



## Article

# Investigation of Nursing Errors in Greek Pediatric Hospitals

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**Abstract:** Background: Adverse events are a prevalent occurrence across pediatric healthcare environments, and patient safety is intricately tied to nursing errors due to nurses' consistent presence and interaction with patients, which surpasses that of any other healthcare professional. This research sought to explore the factors influencing errors as perceived by pediatric nurses in Greek hospital settings. Methods: Clinical pediatric nurses voluntarily and anonymously completed a specialized structured survey, utilizing the Taxonomy of Error, Root Cause Analysis, and Practice-responsibility (TERCAP) tool, which delineates the circumstances surrounding errors occurring during clinical practice. Results: Among the participants employed in the pediatric department, 80.8% ( $n = 84$ ) reported experiencing an error at their workplace. Notably, in 48.7% ( $n = 38$ ) of these instances, the error was attributed to themselves (personal responsibility), while in 78.9% ( $n = 56$ ) of cases, it was linked to errors committed by other colleagues in the clinic. As reported by participants in pediatric departments, the primary factors contributing to potential error occurrence include the absence or inadequacy of orientation and training for new staff (43.2%), the absence of a standardized protocol for resolving disagreements (39%), insufficient ongoing training (38.3%), and breakdowns in interdisciplinary communication (21%). Conclusions: By classifying errors based on various criteria such as outcomes, processes, cognitive reasoning, ethical considerations, and importance, this study presents a holistic framework for examining pediatric nurses' errors from diverse perspectives. Through this classification approach, the study establishes a foundation for tailored interventions targeting particular aspects of errors and their root causes in pediatric departments.

**Keywords:** errors; adverse events; nurses; pediatric hospitals



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## 1. Introduction

Nurses working in pediatric hospitals are exposed to additional stressors, such as the presence of parents in the child's care, imminent death in their unit, and cases of children brought in under protective custody due to intrafamilial issues, which can increase the likelihood of professional burnout [1]. Research suggests that emotional exhaustion and job satisfaction among pediatric nurses in hospitals can significantly influence the quality of care provided to hospitalized children, potentially increasing the likelihood of errors. According to their recommendations, strategies to support nurses in reducing emotional exhaustion and improving job satisfaction may contribute to patient safety and enhance the quality of services provided. Nurses' fatigue in pediatric units is associated with adverse events [2–5]. Improving nurses' physical and psychological well-being in combination with providing suitable working conditions (reduced workload, balanced shifts, and a lower nurse-to-patient ratio) can significantly reduce the risk of professional burnout among nurses and increase the safety level of young patients [6].

In pediatric wards, common errors include medication mistakes such as incorrect dosages, administering the wrong medication, and timing errors, as well as communication failures among staff and with parents, patient misidentification, procedural errors, and lapses in infection control [7]. Critical errors can involve severe medication overdoses, unrecognized anaphylactic reactions, critical communication failures during handoffs, patients undergoing the wrong surgeries, and catastrophic technical mistakes during procedures [8–10]. To prevent these errors, strategies include implementing standardized dosage calculations, using barcoding and color-coded labels for medications, conducting structured hand-offs with tools like SBAR, involving families in care plans, ensuring clear documentation, using multiple patient identifiers, enforcing time-out protocols before procedures, providing continuous skill training, and adhering to strict hygiene protocols. Additionally, the use of technology such as Electronic Health Records (EHRs) and Computerized Physician Order Entry (CPOE) systems can significantly enhance accuracy and reduce errors, ultimately creating a safer environment for pediatric patients [11].

In addition to medication errors, communication breakdowns and inadequate training also contribute to nursing errors in pediatric hospitals. Poor communication between healthcare providers, especially during critical situations, can lead to misunderstandings and mistakes in patient care. Moreover, insufficient training or orientation for nurses in pediatric units may result in unfamiliarity with specialized procedures or protocols, increasing the likelihood of errors. To mitigate these risks, ongoing education and training programs tailored to the unique challenges of pediatric care are essential. Additionally, fostering a culture of open communication and collaboration among healthcare teams can enhance patient safety and minimize the occurrence of nursing errors in pediatric settings [12].

Beyond the factors mentioned, staffing shortages and high workload levels exacerbate the risk of nursing errors in pediatric hospitals. Nurses often face overwhelming patient loads, leading to fatigue and decreased vigilance, which can compromise patient safety. Additionally, frequent interruptions and distractions further challenge nurses' ability to deliver optimal care. Addressing these systemic issues requires strategic workforce planning, adequate staffing levels, and supportive workplace policies that prioritize nurses' well-being. By addressing these underlying challenges, healthcare organizations can create environments conducive to safe and effective pediatric care delivery while minimizing the occurrence of nursing errors [13].

The aim of this study was to investigate the type of errors and the basic factors affecting the occurrence of adverse events by pediatric nurses in Greek hospitals. Emphasizing the critical need to investigate nursing errors in Greek pediatric hospitals at this moment can highlight the potential impact on patient safety and quality of care. By addressing this gap in knowledge, this study aims to contribute valuable insights to enhance healthcare practices and ultimately improve outcomes for pediatric patients in Greece.

## 2. Materials and Methods

### 2.1. Participants

This study involved participants with diverse educational backgrounds in nursing, including university-trained nurses, those from technological institutions, and assistant nurses from secondary schools, all working in various departments of general hospitals across Greece. These departments included pathology, surgery, intensive care units (ICUs), respiratory clinics, and oncology units of three Greek pediatric public hospitals. As for inclusion and exclusion criteria, the nurses had to be official employees of the hospital participating in the research, from which the relevant permission to conduct the study had been obtained. Additionally, the participants in the research were required to speak and write in the Greek language and to consent by signing the printed questionnaires. Nurses who did not know the Greek language in both written and spoken form were not allowed to participate in the study. Furthermore, nurses who did not have an official contract with the hospital and those who had not signed their consent either during the completion of

the questionnaire or by selecting 'I agree to participate in the research' in the electronic form of the questionnaire were excluded from the present study.

## 2.2. Data Collection

The data collection occurred between November 2020 and November 2023 through voluntary and anonymous surveys. Approval for the study was obtained from the Ethics Committee of the University of West Attica (Approval No: 52654—20/07/2020) and the scientific councils of collaborating institutions. To accommodate pandemic-related limitations, an electronic survey was also created for distribution and data collection. Convenience sampling was utilized to reach participants from various nursing departments.

## 2.3. Instruments

The research instrument comprised two primary sections. The first section gathered demographic data, encompassing inquiries into participants' gender, age, marital status, educational background, and specifics regarding their work department (e.g., inpatient, outpatient, operating, oncology), along with their tenure duration in a particular unit. The second section, the Taxonomy of Error, Root Cause Analysis, and Practice-responsibility (TERCAP), aimed to capture descriptive information on nursing practice breakdowns across various nursing boards [14]. It presented diverse classifications rooted in the principles of exemplary nursing practice, covering aspects such as safe medication administration, documentation, surveillance, prevention, intervention, clinical reasoning, interpretation of orders, and professional responsibility/patient advocacy. Notably, the questionnaire underwent validation in Greek through double translation and test-retest assessment. As all participants were Greek citizens, translating the questionnaire into Greek ensured comprehension. Specifically, a demographic question queried whether Greek was the participants' mother tongue, and all participants confirmed that this was the case. Written informed consent was obtained from all participants, and in cases of electronic completion, individuals were required to indicate their agreement or disagreement to proceed with the survey.

## 3. Results

The sample of participants in this group consisted of 104 nurses working in pediatric departments, such as pediatric clinics and surgical or mixed departments. Overall, 85.6% ( $n = 89$ ) of the sample were female and 14.4% were male. A total of 28.8% were nurses aged 22–35 years, 31.7% were 36–45 years old, 33.7% were 46–55 years old, and 5.8% were over 56 years old. Married nurses accounted for 47.6% of the sample, and 56.7% of the sample had children. Additionally, 6.8% of the sample were living with a partner, and 9.7% were divorced. In terms of education level, 36.5% of the sample of nurses were graduates of tertiary education (Table 1), 53.8% held a master's or doctoral degree or were in the process of obtaining one, 8.6% were graduates of vocational nursing schools or secondary education, and 7.7% of the nurses had completed a nursing specialization. Regarding the economic status of the participants, 39.8% had a monthly income of EUR 500–1000, and 57.3% had a monthly income of EUR 1001–1500. Additionally, 11.5% had some additional employment to supplement their income. Finally, 95.1% of the participants had Greek as their first language.

It was determined that 74% of the participants worked as permanent staff, 17.3% as temporary staff, and 8.7% had fixed-term contracts. The mean total duration of participants' work experience in the hospital where they were employed was 13.8 years ( $SD = 10.9$  years). In total, 88.6% of the sample were graduate nurses, some of whom (29.9%,  $n = 31$ ) held specific positions in the nursing hierarchy, such as supervisor, head nurse, or director, and 11.5% were nursing assistants. In 80.8% of the participants working in the pediatric department, an error had occurred in their workplace, and notably, in 48.7% ( $n = 38$ ) of these cases, the error was committed by themselves (personal liability), while in 78.9% ( $n = 56$ ) it was committed by another colleague in the clinic. Overall, 47.1% of the errors

occurred during the morning shift, 32.9% during the afternoon shift, and 14.3% during the night shift. The mean age of the pediatric patients involved in the error was 4.08 years (SD = 4.25 years) and 53.7% of them were boys. The initial diagnoses of the children included malignancies/tumors (20%), cardiovascular diseases (11.4%), and respiratory diseases (12.9%). Additionally, 11.1% of the patients at the time of the error presented with agitation/aggressiveness and 5.6% showed disorientation or pain.

**Table 1.** Demographic data of participants.

		n	%
Gender	Male	15	14.4
	Female	89	85.6
Age	22–35	30	28.8
	36–45	33	31.7
	46–55	35	33.7
	56 and above	6	5.8
Marital status	Unmarried	36	35.0
	Married	49	47.6
	Cohabiting	7	6.8
	Divorced	10	9.7
	Widow	1	1.0
Children	No	45	43.3
	Yes	59	56.7
Educational status	Graduate of tertiary education (University Degree, Technological Educational Institute Degree)	38	36.5
	Graduate of Vocational Training Institute (IEK)	2	1.9
	Graduate of secondary education	7	6.7
	Postgraduate/Doctoral studies	56	53.8
	Other	1	1.0

According to participants in pediatric departments, the main factors contributing to potential error occurrence include the absence or inadequacy of orientation and training for newcomers (43.2%), the absence of a common protocol for resolving disagreements (39%), insufficient ongoing training (38.3%), and disruption of interdisciplinary communication (21%). A total of 21% participants reported that errors may be due to malfunctioning communication system equipment, while 18.5% stated that errors could occur during shift changes, 19.8% stated errors could occur as a result of patient misidentification, and 16% stated that errors could arise because of possible confusion between children (Table 2). High staff workload and continuous understaffing in pediatric departments were the main factors mentioned by nurses to be associated with management and errors, at rates of 85.2% and 74.1%, respectively. Additionally, assigning higher-responsibility tasks to inexperienced personnel (48.1%), inadequate implementation guidelines (42%), lack of support from supervisors (24.7%), insufficient support from nursing management (35.8%), unclear orientation and ambiguous boundaries of responsibility (32.1%), inadequate supervision (21%), and insufficient patient classification system to support the placement of suitable personnel in appropriate responsibility positions (19.8%) were reported by participants as factors that contributed to errors from a management perspective (Table 2).

**Table 2.** Main factors contributing to potential error occurrence.

		n	%
The factors of the system that you consider contribute to the potential occurrence of an event. (You have the option of multiple choice).	Dysfunction of communication system equipment	17	21
	Interdepartmental communication breakdown/conflict	17	21
	Shift change hour (patient hand-offs)	15	18.5
	Patient transfer (hand-offs)	11	13.6
	Lack of common ground for conflict resolution	32	39.5
	Lack or inadequacy of orientation/training	35	43.2
	Lack of ongoing training	31	38.3
	None of the above applies	7	8.6
What factors do you believe are related to management and the occurrence of error events? (You have the option of multiple choice).	Other	17	21
	Inadequate supervision	17	21
	Assignment of tasks to inexperienced staff	39	48.1
	Persistent staff shortage	60	74.1
	High workload for staff	69	85.2
	Inadequate patient classification system to support appropriate staffing placement	16	19.8
Alternative and supportive factors that you believe are responsible for the creation of error events.	None of the above applies	3	3.7
	Ineffective workload distribution among nurses for safe patient care	42	51.9
	Lack of adequate response to worker rights for providing adequate care	24	29.6
	Lack of specialized nursing system	45	55.6
	Ineffective support of nurses in “under pressure” care situations (urgent needs in respective departments)	54	66.7
	Lack of mindset for adequate collaboration with laboratories/radiology department/pharmacy or any other department	21	25.9
	None of the above applies	5	6.2

The main alternative and aggravating factors reported by pediatric hospital nurses as responsible for error occurrence were ineffective support for nurses in “under pressure” care situations, at a rate of 66.7%, and the lack of a specialized nursing system, at a rate of 55.6%. A total of 51.9% of participants mentioned ineffective workload distribution among nurses for safe patient care, while 25.9% reported a lack of adequate collaboration with laboratories, radiology departments, pharmacies, or other departments as additional catalytic factors contributing to error occurrence. Approximately 29% emphasized the lack of adequate response to worker rights for providing sufficient care as an additional catalytic factor in error occurrence.

The main environmental factors responsible for errors, as reported by pediatric nurses, are frequent interruptions to nurses during nursing procedures and interventions from visitors (72.8%), numerous urgent patient events in clinical nursing (50.6%), and lack of materials and equipment (46.9%). Additional environmental factors mentioned by participants included increased noise (33.3%), equipment misuse (17.3%), misleading labels (non-pharmaceuticals) (13.6%), physical environmental hazards (12.3%), inadequate lighting (9.9%), and cases where the hospital is in a state of emergency reported by 8.6% of nurses. In response to an open-ended question about environmental factors, nurses

also mentioned poor infrastructure of their work environment. The environmental factors responsible for errors are detailed in Table 3.

**Table 3.** Other factors responsible for errors occurrence.

	n	%	
Environmental factors	Inadequate lighting	8	9.9
	Increased noise	27	33.3
	Frequent interruptions and interventions by visitors	59	72.8
	Lack of materials and equipment	38	46.9
	Failure to use equipment	14	17.3
	Natural environmental hazards	10	12.3
	Multiple emergent situations	41	50.6
	Similar/misleading labels (non-pharmaceutical)	11	13.6
	Hospital is in a state of emergency (code)	7	8.6
	None of the above applies	3	3.7
	Other	1	1.2
Other members of the healthcare team who contributed through their communication to the occurrence of the event.	Responsible nurse	24	30.4
	Physician (attending, resident, or other)	29	36.7
	Pharmacist	4	5.1
	Other nurse	27	34.2
	Moving/auxiliary staff	11	13.9
	Other healthcare professional	4	5.1
	Health sciences student/trainee	1	1.3
Personnel issues that you believe contributed to the occurrence of the event.	Lack of supervision/support from management	17	21.3
	Lack of experienced nurses	32	40
	Lack of support from nursing staff	23	28.8
	Lack of clerical support	4	5
	Lack of support from another healthcare team	9	11.3
	None of the above applies	10	12.5
I don't know	8	10	

In total, 36.7% of the participants reported that the physician's communication contributed to the occurrence of the event, while 34.2% ( $n = 27$ ) stated that another nurse contributed to the event, and 30.4% reported that the charge nurse contributed to the reported event. Additionally, 40% of the sample believed that the lack of experienced nurses contributes to the occurrence of events, and 28.8% cited a lack of support from other nursing staff. Lack of supervision by management was reported as a cause of errors by 21.3% of the nurses in pediatric hospitals. Regarding healthcare team communication, 46.1% of nurses reported that the most significant reason for errors was the failure of team communication, while 27.6% of the sample cited a lack of planning in nursing care as a cause of errors. Additionally, 26.3% mentioned that the illegible handwriting of the staff also contributed to error events. In 58.2% ( $n = 46$ ) of cases, the event involved a medication error. Specifically, in 22.5% of cases, the medication was given to the wrong patient, and an incorrect medication dosage was reported by 15% of participants.

Administering the wrong medication to the patient was reported by 15% of the sample. In 12.5%, an additional dose of medication was given to the patient, and incorrect



medication preparation was reported by 10% of the study sample. Omission of medication dose was reported by 10%. Furthermore, administering the medication via the wrong route to the patient was reported by 5% of nurses. Misleading drug labels compared to identical labels of another drug were reported by 5% of nurses, and an incorrect drug administration method was confirmed by 2.5% of pediatric nurses in the sample. A total of 16.2% of the participants reported an error in recording medication on the patient's chart, while 83.3% of the nurse sample mentioned that errors occur in transferring medical orders from the folder to the patient's individual medication chart. Data regarding the existence of medication errors are provided in Table 4.

**Table 4.** Data regarding the existence of medication errors.

		n	%
Does the event include Medication error?	No	28	35.4
	Yes	46	58.2
	I don't know	5	6.3
	Incorrect drug preparation	4	10
	Extra dose of medication	5	12.5
	Incorrect labeling for medication administration	2	5
	Omission of medication dose	4	10
	Incorrect method of administration	1	2.5
	Incorrect dosage	6	15
	Wrong medication	6	15
	Wrong patient	9	22.5
	Wrong route of medication administration	2	5
	Wrong time of medication administration	3	7.5
	Wrong medication selection	3	7.5
	I don't know	1	2.5
	Other	1	2.5

Regarding supervision by clinical nurse managers, the majority of participants (58.5%) stated that supervising nursing care procedures is not a factor that contributes to nursing errors. A total of 23.1% of the sample reported that staff performance was not evaluated over a period as a control factor for procedures ensuring patient safety. Additionally, 13.8% of nurses working in pediatric departments reported that the patient was unsupervised for an unsafe period (Table 5).

Regarding clinical factors contributing to nursing errors, 22.8% of the sample stated that nursing care guidelines were not consciously applied by the nurse and 13.9% of participants reported inappropriate assignment of nursing tasks and acceptance of responsibility beyond the nurse's competency level for the specific cognitive field. A total of 19% of pediatric nurse participants reported a lack of knowledge of the nurse regarding nursing care application guidelines, while 10.1% of the sample stated that changes in the patient's signs and symptoms were not properly recognized by the nurse, nor was the patient's reaction to interventions. Meanwhile, 16.5% of participants reported inadequate supervision of nursing actions by other members of higher administrative responsibility (Table 5).

Furthermore, 7.6% of nurses reported that changes in the patient's signs and symptoms, as well as the patient's reaction to interventions, were not correctly interpreted by the nurse. These percentages were reported by pediatric nurses as contributing to the occurrence of errors due to the influence of clinical factors during the implementation of nursing procedures. The most significant category for nursing errors reported by participants in pediatric departments was professional responsibility, according to 50% of the

sample, followed by administrative supervision during the implementation of high nursing responsibility actions (19.2%), interpretation of medical directives (15.4%), error prevention (9%), the influence of clinical factors on error occurrence (11.2%), and finally, safe nursing intervention in patient care (9%).

**Table 5.** Supervision and clinical factors that contributed to the reported error.

	n	%	
Did Supervision by the responsible nurses of the clinic contribute to causing nursing error? (Please indicate your belief—You have the option of multiple choice).	The patient was unsupervised for an unsafe period of time	9	13.8
	Staff performance was not evaluated for an unsafe period of time	15	23.1
	The supervision process was not a contributing factor to the nursing error	38	58.5
	Other	4	6.2
	The nurse did not consciously apply the guidelines for patient care	18	22.8
	Inadequate judgment in representation and supervision by other staff members	13	16.5
	Inappropriate assignment of nursing tasks and acceptance beyond the nurse's knowledge and abilities	11	13.9
	Lack of nurse's knowledge	15	19
	None of the above applies	27	34.2
	Other	9	11.4

#### 4. Discussion

The statements of pediatric nurses in the present study revealed some significant findings regarding the distribution and causative aspects of error incidents. The occurrence of errors was more frequent during various shifts, according to one-third of the nurses, with the morning shift having the highest frequency, followed by the afternoon and night shifts, respectively. The research findings concern the occurrence of errors during different shifts, with contributing variables such as inadequate training and environmental concerns. The latter aligns strongly with the findings of Araştırma et al. (2021) regarding errors related to medication administration and their occurrence during nurses' shifts [15].

The results of this study emphasize the importance of clear and effective communication in healthcare settings, especially in pediatric care where errors can have serious consequences. Approximately half of the pediatric nurses in the sample reported ineffective communication specifically as a contributing factor to error incidents. This aligns with the findings of previous research such as that of Gampetro et al. [16], which aimed to investigate the correlations between nurses' communication within healthcare teams and the frequency of reported error incidents, as well as perceptions of safety within the hospital unit. The latter highlighted the critical role of effective communication in preventing error incidents, which is consistent with the findings of the present study. Another study by Fuseini et al. (2023) found that open communication and teamwork across all units are critical but identified issues such as fear among nurses to challenge authority, which can impact patient safety [17]. This aligns with the findings of the present research regarding the importance of effective communication and teamwork in reducing errors. Research findings align, also, with the notion that inadequate communication contributes to medication errors [18]. Additionally, factors such as strained work relationships, including negative atmospheres, distrust between physicians and nurses, and insufficient coordination between wards, exacerbate heavy workloads [19,20].



The main causes identified by the participants that contributed to these error incidents were inadequate orientation and training of nurses, lack of standardized conflict resolution procedures, insufficient ongoing education, and poor interdisciplinary communication. Additionally, nurses emphasized that management-related concerns, such as excessive workload and continuous understaffing in pediatric departments, were key factors contributing to these errors. Both the current research and the study conducted by Araştırma et al., in 2021, highlight the critical importance of nursing practices in ensuring the health and safety of patients, especially in pediatric care settings. They suggest that enhancing education, providing adequate staffing, and addressing environmental issues such as frequent interruptions and multiple urgent incidents can significantly reduce errors. Furthermore, they emphasize the necessity of a supportive work environment that considers the psychological and physiological well-being of nurses, thereby influencing their work effectiveness and the level of patient care [15]. This is supported by the study of Alturkistani et al., in 2023, which identified human factors, inadequate training, and poor working conditions as primary contributors to errors in pediatric emergency cases [21]. Similar findings were revealed in another study which identified that the most important reason for missed nursing pediatric care was frequent interruptions by anyone [22]. A study that investigated inhalation technique skills and knowledge in pediatric nurses revealed the important meaning of education and knowledge level in daily practices. Researchers mentioned that half of the participants did not know that it was important to properly cleanse the patient's oral cavity following the administration of budesonide inhalation to avoid patient inconvenience and other related problems [23].

Errors in pediatric environments have been found to be influenced by various environmental conditions. Factors contributing to errors during nursing procedures, according to over one-third of nurses, included frequent interruptions from visitors and the unavailability of essential materials and equipment. The current research also emphasizes the role of workload and staff stress in contributing to errors. In addition to findings from other studies, this study supports that nurses who reported more negative emotions ( $p = 0.049$ ) and experienced physical symptoms of fatigue ( $p = 0.030$ ) (exhaustion, feelings of fatigue, headaches) experienced a statistically significantly higher number of errors in their workplace. The studies by Fuseini et al. and Alturkistani et al., in 2023, state that burnout or fatigue among healthcare professionals is a significant cause of errors in pediatric cases. These studies suggest that high-pressure environments and demanding schedules in emergency situations, as well as high workloads and staffing issues, are factors that increase the likelihood of serious errors [17,21].

A significant proportion of error events were related to medication errors. These included various categories such as administering medication to the wrong patient, inappropriate drug dosage, administering the wrong medication, overdosing, and errors in medication preparation. The findings of this study regarding medication errors align with the focus of the study by Gampetro and colleagues on the high risk of medication errors in pediatric care. The study highlights that due to the small body size of pediatric patients and the need for weight-based calculations, medication errors are more frequent and pose the greatest risk in pediatric populations [16]. Additionally, the study by Sears et al. (2016) reached similar conclusions. It recognized that medication errors were a common occurrence in hospitals and were particularly detrimental to pediatric patients [24]. The present study also addressed medication administration errors and the challenges nurses face in the workplace during nursing practice, as six out of ten nurses reported personal involvement in medication administration error incidents. These findings align with those of Araştırma et al. [15], who aimed to identify the most common errors in pediatric clinics and their impact on nurses. A study utilizing administrative data to analyze medication error occurrences found that pediatric units had a higher medication error rate per 1000 patient days (14.8) compared to adult units (5.7) [25]. The injury rate for adult patients typically ranges between 1 and 3% [26], whereas for pediatric patients, it is reported to be three times higher [27]. The present study reveals that in Greek pediatric hospitals, the most

frequent medication error is giving medicine to the wrong patient. Conversely, in a study by Chua et al. the most common relevant event was the incorrect time of administration [28]. According to existing literature, the majority of the studies about nursing errors in pediatric departments are associated with medication errors. Children are at a higher risk of experiencing medication errors and suffering complications as a result of them [29,30]. This poses as a promising area for further investigation internationally, particularly within Greece, where research in this field is notably scarce.

## 5. Conclusions

In the healthcare sector, where ensuring patient safety and delivering high-quality care are paramount, it is essential to grasp the intricate nature of nursing mistakes and how they affect nurses' well-being. The current research extensively explores nursing errors in pediatric units, shedding light on their root causes, potential triggers, and resulting impacts. This summary encapsulates the primary findings of the study and underscores their importance in bolstering patient safety and nurse welfare.

The thorough examination of errors by pediatric nurses in this study offers a detailed understanding of the diverse factors contributing to their occurrence. By categorizing errors according to various criteria such as outcomes, processes, cognitive reasoning, ethical considerations, and significance, the study provides a comprehensive framework for analyzing errors from multiple angles. This approach unveils the complex array of influences that can lead to errors, encompassing systemic deficiencies, individual cognitive processes, ethical dilemmas, and procedural intricacies. Through this categorization process, the study lays the groundwork for targeted interventions aimed at specific dimensions of error and their underlying causes.

## 6. Limitations of the Study

This research study had certain limitations, which pertained to practical issues such as the distribution of questionnaires during the pandemic to a population group that was constantly experiencing high levels of stress and burnout, as well as to the proper understanding and interpretation of the questions by the nurses. Firstly, the distributed questionnaires were self-report tools. Each participant provided their responses based on their personal thoughts, experiences, and emotions, which does not necessarily mean that what they reported as normal is substantiated and commonly accepted. Self-report tools often lead to both underestimation and overestimation of situations, resulting in participants' responses significantly diverging in opposite directions. Naturally, the subjectivity of the responses is a factor that can disrupt the level of objectivity in the research data during the conduction of a study.

A highly useful and reliable element for a sample is its size. The expectation of the present study was for a larger number of participants to increase the representativeness of the sample. However, due to the pandemic and the restrictive measures, there was an impediment to the undisturbed distribution of the questionnaires. The distribution continued with the use of electronic questionnaires, which posed the risk of limited participation from age and educational groups that were not comfortable using electronic means.

Finally, a particularly significant limitation was the inability to absolutely correlate the error with the reported mental state. Participants were asked to respond and report their experience of a nursing error in relation to their health condition at that moment. They were informed to refer to concurrent conditions as much as possible. However, it was not feasible to verify this specific correlation in real time. Depending on their perceptual ability, the corresponding incidents were described. It is also useful to mention that making an error is a highly stressful situation for a significant percentage of individuals in general. It can cause feelings of guilt and shame, leading to underreporting and recording of these errors. Often, nurses experience bullying after such events, which inhibits the desire of a participant to report it in a study. This is considered a form of stigmatization in the workplace, and particularly in our country, there needs to be a development of a culture of encouraging

error reporting and a tendency towards training to avoid errors and recognizing them as opportunities for self-improvement and staff support.

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