3.1 Characteristics of Study Subjects

Participants in this study included 20 female nurses with an average age of 31 ± 6 years, 1-22 years of work experience, a bachelor's degree, and the responsibility of administering medications in the different pediatric wards (infectious-immunology, neurology-nephrology, cardiology, endocrinology, and gastrointestinal) of Namazi teaching hospital.

3.2 Analysis of Interviews with Nurses

From the rich description of the participants, 586 initial codes were extracted. After several reviews and a summarization based on similarity and congruence, these codes were classified. Through analysis and comparison, four main themes were extracted. Based on their nature, these themes were identified as conceptual or abstract and placed in 4 main categories and 11 subcategories. The main categories are as follows:

- Working pressure with the subcategories of multiplicity of tasks, shortage of nurses, and specific difficulties of drug administration in pediatric wards
- Lack of drug resources with the subcategories of drug deficiency, lack of space, and medical equipment
- Insufficient colleague performances with the subcategories of defects in medication orders, dispenser errors, and failure in drug delivery to the wards.
- Lack of experience and knowledge in drug administration with the subcategories of insufficient in-service medication training and inability of novice nurses.

3.3 Working Pressure

According to the participants' opinions, working pressure exerted on them by the multiplicity of tasks, shortage of nursing workforce, and specific difficulties in administering medication in pediatric wards that lead to physical and mental fatigue reduced their attention and provided the context for non-safe drug administration and the occurrence of medication errors.

3.3.1 Multiplicity of Tasks

In Iran, registered nurses who hold a bachelor's degree in nursing have the role of delivering nursing care to children. One duty of registered nurses in pediatric wards is drug administration. Since the work of pediatric nurses in Namazi Hospital is divided according to the case method of assignment, nurses are responsible for other care giving as well.

The multiplicity of tasks on different shifts and the extra work required of them with drug administration caused working pressure. Indeed, the multiplicity of tasks affected the quality of nursing care and prevented principled and safe drug administration. Nurse (14) with 5 years of experience stated:

"Before giving the drug intravenously, I should check and flush the vein to see if it is healthy, but because I had a lot of work, I did not check his vessel! I poured the drug into the micro set; then I connected the micro set to the patient. The medication went under the skin and the patient's hand swelled."

3.3.2 Nursing Shortage

The experience of the majority of nurses showed that shortages and the need to care for a large number of patients decreased the ability of nurses to function in accordance with professional standards. The increased number of patients per nurse acts as an obstacle to safe drug administration, and causes delays in medication administration. Nurse (6) with 10 years of experience stated:

"We sometimes have a lack of staff. Such as today, these 16 patients are divided between 2 nurses, so we should check medication cards quickly to administer drugs. We do not even drink water and yet we still cannot give our drugs on time. Medication administration is often late. We cannot even check the drug cards accurately."

3.3.3 Specific Difficulties of Medication Administration in Pediatric Wards

Most of the participants pointed to the different nature and complexity of drug administration in pediatric fields compared with adult wards and identified it as a factor in medication errors. Nurses cited specific conflicts regarding drug administration in pediatric wards, such as low doses of medication, time-consuming drug calculations, the need to dissolve oral medications, and resistance in children to take the medications, as factors delayed medication administration and caused medication errors.

Nurse (16) with 5 years of experience stated:

“Medication administration is really difficult in pediatric wards. If you administer 40 milligrams of drugs instead of 4 milligrams, the child will react quickly. But in an adult ward, if you give 2 wrong drugs, the patients do not show much reaction. Additionally, it is difficult to calculate pediatric drugs; if the prescription is based on a microgram dose, it must be converted. It occurs to me that I have made mistakes in such complex calculations.”

3.4 Lack of Resources for Drug Administration

Participants expressed that, in their experience, some drugs are not available in the hospital pharmacy. In such cases, nurses risk committing errors, such as delaying medication administration. Nurses also considered the lack of space and medical equipment as causes of unsafe drug administration.

3.4.1 Drug Deficiency

In their experience, participants found that some drugs are not available in the hospital pharmacy. If this situation occurs, the patient must be hospitalized for several days without receiving the drug he needs. This delay in receiving drugs was considered an obstacle to safe drug administration by the nurses. Nurse (5) with 10 years of experience stated:

“Sometimes hospital pharmacy does not have some particular medicines. So the patient does not take drugs. If a drug is hard to find, the patient must wait a week to ten days for treatment. A delay will occur; perhaps the drug is not found.”

3.4.2 Lack of Space and Medical Equipment

Nurses' experiences showed that there is not only a deficit of drug, but also a deficit of space, medical equipments, and accessories. The lack of items such as cooled boiled water with which to dissolve oral drugs, and the unavailability of some solutions with which to dilute intravenous drugs were cited among the factors that prevent nurses from using safety during drug administration. Nurse (2) with 7 years of experience said:

“We should dissolve oral drugs in cooled boiled water, but often we have to dissolve them in tap water. We know this is wrong, but since there is no cold boiled water in the ward, we have to do this.”

3.5 Insufficient Colleague Performance

Almost all pediatric ward nurses said that a failure in the performance of a colleague, including physicians, pharmacy staff, and messengers, prevented nurses from safe drug administration.

3.5.1 Defects in Medication Orders

Based on their experiences, nurses pointed to mistakes by physicians in writing medication orders as one of the barriers to safe medication administration. It prepares an environment for unsafe drug administration and drug errors by nurses. Nurse (18) with 11 years of experience said:

“An order was previously written by an intern, and he had written magnesium sulfate, a dose of 12 milliliters instead of 0.12 or 1.2 milliliters for a 2-3-month-old baby! According to the intern's incorrect order, the nurses gave high doses of drug to the child, and the child was really unwell.”

3.5.2 Dispenser Errors

Through their experience, participants indicated that inaccuracies by their colleagues in pharmacies caused mistakes in the type and quantity of drugs delivered to pediatric wards. In cases where, because of haste and a lack of precision, some nurses paid no attention to the drug label and chose the wrong drug, the safety of the patient was endangered. Participant (1) with 2 years of experience said:

“The pharmacy staffs send some wrong drugs, and when we are in a hurry, we pick the wrong drug. Once it happened for me that I took a drug with a syringe last time I looked at it and I saw diazepam instead of furosemide, because the pharmacy personnel had sent the wrong drug.”

3.5.3 Failure in Drug Delivery to the Wards

Another aspect mentioned by nurses was a failure in delivering drugs to the wards which caused delays in drug administration. Transferring drugs from the pharmacy to the wards is the task of messengers in hospitals in our country. Unfortunately, a shortage of messengers results in drugs arriving late, even in emergency situations. In the nurses' point of view, it is an obstacle to the safe administration of drug. Nurse (19) with 3 years of experience stated:

“We often want to coordinate the emergency medicine that the messenger must transfer to the wards, but the messenger says “I have too much work, and I can't come; wait for half an hour.” This makes the patient receive

the drug late.”

3.6 Lack of Knowledge and Experience in Drug Administration

Almost all nurses expressed that the lack of scientific-practical preparation of nurses in relation to drug administration prevented them from safely administering medication in pediatric wards.

3.6.1 Insufficient In-Service Medication Training

Participants stated that factors such as a lack of learning opportunities for nurses, leads to knowledge deficit in relation to the administration of drugs and provides the context in which errors can occur. It is clear that the occurrence of these errors causes patient problems and the involvement of other nurses causes other patients to receive drugs with a delay. Nurse (3) with 16 years of experience said:

“Here, in connection with the drugs that are used, we do not receive adequate education. Some of our nurses do not know the technique of subcutaneous drug injection yet. They are not trained, and this causes errors during injection. Then other nurses should leave their duties to help her and to handle her patient. This delays their patients in receiving their drug.”

3.6.2 Inability of Novice Nurses

The inability of novice nurses is another factor that prevents nurses in pediatric wards from administering medications safely. Inexperienced nurses have to administer drugs without a profound and adequate drug orientation in the wards because of the nurse shortage.

Drug administration with minimum orientation results in novice nurses lacking the ability and experience necessary for safe drug administration. Then medication errors happen. Subsequently, complications for the patient occur, other nurses become involved with the novice nurse’s patient, and the other patients’ drugs are delayed. Nurse 10 with 4 years of experience stated:

“One patient had to take phenytoin intravenously but the new nurse on the ward had spilled phenytoin into dextrose water! Then I saw the contents of the patient’s micro set were sediment. I changed the micro set, but that caused me to lose time and other patients received their drugs late.”

This theme is summarized in Table 1 and accompanied by representative quotations.

Table 1. An example of category development from the data

Representative quotations	Primary code	Subcategory	Main category
“We are very busy and do not have time to study the drugs. We can only try to give patients their medications on time!”	A lack of learning opportunities for nurses	Insufficient in-service medication training	Lack of knowledge and experience in drug administration
“There is no new booklet for intravenous drug infusion in the ward. We only have one from a long time ago.”	The absence of educational pamphlets in wards		
“Early on, when I had just started my job, I did not know how to calculate digoxin syrup based on a microgram dose. This made me give the wrong dose of digoxin!”	Miscalculation of medication by new nurses	Inability of novice nurses	
“If the doctor writes a wrong drug order, how do I know it is wrong? I do not have experience. Therefore I will make a mistake, because I do not detect the error.”	inability of new nurses to recognize errors in orders given by interns		

It should be noted that main categories, subcategories, and primary codes extracted from the data are summarized in Table 2.

Table 2. Main categories, subcategories, and primary codes extracted from the data

Primary code	Subcategory	Main category	
Doing several paper works in additionally to drug administration	Multiplicity of tasks	Working pressure	
Providing care to the patients throughout drug administration			
Insufficient numbers of nurses in several shifts	Nursing shortage		
Limitations in recruitment of nurses by hospital directors			
Difficulty in calculation as a result of the low dose of medicine	Specific difficulties of medication administration in pediatric wards		
Child refusing to take oral medicine			
Shortages of some medicines in hospital pharmacy	Drug deficiency		
Not provided medication outside of Pharmacopoeia list by hospital pharmacy			
A little and jammed medication room	Lack of space and medical equipment		Lack of resources for drug administration
Unavailability of some solutions with that to dilute intravenous medication			
Writing a wrong dose of drug by interns	Defects in medication orders	Insufficient colleague performance	
Writing a wrong type of drug by interns			
Sending the incorrect drug by pharmacy staff	Dispenser errors		
Sending the incorrect number of drug by pharmacy staff			
Late transfer of medicine from pharmacy	Failure in drug delivery to the wards		
Wrong transfer of medicine to a different ward			
A lack of learning opportunities for nurses	Insufficient in-service medication training		Lack of knowledge and experience in drug administration
The absence of educational pamphlet in pediatric wards			
Miscalculation of medication by new nurses	Inability of novice nurses		
Intravenous infusion of wrong drug by inexperienced nurse			

4. Discussion

The findings of this qualitative study suggest that several factors prevent safe drug administration from the perspective of nurses. Almost all participants in this study recognized working pressure as a major obstacle for compliance with standard principles in medication administration. Nurses in this study who are responsible for drug administration believed that increased workload and staff shortages affect one's nursing ability and concentration and increase medication errors. Similarly, deficiency in the management of human resources could lead to nurses conducting unsafe clinical activities (Reason, 2000). Other researchers also pointed to heavy workload, lack of personnel, and unfavorable workplace conditions as factors contributing to medication errors, (Hicks et al., 2004; Kralewski et al., 2005; Taxis & Barber, 2003) that their results support the findings of this study.

Researchers believe that errors in Iran may be caused by improper and long working hours, excessive responsibilities of nurses, lack of sufficient work experience, and nursing shortages (Seidi & Zardosht, 2012). Since a significant correlation was found between nurses' medication errors and their working conditions, it is recommended that nursing managers must identify adverse work situations so as to provide safe conditions at the work place and promote patient safety (Joolaei et al., 2011).

Data analysis showed that inadequate drug facilities prevent the safe administration of medication by nurses. The lack of some drugs, space, and medical equipments resulted in unsafe drug administration. Similar to the findings of the current study, researchers found that the physical problems of nurses in the workplace, such as inadequate space in the drug room cause medication errors, (Mahmood, Chaudhury, & Valente, 2011) and defects in equipments causing clinical activities be unsafe (Reason, 2000).

Another obstacle to the safe administration of medication reported in current study was the higher degree of difficulty and complexity in administering drug to children rather than adults.

Specific difficulties and unique conflicts during drug administration in pediatric wards, such as low-dose pharmaceutical drugs, the necessity of complex calculations, and children's refusal to take oral medications, distinguish these units from adult sections; pediatric nurses have doubled workloads, physical and mental fatigue, and reduced attention, and these conditions may lead to decreased safety in drug administration. Similarly another researcher stated that administering oral medications in pediatric wards needs more time and nurses become fatigued (Boztepe et al., 2014).

Most participants in the current study mentioned that insufficient colleague performance is one of the barriers to safe medication administration. Physicians made errors in the type, amount of drugs and the medication instructions mentioned in their drug orders. Nurses insist that negligence and errors in medication orders recorded by doctors is a starting point that leads to errors. In line with the current findings, researchers confirmed the impact of physician errors on nurses' medication errors (Valizadeh et al., 2008) and reported that medication errors had been made by the physicians that prescribed the drugs (Boztepe et al., 2014).

Mistakes and the carelessness of colleagues in pharmacy and drug delivery messengers are included in those listed by nurses as obstacles to the safe administration of medication. Nurses in one study stated that one of the most common causes of medication errors was pharmacy error in type and quantity of drugs sent to the ward (Toruner & Uysal, 2012). Therefore, more coordination among treatment team members seems necessary to improving the safety of drug therapy.

Studies have shown that a lack of knowledge is one cause of medication errors in clinical settings. Many errors that caused by a lack of knowledge among nurses are as to how medication orders should be implemented and how administration should occur (Anoosheh et al., 2007; Lefrak, 2002). All nurses in the context of understanding and expression of concepts in the field of pharmacology are in trouble (Manias & Bullock, 2002).

Similarly, the current study revealed that a lack of experience and knowledge in connection with drug administration, including the insufficient in-service medication training and the inabilities of novice nurses are obstacles to safe drug administration.

Many nursing researchers have mentioned increasing nurses' pharmacological knowledge as an important strategy for reducing medication errors and have stated that updating their information related to drugs, especially new ones, can be an important factor in reducing errors in medication administration (Seidi, Cheraghi, & Hasan, 2015). So, clinical strategies must be used as much as possible to improve the knowledge of nurses regarding medication to prevent endangering the safety of patients.

The inability of novice nurses due to their quick start in drug administration was named as another obstacle to safe drug administration. Similar to the current findings, one of the most important factors in the development of medication errors was the inexperience of nurses (Tang et al., 2007). Therefore, nurse managers need to ensure the sufficient knowledge of the nurses before assigning them to a ward. A nurse's work experience should also be regarded as one of the most important indicators at the time of recruitment in various hospital wards.

The carelessness of nurses, increased workload and the presence of novice nurses were the most important factors in the incidence of medication errors (Tang et al., 2007). In the current study, the inadequacy of medical resources, insufficient colleague performances, and inadequate pharmacological knowledge among nurses were listed as other factors affecting the incidence of medication errors in addition to the factors mentioned in Tang's study. Similarly, nurses in studies stated that the most common causes of medication errors are long work hours, a high patient-to-nurse ratio, the lack of appropriate dosage forms of medicines for children, transfer of the wrong drug from the pharmacy to the pediatric ward, and an inappropriate environment for the preparation of drugs as causes of drug errors (Toruner & Uysal, 2012). Working conditions such as lack of time and staff, poor facilities, and lack of experience increased unsafe clinical activity and created medication errors (Reason, 2000). All findings from the above-mentioned studies supported the results of the current study.

Despite clear documentation of the problem and medication safety research in the last decade, researchers have failed to identify sustainable solutions to reducing errors in the administration of medication to improve the

culture of medication safety (Keers et al., 2013).

Studies in Iran have identified a variety of measures for reducing errors, but many of the solutions are largely ignored cultural and organizational approaches; one should try to adjust and learn from medication errors as it improves environmental conditions (Pazokian, Tafreshi, & Rassouli, 2014).

All authorities and health care providers are required to collaborate and work as a team to facilitate the provision of safe care. Nurse leaders should improve nurses' working conditions, develop nurses' practical competencies, assign duties to nurses according to their skills and capabilities, administer appropriate supervision, improve health care providers' professional relationships and encourage their collaboration, empower nurses, and reward their safe practice (Vaismoradi et al., 2014).

In Iranian university hospitals, mothers have been taking part in the hospital care of their children for over a decade. Today, university hospitals included in their policies that mothers should stay with the child during hospitalization for psychological support and safety protection of child (Aein et al., 2011).

Pediatric patient safety can be improved and the risk of medical errors to children can be further reduced only through the complete incorporation of the culture of safety, assumption of personal responsibility for patient care outcomes, increased examinations of risk areas for pediatric patient safety, and the deployment and rigorous evaluation of system enhancements (The American Academy of Pediatrics, 2011).

But, it is not easy to determine a uniform standard for medication administration in health centers because of differences in physical layouts, installation of equipment, workforce deployments, organizational culture, and practice policies across the facilities (Huang & Gramopadhye, 2014).

5. Limitations

The current study had some limitations that should be considered. First, this research was conducted in pediatric wards, so its findings are not intended to be generalized to other clinical settings. It is recommended that further studies be conducted in other types of wards. Second, participants were selected from one teaching hospital; thus the findings are not representative of other health centers.

6. Conclusion

Given the importance of safety during drug administration and its effects on the health of patients, an awareness of the obstacles to the safe administration of medication by nurses in pediatric wards is essential. Nurses play a key role in monitoring, reporting, preventing error, and safely administering medications and their views on the obstacles of safe drug administration are keys to the development of policies for the prevention of medication errors and improving safety when administering drugs. Because of the undeniable strong effects of obstacles to safety during the administration of medication and the possibility of human error, Care managers can design strategies to remove obstacles as possible and to improve safety in hospitals.

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Contributors

M.S. and Z.M formed and designed the Study.

M.S. acquired data. M.S and Z.M managed the data.

M.S, Z.M, E.M, F.SH and M.R analyzed and interpreted the data.

Z.M, E.M, F.SH and M.R supervised the study.

Z.M obtained funding. Z.M, E.M, F.SH and M.R provided administrative, technical, or material support.

M.S, Z.M, E.M, F.SH And M.R drafted the manuscript, critically revised article for necessary intellectual content.

Z.M takes overall responsibility for the paper.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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