Journal of İnönü University Health Services Vocational School
İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksekokulu Dergisi

e-ISSN: 2147-7892 Volume 13, Issue 3 (2025) 567-586 doi: 10.33715/inonusaglik.1592421

Research Article

DETERMINATION OF NURSES' KNOWLEDGE LEVELS ON PATIENT SAFETY IN A PEDIATRIC HOSPITAL

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Article Info

Received: *27 November 2024*
Accepted: *23 June 2025*

Keywords

Child,
Pediatric nursing,
Patient safety.

ABSTRACT

The aim of this study was to assess the extent of knowledge levels regarding patient safety among pediatric nurses. This descriptive study was conducted in a pediatric hospital with 265 nurses who volunteered to participate after ethical approvals. The data were collected online between August 2022 and August 2023 by using Descriptive Information Form and Patient Safety Data Collection Form. The SPSS V23 statistical program was used to evaluate the data. The study revealed that the knowledge levels of pediatric nurses regarding the verification of patient identification information, the prevention of errors during patient delivery, the prevention of falls and medication errors, the prevention of healthcare-associated infections, the prevention of errors in patient transfer, and the prevention of errors caused by the use of medical devices were found to be adequate. Nurses must be informed about; patient safety education training, participating in patient safety activities, reporting patient safety errors, and automatic drug dispensing systems. In order to prevent errors related to patient safety in pediatric patients, it is recommended to provide regular training to nurses, update their knowledge in line with the developing technology, ensure their participation in activities as courses, congresses, and symposiums, and establish error reporting systems.

INTRODUCTION

The concept of patient safety has emerged as a critical topic in enhancing the care quality in health institutions and organizations, with the ultimate objective of ensuring patient satisfaction (Bayer & Çevik, 2019). The practices implemented to avert errors that may be faced in the delivery of healthcare services and to mitigate and eradicate the damages that may be inflicted on the patient by determining the underlying causes are delineated as patient safety (Bayer & Çevik, 2019). Patient safety is a critical quality indicator, as evidenced by numerous studies (Bayer & Çevik, 2019; Elsous, Sari, AlJeesh & Radwan, 2017). Institutions must prioritize this crucial aspect to ensure optimal patient care and outcomes. (Korkmaz, 2022).

Pediatric clinics are considered high-risk departments with regard to patient safety errors (Korkmaz, Yenice, Esenay & Sezer, 2021). As the children are in an ongoing developmental process and have heterogeneity in their treatment and care requirements, they are regarded as a

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How to cite this article: Bağrıyanık, T., Yücesan, B. & Çalık Bağrıyanık, B. (2025). Determination of Nurses' Knowledge Levels on Patient Safety in A Pediatric Hospital. *İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksekokulu Dergisi*, 13(3), 567-586. doi: 10.33715/inonusaglik.1592421

more vulnerable group in comparison to adults (Pazarcıkcı & Efe, 2018). Nurses play a pivotal role in ensuring patient safety, as they are directly and continuously responsible for patient care (Al Rafay, Shafik & Fahem, 2018; Pazarcıkcı & Efe, 2018). The enhancement of patient safety is contingent upon the cultivation of awareness and the periodic dissemination of knowledge through training programs directed at nurses (Korkmaz Yenice et al., 2021; Pazarcıkcı & Efe, 2018). The implementation of specialized nursing personnel within pediatric hospitals (Pazarcıkcı & Efe, 2018) and the establishment of incident reporting systems for error documentation (Korkmaz Yenice et al., 2021) are pivotal in the reduction and prevention of errors with patient safety implications.

Nurses play a pivotal role in comprehending and executing the "International Patient Safety Goals," with the objective of minimizing potential hazards and errors (Shehata Mohammed Mady, El Rafy & Tantawi, 2017). “In accordance with the "International Patient Safety Goals," incorrect patient identification, failures in effective communication and erros during patient handovers, medication errors, patient falls, healthcare-associated infections, errors occurring during patient transfer and errors caused by inappropriate and improper use of medical devices are frequently encountered patient safety problems in pediatric clinics (Aktar et al., 2016; Atalay Özkılıç & Kardaş Özdemir, 2022; Dedefo, Mitike & Angamo, 2016; Ersun, Başbakkal, Yardımcı, Muslu & Beytut, 2013; Krzyzaniak & Bajorek, 2016; Maraş, Somer, Sütçü, Acar & Salman, 2015; Pazarcıkcı & Efe, 2018; Polat Külcü & Yiğit, 2017; Taş Arslan & Aldem, 2014; Wimmer, Neubert & Rascher, 2015).

The American Academy of Pediatrics (AAP) asserts that to ensure patient safety in pediatric patients, healthcare professionals working in pediatric services must comprehend the significance of patient safety, meticulously implement patient safety procedures, and cultivate a patient safety culture (AAP, 2011). In order to ensure patient safety in pediatric patients, it is imperative to identify and address the frequently made mistakes in pediatric clinics. This will facilitate the implementation of necessary precautions (Pazarcıkcı & Efe, 2018). Consequently, it is imperative to assess the knowledge level of nurses, who play a pivotal role in patient care, to promote awareness through regular training sessions, to ensure that the training content aligns with the nurses' knowledge level, to repeat the training when necessary, and to solicit feedback on the training (Korkmaz Yenice et al., 2021; Pazarcıkcı & Efe, 2018). Consequently, this study was conducted to determine the knowledge levels of pediatric nurses regarding patient safety. It is crucial to determine the level of knowledge before providing training to nurses and to ensure that the training is aligned with their needs. It is hypothesized that the findings of this study will provide guidance to pediatric nurses and serve as a resource for individuals who will

engage with this issue. In addition to ensuring the safety of children, the initiative will enable pediatric nurses to gain awareness.

MATERIAL AND METHOD

Research Purpose and Type

This study was conducted to determine the level of knowledge of pediatric nurses about patient safety. It is a descriptive and cross-sectional study.

Research Population and Sample

The study population consisted of all nurses (n=850) working in the clinics/policlinics of Ankara Bilkent City Hospital MH4 Children's Hospital between 01.08.2022-and 01.08.2023. No sampling method was used in the study, and a complete census method was used to reach all nurses working in the relevant hospital on the specified dates. The study was completed with 265 nurses who voluntarily participated. The study included nurses who completed the online data collection form completely, volunteered to participate in the study, were open to communication, were 18 years of age or older, worked as pediatric nurses, had internet access, and could use the internet.

Data Collection

Data were collected using the “Google Drive” platform due to the Covid-19 pandemic. While preparing the data collection form for the study, the “Google Forms” application was used, and the online questionnaire was sent via WhatsApp application to the nurses who voluntarily agreed to participate in the study. In line with the feedback received from the nurses, it was determined that the data collection form was answered in approximately 10 minutes.

“Descriptive Information Form” and “Patient Safety Data Collection Form” were used to collect data in the study.

Descriptive Information Form: The form was prepared by the researchers in line with the literature (Ersun et al., 2013; Korkmaz, Yenice et al., 2021; Taş Arslan & Aldem, 2014). It consists of questions to determine the socio-demographic characteristics of the nurses.

Patient Safety Data Collection Form: Form was developed by the researchers in line with literature (Atalay Özkılıç & Kardaş Özdemir, 2022; Bülbül et al., 2014; Chroma, 2016; Çevik et al., 2020; Fujita, Fujita & Fujiwara, 2013; Gök & Yıldırım Sarı, 2016; Gürlek, Kanber & Khorshid, 2015; Horoz, Yıldızdaş & Menemencioğlu, 2014; Özalp Gerçeker, Akçay Didişen, Bolışık & Başbakkal, 2015; Taş Arslan & Aldem, 2014; Tuğrul & Khorshıd, 2015; Tuğrul & Şahbaz, 2021; Pazarcıkcı & Efe, 2018; Yıldız Fındık, Soydaş Yeşilyurt & Gökçe Işıklı 2019;

Tok Yıldız & Yıldız, 2020; Uysal, 2010). The form is composed of seven sections, the purpose of which is to ascertain the level of knowledge regarding patient safety possessed by nurses who have consented to participate in the study. The section on identification and verification of patient identification information consists of eight items. The section on prevention of falls consists of 11 items. The section on prevention of medication errors consists of 26 items. The section on prevention of healthcare-associated infections consists of nine items. The section on the prevention of errors encountered in patient delivery consists of nine items. The section on prevention of errors in patient transfer consists of nine items. The section on prevention of errors caused by the use of medical devices consists of six items. The items contained within each section have been meticulously reviewed to ensure their accuracy and internal consistency. The nurses' knowledge level for each item was determined based on the responses to the items' correct answers.

Data Analysis

Data were analyzed using the IBM SPSS V23 statistical program. Frequency distributions (n, %) were used for categorical variables, and mean ± standard deviation was used for numerical variables.

Limitations of the Study

The study was conducted in a single center, and the answers to the questions on patient safety were limited to the level of knowledge and answers given by the nurses participating in this study. Nurses without internet access could not be included in the study.

Ethical Aspects of the Study

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethics committee approval was obtained from Çankırı Karatekin University Ethics Committee with number 25 dated 21.04.2022. Written permission to conduct the study was obtained from Ankara Provincial Health Directorate with the decision dated 17.06.2022 and numbered 41. The “Informed Consent Form” was added to the first part of the online questionnaire sent to the nurses via WhatsApp application, and those who declared their participation in the study were included. In the study, the Principles of Research and Publication Ethics were followed.

RESULTS

Of the nurses participating in the study, 77.7% were female, 82.3% held a bachelor's degree, and their mean age was 30.08 ± 6.39 years (Table 1).

Among the nurses who participated in the study, 78.9% reported receiving training on patient safety, and of those who received training, 93.8% underwent in-service training. Furthermore, 57.0% of the nurses participated in activities related to patient safety, while 50.2% were unaware of the existence of a patient safety committee within their institution. The prevalence of errors related to patient safety was 39.6%, while 55.2% of nurses who experienced errors encountered falls, 50.5% encountered medication administration errors, 48.6% encountered errors in patient delivery, and 69.5% reported the errors they experienced (Table 1).

Table 1. Nurses' Socio-demographic Characteristics

	(n) / Mean± S.d.	**(%) / Median (Min.-Max.)**
Gender		
Female	206	77.7
Male	59	22.3
Age	30.08±6.39	27.00 (22.00 – 49.00)
Graduated School		
Health Vocational High School	12	4.5
Associate degree	18	6.8
Undergrad	218	82.3
Postgraduate	17	6.4
Receiving Training on Patient Safety		
Yes	209	78.9
No	56	21.1
Place of Training (n=209) ^[x]		
Course	13	6.2
Congress	13	6.2
Symposium	6	2.9
In-service training	196	93.8
Internet	50	23.9
Participation in Patient Safety Activities		
Yes	151	57.0
No	114	43.0
Availability of a Patient Safety Committee in the Hospital		
Yes	127	47.9
No	5	1.9
I don't know	133	50.2
Mistakes Regarding Patient Safety		
Yes	105	39.6
No	160	60.4
Mistakes Made for Patient Safety (n=105) * [x]		
Medication administration error	53	50.5
Falls	58	55.2
Mistakes due to patient delivery	51	48.6
Identification errors	43	41.0
Healthcare-associated infections	19	18.1
Mistakes due to patient transfer	44	41.9
Reporting of Mistakes (n=105) *		
Yes	73	69.5
No	32	30.5

S.d.: Standard Deviation, Min: Minimum, Max..: Maximum, ^Number of nurses who received training on patient safety, *Number of nurses who made mistakes regarding patient safety, [x]Multiple responses were allowed

Of the nurses participating in the study, 99.6% of the nurses participating in the study recommended patient verification before putting on the patient wristband, 72.1% recommended white colored patient wristbands for all patients admitted to the clinic, 87.6% recommended red colored patient wristbands for patients with allergies, 81. 5% stated that room number should not be used for patient identification, 81.5% stated that bed number should not be used for patient identification, 99.6% stated that patient identity verification should be performed before all applications, and 98.1% stated that the patient wristband should be worn until the patient is discharged (Table 2).

Among the nurses involved in the study, 99.6% evaluated all patients admitted to the clinic with regard to fall risk, 98.9% measured the risk of falling with a measurement tool that met international standards, 95.8% measured the risk of falling at regular intervals, and 91.7% hung a fall risk symbol on the bedside/patient room door for patients with fall risk. The data indicates that 99.6% of nurses utilized a crib or bed that was suitable for the patient. Furthermore, 99.6% of nurses removed the bed or crib borders while the patient was in bed. It is noteworthy that 99.6% of nurses kept the patient's bed breaks closed. Moreover, all nurses paid attention to ensuring that the floors were not wet or slippery. In the event that the clinic undergoes cleaning procedures, a conspicuous warning sign should be placed regarding slippery floors. Additionally, it was emphasized that parents should undergo training to mitigate the risk of falls. A resounding 99.6% of respondents underscored the necessity for heightened surveillance of patients who utilize medications with the potential to induce falls (Table 2).

Table 2. Nurses' Statements on Identification and Verification of Credentials and Prevention of Falls

	Yes		**No**		**I don't know**	
	n	**%**	**n**	**%**	**n**	**%**
Identification and Verification of Patient Credentials						
Patient verification should be done before putting on the wristband.	264	99.6	1	0.4	0	0.0
All hospitalized patients should wear a white colored wristband.	191	72.1	68	25.7	6	2.2
Patients with allergies should wear a red colored wristband.	232	87.6	25	9.4	8	3.0
Room numbers should not be used for identification.	216	81.5	39	14.7	10	3.8
Bed number should not be used for identification.	216	81.5	40	15.1	9	3.4
Identity verification must be done before making any applications.	264	99.6	1	0.4	0	0.0
The patient wristband must remain on until the patient is discharged.	260	98.1	5	1.9	0	0.0
Prevention of Falls						
Fall risk should be assessed in all hospitalized patients.	264	99.6	0	0.0	1	0.4
Fall risk should be assessed using an internationally recognized measurement tool.	262	98.9	0	0.0	3	1.1
Fall risk should be evaluated at regular intervals.	254	95.8	9	3.4	2	0.8

A fall risk symbol must be hung on the bedside/patient room door of patients with fall risk.	243	91.7	21	7.9	1	0.4
A cradle/bed suitable for the patient should be used.	264	99.6	1	0.4	0	0.0
Bed/cradle borders should be lifted while the patient is in bed.	264	99.6	1	0.4	0	0.0
The brakes of the patient's bed should be kept closed.	264	99.6	1	0.4	0	0.0
Care should be taken to avoid wet and slippery floors.	265	100.0	0	0.0	0	0.0
If the clinic is cleaned, a slippery floor warning sign should be placed.	265	100.0	0	0.0	0	0.0
Accompanying parents should be trained to prevent the risk of falling.	265	100.0	0	0.0	0	0.0
Patients taking medications that may cause falls should be closely monitored.	264	99.6	0	0.0	1	0.4

All participants answered the questions.

Among the nurses participating in the study, 99.2% stated that patient identity verification should be performed prior to medication administration; 98.1% indicated that medications should be prepared in an environment free from distracting stimuli; 98.1% emphasized that look-alike, sound-alike medications should be stored separately; 98.1% reported that abbreviations and symbols should not be used in medication names; and all nurses agreed that when receiving verbal orders, the medication name, dosage, and route should be read back to the physician for confirmation. Additionally, 93.2% reported that verbal orders should be documented in written form within 24 hours at the latest. All participants stated that the expiration date of the medication should be checked before preparation; 99.2% noted that drug dosages should be calculated based on the child's weight; and all confirmed that the accuracy of dosage calculations should be ensured. Furthermore, all nurses emphasized that decimal or zero-including numbers in orders should be double-checked prior to medication administration; 94.0% noted that the volume of dry powder in powdered medications should be considered; 96.6% stated that medications should be reconstituted with their specific diluents; and 99.2% reported that high-risk medications should undergo double-checking before preparation. Moreover, 99.6% stated that medications should be prepared immediately before administration to the patient; 98.1% emphasized that medications should be administered exactly as ordered; and all nurses indicated that medications should be administered via the correct route. Additionally, 99.6% stated that medications should be administered at the correct time; 97.0% reported that medications prepared by others should not be administered; 99.6% highlighted that all administered medications should be documented in the patient's file; and all nurses agreed that patients should be observed to evaluate the effects of medications. Furthermore, 99.2% stated that medications should be properly labeled if storage is required; 91.3% reported that smart pump systems should be used to minimize medication administration errors; 90.9% recommended the use of electronically generated orders to reduce such errors; 99.6% emphasized that medication errors should be reported in order to reduce their occurrence; 78.9%

indicated that the use of automated drug dispensing devices could help reduce medication errors; and 93.6% noted that the lack of pediatric-specific formulations contributes to an increase in medication errors (Table 3).

Table 3. Nurses' Statements on Prevention of Medication Errors

	Yes		No		I don't know	
	n	%	n	%	n	%
Preventing Medication Errors						
Identity verification should be done before administering medication.	263	99.2	0	0.0	2	0.8
Medicines should be prepared in an environment free of distracting stimuli.	260	98.1	3	1.1	2	0.8
Drugs with similar spelling, pronunciation, and appearance should be in different places.	260	98.1	2	0.8	3	1.1
Abbreviations and symbols should not be used in drug names	260	98.1	3	1.1	2	0.8
When a verbal order is received, the drug name, dose, and route should be read back to the physician and verified.	265	100.0	0	0.0	0	0.0
When a verbal order is received, it should be written down within 24 hours at the latest.	247	93.2	7	2.6	11	4.2
The expiration date of the drug should be checked before drug preparation.	265	100.0	0	0.0	0	0.0
Lack of drugs in pediatric form leads to an increase in medication errors.	248	93.6	9	3.4	8	3.0
Drug doses should be calculated, taking into account the weight of the child.	263	99.2	1	0.4	1	0.4
It should be ensured that drug doses are calculated correctly.	265	100.0	0	0.0	0	0.0
Decimal or zero counts in the order should be double-checked before drug administration.	265	100.0	0	0.0	0	0.0
For medicines in powder form, the volume of dry powder should be taken into account.	249	94.0	8	3.0	8	3.0
Drugs should be diluted with their own solution.	256	96.6	6	2.3	3	1.1
Double-check before preparing high-risk drugs.	263	99.2	1	0.4	1	0.4
Drugs must be prepared immediately before administration to the patient.	264	99.6	0	0.0	1	0.4
Medication should be administered as ordered.	260	98.1	4	1.5	1	0.4
Medication should be administered in the right way.	265	100.0	0	0.0	0	0.0
Medication should be administered at the right time.	264	99.6	0	0.0	1	0.4
Medicines should not be administered that are prepared by others.	257	97.0	4	1.5	4	1.5
The administered medication should be recorded in the patient file.	264	99.6	0	0.0	1	0.4
The patient should be observed to evaluate the effect of the medication.	265	100.0	0	0.0	0	0.0
If medicines need to be stored, they should be labeled and stored.	263	99.2	0	0.0	2	0.8
Smart pump systems should be used to minimize medication administration errors.	242	91.3	4	1.5	19	7.2
Electronic orders should be used to minimize medication administration errors.	241	90.9	9	3.4	15	5.7
Use of vending drug dispensing devices can reduce medication errors.	209	78.9	8	3.0	48	18.1
Errors should be reported/reported to minimize medication errors.	264	99.6	1	0.4	0	0.0

All participants answered the questions.

Of the nurses participating in the study, 99.6% washed hands before all applications, all before contact with the patient, 98.8% after contact with the patient, 99.2% washed hands when moving from one patient to another patient, 96.6% did not replace hand washing with the use of the antiseptic solution, 99. 6% stated that attention should be paid to asepsis in invasive procedures, 98.8% stated that visitors should be restricted in infectious diseases, 91.0% stated that stethoscopes, thermometers, and tape measures should be wiped with alcohol, 99.2% stated that aspiration catheters should be sterile and disposable (Table 4).

Among the nurses who participated in the study, 99.2% reported that patient handovers should be conducted in a complete, accurate, and comprehensible manner; 98.5% indicated that handovers should take place at the bedside; 97.7% stated that they should be conducted face-to-face; and 78.9% emphasized that handovers should be documented in written form. Additionally, 96.6% noted that checklists should be used during the handover process; 90.6% reported that structured handover models should be employed; and 99.6% stated that patient handover should occur at every shift change. Furthermore, 98.9% agreed that both the incoming and outgoing nurses should participate in the handover process, and all participants emphasized that noise should be minimized during the handover to ensure effective communication (Table 4).

Table 4. Nurses' Statements on Prevention of Healthcare Associated Infections and Patient Delivery Errors

	Yes		**No**		**I don't know**	
	n	**%**	**n**	**%**	**n**	**%**
Prevention of Healthcare Associated Infections						
Hands should be washed before all applications.	264	99.6	1	0.4	0	0.0
Hands should be washed before contact with the patient.	265	100.0	0	0.0	0	0.0
Hands should be washed after contact with the patient.	262	98.8	2	0.8	1	0.4
Hands should be washed when moving from one patient to another.	263	99.2	2	0.8	0	0.0
The use of antiseptic solutions should not replace hand washing.	256	96.6	6	2.3	3	1.1
Attention should be paid to asepsis in invasive procedures.	264	99.6	0	0.0	1	0.4
Visitors should be restricted to individuals with infectious diseases.	262	98.8	2	0.8	1	0.4
Stethoscopes, thermometers, and tape measures should be wiped with alcohol.	241	91.0	16	6.0	8	3.0
Aspiration catheters should be sterile and disposable.	263	99.2	0	0.0	2	0.8
Preventing Errors in Patient Handover						
Handovers should be complete, accurate, and understandable.	263	99.2	0	0.0	2	0.8
Patient handover should be done at the bedside.	261	98.5	1	0.4	3	1.1
Patient handover should be done face to face.	259	97.7	6	2.3	0	0.0
Patient handover should be done in written form.	209	78.9	44	16.6	12	4.5
Checklists should be used in patient handover.	256	96.6	1	0.4	8	3,0
Patient handover models should be used.	240	90.6	9	3.4	16	6.0
Patient handover should be done at each shift change.	264	99.6	1	0.4	0	0.0

All nurses whose shift starts and ends must participate in patient handover.	262	98.9	3	1.1	0	0.0
Noise should be minimized during handover.	265	100.0	0	0.0	0	0.0

All participants answered the questions.

Among the nurses who participated in the study, 99.2% stated that patient identity verification should be performed prior to patient transfer, and all participants emphasized that a professional healthcare provider should accompany the patient during the transfer. Additionally, 99.2% indicated that an appropriate transport vehicle should be selected for the patient; 99.6% noted that the functionality of devices and equipment to be used during transfer should be checked in advance; and all participants reported that the necessary materials and medications should be prepared prior to the transfer. Furthermore, 99.6% emphasized that appropriate fall prevention measures should be taken; all nurses stated that attention should be paid to catheters and medical equipment attached to the patient; 99.6% highlighted that communication should be established with the receiving unit before the transfer; and 99.6% indicated that the patient's general condition should be closely monitored throughout the transport process (Table 5).

Among the nurses who participated in the study, 99.6% stated that faulty and defective devices should not be used, all nurses should be trained to use medical devices, 99.6% stated that maintenance and calibration of medical devices should be performed, 99.2% stated that all devices and technologies should be standardized, 99.6% stated that devices suitable for pediatric patients should be used. All device settings should be correct and appropriate (Table 5).

Table 5. Nurses' Statements on Prevention of Errors in Patient Transfer and Use of Medical Devices

	Yes		**No**		**I don't know**	
	n	**%**	**n**	**%**	**n**	**%**
Preventing Errors in Patient Transfer						
Patient identification should be verified.	263	99.2	1	0.4	1	0.4
A professional health worker should accompany the patient transfer.	265	100.0	0	0.0	0	0.0
Appropriate transportation vehicles should be selected for the patient.	263	99.2	2	0.8	0	0.0
The availability of devices and instruments to be used during transfer should be checked.	264	99.6	0	0.0	1	0.4
Necessary materials and medicines should be provided during the transfer.	265	100.0	0	0.0	0	0.0
Necessary precautions should be taken against falling.	264	99.6	0	0.0	1	0.4
Necessary precautions should be taken to prevent damage to the catheters/equipment in the patient.	265	100.0	0	0.0	0	0.0
The unit to which the patient will go should be contacted before patient transfer.	264	99.6	0	0.0	1	0.4

The general condition of the patient should be closely monitored during transportation.	264	99.6	1	0.4	0	0.0
Prevention of Errors Arising from the Use of Medical Devices						
Faulty and defective devices should not be used.	264	99.6	1	0.4	0	0.0
Nurses who will use medical devices should be trained.	265	100.0	0	0.0	0	0.0
Medical devices should be maintained and calibrated.	264	99.6	0	0.0	1	0.4
All devices and technologies used should be standardized.	263	99.2	2	0.8	0	0.0
Devices suitable for pediatric patients should be used.	264	99.6	0	0.0	1	0.4
Device settings should be correct and appropriate.	265	100.0	0	0.0	0	0.0

All participants answered the questions.

DISCUSSION

It was determined that a significant portion of the nurses participating in the study received training on patient safety and the majority of the nurses who received training received training through in-service training. The study revealed that more than half of the nurses engaged in activities related to patient safety yet lacked awareness regarding the existence of a patient safety committee within their institution. A study revealed that 63.1% of nurses were knowledgeable about patient safety, with 38.5% of this knowledge being acquired through in-service training (Taş Arslan & Aldem, 2014). In a study 68.6% of nurses indicated that they had not participated in training on medical malpractice, and 74.3% stated that they needed training on this issue (Polat Külcü & Yiğit, 2017). A study conducted with pediatric surgical nurses revealed that nurses require training in various domains, including drug administration and safety, drug storage, safe patient transfer, the risk of falls in pediatric patients, control of blood and blood products, procedures to ensure patient safety, sending patients to surgery according to the surgical procedure, and control of medical devices (Korkmaz Yenice et al., 2021). A study conducted with nurses working in neonatal intensive care units revealed that 74.0% of the nurses received training on patient safety, and 62.5% received training on patient safety in the unit where they worked (Yeniterzi, 2013). The findings of the study suggest that nurses should be supported through training opportunities focused on patient safety and active involvement in patient safety initiatives.

The study revealed that 39.6% of the nurses participating in the study encountered errors related to patient safety. Among these errors, more than half were related to falls and drug administration, nearly half were related to patient delivery, and the majority of the nurses reported the errors they experienced. A study revealed that 48.9% of nurses made pediatric drug administration errors at least once during their professional careers (Başer & Manav, 2018). A study conducted with nurses working in pediatric clinics revealed that 42.9% of the nurses made medical malpractice during their professional life, and 62.9% of them witnessed errors made by the nurses they worked with (Polat Külcü & Yiğit, 2017). A study conducted with pediatric

nurses revealed that 61.0% of nurses encountered medical errors (Ersun et al., 2013). In a study conducted in pediatric wards, it was found that 44.4% of nurses made one or two medication errors in the 6 months before the study (Salmani & Fallah Tafti, 2016). In a study conducted with pediatric surgical nurses, it was determined that nurses received the lowest score from the "unexpected event and error reporting" sub-dimension of the patient safety culture scale (Korkmaz Yenice et al., 2021). A study conducted the rate of individuals who consistently report through the system was determined to be 47.9% (Kilicarslan, Toruner & Uysal, 2012). In a study conducted with pediatric nurses, it was determined that none of the nurses filled out an incident report form and reported malpractice verbally (Ersun et al., 2013). The findings of the study underscore the imperative for nurses to be encouraged to report errors.

The first of the International Patient Safety Goals is the verification of patient identity (JCI, 2014). Errors related to patient identification have been shown to occur with a high frequency. The implementation of barcoded patient wristbands has been demonstrated to contribute to a reduction in medical errors. Consequently, it is imperative to implement protocols to ensure that each patient is appropriately identified by a patient wristband (Khammarnia, Kassani & Eslahi, 2015). The study's findings indicated that the nurses participating in the study demonstrated sufficient knowledge regarding the verification of patient identification information. However, it was recommended that the nurses be provided with support in wearing the appropriate patient wristbands. In a study conducted with midwives and nurses working in pediatric clinics, 54.1% of the participants stated that they provided identifiers/armbands to patients, 87.7% checked patient identity before all applications, 45.1% provided white armbands to every patient who was admitted, 39.3% provided red armbands to allergic patients, and 45.1% did not use room and bed numbers to identify patient information (Taş Arslan & Aldem, 2014). A study conducted in neonatal intensive care units revealed that 58.3% of nurses affixed an identification bracelet to the patient's arm, and an overwhelming 92.7% of nurses examined the patient's identification before conducting any procedures (Yeniterzi, 2013). In the case of young children, patient identity verification should be approached with particular caution, as their physical, cognitive, social, and language development is still in the process of maturation. The provision of training to nurses on patient identification and verification has the potential to contribute to a reduction in error rates related to identification and an enhancement in patient safety.

Patient falls are regarded as a significant safety concern. Children constitute a significant demographic in terms of fall risk, a consequence of their developmental characteristics (Çamurcu, Manav, & Karayağız Muslu, 2020). It was determined that the nurses participating

in the study possessed sufficient knowledge for the prevention of falls. The results of the study conducted with institutional nurses indicate that the placement of a four-leaf clover symbol on the bedside or patient room door is recommended for patients at risk of falling. However, the specific symbols employed vary across hospitals. The prevailing guidelines promulgated by the Ministry of Health incorporate the "patient at high risk of falling" symbol (Quality Standards in Health-Hospital, 2020). A study was conducted with pediatric nurses to assess their practices regarding the evaluation of fall risk in children. The results indicated that the majority of the nurses (85.0%) routinely assessed fall risk in the clinic where they worked. Furthermore, a significant proportion of the nurses (96.7%) expressed a strong belief that every child should undergo evaluation for fall risk. The study also revealed that the Harizmi Fall Risk scale was utilized by 80.0% of the nurses when evaluating the fall risk of children in the clinic. A recent study revealed that 75.0% of the participants indicated that they assess pediatric patients in the clinic with regard to fall risk during their initial hospitalization. Moreover, 96.7% of the participants reported that they implement safety measures for children's beds in the clinic where they are employed. Additionally, 73.3% of the participants indicated that they provide training to families to prevent falls in the clinic where they work. Finally, 91.7% of the participants stated that they are aware of the medications that can potentially cause falls in children (Atalay Özkılıç & Kardaş Özdemir, 2022). In a study conducted with pediatric nurses, it was found that 86.1% of midwives and nurses continuously evaluated the patient in terms of fall risk, 77.0% continuously checked the edges of the bed when they took the patient to bed, and 58.2% kept the warning sign in the corridor during cleaning in the ward (Taş Arslan & Aldem, 2014). In another study, it was determined that the fall rate was lower in facilities that used a fall risk assessment tool, educated patients and caregivers about fall prevention, set criteria for the selection of appropriate handrails, and used beds suitable for the patient. The study also found that facilities that used beds suitable for the patient educated patients and caregivers about the appropriate use of side rails using brochures, and maintained surveillance of wet floors and surfaces did not cause a difference in fall rates (Fujita et al., 2013).

Medication errors have been demonstrated to have deleterious effects on patient safety and healthcare costs. Children are considered to be at high risk for medication errors due to their developmental characteristics and the absence of child-specific drug forms (Gök & Yıldırım Sarı, 2016). The study's findings indicated that the participating nurses demonstrated adequate knowledge regarding the prevention of medication errors. However, the study recommended that nurses be supported in their utilization of automated drug dispensing systems. A study was conducted with pediatric nurses to ascertain their perspective on optimal

pharmaceutical administration practices. The results of the study indicated that 86.7% of the nurses indicated that an identity check should always be made from the ID wristband before administering a drug. Furthermore, 79.6% of the nurses indicated that the drug name, dosage, and route of administration should be read back to the physician after receiving and recording a verbal or telephone order. Finally, 73.3% of the nurses indicated that medication errors occur as a result of violating the five right principles. In the patient records, 17.1% of the respondents documented the administration of the drug. 41.7% of the respondents indicated that the abbreviation "U" should not be used in place of the term "Unit." Furthermore, 64.9% of the respondents asserted the importance of conducting double-checks with a second employee during the administration of high-risk drugs. Finally, 74.9% of the respondents emphasized the significance of reporting medication errors to assess the competence of nurses in drug administration (Özkardaş, 2019). A study revealed that 42.3% of nurses did not verify the name on the child's wristband prior to administering the drug, 96.5% documented the drug administration on the nurse observation form, and 33.3% did not inspect the expiration date of the drug (Bilsin, 2020). In a separate study conducted with pediatric nurses, it was determined that 98.4% of midwives and nurses ensured that the medication was administered to the correct patient. Additionally, 98.4% of the participants administered the medication in accordance with the stipulated orders, 95.1% administered the medication at the designated time, and 96.7% administered the orders in the prescribed form. A total of 98.4% of respondents indicated that they ensure the accurate calculation of drug doses. Furthermore, 66.4% of respondents reported that they monitor patients to assess the efficacy of administered drugs. Additionally, 87.7% of respondents noted that they document the drug administration in the patient's medical record. Moreover, 73.8% of respondents indicated that they re-read verbal orders and obtain approval from the individual who issued the order, utilizing the coding system if necessary. A survey was conducted to assess the adherence to protocol in the administration of verbal orders. The results indicated that 72.1% of respondents completed the verbal order form upon receipt of the order, 73.8% had the verbal order form signed by the relevant physician within 24 hours, 86.9% double-checked the medication on the medication chart before administration, and 95.1% paid attention to medications that were similar in reading and appearance. Furthermore, 61.5% of the subjects indicated that the pharmaceutical agent should be reconstituted with its proprietary solution. In contrast, 80.3% of subjects reconstituted the drugs to be administered during treatment, and 53.3% continuously administered the drug prepared by themselves (Taş Arslan & Aldem, 2014). A recent study conducted with nurses working in neonatal intensive care units revealed several noteworthy findings. First, the vast majority of nurses, 99.0%, administered

the medication in accordance with the request. Second, an overwhelming majority, 99.0%, were certain that they administered the medication to the correct infant. Third, a substantial proportion, 97.9%, were confident in the accuracy of the calculated dose. Finally, a significant percentage, 96.9%, administered the medication at the designated time. A total of 93.8% of the respondents administered the medication in the requested form. Furthermore, 96.9% of them recorded the medication in the patient file. Additionally, 81.2% of the respondents checked the name, dose, and route of the medication by reading it back to the doctor and recorded it in the patient's file. Moreover, 66.7% of the respondents double-checked when using high-risk medications. Finally, 95.8% of the respondents paid attention to medications that were similar in spelling, writing, and appearance. The study found that 80.2% of the participants diluted the drug with their own solution, 84.4% prepared the drug just before administration, 78.1% paid attention to the expiration date, and 69.8% administered only the drug they prepared themselves (Yeniterzi, 2013). In a study conducted with pediatric nurses, it was found that while all nurses were aware of the correct order of weight measurements and the conversion of one gram to milligrams when calculating drug doses, 13.3% made errors in the conversion of milligrams to micrograms, 64.3% made double checks when preparing or administering high-risk drugs. The study revealed that 76.5% of the respondents were aware of the proper storage conditions for medications, 79.6% correctly identified the method for preparing an oral drug commonly used in pediatric patients that necessitates reconstitution, and 85.7% demonstrated proficiency in measuring the volume of dry powder (Bülbül et al., 2014). In another study conducted with pediatric nurses, it was found that 83.8% read the package leaflets of the drugs to be administered, and 69.1% paid attention to the volume of dry powder when calculating the doses of the drugs to be administered (Özalp Gerçeker et al., 2015). Providing training to nurses on the prevention of medication errors may contribute to the prevention of medication errors.

Healthcare-associated infections represent a significant patient safety concern. The study's findings indicated that the nurses participating in the study demonstrated sufficient knowledge regarding the prevention of healthcare-associated infections. In a separate study, it was determined that 28.6% of nurses wash their hands before contact with the patient, 49.2% after contact with the patient, 44.4% before aseptic techniques, 38.1% after contact with the patient's environment, 47.6% wash their hands with water and antiseptic solution, and 30.2% wash their hands with water and soap (Karaoğlu & Akın, 2019). In a study conducted with pediatric nurses, 83.6% of midwives and nurses washed their hands when starting clinical work, 73.0% washed their hands before contact with the patient, 91.0% after contact with the patient, 81.1% before any invasive intervention applied to the patient, 94.3% after interventional

procedures were performed on the patient. Futhermore, it was observed that 60.7% of healthcare professionals performed hand hygiene practices when transitioning between patients. Moreover, 73.0% of the respondents engaged in hand hygiene, often accompanied by the application of antiseptic solutions, prior to the administration of treatment. Following the conclusion of treatment procedures, 86.9% of the participants continued to adhere to hand hygiene practices, utilizing antiseptic solutions (Taş Arslan & Aldem, 2014). The findings of the study suggest a need for training in infection prevention strategies among nurses.

Patient handover is a critical component of patient safety (Tuğrul and Şahbaz, 2021). Shift handovers are of paramount importance for ensuring the safety of patients. A recent study revealed that nurses performed the handover effectively, with nurses receiving the highest score in the "quality of information" sub-dimension (Tuna & Dallı, 2018). The accurate transfer of clinical information is imperative for ensuring continuity of care and patient safety (Smeulers, Lucas & Vermeulen, 2014). Incorrect and incomplete handovers have been demonstrated to cause serious problems for patients by increasing the percentage of errors (Raeisi, Rarani & Soltani, 2019). It was determined that the nurses participating in the study possessed sufficient knowledge to prevent errors caused by patient handover. A study revealed that 60.5% of nurses indicated that a lack of information about the patient was among the situations that prevented patient handover. Furthermore, 47.8% of nurses believed that patient handover should be verbal at the bedside, 41.8% thought that it should be written at the bedside, and 60.5% stated that noise was among the situations that prevented patient handover (Tuğrul & Şahbaz, 2021). In a study conducted the primary challenge encountered during the handover process was attributed to communication issues rather than the utilization of a checklist (Raeisi et al., 2019). In a study conducted in neonatal intensive care units, 96.9% of the nurses reported that they received or gave the baby at the incubator/bedside every time during shift changes (Yeniterzi, 2013). A study indicated that face-to-face communication and the utilization of structured documentation serve as guiding principles in the design of the nursing handover process (Smeulers et al., 2014). The findings of the study indicate that nurses require training to promote the importance of face-to-face, written, and bedside handover procedures.

In pediatric patients, the transfer process necessitates meticulous evaluation due to the potential risks involved. Assessing the necessity of transfer, determining the personnel who will accompany the transfer and the necessary equipment during the transfer, and preparing the patient for transfer are very important to reduce these risks (Horoz et al., 2014). Consequently, the nurse assigned to the transfer team should possess the necessary knowledge, skills, and equipment. The study's findings indicated that the nurses participating in the study

demonstrated sufficient knowledge regarding the prevention of errors caused by patient transfer.

A significant patient safety concern is the occurrence of errors stemming from the utilization of medical devices. The study's findings indicated that the nurses participating in the study demonstrated sufficient knowledge regarding the prevention of errors caused by the use of medical devices. In a study conducted, nurses exhibited a higher propensity for patient monitoring and material-device safety errors compared to other sub-dimensions (Polat Külcü & Yiğit, 2017). In a study conducted in neonatal intensive care units, 75.0% of the nurses reported checking all the devices in the ward daily to ensure that they were in working order and reporting the broken ones. Furthermore, 88.5% of the nurses indicated that they did not use the material or device when they doubted its safety (Yeniterzi, 2013). In light of the evolving technological landscape, there is a growing recognition of the need to update the knowledge base of nurses. One potential approach involves the provision of training programs that focus on the utilization of medical devices and the selection of appropriate devices.

CONCLUSION

The results of the study indicated that the nurses working in a pediatric hospital demonstrated sufficient knowledge regarding the verification of patient identification information, the prevention of errors during patient delivery, the prevention of falls, the prevention of medication errors, the prevention of healthcare-associated infections, the prevention of errors in patient transfer, and the prevention of errors caused by the use of medical devices. It is crucial for nurses to be informed about receiving training on patient safety, participating in patient safety activities, reporting patient safety errors, and automatic drug dispensing systems.

In order to reduce or eliminate errors related to patient safety in pediatric patients, it is important to update the knowledge of nurses by providing regular training on patient safety and to increase their awareness by receiving feedback after each training. It is recommended that policies be established for the implementation of international patient safety goals in children's hospitals. These goals should be implemented in nursing care services. Existing policies should be updated in line with the developing technology. Nurses' participation in activities such as courses, symposiums, and congresses should be supported. Event notification/reporting systems should be established. Managers should be prevented from taking a punitive and critical approach when undesirable situations occur. More scientific studies on this subject should be conducted. It is recommended that specialist pediatric nurses and nurses with experience in

working with pediatric patients should work in children's hospitals. Continuous audits should be carried out for patient safety in institutions, and improvements should be made accordingly.

Acknowledgments

We thank all the nurses who participated in the study voluntarily.

Note: The article is derived from a master's thesis. The research was accepted as an oral abstract to the 3rd Congress of Medical and Health Sciences Studies, which will be held virtually on December 13-14, 2024.

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