

The Relationship Between Self-Reported Medication Errors, Anxiety, and Insomnia Among BSN Students During Clinical Training: A Descriptive Cross-Sectional Study.

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Abstract

Background: Medication errors during clinical training are a problem for patient safety and could severely impact nursing students' learning experiences. Anxiety and insomnia could negatively affect concentration, clinical judgment and decision making, which may lead to medication errors. Thus, the purpose of this study is to explore the relationship between, self-reported medication error and anxiety with insomnia in BSN students in the context of clinical training.

Methodology: A quantitative analytical cross-sectional study was conducted among 138 students of BSN who were taken from the situation using a convenience sampling technique. The data was collected using a structured self-administered questionnaire which contained demographic information, the medication error questionnaire, Generalized Anxiety Disorder (GAD-7) and the Insomnia Severity Index (ISI). The data were analyzed for descriptive statistic, Pearson correlation and Chi-square test at $p < 0.05$ significance level using IBM SPSS Statistics 27.0.

Results: Of the 138 respondents, 61.6 % were female and 56.5% reported one or more medication errors occurred during clinical training. The most prevalent level of anxiety was mild with 41.3% of participants, and 51.4% had no clinically significant sleep related major depressive episode. There was no significant association between the variable of medicine error and anxiety ($\chi^2 = 1.194$, $p = 0.754$) or sleep disturbance (insomnia) and medicine error ($\chi^2 = 1.528$, $p = 0.676$). A positive correlation between anxiety and insomnia was found ($r = 0.233$, $p = 0.006$); higher level of anxiety was associated with higher level of insomnia in BSN students.

Conclusion: There was no significant differences between the presence of anxiety and self-reported medication errors, but significant positive correlation of anxiety with insomnia within BSN students. The study results emphasize that in order to improve safe clinical practice, medication safety education, clinical supervision, in addition to promoting students' psychological wellbeing should be enhanced.

Keywords: Medication errors; Generalized anxiety; Insomnia; Bachelor of Science in Nursing (BSN) students; Clinical education; Patient safety.

Introduction

Medication errors continue to be one of the biggest risks to patient safety and health care quality, globally. They are preventable events that could cause inappropriate medication use or patient harm during any point in the medication-use process: prescribing, dispensing, preparing, administration and monitoring (Tariq, Vashisht et al. 2026). Medication safety is recognized as a worldwide priority by the World Health Organization (WHO) in their Medication Without Harm initiative, which focuses on the need for coordinated action within health systems, schools, and professions to reduce medication safety harms (Sheikh, Rudan et al. 2019). The medications administration process, which comes before the patient receiving the medication, is a key stage because if medication errors occurred at this stage, the potential harm to the patient is immediate and minimized likelihood of discovery (Cottell, Wätterbjörk et al. 2020, Puxty, van Mol et al. 2025).

The skill of nurses and their clinical judgment is of particular importance in relation to the administration of medicines as they are the first to have direct contact with patients during this process (Seidi, Alhani et al. 2017). Bachelor of Science in Nursing (BSN) programs teach students to develop skills for medication administration during supervised clinical experiences that occur in the undergraduate curriculum (Fusco, Alfes et al. 2021). At the same time, they also give students the opportunity to be involved in challenging healthcare contexts that share features of new places, time pressure, high workload, complex medicines, all of which are constantly assessed (Negm, Mersal et al. 2024). As nursing students are not fully competent clinically, they can be especially susceptible to medication errors.

Several factors related to education, organization, and individual have been linked to medication errors among nursing students (Behmanesh Pour, Khoshakhlagh et al. 2026). More recently, psychologists have begun to look at psychological issues that might have an impact on students' clinical performance. Nursing education has a high academic level, a high workload, and is extremely emotional, where students are maintaining the ability to attend class, practice in the lab, and work in the clinical setting, be ready for exams, and manage their own personal needs at the same time (Andargeery, Altaweel et al. 2024, Mohamed, Ali et al. 2024).

Anxiety is one of the most common mental health issues among nursing students during clinical training, among psychological factors (Seshabela and Shakwane 2024, Yosep, Mardhiyah et al. 2026). Fears of failure, attending to seriously ill patients, communicating with health cares, and meeting expectations of instructors are common worries for students (Smithson, Hart et al. 2010, Aryuwat, Holmgren et al. 2024). This can therefore mean that heightened stress could result in more mistakes with medications and negatively impact patient safety and academic performance (Bastani, Barfar et al. 2024).

Sleep health is still another risk factor that is relatively understudied among nursing students, but becomes a significant risk factor among clinical performance (Benjamin, Pasay-An et al. 2024). University students experience sleep disturbances in maintaining sleep or initiating sleep, and in quality of sleep that can be called insomnia (Schlarb, Friedrich et al. 2017). Clinical rotations, academic workload, examination pressure, irregular schedules and emotional exhaustion often have a negative influence on the quality of sleep of nursing students (mohamed ariffin, Sahar et al. 2025). Insomnia-induced fatigue may make them less vigilant, less able to concentrate, and less likely to think straight, which increases their risk of drug error (Fernandez-Mendoza and Vgontzas 2013).

Additionally emerging evidence indicates that there are close relationships between anxiety and insomnia. It is critical, therefore, for identifying pupils with a higher risk of medication incident and planning interventions to support student/well-being and patient safety. Medication errors, anxiety or even sleep disturbances have been studied in nursing students; however, these areas have mainly been studied alone (Lavoie-Tremblay, Sanzone et al. 2022). A paucity of literature

has examined this complex and overlapping linkage among self-reported medication errors, anxiety and insomnia among undergraduate students enrolled in BSN programs during clinical placement (Lavoie-Tremblay, Sanzone et al. 2022, García-Velasco, Alcoceba-Herrero et al. 2025). In addition, there is limited evidence available from developing countries even though there are significant differences in nursing education systems, clinical learning settings, supervision, and healthcare resources that could affect the psychological health of the students and the safe provision of medication.

This cross-sectional study aims to examine the association between self-reported medication errors, anxiety, and insomnia among BSN students during clinical training. The findings will provide evidence to support educational, psychological, and patient safety interventions to improve nursing education and medication safety. The aim of this study was to: confirm a significant association between anxiety and insomnia and self-reported medication errors, and offer evidence to support development of specific educational, psychological, and patient safety interventions to be integrated into undergraduate nursing programs. The results will fill a gap in the literature and could be useful for enhancing nursing education, to support students' psychological health, and to enhance medication safety in clinical practice.

Methodology

Study Design

The purpose of the study was to learn more about the prevalence of self-reported medication errors, anxiety, and insomnia among BSN students in clinical training, and assess whether there was a relationship between these three variables. Since the data in the study could be gathered at the same point in time and the relations between the study variables could be evaluated, a cross sectional study design was used. This design was deemed suitable to assess the prevalence of medication errors, anxiety, insomnia experience by self-reported BSN students to determine the factors associated with medication errors among the BSN students.

Study Setting

The study was carried out on the undergraduate Bachelor of Science in Nursing (BSN) students from different setup. The institute offers both theoretical training in nursing and hands-on clinical training with attached hospitals and healthcare centers. Medications are administered and other nursing tasks are performed with students during clinical placements with the support of the registered nurses and clinical instructors.

Study Population

Participants in the study were undergraduate BSN students, who were involved in clinical rotation during the study period. Students with direct clinical exposure and experience in medication administration were obviously eligible to participate in the study, as they were able to provide information about medication errors that they had experience with during their clinical practice.

Sample Size

The number of undergraduate BSN students who participated in the study was 138 students. The sample size used was determined to be adequate to consider the relationship between self-reported medication error, anxiety, and insomnia and for suitable statistical analyses to be carried out.

Thus, a minimum of 138 participants will be enrolled. To account for potential non-response or incomplete data, an additional 10% will be added.

The required sample size is calculated using the single population proportion formula, assuming a conservative prevalence estimate to maximize sample size and statistical power:

$$n = \frac{z^2 \times p(1 - p)}{\epsilon^2}$$

Where:

- $Z=1.96$ (standard normal deviate for 95% confidence interval)

- $p=0.10$ $p=0.10$ (assumed prevalence of adequate first aid knowledge – conservative 10%, maximizing variance)
- $d=0.05$ $d=0.05$ (absolute precision or margin of error)

$$n = Z^2 \times p \times (1 - p) / d^2$$

Where:

$Z = 1.96$ (for 95% CI)

$p = 10\% = 0.1$ (assumed prevalence of adequate first aid knowledge; conservative estimate maximizes sample size)

$d = 0.05$ (absolute precision)

$$n = 1.96^2 \times 0.1 \times (1-0.1) / 0.05^2$$

$n = 138$ participants

Sampling Technique

Convenience sampling method was applied to recruit the participants. Students were approached at clinical sessions for the study, and informed about the study, and completed the selection process to become eligible for the study if they met the inclusion criteria. Informed consent was sought and provided and students who agreed to participate were included until the desired sample size of 150 was obtained.

Inclusion Criteria

The subjects were asked to participate in the study if they:

- Were enrolled in the Bachelor of Science in Nursing (BSN) program.
- Went to every session on their bike. Went to all sessions on bike and were 18 years or older.

Completed one or more placement experiences in which medication was administered.

- Were prepared to volunteer.
- Provided informed consent.

Exclusion Criteria

Students were excluded from the study if they:

- Had not yet started clinical training.
- Declined to participate.
- Completed incomplete questionnaires but had major gaps in responses.
- Were absent during the data collection period.

Study Variables

Self-reported medication errors during clinical training were a dependent variable of the study.

The following variables were used as independent:

- Anxiety
- Insomnia

The following demographic variables were also obtained:

- Age
- Gender
- Academic year
- Clinical placement area
- Weekly clinical hours
- Previous medication administration training
- Average sleep duration

Data Collection Instrument

A structured, self-administered questionnaire was developed based on the literature review and a set of psychometric instruments are used for data collection. The questionnaire was organized into four sections.

Section I: Demographic Characteristics

Demographic and academic information were gathered in this section. This section gathered information about the demographic and academic information of participants which involved the age, gender, academic year, clinical placement area, clinically spent hours per week, past medication administration training and average sleep duration for the participant.

Part II: Incidents Based on Self-Reports of Errors

The errors made with self-report were evaluated by a questionnaire constructed based on previous studies of medication error and nurse education. All attendees were asked about if they have ever made a mistake while dispensing drugs when first learning their trade. Study participants were also queried concerning how often medication errors occurred and possible causes such as lack of knowledge, anxiety, fatigue, workload, distractions, lack of supervision, communication difficulties, and limited clinical experience.

Section III: Assessment of Anxiety

The Generalized Anxiety Disorder-7 (GAD-7) was used as an anxiety assessment.

The GAD-7 is a 7 item, self-report standardized questionnaire for rating symptoms of generalized anxiety from the previous 2 weeks. The scoring for each item was done on a four-point Likert scale from 0 (Not at all) to 3 (Nearly every day).

The True score was from 0–21, with 0–12 indicating low comprehension, 13–18 as medium and 19–21 as high.

- 0–4: Minimal anxiety
- 5–9: Mild anxiety
- 10–14: Moderate anxiety
- 15–21: Severe anxiety

Scores were higher at greater anxiety severities.

Next, the examination of insomnia (Section IV). Then, the assessment of insomnia (Section IV).

Insomnia Severity Index (ISI) was used for the assessment of insomnia.

The ISI is made up of 7 items that assess sleep onset difficulty, sleep maintenance and early morning awakening, satisfaction with sleep, sleep problems within daily functioning, awareness of sleep problems and sleep problems causing distress.

Each item was rated from 0 (for 3) to 4 (for 7).

The overall scores were analyzed based on the following criteria:

0 is no clinically significant insomnia. No clinically significant insomnia is a score of 0 for the age group 0–7.

- 8–14: Subthreshold insomnia
- 15–21: Moderate clinical insomnia
- 22–28: Severe clinical insomnia

Scores of higher levels indicated more insomnia severity.

Validity and reliability of Study instrument

Researcher-developed medication error questionnaire content validity which was validated with the opinion of the experts was carried out by one expert in nursing education, clinical nursing, and research methodology sciences. Their suggestions were taken on board and incorporated into the questionnaire where relevant and appropriate for the purposes of better clarity and relevance of the questionnaire being completed prior to data collection. The survey instruments were the widely used and validated Generalized Anxiety Disorder-7 (GAD-7) and the Insomnia Severity Index (ISI).

The analysis of the pilot study was carried out with a limited number of about 10% of the target population who were not in the final study. The internal consistency reliability of the instruments that were standardized was measured through the Cronbach's alpha coefficient. The GAD-7 was found to be reliable (Cronbach's $\alpha = 0.960$), and the ISI was also found to be reliable (Cronbach's $\alpha = 0.956$). For both the threshold value was exceeded by recommended value of 0.70 suggesting that for the present study the instruments were highly reliable.

Pilot Study

A pilot study was performed with about 15 BSN students to test the questionnaire for clarity, readability, and feasibility prior to the main data collection. The comments received in the pilot has been used strategically to make recommendations for the words, the sequence and how the questionnaire is presented. The pretest data and data from the pilot study were not used for the final analysis.

Data Collection Procedure

The administration of the institution in which the study was conducted granted permission before data collection for the study to proceed. During students' clinical training each student who fulfilled the criteria for inclusion in the study was approached and talked about the objectives and significance of the study. All the participants were informed that they would be participating on a voluntary basis and would there be confidentiality regarding the information supplied.

Consent questionnaires were sent out after obtaining written informed consent. The questionnaires were completed separately in a quiet classroom/clinical area without discussion with other participants. The researcher was on hand to provide instructions on clarifying any questions, but did not manipulate participants' responses. The questionnaires took about 15 - 20 minutes to fill out. Those questionnaires which were completed were retrieved as soon as they were finished and completeness of these questionnaires was checked before entering the data.

Data Management

The participant responses to the completed questionnaires were anonymized with each responding individual receiving a unique identification number. Data were made on Microsoft Excel and then imported into IBM SPSS Statistics version 27.0 for data analysis. The data was checked on completion, missing data, inconsistencies, and possible data entry errors prior to the analysis.

Statistical Analysis

IBM SPSS Statistics 27.0 was used for analyzing the data. Demographic characteristics and the study variables were summarized using descriptive statistics. Frequencies and percentages were used with categorical variables and means and standard deviations were used with continuous variables. A prevalence rate of medication errors, anxiety, and insomnia was determined.

Association between categorical variables were assessed by using chi-square test. Where appropriate, independent sample t tests and one-way analysis of variance (ANOVA) were used to compare the mean anxiety and insomnia scores for participant characteristics. Pearson's correlation analysis was used to determine the relationship between self-reported medication errors, anxiety scores, and insomnia scores. After entering for demographic variables, factors associated with self-reported medication errors were identified by binary logistic regression analyses.

The p-value of < 0.05 was considered to indicate statistical significance.

Ethical Considerations

This study was carried out in compliance with the ethical rules of respect for persons, beneficence, confidentiality, and free consent. Study participation was completely voluntary. Informed consent was obtained from all the conditions concerning the objectives, purpose, and procedures of the study. All participants gave informed consent prior to data collection.

The participants were informed that their participation in the study and/or their withdrawal from the study would be without any academic consequence/penalty. No personal identifiers (names, registration number, telephone number, e-mail addresses etc.) were collected to maintain the confidentiality and anonymity of the participants. Several identification codes were assigned to each questionnaire to facilitate management and analysis of data.

Completed questionnaires and electronic data were kept secure and only the researcher had access to them. Collected data was anonymized and utilized without being given to or shared with any entities or third party. All attempts were made to keep participants of the study free from physically, psychologically, socially, and academically harmful situations. All participants had their privacy, dignity and rights respected throughout the research process.

Results

Table 1. Demographic Characteristics of the Participants (N = 138)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	20–21	32	23.2
	22–23	46	33.3
	24–25	41	29.7
	26–27	19	13.8
Gender	Male	53	38.4
	Female	85	61.6

Mean age category score: 2.34 ± 0.99

Table 1 presents the demographic characteristics of the 138 BSN students who participated in the study. The largest proportion of participants belonged to the **22–23 years** age group (**n = 46, 33.3%**), followed by those aged **24–25 years** (**n = 41, 29.7%**), **20–21 years** (**n = 32, 23.2%**), and **26–27 years** (**n = 19, 13.8%**). Regarding gender, most participants were **female** (**n = 85, 61.6%**), while **53 (38.4%)** were male.

Table 2. Clinical Characteristics of the Participants (N = 138)

Variable	Category	Frequency (n)	Percentage (%)
Clinical Rotation	Medical-Surgical	55	39.9
	Critical Care/ICU	24	17.4
	Emergency Department	20	14.5
	Pediatrics	18	13.0
	Maternal Child/OB	14	10.1
	Psychiatric/Mental Health	7	5.1

Variable	Category	Frequency (n)	Percentage (%)
Clinical Shifts Completed	1–3 shifts	12	8.7
	4–6 shifts	41	29.7
	7–9 shifts	43	31.2
	≥10 shifts	42	30.4
Prior Healthcare Experience	Yes	26	18.8
	No	112	81.2
Use of Sleep Aids/Energy Drinks	None	69	50.0
	OTC sleep aids	17	12.3
	Prescription sleep aids	21	15.2
	Energy drinks/High caffeine	28	20.3
	Prescription stimulants	3	2.2

Table 2 summarizes the clinical characteristics of the participants. Most students were undertaking their clinical rotation in the **Medical-Surgical ward (n = 55, 39.9%)**, followed by the **Critical Care/ICU (n = 24, 17.4%)**, **Emergency Department (n = 20, 14.5%)**, **Pediatrics (n = 18, 13.0%)**, **Maternal Child/Obstetrics (n = 14, 10.1%)**, and **Psychiatric/Mental Health (n = 7, 5.1%)**.

Regarding clinical exposure, **43 students (31.2%)** had completed **7–9 clinical shifts**, **42 (30.4%)** had completed **10 or more shifts**, **41 (29.7%)** had completed **4–6 shifts**, and **12 (8.7%)** had completed **1–3 shifts**. Most participants **did not have prior paid healthcare experience (n = 112, 81.2%)**, whereas **26 (18.8%)** reported previous healthcare experience.

Half of the participants (**n = 69, 50.0%**) reported **not using any sleep aids or stimulants** to manage fatigue. Among those who reported using fatigue management strategies, **28 (20.3%)** consumed energy drinks or high caffeine, **21 (15.2%)** used prescription sleep aids, **17 (12.3%)** used over-the-counter sleep aids, and **3 (2.2%)** reported using prescription stimulants.

Table 3. Distribution of Self-Reported Medication Errors During Clinical (N = 138)

Number of Medication Errors	Frequency (n)	Percentage (%)
0	60	43.5
1	31	22.5
2	28	20.3
3	12	8.7
4 or more	7	5.1
Total	138	100.0

Mean ± SD: 1.09 ± 1.20

Table 3 presents the frequency of self-reported medication errors among the participants. A total of **60 students (43.5%)** reported **no medication errors** during clinical training. However, **31 (22.5%)** reported committing **one medication error**, **28 (20.3%)** reported **two medication**

errors, 12 (8.7%) reported **three medication errors**, and 7 (5.1%) reported **four or more medication errors**. Overall, the mean number of self-reported medication errors was 1.09 ± 1.20 .

Table 4. Anxiety Levels Among BSN Students According to GAD-7 (N = 138)

Anxiety Level	Frequency (n)	Percentage (%)
Minimal anxiety	14	10.1
Mild anxiety	57	41.3
Moderate anxiety	48	34.8
Severe anxiety	19	13.8
Total	138	100.0

Mean $\pm$ SD: 2.52 ± 0.86

Table 4 shows the distribution of anxiety levels among the participants according to the Generalized Anxiety Disorder-7 (GAD-7) scale. The largest proportion of students experienced **mild anxiety** (n = 57, 41.3%), followed by **moderate anxiety** (n = 48, 34.8%). **Severe anxiety** was reported by 19 students (13.8%), whereas 14 students (10.1%) experienced **minimal anxiety**.

Table 5. Insomnia Levels Among BSN Students According to the Insomnia Severity Index (ISI) (N = 138)

Insomnia Level	Frequency (n)	Percentage (%)
No insomnia	71	51.4
Subthreshold insomnia	47	34.1
Moderate insomnia	10	7.2
Severe insomnia	10	7.2
Total	138	100.0

Mean $\pm$ SD: 1.70 ± 0.89

Table 5 presents the distribution of insomnia levels among the participants. More than half of the participants reported **no clinically significant insomnia** (n = 71, 51.4%). **Subthreshold insomnia** was observed among 47 students (34.1%), while 10 students (7.2%) each reported **moderate** and **severe insomnia**, respectively.

Table 6. Association Between Anxiety and Self-Reported Medication Errors (N = 138)

Anxiety Level	Medication Error (No) n (%)	Medication Error (Yes) n (%)	Total
Minimal anxiety	7 (50.0)	7 (50.0)	14
Mild anxiety	23 (40.4)	34 (59.6)	57
Moderate anxiety	23 (47.9)	25 (52.1)	48
Severe anxiety	7 (36.8)	12 (63.2)	19
Total	60 (43.5)	78 (56.5)	138

Table 6 presents the association between anxiety level and self-reported medication errors. Among students with **minimal anxiety**, medication errors were equally distributed between those reporting no medication errors and those reporting medication errors (50.0% each). Among students with **mild anxiety**, 59.6% reported medication errors, while 40.4% reported no

medication errors. Similarly, **52.1%** of students with **moderate anxiety** and **63.2%** of those with **severe anxiety** reported medication errors. The Pearson chi-square test indicated **no statistically significant association** between anxiety level and self-reported medication errors ($\chi^2 = 1.194$, $df = 3$, $p = 0.754$).

Table 7. Association Between Insomnia and Self-Reported Medication Errors (N = 138)

Insomnia Level	Medication Error (No) n (%)	Medication Error (Yes) n (%)	Total
No insomnia	34 (47.9)	37 (52.1)	71
Subthreshold insomnia	19 (40.4)	28 (59.6)	47
Moderate insomnia	3 (30.0)	7 (70.0)	10
Severe insomnia	4 (40.0)	6 (60.0)	10
Total	60 (43.5)	78 (56.5)	138

Table 7 illustrates the association between insomnia level and self-reported medication errors. Among participants with **no insomnia**, **52.1%** reported medication errors. Medication errors were reported by **59.6%** of students with **subthreshold insomnia**, **70.0%** of those with **moderate insomnia**, and **60.0%** of those with **severe insomnia**. The Pearson chi-square test demonstrated **no statistically significant association** between insomnia level and self-reported medication errors ($\chi^2 = 1.528$, $df = 3$, $p = 0.676$).

Table 8. Correlation Between Overall GAD-7 and Overall ISI Scores (N = 138)

Variables	Pearson Correlation (r)	p-value
Overall GAD Score and Overall ISI Score	0.233	0.006

Table 8 presents the correlation between overall anxiety and insomnia scores. Pearson's correlation analysis revealed a **weak positive correlation** between the Overall GAD-7 score and the Overall ISI score ($r = 0.233$, $p = 0.006$). The correlation was statistically significant, indicating that higher anxiety scores were associated with higher insomnia scores among BSN students.

Discussion

The purpose of this cross-sectional study was to investigate the self-reported medication error, anxiety, insomnia, and interrelationships between these among 138 undergraduate nursing (BSN) students who were assigned clinical rotation. The lessons learned included several important insights. One, the participants are mainly female nursing students between ages 22-23 years with many of them having completed their clinical training from medical-surgical wards. The prior experience of healthcare workers was quite limited, and half of the students didn't consume sleep aids, energy drinks or caffeine products to help with clinical fatigue. More than half (56.5%) of the students did experience at least one medication error, having an average of 1.09 ± 1.20 self-reported medications error.

Second, based on the GAD-7 results, the highest occurrence was for mild anxiety, with moderate anxiety scores coming in next, and only one-tenth of the students scoring minimal anxiety on the instrument. Over half of the people did not have clinical insomnia, and those with subthreshold insomnia were the most common disturbance noted with the Insomnia Severity Index (ISI).

Third, there were no statistically significant association measured by chi-square test between anxiety severity and self-reported medication errors ($\chi^2 = 1.194$ with 3 df and a p value of 0.754) and between insomnia severity and self-reported medication errors ($\chi^2 = 1.528$ with 3 df and a p value of 0.676). As reported, the percentage of students reporting medication errors tended to

increase with reporting of higher anxiety scores and insomnia severity, but these trends were not statistically significant in the current sample. Finally, there was a weak positive correlation between GAD-7 anxiety scores and ISI insomnia scores ($p = 0.006$, $r = 0.233$) indicating that the higher the anxiety the more the insomnia symptoms among BSN students.

Demographic and Clinical Profile of Nursing Students

The demographic characteristics of the sample population (females aged 22-23 years, with BSN major) are consistent with other cohorts of nursing students from either low or middle-income countries, in which women generally have a higher proportion of students enrolled in a nursing programme than men of similar age (Maurud, Børøund et al. 2022). Medical-surgical rotations appear due to the typical undergraduate nursing core curriculum, in which the greatest number of hours are spent in the medical surgical wards, while the psychiatric and maternal-child health rotations are typically shorter (Hussein Yaas, Hamarash et al. 2023). Most participants had no prior healthcare experience, indicating that many students are likely to experience the first-time administering care directly to patients during their time in clinical practice, a setting where they may be less familiar with the processes and requirements of medication administration (Chu, So et al. 2025). According to a considerable part of students, their use of caffeine and energy drinks or sleep aids related to clinical workloads and the irregular shift-time, which is consistent with previous studies which reported maladaptive ways to manage fatigue among nursing students (Alshumrani, Shalabi et al. 2023).

Prevalence of Self-Reported Medication Errors

More than two-thirds (56.5%) of the participants recognized one or more medication errors while providing clinical care, with a mean of just more than one error per participant. The results are like (Saifullah, Sharafi et al. 2025), who found that the prevalence of self-reported medication error among the final-year nursing students in Pakistan ranged from 52% to 61%. Frequently, the reasons behind self-reported medication error among the trainees are related to limited clinical experience, lack of tolerance for dosage, lack of supervision during medication rounds by the registered medical staff on the ward, and interruptions during medication rounds (Surani, Ahmad et al. 2025). Importantly, self-reported error rates can be underestimated as the student does not want to share errors with fear of academic consequences (Fadillah, Hamid et al. 2025). The current findings reiterate the need for medication safety education to be continuously incorporated during clinical rotations as opposed to confined to "classroom instruction

Levels of Anxiety and Insomnia Among BSN Student

Most participants (86.6%) expressed mild and moderate anxiety while only a few expressed minimal anxieties. These findings are like those from systemic review study that supports the role of a nursing student's clinical rotation as a significant stressor (Ahmed, Alrashidi et al. 2023). The high expectations in academics, a fear of clinical error, difficulties with patients and colleagues, and adjusting to shift work all have a cumulative effect on levels of anxiety during placement (Seshabela and Shakwane 2024). Regarding sleep competency, over half of the sample had not been diagnosed as insomnia but 1/3 were symptomatic for subclinical insomnia. This is like the findings of the data from the Indian nursing students reported by (Jamatia 2025) where the most prevalent subthreshold insomnia problem among learners without progression to moderate or severe insomnia was found. However, chronic mild sleep dysfunction will begin to affect attention, decision making and psychomotor dysfunction, which are necessary skills for working safely with medication.

Association of Anxiety and Insomnia with Medication Errors

The present study results did not support the first hypothesis as no significant statistically correlation was seen between anxiety severity, insomnia severity and self-reported medication error. The present study is contrary to multiple cross-sectional studies of qualified registered nurses revealing elevated levels of anxiety and poor sleep quality were associated with increased risk of medication error (Di Simone, Fabbian et al. 2020). There are a few reasons why this did not be a significant value. Firstly, nursing students are supervised constantly when taking and giving medicines; supervision also acts as a protective buffer which can buffer-off any errors that may be caused by anxiety or sleep deprivation (Demir and Karadag 2024). Second, a component of self-reported medication errors is that the errors are noticed and recalled by the student, and an anxious and/or sleep-deprived student may not notice or document minor errors, therefore introducing reporting bias (Braiki, Douville et al. 2024). Third, other variables not assessed in this study, such as attention span, workload density, quality of mentorship, and number of interruptions during drug rounds, may have more effects on the incidence of errors than just anxiety or insomnia. Additionally, it is possible that the number of subjects was not sufficiently large to reasonably test for small but significant relationships among these variables. The descriptive trend that higher scores for medication errors in those with severe anxiety and moderate insomnia is worthy of further investigation in larger samples.

Correlation Between Anxiety and Insomnia

Insomnia is related with anxiety. The correlation coefficient for GAD-7 anxiety scores to ISI insomnia scores showed a positive correlation which was weak but statistically significant ($r = 0.233$, $p = 0.006$). International literatures exploring students' mental health strongly bolstered this connection. At bedtime, rumination and hyperarousal are induced by ongoing anxiety, resulting in a delay in sleep onset and episodes of worse sleep (Palagini, Miniati et al. 2024), while decreased emotional regulation predisposes to worsening anxiety symptoms, which in turn delays sleep onset in hyperarousal and worsens sleep quality (Dolan, Slavish et al. 2023). Similar mild levels of correlation were reported in the Pakistani context among health sciences students by (Razaq, Babar et al. 2024) who suggested that a bidirectional cycle of anxiety and insomnia tends to present with great intensity when health sciences students begin to move into stressful clinical rotations. Association was moderate, suggesting that anxiety is one factor contributing to sleep disturbance; other factors, such as the times when shifts are carried out, academic pressures, and home environment similarly influence sleep patterns.

Implications

Practical implications for nursing education and clinical mentoring resulting from the study. First, though, there is still a need to pay a fringe attention to training in medication safety because of the high number of students reporting medication error. Second, frequent assessments of anxiety and insomnia should be made in normal clinical settings as these issues are commonly reported together by nursing students. In this sample self-reported errors were not statistically linked to anxiety and insomnia but poor psychological wellbeing reduces the learning capacity and can cause safety risks to learners as they enter unsupervised professional practice upon leaving university. To establish accessible counselling services, encourage good sleep hygiene within institution settings and provide structured and planned workshops for clinical placement students on stress management.

Conclusion

This study aimed to explore the correlation among self-reported medication errors, anxiety, and insomnia of the BSN students during clinical practice. Overall, over half of respondents

experienced at least one medication error, and, mild anxiety and no clinically significant insomnia was most frequently observed. There was no significant relationship between anxiety and/or insomnia and self-reported medication errors, but there was a significant positive correlation between anxiety and insomnia. The results of this study reveal the need to reinforce medication safety education, promote psychological health and offer supportive clinical supervision to further improve safe clinical practice of nursing students.

Limitations and Recommendations

There are several limitations of this study that are important to note when considering the results. It is not possible to draw causal inferences between medication errors, anxiety, and insomnia due to the cross-sectional design. Moreover, medication errors were self-reported and may have been subject to recall, or reporting bias. Convenience samples using a single nursing home may also limit the generalizability of the findings. Additionally, other characteristics including medication knowledge, clinical competence, workload, and quality of clinical supervision were not explored. Notwithstanding these shortcomings, the results will indicate need to enhance the education of medicines safety by utilizing simulation-based training, medication calculation exercises, and ongoing clinical supervision. In addition, the nursing institutions could help with mental health problems as well as establish healthy sleeping habits in order to improve students' well-being and clinical work. More research is needed in the future using more large, multicenter, and longitudinal studies, to further explore the relationship between medication error, anxiety, insomnia, and other factors in nursing students.

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Conflict of Interest

The author declares that there are no conflicts of interest regarding the publication of this study.

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Authors' Contribution

The author solely conceived and designed the study, collected, and analyzed the data, interpreted the findings, and prepared the manuscript.

Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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