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Assess the Opinions of Nurses in Hospitals in the Al-Diwaniah Governorate on the Most Common Drug Errors and the Factors that Lead to Them

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Abstract

This study aims to investigate nurses' perspectives on medication errors and the factors that lead to them. A total of 355 nurses from three general hospitals and a private facility in Aldiwaniah City participated in this descriptive cross-sectional research. We created a five-part self-administered questionnaire based on previously published research and gave it to the nurses throughout their shifts. We contacted 355 nurses, and 352 of them completed the questionnaire. The data analysis employed descriptive statistics. According to the study's results, giving medication at the wrong time was the most common type of medication mistake, scoring 2.5±1.02. Errors with a lower severity were less common. 64% of nurses did not report prescription mistakes, but 44.6 percent did so orally, and 56.8% did so in the form of an event report. The most frequent obstacle to reporting was a misunderstanding of what defines a drug error, indicating a substantial discrepancy between their perception and knowledge. Common medication errors (MEs) that nurses describe include administering medication to the incorrect patient at the wrong time, delivering IV medication at the incorrect speed, and forgetting to add a dosage. Both environmental factors (frequent visits) and personal factors (stress and fatigue) contribute to these errors. There is a statistically significant correlation between the incorrect time and characteristics such as ward, hospital type, age, gender, and educational attainment. There is a strong correlation between systemic problems and incorrect time errors.

Introduction

Healthcare professionals prioritize patient safety, aiming for safe and effective treatment. Medication administration and charting can account for 33% of nursing time in hospitals (Carayon et al., 2021). Technological advancements have significantly impacted medication and recording aspects of nursing practice, with new medications, devices, and electronic monitoring methods. Clinical information systems aim to improve patient safety through technology, ensuring a constantly evolving reality for nurses (Al Khreem & Al-khadher, 2021). A US study revealed that 11% of medication administration errors occur daily in 36 healthcare facilities, including wrong-time errors. Hospital patients are at risk of one error per day, potentially leading to avoidable adverse drug events (ADEs). Failing to adhere to the five rights of medication administration can result in ME, including wrong dosage, missing dose, incorrect pace, duration, over/under dosage, excess dose, and wrong strength (Çetin and Cebeci, 2021).

In hospitals, medication delivery involves three stages: doctor prescribing, pharmacist preparing, and nurse administering (Jassima & Ebrahimb, 2020). Nurses bear the responsibility of administering medication, yet insufficient understanding, non-compliance with guidelines,

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distractions, and limited knowledge can lead to errors during the prescribing stage. These factors contribute to a higher global incidence of medication errors by nurses (44.6%). It is crucial to address these errors to ensure patient safety (AL Qrishah, 2017). Administration medication errors (AMEs) are the most severe form of medication errors, primarily committed by nurses. Understanding nurses' main categories, factors, and reporting attitudes can assist in developing effective strategies to minimize and resolve this issue (Al-Sarawan, 2014). These errors are responsible for one in every 854 inpatient deaths (Cruz, 2023).

A significant number of studies found that communication problems among healthcare professionals often caused medication errors. Physicians' unclear writing, the absence of prescriptions written by generic names, and the unreadable prescriber and medicine names are all contributing factors to medication errors (Albarrak et al., 2014; Baghaei et al., 2015). Potylycki et al. (2006) recognize that inadequate staffing levels and excessive hours worked affect nurses' ability to carry out medication management. The intensity of labor, time constraints, rushed situations, and occupational stress all seem to add to nurses' workload. A USA study found that 35% of nurses' report medication errors due to patient misidentification, while 25% report fatigue and exhaustion. Many avoid reporting due to fear of retaliation (Al-Sarawan, 2014). A survey among 983 American nurses revealed the top three perceived causes of medication errors: difficult or illegible handwriting, distraction, and fatigue (Al Sahli *et al.*, 2021).

In the Middle East, a 2019 study in Iraq found that job overload and visitor coworker confusion were prevalent factors contributing to medication errors, with 40% identifying physician font and patient name misunderstanding as significant (Saker et al., 2021). Another 2020 study in Basra city found that overworked fatigue, departmental noise, inadequate number of nurses per patient, and poor handwriting in patient records were the main causes of medication errors. The findings suggest that nurses have varying levels of understanding about prescription errors, with 11% having good comprehension and 45% having poor comprehension (Jassima & Ebrahimb, 2020).

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Methods

We conducted the study in Al-Diwaniyah city, Iraq, using a descriptive cross-sectional design. Data collection began in August 2023 and ended in January 2024. The city, located in Al-Qadisiyah province, had an estimated 1.5 million people in 2014. In the city, there were three private hospitals and three governorates. We determined the sample size using the Epi_info program Version 7, taking into account the population, confidence interval, error margin, and response distribution. The minimal sample size was 323 nurses, with a 95% confidence level, a 5% error margin, and a 50% response distribution. We expanded the total sample size to 355 nurses to increase accuracy after accounting for a 10% non-response rate.

Inclusion Criteria

This applies to every registered nurse who works at the hospitals indicated above.

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Exclusion Criteria

The study excluded nurses who worked in administrative positions, outpatient clinics, and operating rooms because they could not administer medicine to patients in such situations. Moreover, nurses with less than a month of work experience are required to carry out their tasks under supervision and cannot independently dispense drugs.

Data Collection Method

Site visits, conversations with nurses, and the distribution of a standardized questionnaire were all part of the study. The intention was to encourage active participation and clarify the purpose of the questionnaire. Each month, 60 nurses participated in the interview process, which required an average of 15–20 minutes. We withheld contact information to protect data privacy.

Statistical Analyses

To meet the current study's aims, we employed SPSS, which is program version 26, for data input and analysis. We used the data analysis technique as outlined below. Frequency tables described categorical variables, while standard deviations and mean values described continuous variables. We computed the percentage of each choice for each questionnaire item. We used the chi-square test to investigate the associations between independent and dependent variables in qualitative dat. A significant level of 0.05 was chosen in this study (Alotaibi et al., 2022).

Ethical Considerations

Prioritizing ethical issues is critical while aiming to protect the safety of the researcher or investigators and, more significantly, human participants (AL Qrishah, 2017).These ethical considerations received approval from the Department of Development and Training, the Ethics Committee, and the Diwaniyah Health Directorate. Both hospital management and nurse managers approved the study's execution at their respective facilities. We have obtained the verbal permission from the study participants. We kept the collected data confidential and anonymous. All the information gathered was solely for research purposes.

Results and Discussion

The nurses in the study varied in age between 18 and 50, with an average of 26.785.23 years. The great majority of nurses (72.4%) were women. Of those who participated, 27.6 percent were male nurses. The majority just had a high school diploma, and 51 percent were single. The majority work in public healthcare facilities, with a smaller minority in private ones. The majority of nurses worked 1-6 hours per week, with the morning shift being the most frequent shift. Over the previous two years, 63.4% of all nurses had attended medication error conferences and seminars. The emergency department contained the highest number of nurses (33%), while the ICU (intensive care unit) had the least (3.1%).

Table 2 displays the medication errors that nurses have reported. Our study revealed that nurses most frequently report medication errors (ME) when they administer patients' prescribed medication at an inappropriate time, either an hour earlier or later than recommended. This error has a highest ranking of 2.5±1.02. Following that, giving medication through the IV at the wrong rate is a significant occurrence that ranks second in terms of frequency. Moreover, the omission of doses ranks as the third most common error among nurses. Similarly, the frequency of recording other types of MEs decreased.

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Table 1. Nursing perceptions of common medication errors.

Rank	Type of ME	Never	Rarely	Sometimes	Often	Always	Mean±SD
		Frequency %					
1	Wrong timing (one hour before or after the right time)	61 17.3%	125 35.5%	107 30.4%	48 13.6%	11 3.1%	2.5±1.02
2	The wrong rate (too fast or too slow)	110 31.3%	107 30.4%	70 19.9%	37 10.5%	28 8%	2.34±1.24
3	Omission of the Dose	143 40.6%	106 30.1%	65 18.5%	24 6.8%	14 4%	2.03±1.1
4	Wrongly prescribed drug (prescription error)	184 52.3%	64 18.2%	56 15.9%	26 7.4%	22 6.3%	1.97±1.24
5	The dosage is incorrect (more or less).	165 46.9%	87 24.7%	53 15.1%	38 10.8%	9 2.6%	1.97±1.13
6	The doses are either too high or too low.	152 43.2%	114 32.4%	39 11.1%	33 9.4%	14 4%	1.99±1.13
7	Wrong concentration (calculation error)	150 42.6%	118 33.5%	43 12.2%	28 8%	13 3.7%	1.97±1.09
8	Different Drugs	198 56.3%	77 21.9%	38 10.8%	17 4.8%	22 6.3%	1.83±1.18
9	The dosage is incorrect (more or less).	196 55.7%	88 25%	28 8%	18 5.1%	22 6.3%	1.81±1.17
10	Wrong Patient	211 59.9%	61 17.3%	44 12.5%	18 5.1%	18 5.1%	1.78±1.16

*1 indicates to more frequent ,10 least frequent

Table 1 displays the main type of ME in relation to socioeconomic and occupational characteristics. We have examined each character with the major perceived type of ME to determine any correlation between socio-demographic and occupational factors and the main recorded type of ME. The study identifies five significant relationships between drug administration at the wrong time, including age, gender, educational level, hospital type, and ward. Over 40-year-old nurses report more errors, while male nurses report more. Bachelor's or higher nurses report more errors than secondary and diploma nurses. In a private hospital, the number of errors reported by ICU ward nurses is higher.

Table 2. Shows incorrect time errors based on socioeconomic and occupational characteristics.

Wrong Time Errors						X^2	*P-value*
Variables	Category	Occur		Not occur			
		N	%	N	%		
Age	18-25	74	40.4%	109	59.6%	9.318	.025
	26-33	71	52.6%	64	47.4%		
	34-41	12	50%	12	50%		
	>41	8	80%	2	20%		
Gender	Male	63	64.9%	34	35.1%	17.564	<.001
	Female	102	40.0%	153	60.0%		
Educational	Secondary	40	36.7%	69	63.3%	7.646	.022
	Diploma	79	49.1%	82	50.9%		
	Bachelor's or above	46	56.1%	36	43.9%		

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Marital status	Single	82	42.3%	112	57.7%	2.59	.126
	Married	76	51%	73	49%		
Experience	<5 years	81	44.8%	100	55.2%	4.539	.103
	5-10 years	60	45.1%	73	54.9%		
	>10 years	24	63.2%	14	36.8%		
Type of hospital	Government	147	44.8%	181	55.2%	8.181	.005
	Private	18	75%	6	25%		
Working hours	1-6 hours	68	45%	83	55%	1.127	.569
	7-12 hours	69	50.4%	68	49.6%		
	>12 hours	28	43.8%	36	56.3%		
Working days per week	<5 days	42	50%	42	50%	0.433	.533
	5-7 days	123	45.9%	145	54.1%		
Work shift	Morning	141	48.6%	149	51.4%	2.015	.164
	Evening	24	38.7%	38	61.3%		
Training courses	Yes	96	43.0%	127	57.0%	3.576	.061
	No	69	53.5%	60	46.5%		
Wards	ICU	11	100.0%	0	0%	18.09	.001
	Surgery wards	40	51.3%	38	48.7%		
	Emergency	58	50%	58	50%		
	Esoteric&Gynecology	18	37.5%	30	62.5%		
	Pediatric	38	38.4%	61	61.6%		

The study emphasized the importance of identifying and addressing systemic, environmental, and personal factors before developing policies and strategies to eradicate errors. regarding systemic factors (writing and communication). In this category, similarities in drug name with mean score (3.31±1.1) and patient's name similarity (3.26±1.21) and being unable to understand abbreviations with mean score (3.15±1.27) were the most common factors leading to medication errors, while the least common factors were writing errors (2.71±1.26). In terms of personal factors (nurses and nursing staff), stress, fatigue, and a heavy workload were the most prevalent personal factors contributing to medication errors. Low knowledge about drugs was the least assessed personal aspect as a leading factor for ME (mean 2.39±1.24). Environmental factors, also known as workplace factors, have linked the nurse's confusion from repeated visits, a noisy work environment, and poor lighting to an increase in fatigue, stress, distraction, and interruptions. Ward tasks or distractions from patients or coworkers are the last environmental factor contributing to MEs, and they can manifest in a variety of ways.

Mean Likert scores determine the perceived factors that have the greatest influence on medication errors. According to the study, personal factors such as stress, tiredness, heavy workload, and lack of sleep are the most common causes of medication errors (MEs). The working environment, including frequent visits, noise, and poor lighting, is the second most significant contributor. The study also highlights the importance of similarity in medication names and patient names among nurses and nursing personnel. Nurses often struggle to recognize abbreviations, which is a significant issue in the nursing profession. Table 3 categorizes the study's data and demonstrates that these factors significantly contribute to medication errors in hospital settings.

Table 3. ranking of most significant factors

Rank	The Factors	Mean	Category
1	Stress	4.15±0.93	PF
2	Tiredness	4.15±0.9	PF
3	The nurse's confusion as a result of repeated visits	4.05±1.07	EF
4	Heavy work load	3.97±1.06	PF
5	Lack of Sleep	3.8±1.06	PF
6	Noisy workplace	3.66±1.23	EF

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7	Bad lighting	3.39±1.24	EF
8	Similarity in drug name	3.31±1.1	CL
9	Patient's Name Similarity	3.26±1.21	CL
10	Nurse are unable to understand abbreviation	3.15±1.27	CL

*Legend: PF =Personal factors, EF=Environmental factors, CL= Communication and language

*1 indicates to more frequent, 10 least frequent

In order to find a relationship between the most common type of ME and the main factors that lead to ME generally, as shown in Table 2, We found a significant relationship between incorrect time errors and systemic factors.

Table 4. Main type of ME in relation to Contributing Factors

wrong time error							
		Occur		**Not occur**		**X^2**	**p-value**
		N	**%**	**N**	**%**		
systemic factors	Yes	116	58.9%	81	41.1%	25.906	**<0.001**
	No	49	31.6%	106	68.4%		
personal factors	Yes	103	49%	107	51%	0.987	.329
	No	62	43.7%	80	56.3%		
environmental factors	Yes	134	45.7%	159	54.3%	0.914	.391
	No	31	52.5%	28	47.5%		

The study revealed that the most common medication error (ME) reported by nurses is administering prescribed medication to patients at the wrong time, either one hour before or after the recommended time. This error, with a maximum rating of 2.5±1.02, is associated with stress, fatigue, and confusion resulting from frequent visits. Nurses frequently document errors when they perceive a potential compromise to patient safety. Subsequently, administering medication intravenously at the wrong rate is a notable event that holds the second highest position in terms of occurrence frequency. Furthermore, the third most common error made by nurses is the omission to administer doses. This error can be attributed to various factors, including the patient's sleep patterns or delay, as well as factors related to the nurse, such as the workload in the ward and mental fatigue. Other types of MEs in the same direction were documented less frequently. Multiple studies conducted in Palestine (Al-Sarawan, 2014), The Netherlands (Beaudart et al., 2023), Iran (Fathi et al., 2017), and Ethiopia (Tsegaye et al., 2020; Mohammed et al., 2022) have consistently shown that the most commonly reported medication error among nurses is the administration of drugs to patients at the wrong times.

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We compared each character to the main perceived types of ME to determine the relationship between socio-demographic and occupational factors. The study found that over 40-year-old nurses report more errors due to stress and tiredness, while male nurses report more errors due to a shortage of male-to-female ratios. Bachelor's or higher nurses report more errors than secondary and diploma nurses. Due to the nature of their work, ICU ward nurses in private hospitals report more errors. A study was conducted in Iran. Our study's results were inconsistent with the established results. The study failed to identify any statistically significant association between the MEs, and variables such as nurses' age, marital status, degree of educational level, or years of experience could be the reason (Fathi et al., 2017). First off, the study's results might not apply to other kinds of hospitals (private hospitals as well as social security hospitals). Second, the use of self-reported data is less accurate than observational and follow-up studies.

Personal factors such as stress, fatigue, and heavy workloads are common contributors to medication errors, with low drug knowledge being the least assessed. This suggests that nurses are making good efforts to further develop their knowledge of medications. The findings of this research agree with a study conducted in Iraq, which showed that work stress and tiredness emerged among the main factors associated with medication errors (Saker, Shlash and Abdulrazaq, 2021).

The study found a significant correlation between wrong-time errors and systemic factors, with systemic factors being more accountable than personal or environmental factors. Research in Jordan found a significant association between personal factors and errors (Alyahya et al., 2021), while Ethiopian research showed a positive association between errors and systemic and personal factors (Tsegaye et al., 2020). This discrepancy may be due to the specialization in Iraqi hospitals and the study's methodology. We need more research to validate these findings.

Conclusion

According to nurses, the most common types of medication errors were incorrect drug administration times, incorrect IV medication delivery rates, and forgetting to add a dosage while administering medication to the wrong patient. The most common leading factors for medication administration errors were stress and fatigue, which fall under the personal category of contributing factors, and the nurse's confusion due to frequent visits, which falls under the environmental category. We found a statistically significant correlation between the incorrect time and characteristics such as ward, hospital type, age, gender, and educational attainment. A significant correlation exists between systemic elements and incorrect time errors.

Recommendations

In order to solve these problems and create a better healthcare system, policymakers and hospital management need to assess the factors that lead to ME. Give more attention to improving the work environment.

The General Directorate of Health and the Ministry of Health may hire more nurses to solve the shortage in medical institutions.

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