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Risks of nurses administering medications and addictive substances

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Abstract
Goal: The administration of medications, including those containing addictive substances, plays a fundamental role in healthcare. The administration of medication by nurses in hospitals is a critical yet high-risk process. This research aims to map the risks of medicine administration errors in a hospital, including medications containing addictive substances.
Methods: The data were obtained using the standardized Medication Administration Error Survey (MAE) questionnaire, which was supplemented by a non-standardized section. A total of 500 questionnaires were distributed. The return rate of the questionnaires was 382 (76%). The sample consisted of nurses from selected departments from four hospitals in South Bohemia. The research was carried out between June and August 2023. Nurses were asked about medication administration in the hospital environment.
Results: The research results point to the possible risks of medication errors during the preparation and administration of medicines, the reasons for medication administration errors in the workplace, and whether nurses pay attention to medications containing addictive substances.
Conclusion: Patient safety and protection is a priority for all healthcare facilities. An important part is monitoring all adverse events associated with medication administration errors and setting clear rules to minimize these risks.

Keywords: Medication administration; Medication administration errors; Patient; Nurse; Safety

Introduction

The World Health Organization (WHO) emphasizes patient safety in the provision of health services, stating that millions of patients worldwide are harmed due to errors. It addresses the issue of medication errors at a global level; these errors pose significant risks to patients as they can not only lead to health issues but also to negative personal, social, and economic consequences (WHO, 2019).

Medication errors can be prevented or minimized in practice. They can cause significant harm to patients or even cause death, as well as increasing costs for healthcare organizations (Ciapponi et al., 2021). Medication errors are defined in many ways and can be classified from several perspectives (Biro et al., 2022).

Fathi et al. (2017) report that the most common errors include administering medication at the wrong time, administering the wrong dose, and administering the medication to the wrong patient. They also report that less common errors include confusing or administering the medication without a doctor's prescription. A study by Baraki et al. (2018) in Tigray, northern Ethiopia, found similar results. The most common types of errors were incorrect dosage, administering the medication at the wrong time, omitting medication, administering the medication to the wrong patient, administering the medication incorrectly, administering a non-prescribed medication, and administering the wrong medication. A study by Brabcová et al. (2024) conducted in the Czech Republic showed similar results. The main errors were found in the preparation and administration of medications, confusing the medication, its strength or form, or administering the medication to the wrong patient. Procedural errors include incomplete or illegible prescriptions, insufficient patient identification, and administering medication at the wrong time. Salami et al. (2019) report that the most common errors in Jordanian hospitals were administering medication at the wrong time and administering medication to the wrong patient. Cavell and Mandaliya (2021) report incorrect dosing errors in all hospitals.

Due to the complexity of the healthcare system, there are several causes of medication errors in clinical practice (Wondmieneh et al., 2020). Manias et al. (2019) identify communication-related factors as the leading cause of errors. They state that communication problems account for more than half of all causes of medication errors. This is also consistent with the study by Hammoudi et al. (2017), which states that

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the most common cause of errors is communication between a nurse and a doctor. Other common reasons include similar packaging and terminology of medications, staffing of nurses on duty (associated with the high workload and frequency of staff rotation in workplaces), pharmacy processes in relation to unclear drug ordering, and prescription transcription. The analysis by Prokešová et al. (2022) cites the administration of generic drugs and incomplete prescription of drugs as one of the crucial strategic weaknesses that can lead to medication errors. This has also been confirmed in the study by Tóthová et al. (2020), which describes the issue of administering generic drugs as risky. The authors state that if nurses administer a generic drug to a patient, they bear full legal responsibility in the event of medication errors.

According to Baraki et al. (2018), the most common factors contributing to errors include the level of education of healthcare workers, the age of patients, and the availability of a drug preparation room. A study by Wondmieneh et al. (2020) reported that the most common causes of errors include insufficient staff training, unavailability of work procedures, interruptions during drug administration, and night shifts. Similar results were reported by Elasrag and Abu-Snieneh (2020). System failures were mainly found in insufficient knowledge related to drug administration information and inadequate staff training. Other factors included insufficient staff on a shift, ineffective communication, late prescriptions by the doctor, and their copying. Several nurses also agreed that patients had broadly similar medications, or that medications had similar names or packaging (Elasrag and Abu-Snieneh, 2020). Kuitunen et al. (2021) list poor communication, failure to double-check procedures, lack of knowledge about medications, and similar-looking medication packaging as systemic causes of errors.

This research aims to map the risks of medication errors when nurses administer medications in a hospital, including medications containing addictive substances.

Materials and methods

Research design

A descriptive cross-sectional design.

Research sample

The research included nurses from four selected hospitals in South Bohemia. The nurses interviewed worked in various departments, such as surgery, internal medicine, paediatric, and follow-up and long-term care departments. The questionnaire survey was anonymous and completed by nurses who were willing to participate in the research.

Research tool

The questionnaire survey was conducted using the standardized Medication Administration Error Survey (MAE), supplemented by a non-standardized part related to administering medications by nurses, including medications containing addictive substances. A total of 500 questionnaires were distributed. The return rate of the questionnaires was 382 (76%). In the standardized part of the questionnaire, respondents agreed with each item on a Likert scale, with answers ranging from 1 = strongly disagree to 6 = entirely agree. The non-standardized part was compiled into a seven-point scale ranging from 1 – never, 2 – very rarely, 3 – rarely, 4 – sometimes, 5 – often, 6 – very often, 7 – always. The questionnaire also included the nurses' identification data, including gender, age, type of hospital, type of workplace, highest education achieved, and length of practice.

Data collection

Data collection occurred in four selected hospitals in South Bohemia among nurses working in selected surgical, internal, paediatric, follow-up and long-term care departments between June and August 2023. Independent individuals with no affiliations to the respective hospitals conducted the data collection.

Statistical data analysis

Statistical data processing was performed using SASD 1.5.8 (Statistical Analysis of Social Data) and SPSS Statistics ver. 28. The 1st level of sorting and contingency tables of selected indicators of the 2nd level of sorting were prepared. The degree of dependence of selected features was determined based on the χ^2-test, independence test, and other testing criteria applied according to the nature of the features and the type of their distribution. Based on this analysis, data interpretation was performed, and the appropriate tables were prepared. The level of statistical significance was set at $p < 0.05$, $p < 0.01$ and $p < 0.001$.

Ethical approval

This research was approved by the ethics committee of the Faculty of Health and Social Affairs of the University of South Bohemia on June 18, 2019. Participating respondents were informed in advance about the focus and objectives of the research, and they were guaranteed the protection of personal data.

Results

Demographics

382 nurses completed the questionnaire. The research was representative concerning gender, age, type of hospital, type of workplace, education, and length of practice, with the areas analyzed being selected demographic factors (Table 1).

The research was further divided into several areas, which included medication preparation (Tables 2, 3), medication administration during hospitalization (Tables 4, 5), reasons for medication errors (Table 6), and areas related to medications containing addictive substances (Tables 7, 8).

Based on the comparison of the results from Table 2, it is possible to determine the behaviour of nurses when preparing medications for patients during hospitalization. Nurses rarely communicate with other people when preparing medications and admit that medication preparation is sometimes interrupted for various reasons, such as patient bells or telephone calls (average of 3.87). Triple checking of medications during preparation is very common (average of 6.56), and this is essential for error prevention. Checking the number of medications prepared aligns with the number of drugs listed in the medical documentation is also performed regularly. In the absence of a specific drug and the possibility of using a generic drug, nurses often administer it and then ask the doctor to change the documentation (average 4.95). Concerning the preparation of drugs, selected characteristics were monitored to see whether nurses with higher education pay more attention to the preparation of medicines than nurses with secondary education (Table 3). No statistically significant relationship was identified in any of the monitored characteristics. It can be stated that there is no statistical significance between the education of nurses and the preparation of drugs.

Table 1. Nurse demographics

Characteristic	Participants (*N* = 382) [*n* (%)]
Gender	
Female	359 (94)
Male	16 (4)
n/a	7 (2)
Age	
<29	98 (25.7)
30–39	85 (22.3)
40–49	109 (28.5)
50–59	54 (14.1)
60 <	18 (4.7)
n/a	18 (4.7)
Hospital	
Regional	184 (48.2)
District	198 (51.8)
Workplace	
Surgical	154 (40.3)
Internal	125 (32.7)
Paediatric	14 (3.7)
Follow-up and long-term care	83 (21.7)
n/a	6 (1.6)
Education	
Secondary school	204 (53.4)
Higher vocational school	46 (12.0)
University	126 (33.0)
n/a	6 (1.6)
Length of experience	
0–19	215 (56.3)
20–39	137 (35.9)
40 and above	16 (4.2)
n/a	14 (3.7)

Table 4 shows the results that focus on medication administration during hospitalization. The analysis indicates that nurses understand the reasons for changes in the prescribed medication schedule and are informed about the reasons for changing the therapy. The high level of agreement (6.08 ± 0.95) also indicates that nurses can explain to their patients what medications they are administering. If a patient refuses the prescribed medication, nurses often call the doctor. Communicating with another person during the preparation and administration of medication is not a common practice. Nurses rarely perform other activities during medication administration. Medication errors seldom occur on the ward (average of 1.72). Selected features between their professional field and medication administration during the patient's hospitalization were monitored (Table 5). A statistically significant association was identified between the nurses' professional field and patients' waiting time to take the medication. Nurses from internal medicine departments are significantly more likely ($p < 0.001$) to wait with the patient until they take the medication than nurses from surgical departments. A statistically significant association was also identified between nurses from internal medicine and surgical departments and some steps of medication administration. Nurses from internal medicine departments are significantly more likely ($p < 0.05$) not to leave medication on the patient's table during the patient's absence and to check the identification bracelet before each medication administration.

Based on the means (M) and standard deviations (SD) from Table 6, it is possible to determine the most significant reasons for medication errors in the workplace. Similar names (M = 3.36), similar-looking drugs (M = 3.95), and similar-looking packaging (M = 3.96) can lead to drug confusion. Frequent substitution of medications with generics (M = 3.60) can cause

Table 2. Drug preparation

Questions	Mode	Min–max	s^2	M ± SD
Do you communicate with another person when preparing medications?	2	1–7	2.85	3.21 ± 1.68
Do you interrupt the preparation of medication for administration for any reason (e.g., doorbell, telephone)?	4	1–7	2.48	3.87 ± 1.57
Do you prepare medications just before administration?	7	1–7	1.19	6.35 ± 1.09
Do you administer medication prepared by another nurse?	1	1–7	2.55	2.46 ± 1.59
Do you prepare your medications in advance during your shift?	1	1–7	2.39	2.02 ± 1.54
Do you triple-check when preparing medications?	7	1–7	0.83	6.56 ± 0.91
Do you check the number of medications prepared for administration aligns with the number listed in the medical documentation?	7	1–7	1.09	6.45 ± 1.04
Suppose you do not have a medicine with the name listed in the medical documentation, but you have the same medicine under a different name (generic). Will you administer it and then ask the doctor to change the documentation before administering it?	7	1–7	4.27	4.95 ± 2.06
Do you put used medications (blisters, bottles) back into their original packaging (boxes)?	7	1–7	2.40	6.27 ± 1.54
Do you administer medications from blister packs directly to the patient (into the hand, mouth, etc.)?	1	1–7	4.16	2.58 ± 2.04
Do you return halved medications (tablet remnants) in their original packaging?	1	1–7	3.10	2.07 ± 1.76

Note: Mo – modus; min – minimum; max – maximum; s^2 – spread; M – mean; SD – standard deviation

Table 3. The connection between nursing education and drug preparation

Nursing education and …	*N*	Value χ^2	df	*p*	Stat. sign.
Communication with another person when preparing medication.	375	2.395	3	0.495	n.s.
Interruption of medication preparation for administration for any reason (bell, telephone, etc.).	376	1.621	3	0.655	n.s.
Triple checks when preparing medications.	376	0.706	3	0.872	n.s.
Checking the number of medications that is ready for administration aligns with the number stated in the documentation.	375	2.020	3	0.568	n.s.
Administration of a generic alternative if the drug listed in the documentation is not available, and subsequent request to the doctor to change the documentation.	373	3.339	3	0.094	n.s.

Note: χ^2 – chi square; *p* – independence test; df – degree of freedom; n.s. – statistically insignificant difference; * statistically significant difference for significance level α = 0.05; ** statistically significant difference for significance level α = 0.01; *** statistically significant difference for significance level α = 0.001

Table 4. Administering medications during hospitalization

Questions	Mode	Min–max	s^2	M ± SD
Do you know the reason for any change in the prescribed medication schedule compared to what the patient typically takes at home?	6	1–7	2.44	5.05 ± 1.56
Are you informed about the reason for the change in therapy before administering the medication to the patient?	6	1–7	2.50	5.26 ± 1.58
Can you explain to the patient what medications you are giving them?	7	2–7	0.91	6.08 ± 0.95
If the patient refuses the medication, do you justify the importance of its use?	7	1–7	1.27	6.14 ± 1.13
If a patient refuses the medication, will you call the doctor?	7	1–7	2.20	6.00 ± 1.48
Do you wait for the patient to swallow the medication?	7	1–7	2.08	5.83 ± 1.44
If the patient is not in bed, do you leave the medication on the table when administering the medication?	1	1–7	2.92	2.50 ± 1.71
Do you ask the patient's name before administering the medication?	7	1–7	2.22	6.00 ± 1.49
Do you check the patient's identification bracelet before each medication administration?	7	1–7	3.27	5.36 ± 1.80
Do you communicate with another person while administering the medication to a specific patient?	2	1–7	1.93	2.51 ± 1.38
Do you perform other activities while administering the medication?	1	1–7	2.04	2.19 ± 1.42
Are there any medication errors in your department?	2	1–4	0.34	1.72 ± 0.58

Note: Mo – modus; min – minimum; max – maximum; s^2 – spread; M – mean; SD – standard deviation

Table 5. The connection between nurses' professional field and the medication administration

Nurses' professional field and …	*N*	Value χ^2	df	*p*	Stat. sign.
Do you wait for the patient to swallow the medication?	362	29.485	1	<0.001	***
If the patient is not in bed when administering medication, do you leave the medication on the table?	361	4.331	1	<0.05	*
Do you ask the patient's name before administering medication?	362	3.302	1	0.072	n.s.
Do you check the patient's identification bracelet before each medication administration?	362	5.761	1	<0.05	*
Do you communicate with another person while administering medication to a specific patient?	362	2.405	1	0.124	n.s.

Note: χ^2 – chi square; *p* – independence test; df – degree of freedom; n.s. – statistically insignificant difference; * statistically significant difference for significance level α = 0.05; ** statistically significant difference for significance level α = 0.01; *** statistically significant difference for significance level α = 0.001

uncertainty for nurses and patients. Frequent interruptions of nurses (M = 3.52) can increase the risk of medication errors during administration. Lesser risks include failure to follow the approved drug administration procedure (M = 1.52) and incorrect labelling of drugs by the pharmacy (M = 1.28).

Table 7 shows the attention nurses pay to drugs containing addictive substances. The results show that nurses comply with all internal regulations regarding the handling and administering of medications containing addictive substances (M = 6.84). The entry in the opiate books is usually made immediately after administering the medication containing addictive substances (M = 6.87). As for corrections in the opiate books, these ensure the original entry is legible. Most nurses know the mechanism of action of medications containing addictive substances (M = 6.47). Adverse events regarding administering medications containing addictive substances are regularly reported (M = 6.75). The rating of one specific person always having the key to the safe in individual shifts was 6.18, which indicates a slight variability in practice with relatively higher variance (SD = 1.68). Concerning medications containing addictive substances, selected features between nursing practice and safety procedures when handling and administering medications containing addictive substances were monitored (Table 8). A statistically significant connection was identified for two features. Nurses from internal medicine departments are significantly more likely ($p < 0.01$) to follow

Table 6. Reasons for medication errors in the workplace

Questions	Mode	Min–max	s^2	M ± SD
The names of many drugs are similar.	4	1–6	1.88	3.68 ± 1.37
Different drugs look similar.	4	1–6	2.01	3.95 ± 1.42
The packaging of many medicines is similar.	4	1–6	1.88	3.96 ± 1.37
The doctor's instructions regarding medication are illegible.	2	1–6	2.38	3.01 ± 1.54
The doctor's instructions regarding medication are unclear.	2	1–6	2.05	2.74 ± 1.43
Doctors change instructions frequently.	2	1–6	2.03	3.05 ± 1.42
Instead of listing the full names of prescribed medications, abbreviations are used.	1	1–6	1.77	1.98 ± 1.33
Written instructions are often replaced by verbal instructions.	2	1–6	2.34	2.63 ± 1.53
The pharmacy supplies the wrong strength of medication (weight).	1	1–6	1.12	1.73 ± 1.06
The pharmacy does not prepare the medication correctly.	1	1–6	0.88	1.37 ± 0.94
The pharmacy does not label the medications correctly.	1	1–6	0.61	1.28 ± 0.78
Pharmacists are not available 24 hours a day.	1	1–6	4.22	3.30 ± 2.05
Frequent substitution of medications (i.e., cheaper generics instead of brand-name drugs).	4	1–6	2.56	3.60 ± 1.60
Poor communication between nurses and doctors.	2	1–6	1.61	2.37 ± 1.27
Many patients take the same or similar medications.	5	1–6	2.18	3.74 ± 1.47
Department staff are not sufficiently trained about new medications.	2	1–6	2.10	2.60 ± 1.44
It is not easy to find information about medications at this workplace.	1	1–6	0.88	1.62 ± 0.94
Nurses in this workplace have limited information about medications.	1	1–6	1.06	1.77 ± 1.03
Nurses move between workplaces.	1	1–6	1.39	1.72 ± 1.18
If a scheduled medication is delayed, nurses will not provide information about when the next dose should be given.	1	1–6	1.06	1.61 ± 1.03
Nurses on this ward do not follow the approved (recommended) medication administration procedure.	1	1–6	0.94	1.52 ± 0.97
Nurses are often interrupted during medication administration because they have other duties.	2	1–6	2.63	3.52 ± 1.62
The staffing in the department is insufficient.	1	1–6	2.52	2.35 ± 1.58
All medications for one group of patients cannot be administered according to the approved schedule.	2	1–6	2.38	2.68 ± 1.54
Medication instructions are not recorded correctly in the documentation.	1	1–6	1.73	2.31 ± 1.31
There are often errors in the documentation.	2	1–6	1.90	2.46 ± 1.37
The device (equipment) is malfunctioning or is incorrectly set (e.g., infusion pump).	2	1–6	1.39	1.91 ± 1.18
The nurse is unaware of the patient's existing allergy.	1	1–6	0.71	1.57 ± 0.84
Patients are not present on the ward due to different care.	2	1–6	1.62	2.50 ± 1.27

Note: Mo – modus; min – minimum; max – maximum; s^2 – spread; M – mean; SD – standard deviation

safety procedures, where the keys to the safe with medications containing addictive substances are always held by one specific person in each shift. Nurses in surgical departments are significantly more likely ($p < 0.05$) to administer medications containing addictive substances, with their preparation and documentation in the register handled by another nurse.

Table 7. Handling medications containing addictive substances

Questions	Mode	Min–max	s^2	M ± SD
Do you comply with all internal regulations related to the handling and administering of addictive medications at your workplace?	7	2–7	0.29	6.84 ± 0.54
Do only authorized employees from individual departments always collect addictive medications from the pharmacy?	7	1–7	0.21	6.91 ± 0.46
Are addictive medications stored in handy, securely attached safes at departments?	7	4–7	0.04	6.97 ± 0.20
Does one specific person always have the key to the safe containing addictive medications during each shift?	7	1–7	2.83	6.18 ± 1.68
Are entries in opiate books made immediately after administering medications containing an addictive substance?	7	1–7	0.40	6.87 ± 0.63
Do corrections in opiate book records ensure the original entry is legible?	7	4–7	0.08	6.94 ± 0.29
Is a physical check of the actual status of addictive medications and records carried out in the department after the end of each shift?	7	4–7	0.17	6.88 ± 0.41
Do you administer medications containing addictive substances prepared and recorded in the record book by another nurse?	1	1–7	1.99	1.77 ± 1.41
Do you prepare medications that contain addictive substances well in advance?	1	1–7	0.95	1.31 ± 0.97
Does the prescription for a prescribed addictive medication include the full name, form, dosage, time, and administration method?	7	1–7	0.53	6.71 ± 0.73
When administering addictive medications to a patient. do you perform active patient identification?	7	3–7	0.49	6.73 ± 0.70
Do you know the mechanism of effect of the administered medications with the addictive substance?	7	1–7	0.84	6.47 ± 0.91
Do you know the side effects associated with the administration of medications containing addictive substances?	7	2–7	0.88	6.41 ± 0.93
When administering addictive medications. do you actively check for any allergies the patient may have?	7	1–7	0.91	6.51 ± 0.95
Do you report all adverse events related to medications containing addictive substances?	7	1–7	0.63	6.75 ±0.79

Note: Mo – modus; min – minimum; max – maximum; s^2 – spread; M – mean; SD – standard deviation

Table 8. The connection between nursing practice and safety procedures when handling and administering addictive medications

Nursing education and …	*N*	Value χ^2	df	*p*	Stat. sign.
Compliance with all internal regulations related to handling and administering addictive medications.	357	0.011	1	0.920	n.s.
Ownership of the key to the safe with opiates in individual shifts by only one specific designated person.	357	11.286	1	0.01	**
Making entries in opiate books after administering medications containing addictive substances.	357	0.148	1	0.704	n.s.
Carrying out a physical check of the actual status of addictive medications and records in the department after the end of each shift.	357	1.368	1	0.246	n.s.
Administration of addictive medications, where the preparation and recording in the record book was carried out by another nurse.	357	6.285	1	<0.05	*
Performing active patient identification when administering addictive medications.	357	0.001	1	0.984	n.s.

Note: χ^2 – chi square; *p* – independence test; df – degree of freedom; n.s. – statistically insignificant difference; * statistically significant difference for significance level α = 0.05; ** statistically significant difference for significance level α = 0.01; *** statistically significant difference for significance level α = 0.001

Discussion

This research aims to map the risks of medication errors when nurses administer medications in a hospital, including medications containing an addictive substance. The study confirmed that the preparation of medications can be interrupted for various reasons, such as patient bells or phone calls, which can increase the risk of medication errors. 25.1% of respondents answered that the preparation of medications is interrupted occasionally. The answer "often" was given by 19.6% of respondents, "very often" by 15.4%, and "always" by 2.4%. Similar results were seen in the study by Sasaki et al. (2019), which confirms that most interruptions occur during the preparation phase. In contrast, the results of the study by Wondmieneh et al. (2020) indicated that errors are caused by interruptions by medical staff, mainly during the administration of medications. This can also be seen in the current study, which confirmed frequent interruptions by nurses during medication administration (M = 3.52). Frequent interruptions during medication administration and their association with medication errors were also demonstrated in the study by Nicholson and Damons (2022).

The study pointed out that nurses understand the reasons for changes in the prescribed medication schedule, are informed about the reasons for changing therapy, and can explain to patients what medications they are administering. If the patient refuses the prescribed medications, nurses often call the doctor. 45.8% of nurses said that they always wait with the patient until the medication is taken. The study confirmed that nurses from internal medicine departments are significantly more likely to say that they wait with the patient until the medication is taken than nurses from surgical departments. It was also statistically confirmed that nurses from internal medicine departments do not leave medication on the patient's table during their absence and check the identification bracelet before each medication administration significantly more likely than nurses from surgical departments. Checking the patient's identification is essential for preventing medication errors. In the questionnaire survey, nurses admitted that they never checked the identification bracelet (3.4%); checked it very rarely (6.8%), rarely (8.4%), and sometimes (11.3%). Other nurses stated that they checked the identification bracelet often (12.6%), very often (16.8%), or always (40.7%). The studies by Jeon et al. (2019) and Barakat and Franklin (2020) appeal to the importance of patient identification checks before administering medication, which are associated with the introduction of electronic methods in healthcare. The study by Jeon et al. (2019) points out the possibility of verifying the patient using a unique identification, such as a mobile application for facial recognition with biometric identification. On the other hand, the study by Macias et al. (2018) positively evaluates the impact of a medication administration system with a barcode linked to a unique patient identification. Similarly, a study by Barakat and Franklin (2020) assessed the effect of scanning patient and medication barcodes on nursing workflow in a hospital in the United Kingdom, where patient identification rates increased.

This research continued to focus on the reasons for medication errors. The main reasons for errors include similar names, medications, or packaging that look similar. This is confirmed by the studies of Hammoudi et al. (2017) and Elasrag and Abu-Snieneh (2020), who agree that errors increase with medications that have similar names or packaging available to the nurses in the workplace. The study by Wondmieneh et al. (2020) reported that the most common causes of errors include insufficient training of employees, unavailability of work procedures, interruptions during medication administration, and night shifts. Similar results were also reported in the study of Elasrag and Abu-Snieneh (2020). System failures were mainly found in relation to insufficient knowledge of information on medication administration and inadequate training of staff regarding medication administration. Other factors included an insufficient number of staff on shift, ineffective communication, late medication prescriptions by doctors, and overwritten prescriptions. Several nurses also agreed that patients had a high proportion of similar medications or that had similar names or packaging (Elasrag and Abu-Snieneh, 2020). Magalhães et al. (2019) added that equally essential factors included inappropriate working conditions, staff shortages, limited staff knowledge and training, and many types of medications and their administration methods.

The final part of the research focused on medications containing addictive substances. The results show that nurses comply with all internal regulations regarding handling and administering medications containing addictive substances. Entries in the opiate books are usually made immediately after the administration of the medication containing addictive substances, and corrections in the opiate book records ensure the original entry is legible. Adverse events associated with the administration of medications containing addictive substances are regularly reported. The average rating of whether a specific person always has the key to the safe in individual shifts was 6.18. This indicates a slight variability in practice with a relatively higher variance (SD = 1.68). Research has confirmed that nurses from internal medicine departments adhere to safety procedures, where one specific person always has the keys to the safe with addictive medications during each shift, more likely than nurses working in surgical departments. Compliance with system rules for safely handling and using addictive medicines is a global priority (Cadet and Jayanthi, 2021). Failure to comply with strict legislative rules can lead to the misuse of addictive drugs, subsequent addiction, and an increased prevalence of illegally manufactured addictive medications (Bell et al., 2019). Patient safety, which is associated with the administration of medications, is expected to be a constant challenge. Therefore, reporting is vital in medication errors (Xu et al., 2017).

Conclusion

Patient safety and protection is a priority for all healthcare facilities. An important part is monitoring all adverse events associated with medication errors and setting clear rules to minimize these risks. The research results point to the possible dangers of medication errors during the preparation and administration of medications, as well as the reasons for medication errors in the workplace.

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Ethical aspects and conflict of interest
The authors have no conflict of interest to declare.

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