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Assessment of nurses' opinions on the most common medication and their causative factors in hospitals Al Diwaniyah governorate

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Abstract

Background: Medication errors are a significant public health issue, causing increased mortality and morbidity rates, and negatively impacting the healthcare system by increasing costs. Healthcare providers may lose confidence in their abilities and the overall system due to medication errors. Global efforts have been made to address these issues.

Objective: This study aims to examine nurses' perceptions of medication errors, factors contributing to them.

Methods: This study is a descriptive cross-sectional study that involved a total of 355 nurses working in three governmental hospitals and one private hospital in Al Diwaniyah City. The nurses were approached during their work shifts and asked to complete a self-administered questionnaire consisting of five parts, which was developed based on existing literature. Out of the 355 nurses approached, 352 of them completed the questionnaire. Data analysis involved the use of descriptive statistics.

Results: The study found that the most common type of medication errors was administering medication at the wrong time, with a score of 2.5 ± 1.02 . Less severe errors were less frequent. Among the contributing factors to medication errors, the most common leading factors for administering medication errors were stress along with tiredness, which belongs to the personal category of factors contributing to errors, and the nurse's confusion resulting from repeated visits, which belongs to the environmental category. The study found a significant correlation between wrong time errors and systemic factors, two significant associations between wrong rate and both systemic and personal factors, and significant relations between omission of dose errors and all factor categories.

Conclusion and Recommendations: Nurses report common types of medication errors (MEs) including wrong time of drug administration, wrong rate of IV medication delivery, and omission of dose while giving medication to the wrong patient. Personal factors like stress and tiredness, and environmental factors like frequent visits, contribute to these errors. The association between wrong time and characteristics like age, gender, educational level, hospital type, and ward is statistically significant. A significant relationship exists between wrong time errors and systemic factors.

Recommendations: Policymakers and hospital administrators need to assess factors contributing to medication errors (ME) to create guidelines and a safer healthcare system. Nurse demographic attributes and attitudes towards reporting ME are linked, and assistance in defining ME, reporting timing, and reporting to whom may be needed. The General Department of Health and the Ministry of Health could employ more nurses to address shortages, improve the working environment, and encourage all nursing staff to participate in medication error training courses.

Keywords: Opinions, medication errors, nurses, factors contributing to medication 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) [8].

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 and Al-khadher, 2021) [12].

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) ^[20]. In hospitals, medication delivery involves three stages: doctor prescribing, pharmacist preparing, and nurse administering (Jassima and Ebrahimb, 2020) ^[11]. Nurses are responsible for administering medication, but errors during the prescribing stage can be attributed to insufficient understanding, non-compliance with guidelines, distractions, and limited knowledge. The global incidence of medication errors by nurses is higher (44.6%) due to these factors. It is crucial to address these errors to ensure patient safety (AL Qrishah, 2017) ^[15]. Administration medication errors (AMEs) are the most severe form of medication errors, primarily committed by nurses. Understanding the main categories, factors, and reporting attitudes of nurses can help develop effective strategies to minimize and resolve this issue (Al-Sarawan, 2014) ^[2]. These errors are responsible for one in every 854 inpatient deaths (Cruz, 2023) ^[9].

A significant number of studies found that communication problems among healthcare professionals often caused medication errors. The unclear writing of physicians, the absence of prescriptions written by generic names, the unreadable prescriber names and medicine names (Albarrak *et al.*, 2014; Baghaei *et al.*, 2015) ^[3, 6]. Inadequate staffing levels and excessive hours worked are recognized by Potylycki *et al.*, (2006) ^[14] to affect nurses' ability to carry out medication management. Intensity of labor, time constraints, rushed situations, and occupational stress also 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) ^[2]. 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) ^[16]. 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) ^[17]. 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 and Ebrahimb, 2020) ^[11].

Materials and Methods

The study was conducted 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. Three private hospitals and three governorates were present in the city. The sample size was determined using the Epi info program Version 7, considering population, confidence interval, error margin, and response distribution. The minimal sample size was 323 nurses, with a 95% confidence level, 5% error margin, and 50% response

distribution. After accounting for a 10% non-response rate, the total sample size was expanded to 355 nurses to increase accuracy.

Inclusion Criteria

Every registered nurse employed at the aforementioned hospitals.

Exclusion Criteria

The study excluded nurses employed in administrative roles, outpatient clinics, and operating rooms, as they could not administer medication to clients in these settings. Additionally, nurses with at least one month of working experience perform their duties under supervision and are prohibited from independently administering medication.

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. Contact information was withheld to protect data privacy.

Statistical Analyses

To address the objectives of the current study, we used (SPSS) program version 26 for input of data and analysis. The data analysis process that follows was used. Frequency tables were used to describe categorical variables and the standard deviation and mean were used to describe continuous variables. The proportion of each option selected for each questionnaire question was calculated. The relationships between the dependent and independent variables (Qualitative data) were examined using the chi-square test. A significance level of 0.05 was used in this investigation. (Alotaibi *et al.*, 2022) ^[4].

Ethical Considerations

Prioritizing ethical considerations is crucial when striving to safeguard the security of the researcher or researchers and, more importantly, human participants (AL Qrishah, 2017) ^[15]. There was consideration given to these ethical considerations, The Department of Development and Training, Ethics Committee, and Diwaniyah Health Directorate all approved. Both hospital management & nurse managers approved the study's execution at their respective facilities. The permission given verbally by the study participants has been obtained. The collected data was kept confidential and anonymous. All information gathered was solely for research purposes.

Results

The nurses in the study ranged in age from 18 to 50 years old, with an average age of 26.785.23 years. The vast majority of nurses, 72.4%, were female. Male nurses constituted 27.6% of those who took part. The majority had only a high school graduation, and 51.2% were single. The majority are employed in government hospitals, with a smaller proportion working in private hospitals. Most nurses spent 1-6 hours a week, with the most common shift being the morning shift. Over the last two years, 63.4 percent of nurses seriously attended drug error conferences or seminars. The emergency room had the most nurses (33%), and the intensive care unit (ICU) had the least (3.1%).

Table 2 shows the reported errors related to medication made

by nurses. Our study found that the most common medication error (ME) reported by nurses is giving patients prescribed medication at the wrong time, either an hour earlier or later than recommended. This error, with 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. Additionally, the third most prevalent error committed by nurses is omission of doses. Other types of MEs, on the same direction, were recorded less frequently.

Table 1: Nursing perceptions of common medication errors.

Rank	Type of ME	Never	Rarely	Sometimes	Often	Always	Mean ±SD
		Frequency %					
1	Wrong Time (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	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	Wrong Prescribed drug (Prescription error)	184 52.3%	64 18.2%	56 15.9%	26 7.4%	22 6.3%	1.97±1.24
5	Wrong Amount of the Dose (More or less)	165 46.9%	87 24.7%	53 15.1%	38 10.8%	9 2.6%	1.97±1.13
6	Wrong Number of Doses (Extra or lower)	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	Wrong Amount of the Dose (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

The table 2 displays main type of ME in relation to socioeconomic and occupational characteristics. Each character has been examined with the major perceived type of ME in order to identify any relation between socio-demographic and occupational factors and the main recorded type of ME. The study identifies five significant relationships

between drug administrations at the wrong time, including age, gender, educational level, hospital type, and ward. Over 40-year-old nurses report more, while male nurses report more errors. Bachelor's or higher nurses report more errors than secondary and diploma nurses. Private hospital, while ICU ward nurses report more errors.

Table 2: Shows wrong time errors with 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%		
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

unable to understand abbreviation with mean score (3.15±1.27) this were the most common factors leading to medication errors, while the least common factors were writing errors (2.71±1.26) in 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). while in Environmental factors (Workplace factors), the nurse's confusion as a result of repeated visits, a noisy work environment, and poor lighting each of these factors has been linked to an increase in fatigue, stress distraction, and interruptions. The last environmental factor contributing to MEs was ward tasks or distractions from patients or coworkers and it can be shown in a variety of ways.

The perceived factors that have the greatest influence on medication errors are determined based on mean Likert scores. The study reveals that personal factors such as stress, tiredness, heavy workload, and lack of sleep are the leading factors in 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 with recognizing abbreviations, which is a significant issue in the nursing profession. The study's data is categorized into Table 3, which shows that these factors are significant contributors 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
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 relation between the most common type of ME and the main factors that lead to ME generally, as shown in table 2. One significant relation was found between the wrong time errors and systemic factors.

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

		Wrong time error				X ²	p-value
		Occur		Not occur			
		N	%	N	%		
Systemic factors	Yes	116	58.9%	81	41.1%	25.906	p<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%		

Discussions

A 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) [2], The Netherlands (Beaudart *et al.*, 2023) [7], Iran (Fathi *et*

al., 2017) [10], and Ethiopia (Tsegaye *et al.*, 2020; Mohammed *et al.*, 2022) [21, 13] have consistently shown that the most commonly reported medication error among nurses is the administration of drugs to patients at the wrong times.

Each character was compared to the main perceived types of ME to determine if socio-demographic and occupational factors are related. 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. Private hospital, while ICU ward nurses report more errors due to the nature of their work. A study was conducted in Iran. The results of our study 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 (Fathi *et al.*, 2017) [10] could be the reason for this. 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 like stress, fatigue, and heavy workload are common contributors to medication errors, with low drug knowledge being the least assessed factor. 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) [17].

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) [5], while Ethiopian

research showed a positive association between errors and systemic and personal factors (Tsegaye *et al.*, 2020) [21]. This difference may be due to specialization in Iraqi hospitals and the study's methodology. Further research is needed to confirm these findings.

Conclusions

1. The most common types of MEs, according to nurses, were wrong time of drug administration, wrong rate of IV medication delivery, and omission of the dose while giving medication to wrong patient as least common type.
2. Stress and tiredness, which fall under the personal category of contributing factors as well as the nurse's confusion as a consequence of frequent visits, which falls under the environmental category, were the most prevalent leading factors for medication administration errors.
3. The association between wrong time and characteristics such as age, gender, educational level, hospital type, and ward was indicated to be statistically significant.
4. A significant relationship between wrong time errors and systemic factors.

Recommendations

1. Policymakers and hospital administrators must evaluate the factors that contribute to ME to develop guidelines and approaches to address these issues and construct a safer healthcare system.
2. Give improving the working environment greater attention.
3. The General Department of Health & the Ministry of Health might employ more nurses to address the issue of a shortage of nurses in medical facilities.

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