Original Article

ASSESSMENT OF MEDICATION ADMINISTRATION ERRORS AND ITS ASSOCIATION WITH ANXIETY AND DEPRESSION AMONG TERTIARY CARE HOSPITAL NURSES

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Abstract

Objective: This study aimed to assess the frequency and types of medication administration errors, nurse-related non-compliance, and the association of anxiety and depression with MAEs among nurses.

Study Design: A cross-sectional correlational study was conducted.

Place and duration of study: A cross-sectional correlational study was conducted at Saidu Group of Teaching Hospital.

Material and Methods: A cross-sectional correlational study was conducted at Saidu Group of Teaching Hospital. A total of 155 registered nurses were selected through enumerative sampling. Data were collected using a validated self-reported questionnaire and analyzed using SPSS version 22. Ethical approval was obtained from Iqra National University and Saidu Group of Teaching Hospital.

Results: Wrong time was the most frequently reported MAE (29.7%), while wrong route was the least common (3.9%). Nurse-related non-compliance was highest in patient education omission (49.7%) and monitoring drug effects (23.2%). Among psychological factors, anxiety was generally mild, with excessive worry being the most common symptom (25.8%). Depression was more prominent, with fatigue (18.7%) and psychomotor symptoms (16.8%) most frequently reported; 9% of nurses reported suicidal ideation. Correlation analysis showed a significant association between depression and MAEs (r=0.249,p=0.002)(r=0.249,p=0.002),whereas anxiety had a non-significant association with MAEs (r=0.154,p=0.055)(r=0.154,p=0.055).

Conclusion: The study revealed a substantial burden of MAEs, non-compliance, and psychological distress among nurses. Depression was significantly associated with MAEs, indicating the need for supportive workplace interventions and a non-punitive environment to improve patient safety and nurses' mental well-being.

Keywords: Medication administration error, medication error, nurses, tertiary care hospital, anxiety, depression.

1. Introduction

Medication administration errors (MAEs) represent a substantial threat to patient safety globally, especially in tertiary care hospitals where nurses are the frontline providers of drug therapy. The World Health Organization (WHO) defines MAEs as "preventable events leading to inappropriate medication use or patient harm". [(1)] MAEs increase morbidity, mortality, and healthcare costs, particularly in elderly patients. While prevalence varies globally—reported as high as 68.1% in Ethiopia and 25–30% in India—data from Pakistan remain limited (5.5–16.9%) and unevenly distributed across provinces.

These errors, ranging from wrong dosages and incorrect routes to missed medications, are alarmingly prevalent, with studies reporting rates as high as 68.1% in Ethiopia. [(2)]

Key contributors to MAEs include workload, staffing shortages, high nurse-to-patient ratios, fatigue, and environmental disruptions during medication administration. These errors, ranging from wrong dosages and incorrect routes to missed medications, are alarmingly prevalent, with studies reporting rates as high as 68.1% in Ethiopia [(3)] and 25–30% in India. [(4)] In Pakistan, additional challa ges include a lack of continuous training on

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updated guidelines, limited access to medication administration technologies (e.g., barcode and electronic prescription systems), and cultural/institutional barriers, such as the fear of blame, that discourage MAE reporting.
Furthermore, Environmental disruptions and Interruptions during drug increase error risks by 50% . [5] Additionally, there is a lack of continuous training for nurses in Pakistan on the updated guidelines and innovation in medication administration technologies. [6] A critical gap exists in understanding the psychological dimensions of MAEs. While anxiety and depression among nurses are recognized as potential contributors, substantial evidence linking these psychological stressors to MAE frequency is lacking. Nurses who commit MAEs often experience guilt, burnout, and reduced confidence, which may further perpetuate error cycles. However, there is a lack of substantial evidence regarding these associations with MAEs. [7] Nurses experiencing MAEs report feelings of guilt, burnout, and low self-esteem and confidence. [8]

This study addresses this gap by assessing MAE frequency, nurse-related non-compliance, and the association between anxiety and depression levels among nurses at Saidu Group of Teaching Hospitals, Saidu Sharif, Swat—a rural tertiary care setting that remains understudied. Findings will inform targeted interventions in education, training, and policy reforms, including optimizing nurse-to-patient ratios and reducing interruptions during medication administration.MAEs contribute to prolonged hospitalization, adverse drug reactions, and even mortality, particularly among elderly patients. [9]

2. Materials & Methods

This study employed a quantitative cross-sectional correlational design to assess the frequency and types of medication administration errors (MAEs), nurse-related non-compliance, and the association of anxiety and depression with MAEs among nurses.

The study was conducted at Saidu Group of Teaching Hospital, Saidu Sharif, Swat, a tertiary care hospital serving patients from Swat and surrounding underserved areas of the Malakand division and neighboring districts.

The study population comprised registered nurses working in direct patient care and medication administration roles. A total of 155 nurses were selected using enumerative sampling from an estimated population of 260 eligible nurses. The sample size was calculated using OpenEpi with a 95% confidence level, 5% margin of error, and a population proportion of 54% taken from previous research.

Eligible participants were licensed registered nurses with at least one year of clinical experience and current involvement in inpatient care areas such as medical, surgical, ICU, and pediatrics. Nurses on leave and those working in administrative departments were excluded.

Data were collected using a structured questionnaire consisting of four sections: demographic characteristics, the Medication Administration Questionnaire by Fogarty and McKeon, the GAD-7 for anxiety, and the PHQ-9 for depression. The Medication Administration Questionnaire included items on self-reported MAEs and nurse-related non-compliance. The GAD-7 and PHQ-9 were used to assess anxiety and depression symptoms, respectively.

After obtaining ethical and administrative approval, informed consent was secured from all participants. Participation was voluntary, anonymity was maintained by assigning codes to questionnaires, and confidentiality was strictly protected. Data were collected between March and

June 2025 according to the approved study timeline. Data were analysed using SPSS version 22.

Descriptive statistics: for demographic categorical variables such as gender, qualification, shift pattern, and working unit were reported as frequencies and percentages. Continuous variables such as age and year of experience were reported as mean, median, standard deviation, and median. Prevalence and non-compliance scale were labelled as the Likert Scale, and the variables were coded as Never = 1, Once or twice = 2, Three or Four = 3, and More often = 4. In the same way, variables on the non-compliance scale were also similarly coded as Likert scale items. Frequencies, percentages, mean, and SD were calculated for MAEs and non-compliance.

The items on the GAD-7 and PHQ-9 Scale, rated as an ordinal rating scale from 0 to 3, were analysed descriptively by frequency distribution.

Pearson correlation was used to assess the association between the frequency of medication errors (MAEs) and anxiety/depression.

Ethical approval for this study was obtained from the Department of Nursing Sciences, IQRA National University, Peshawar. Study participants were informed that their anonymity would be protected throughout the study. Confidentiality was ensured by keeping all paper and pen data in a locked drawer and all digital data in password-protected files on the computer.

3. Results

This chapter presents the study findings. The study aimed to assess the frequency of medication administration errors (MAEs), nurse-related non-compliance, anxiety and depression, and the association of anxiety and depression with MAEs among 155 nurses working at SGTH.

Administration Errors			times =2		(Std. Deviation)
	N %	N %	N %	N %	
Given the Wrong drug	138 (89.0%)	16 (10.3%)	0 (0.0%)	1 (0.6%)	1.12 (0.384)
By the wrong Route	147 (96.1%)	4 (2.6%)	2 (1.3%)	0 (0.0%)	1.05 (0.276)
To the wrong Patient	143 (92.3%)	11 (7.1%)	1 (0.6%)	0 (0.0%)	1.08 (0.301)
At the wrong time	109 (70.3%)	36 (23.2%)	3 (1.9%)	7 (4.5%)	1.41 (0.745)
At the wrong dose	134 (86.5%)	19 (12.3%)	0 (0.0%)	2 (1.3%)	1.16 (0.463)

Table 1: **Demographic characteristics of the study participants**

Table 1: The demographic profile of the participants shows a workforce that was slightly male-dominated, with 56.8% male and 43.2% female nurses. In terms of educational background, most participants held bachelor-level qualifications, including BSN (43.2%) and Post RN BSN (32.2%), while 26.8% had a general nursing diploma and only 7.7% had a Master's in Nursing. This suggests a relatively well-educated nursing group, although the number of nurses with advanced postgraduate education working at the bedside remained low.

Regarding work pattern and placement, the largest proportion of nurses worked day shifts (50.3%), followed by rotating shifts (38.7%), while night shift staff made up the smallest group (11%). The working units were distributed across several clinical areas, with Medical and Allied units contributing the largest share (29.0%), followed by Surgical and Allied (23.9%) and Paediatrics (20.0%). Smaller proportions worked in Gynaecology (10.3%), Cardiology (8.4%), and

ICUs (8.4%), showing that the sample included nurses from a range of hospital departments.

For the continuous demographic variables, the mean age of participants was 35.43 years with a median of 35 and a standard deviation of 6.708, indicating that the sample was concentrated around the mid-thirties with limited age spread. The mean years of experience in the current unit was 7.08 years, with a median of 5 and a standard deviation of 5.502. This suggests moderate variation in experience, with many nurses having relatively fewer years in the current unit and a smaller proportion with much longer service. Together, these findings indicate a diverse but moderately experienced nursing workforce.

Frequency of Medication Administration Error in the Last 12 Months

Types of Medication Administration Errors	Never=0 N %	Once or twice=1 N %	Three or Four times =2 N %	More often=3 N %	**Mean** (Std. Deviation)
Given the Wrong drug	138 (89.0%)	16 (10.3%)	0 (0.0%)	1 (0.6%)	1.12 (0.384)
By the wrong Route	147 (96.1%)	4 (2.6%)	2 (1.3%)	0 (0.0%)	1.05 (0.276)
To the wrong Patient	143 (92.3%)	11 (7.1%)	1 (0.6%)	0 (0.0%)	1.08 (0.301)
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Table 2: Types and Frequency of Medication Administration Errors (MAEs)

Table 2 shows the frequency of MAEs. Wrong-time administration was the most frequently reported error, with a mean score of 1.41 (SD = 0.745). Wrong-route administration was the least reported error, with a mean score of 1.05 (SD = 0.276). The other MAE items had mean scores of 1.12 (SD = 0.384) for wrong drug, 1.08 (SD = 0.301) for wrong patient, and 1.16 (SD = 0.463) for wrong dose.

Anxiety level based on GAD-7 Scale among Nurses

Table 3: Number of counts and percentage on the GAD-7 Scale.

GAD-7 Items	Not at all sure 0 (Count)	Several days) 1 (Count)	Over half the days 2 (Count)	Nearly every day 3 (Count)	% Moderate-Severe (Score ≥2)
Feeling nervous, anxious, or on edge	108	43	1	3	**2.6%** (4/155)
Not able to stop/control worrying	99	40	10	6	**10.3%** (16/155)
Worrying too much about different things	72	43	27	13	**25.8%** (40/155)
Trouble relaxing	82	47	10	16	**16.8%** (26/155)
Restlessness (hard to sit still)	80	54	15	6	**13.5%** (21/155)
Easily annoyed/irritable	74	48	25	8	**21.3%** (33/155)
Feeling afraid (something awful might happen)	90	40	21	4	**16.1%** (25/155)

Table 3 summarizes anxiety symptoms based on the GAD-7 scale. The most frequently reported moderate-to-severe symptom was “worrying too much about different things” (25.8%), followed by “easily annoyed/irritable” (21.3%). The least reported symptom was “feeling nervous, anxious, or on edge” (2.6%).

Depression Levels Based on PHQ-9 Scale

Table 4: Number of counts and percentage on the PHQ-9 Scale

PHQ-9 Item	Not at all sure 0 (Count)	Several days 1 (Count)	Over half the days 2 (Count)	Nearly every day 3 (Count)	Percentage Moderate-Severe (Score ≥2)
Little interest/pleasure in doing things	96	45	7	7	**9.0%** (14/155)
Feeling down, depressed, or hopeless	94	47	13	1	**9.0%** (14/155)
Trouble falling/staying asleep or sleeping too much	83	49	16	7	**14.8%** (23/155)
Feeling tired or having little energy	86	40	22	7	**18.7%** (29/155)
Poor appetite or overeating	110	22	18	5	**14.8%** (23/155)
Feeling bad about yourself (failure/let down)	108	30	12	5	**11.0%** (17/155)
Trouble concentrating (e.g., reading/watching TV)	88	42	16	9	**16.1%** (25/155)
Psychomotor agitation/retardation (moving/speaking slowly or restlessly)	91	38	17	9	**16.8%** (26/155)
Thoughts of being better off dead or hurting oneself	118	23	13	1	**9.0%** (14/155)

Table 4 summarizes depression symptoms based on the PHQ-9 scale. The most frequently reported moderate-to-severe symptom was "feeling tired or having little energy" (18.7%), followed by "psychomotor agitation/retardation" (16.8%) and "trouble concentrating" (16.1%). The least reported symptoms were "little interest/pleasure in doing things," "feeling down, depressed, or hopeless," and "thoughts of being better off dead or hurting oneself" (each 9.0%).

Correlation parameter	Variable	Pearson Correlation (r)	Sig. (2-tailed)	N	Significance
MAEs	Anxiety	0.154	0.055	155	Not significant
MAEs	Depression	0.249**	0.002	155	Significant at 0.01 level

Table 5: Correlation of anxiety with MAEs

Correlation

Table 5 shows a weak positive correlation between anxiety and MAEs (r=.154,p=.055)(r=.154,p=.055), and the association is not statistically significant.

a significant positive correlation between depression and MAEs (r=.249,p=.002)(r=.249,p=.002). This indicates that higher depression scores are associated with higher medication administration errors.

The data suggests that healthcare workers with higher depression symptoms (per PHQ-9) tend to commit more medication errors. This analysis reveals a significant, meaningful correlation between depression and medication errors. While not proof of causation, the findings highlight depression as a potential risk factor for patient safety worthy of further research and workplace policy attention.

4. Discussion

This chapter interprets the study findings in relation to the research objectives and existing literature. The discussion focuses on the frequency of medication administration errors (MAEs), nurse-related non-compliance, nurses' psychological status, and the association of anxiety and depression with MAEs. Frequency of Medication Administration Errors The study found that wrong-time administration was the most frequently reported MAE among nurses at SGTH. This finding is consistent with previous studies showing that timing-related errors are among the most common medication errors in hospital settings, particularly where workload, interruptions, and time pressure are high. [10,11] Similar patterns have been reported in Pakistan and other low- and middle-income countries, suggesting that medication timing remains a persistent patient safety concern in resource-constrained environments. [12] The high frequency of wrong-time administration may reflect staffing shortages, heavy patient loads, and the fast-paced nature of tertiary care settings. [13] In such contexts, nurses may find it difficult to administer medications exactly as scheduled, increasing the risk of timing-related errors. These findings emphasize the need for workflow support, adequate staffing, and stronger medication administration systems. [14] The study also revealed

important non-compliance in areas related to patient education and monitoring of drug effects. This suggests that medication administration is not limited to giving the drug but also includes communication, observation, and follow-up, which may be compromised when nurses are under time pressure. [15] Prior studies have similarly linked medication errors to workload, distractions, lack of training, and weak safety culture. [16]

These findings indicate that non-compliance may reflect both individual practice gaps and organizational constraints. In busy emergency and tertiary care environments, nurses may prioritize immediate clinical tasks over patient teaching and post-administration monitoring, which can weaken safe medication practice. Strengthening supervision, refresher training, and accountability mechanisms may help address these gaps. [17] The psychological assessment showed that nurses at SGTH experienced symptoms of both anxiety and depression. Anxiety was most commonly reflected by excessive worry and irritability, while depression was marked mainly by fatigue and psychomotor symptoms. These findings are important because psychological distress can reduce concentration, slow decision-making, and impair medication safety. [18]

The presence of depressive symptoms, including suicidal ideation in a small proportion of participants, is particularly concerning and points to the need for mental health screening and workplace support. [19] Similar research has shown that nurses working in high-stress settings are at increased risk of depression, fatigue, and emotional exhaustion, all of which can affect performance and patient safety. [20] The study found a weak, non-significant association between anxiety and MAEs, but a significant positive association between depression and MAEs. This suggests that depression may have a stronger effect on medication administration performance than anxiety. Nurses experiencing depressive symptoms may be more vulnerable to fatigue, poor concentration, and reduced vigilance, which can increase the likelihood of errors. [21] These findings are consistent with earlier studies showing that depressive symptoms and fatigue are linked with increased medication errors among nurses. [22] The results also suggest that psychological distress and medication errors may reinforce each other, creating a cycle that affects both nurse well-being and patient safety. [23] Overall, the study highlights that MAEs, non-compliance, and psychological distress are interrelated problems in the nursing workforce at SGTH. Workload pressure, missed communication steps, and depressive symptoms appear to contribute to medication-related mistakes. The findings support the need for supportive workplace policies, staffing improvements, mental health screening, and regular training to reduce MAEs and strengthen nursing practice. [24]

Conclusion

This study at Saidu Group of Teaching Hospital (SGTH) found a notable frequency of medication administration errors among nurses, with wrong-time administration reported most often. It also identified nurse-related non-compliance, particularly in patient education and monitoring/reporting of drug effects. In addition, the study found a significant association between depression and medication administration errors, while anxiety showed a weak and non-significant association.

Overall, the findings indicate that medication errors, non-compliance, and psychological distress are present among nurses working at SGTH. These results address the study objectives and highlight the need for further attention to safe medication practices and nurses' mental health within the hospital setting.

Limitations

This study uses a Cross-sectional design, which may limit causal inferences. Self-reported data may be subject to social desirability and recall biases. This study was conducted in a single hospital, which may limit the generalizability of the findings.

Future Recommendations

Future studies should include a larger and more diverse sample to improve the validity and

generalizability of the findings. Extending the duration of the research would allow better observation of long-term trends and outcomes related to plantar fasciitis. Additionally, ensuring balanced gender representation among participants would provide more accurate and representative results.

Disclosure /Conflict of interest:

Authors declare no conflict of interest.

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