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REVIEW: A Review of Investigating Causes of Medication Errors among Nurses of Emergency and Intensive Care Unit

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ABSTRACT

Introduction: Medication errors are common in the emergency department and intensive care units, but they can be reduced with a series of appropriate planning. The study goal was to investigate the causes and extent of medication errors among the emergency and intensive care unit nurses.

Material and Methods: This study was done as a review. In the present study, the studies were searched in Persian and English language databases such as SID, Magiran, Iran medex, Scopus and PubMed with the keywords such as medication error, nurses, emergency department, intensive care unit, nurse department, wrong medication, emergency nurse, and special department were searched in databases. The inclusion criteria were the articles dealing with the medication errors among the ICU nurses and the emergency departments. In order to review the present study articles, the year limit from 2014-2022 were applied. The exclusion criteria were the review articles.

Results: The results showed that overwork, fatigue, deficiency of staff, illegible instructions, insufficient knowledge, physicians' illegible handwriting, and night shifts, similar classification of drugs have been the causes of medication errors among the nurses.

Conclusion: According to the findings of the study, it is suggested to hold re-training classes periodically and to have the number of staff proportionate to the needs of the department so that imposing too much workload on staff is avoided.

Introduction

Intensive care units (ICU) and the emergency department are considered of the sensitive hospital wards caring the acute patients exposed to life-threatening conditions under the supervision of the highly skilled staff equipped with advanced facilities and devices (1). Medication errors are viewed as one of the most prevalent mistakes in nursing (2), so that today they are applied as an indicator for determining patient safety in hospital. ICU nurses may experience some working errors that threaten patient safety (1). One of the nursing goals is to provide safe care, prevent injury and promote patients'

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health but in ICUs the patient safety is exposed to danger for various reasons, including medication errors (3). Guaranteeing patient safety is of the major concerns of the health care workforce, thus today in the health service system, patient safety is a key concept and one of the important indicators of quality control of health service.

Medication errors refer to any sort of preventable event during the medicinal therapy process that could lead to inappropriate medication use or harm the patient. A study drawn results in 2001 in New York revealed that 10% of the physically injured patients suffer from failure in providing medical service. During 1955-2000, as reported 1,720 patients unexpectedly died in American hospitals, and 9,584 were injured by malfunctioning certified nurses. Besides, annually American hospitals undergo over $20 million expenses on medication errors (4).

Pursuant to the statistics reported by the American Medical Institute, around 4,400 to 9,800 patients die each year in hospitals due to errors. The studies conducted in Iran also indicate the high percentage of errors (5). Inappropriate use of medication in each of the stages of distribution and prescription is defined as a medication error that can be averted. Medicine-induced outcomes include the instances such as increased patient mortality, increased length of hospital stay, and treatment costs (6). Nurses assume that the incidence of medication errors is more common in the wards such as emergency, intensive care unit, pediatric and neonatal wards. In addition, treating critically ill patients, prescribing multiple medications, and stressful situations make ICUs prone to high medication errors (7). The main goal behind reporting medication errors is to determine how such errors occur, which can be lowered by enhancing patient safety service (8). The current study was performed pursuing the goal to analyze the medication errors among the emergency and Intensive care unit working nurses and the striking reason behind selecting this topic is medication errors being serious and catastrophic and in case of occurring, they result in the patient's death or irreparable complications. Therefore, through investigations and delving into the causes of such errors, its incidence can be reduced.

Methods

The study has been performed as a Narrative review. In the present study, the Persian studies were searched in Persian language databases such as SID, Magiran, Iran medex, with the keywords such as medication error, nurses, emergency department, intensive care unit, Nurse Department, Wrong Medication, were searched in databases. The inclusion criteria consisted of the articles addressing the medication errors among the nurses working in the ICUs and the emergency departments. In order to review the present study articles, the year limit from 2014-2022 were used. The exclusion criteria were the review articles, articles that did not have the full text, and theses.

After searching the databases, 262 articles entered the study. Through employing the inclusion and exclusion criteria and omitting the repeated cases, 13 articles entered in the study. The table below shows how to search for articles and how to select them.

Results

The analysis of the selected articles is shown in ***Figure 1***. The findings demonstrated that the overwork, fatigue, staff deficiency, illegible instructions, similar Grouping of drugs have been the causes of medication errors among the nurses. Medication errors were fewer in the nurses interested in the ward busy working or working in the morning shifts than those working night shifts.

Discussion

This review research was conducted with the goal to analyze the medication errors among the nurses working in the emergency department and Intensive care unit. The study done by Kiymaz et al. indicated that emergency department is of the wards with

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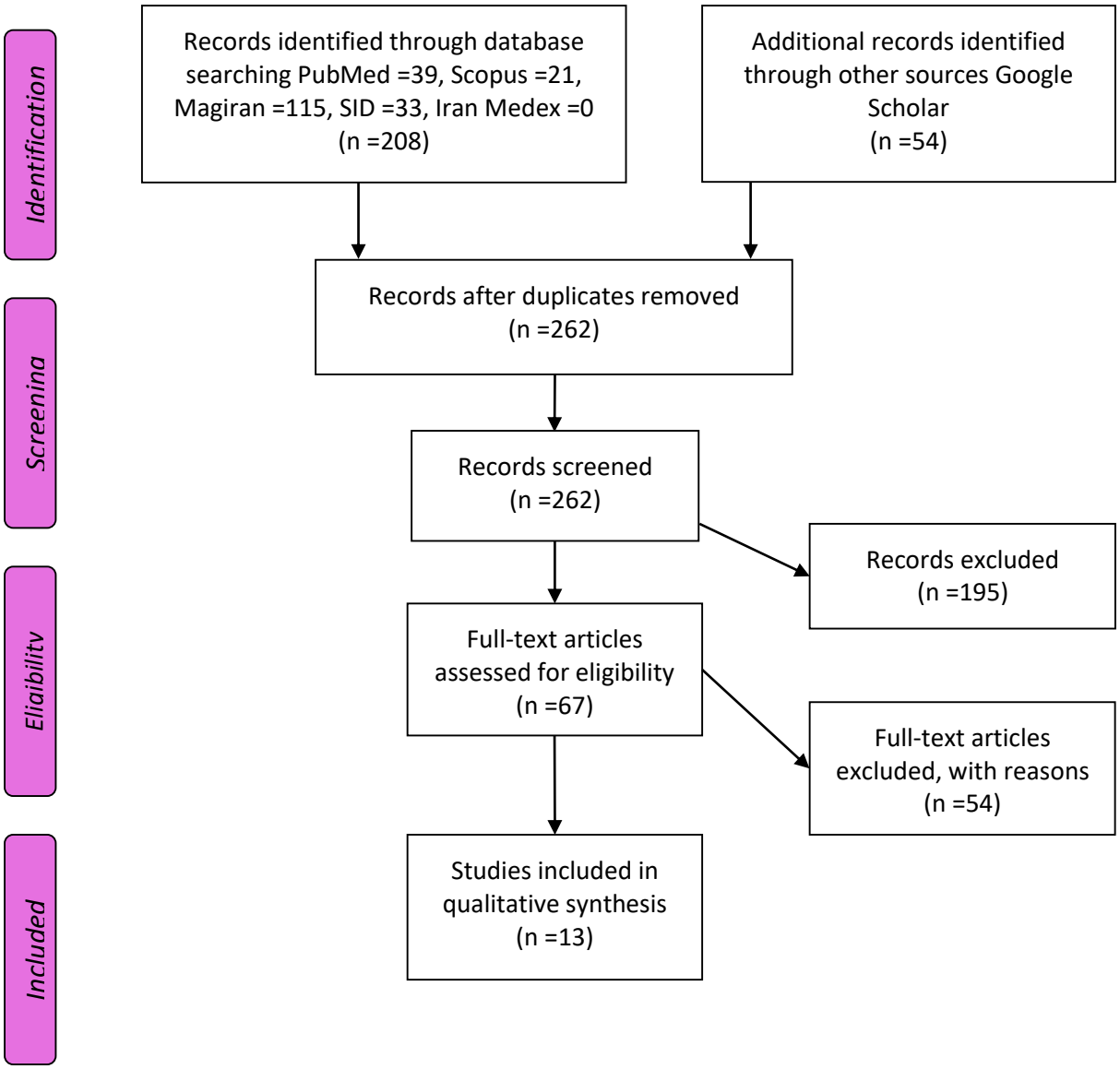

Figure 1. Prisma flowdiagram

the highest errors occurrence and the reason behind it is the nurses' high workload, being few in number and highly fatigued (8). The results demonstrated that annually thousands of cases of medication errors are reported among the medical and paramedical staff. The majority of the unintended incidents of medication errors as 49-56% occur in the prescription stage. The nurses and the pharmacy staff are responsible for 26-34% of such errors, which result in longer hospital stays and cost raises. In the research done by Rouhi et al. (2018) on nurses showed that the highest errors were related to the nurses being unfamiliar with the storage conditions of the medication and not complying with the medication instructions at the prescribed time (11). The research done by Ajri et al. (2017) suggested the individual, and the organizational factors, the emergency department specialization related factors and patient related factors were the contributing factors to the errors. It's rarely possible to identify a single factor as faulty in causing the medication errors. A set of factors lead to the occurrence of an error. Among nurse-related errors, fatigue has been the most important. Lack of knowledge can be considered the reason for creating errors (5). In the research done in Iran, lack of knowledge has been viewed as the most significant factor behind medication errors (14, 15). In the study performed by Farzi et al. and Charaghi et al., verified that illegible handwriting of physici-

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Table 1. Analyzed Studies

1st author	Year	Country	Method	Sample size	Data collection tool	Findings
Farzi (3)	2015	Iran	Descriptive-analytical	235	Researcher made Questionnaire	This study spotted the highest errors in adults'ICUs and announced high workload & illegible medication instructions as the causes.
Saki (4)	2015	Iran	Cross-sectional	170	Multidimensional Fatigue Inventory (MFI), Nursing Errors Questionnaire, and Demographic Information Questionnaire	Nursing fatigue in medical settings reduces safety and quality of care in patients.
Dehvan (7)	2015	Iran	Descriptive-analytical	56	Researcher made Questionnaire	This study showed that the max errors were due to overwork induced fatigue, similar packaging of drugs & insufficient number of nurses relative to the patient.
Vazin (9)	2014	Iran	Observational	202	Error registration form	The study revealed the highest errors resulting from medicine consumption stage and after that, prescription. Hiring further & more experienced nurses can be effective in reducing the errors.
Rezaei Farsani (10)	2017	Iran	Cross-sectional	82	Researcher made Questionnaire	Fatigue leads to dropped patient safety & quality of care .Paying attention to the individuals & job factors and adopting the right management strategies for reducing the fatigue induced outcomes and following that, reducing errors can effectively increase patient safety.

Table 1. Continued

1st author	Year	Country	Method	Sample size	Data collection tool	Findings
Ajri (5)	2017	Iran	Qualitative	17	Semi-structured interview	Identifying the contributing factors was proposed as the first step to avert errors. For reducing the errors, nursing managers should identify the contributing factors and implement the interventions for reducing them.
Rouhi Boroujeni (11)	2018	Iran	Descriptive-analytical	91	Likert Questionnaire	In this research, the highest errors were due to illegible handwriting and the fewest were related to the time when pharmacist was accessed three shifts. Identifying these factors and constantly training the nurse, physician and the pharmacist of the hospital can help prevent medication errors incidence.
Karimi Tezerji (6)	2018	Iran	Descriptive-analytical	50	Standard Questionnaire	Considering nurses' medication errors, re-training courses related to pharmacological information and enhancing the training process, encouraging nurses to report medication errors & the positive reaction of nursing managers to reporting errors can bring about suitable results for reducing medication errors.
Kiymaz (8)	2018	Turkey	Descriptive-analytical	284	Standard Questionnaire	This study indicated that the nurses being interested in their job and satisfied with their working ward and in morning shifts are less prone to medication errors.

Table 1. Continued

1st author	Year	Country	Method	Sample size	Data collection tool	Findings
Simon di (12)	2018	Italy	Descriptive	103	Researcher made Questionnaire	By increasing nursing knowledge, training requirements, changing behavior and attitude, emergency nurses' medication errors can be prevented.
Izadpanah (13)	2018	Iran	Descriptive	423	Researcher made Questionnaire	Medication errors were more prevalent at night shifts than the morning ones and more common among male nurses than the female ones. Employing the wrong training, forgetting the drug dose, prescribing extra dose, & the wrong patient or drug were reported as the instances of medication errors.
Ghanbari Afra (2)	2019	Iran	Descriptive Cross-sectional	300	Researcher made Questionnaire	Software problem were the most and pharmacy errors were the least causes. The most common cause was out of management and clashes of ideas regarding the definition of medication errors were the lowest cause for not reporting such errors.
Salamat (1)	2020	Iran	Descriptive Cross-sectional	200	Researcher made Questionnaire	In this study, 2.91% of nurses considered overwork as the cause of medication error, 1.85% deficient nursing staff and 75.4% fatigue and burnout as the cause of error.
Najafi Ghezeljeh (22)	2021	Iran	Qualitative study	17	Interview	This study shows that a wide range of personal, professional, inter-professional, and organizational factors can affect error communication in ICUs.

ans in prescription cause medication errors in nurses (3, 16). Analyzing working shifts showed night shift raised medication error incidence (17). From the viewpoint of Kim et al. (2020), the most significant strategy proposed by the participants is the nurses constantly monitoring in terms of "5 Rights "(18). Intravenous medications are the most common mistakes made by nurses, which can be effectively prevented by the nurses' knowledge level. Besides, through training the nursing personnel, the errors can be reduced. Appropriate knowledge, positive reaction, befitting behavior regarding the execution of medication instructions and the proper nursing skill can be effective in reducing such errors (12). Moreover, two studies about medication errors on children and adults in the north and south of the country indicated that most errors were spotted in urban dwelling children, while in adults, gender was involved, and the errors were higher among women (19, 20). The current review study targeted to investigate the causes and the types of administration process related errors so that to get to identify the main contributing factors to errors. Considering this fact that the administration process and its associated errors is a critical change in defining patient safety, it's highly significant to recognize administration process in hospital and identify the factors affecting the incidence of errors. The studies drawn results displayed that mistake in setting drug dose and not including the dose in the patient's prescription has been of the most prevalent errors in prescription stage. On the other hand, insufficient knowledge about medication information has been the major factor in the prescription stage and the medication consumption or injection stage.

Conclusion

According to the results derived from the studies in this research, insufficient knowledge, physicians' illegible handwriting, and night shifts are of the factors contributing to error incidence; moreover, training the nursing personnel, appropriate knowledge, positive reaction, and the right behavior related to complying with the medication instructions can effectively reduce the errors. Since advance in medicine and health can be effective in increasing the patients' life span; consequently, for safety and reducing administration process related errors, the decision makers are advised to upgrade the knowledge of the nurses and especially, the newly recruited staff and the fresh work force through appropriately designed training, employing the systems in which the administration process and the nurse who is in charge can be recorded, encouraging the personnel to report errors, as a critical step in this area.

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Conflicts of Interest

None has been announced.

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