Physical Education, Health and Social Sciences

https://journal-of-social-educatin.org

E-ISSN: 2958-5996

P-ISSN: 2958-5988

Relationship between perceived Stress and GPA among BSN Students: An ER-based Study

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DOI: https://doi.org/10.63163/jpehss.v3i2.1721

Abstract

Background: Nursing students often experience high levels of stress during clinical rotations, particularly in emergency room (ER) settings, due to patient acuity, rapid decision-making, workload, and fear of making errors. Such stress can impair concentration, learning, and academic performance. Despite its recognized impact globally, limited evidence exists on the relationship between perceived stress and GPA among BSN students in Peshawar, Pakistan.

Objectives: This study aimed to assess perceived stress among BSN students during ER rotations, compare stress levels between public and private hospitals, and examine the association between perceived stress and academic performance (GPA).

Methodology: An analytical cross-sectional study was conducted with 334 BSN students from five public and private nursing colleges in Peshawar. Data were collected using a structured questionnaire comprising demographic information, self-reported GPA verified against institutional records, and the Perceived Stress Scale (PSS-10). Descriptive statistics summarized participant characteristics, independent samples t-tests compared stress between hospital types, and Pearson's correlation assessed the relationship between perceived stress and GPA.

Results: Most participants experienced moderate stress (88.7%), with low (4.4%) and high (5.9%) stress less common. Students in public hospitals reported significantly higher stress ($M = 20.78$, $SD = 3.99$) than those in private hospitals ($M = 19.71$, $SD = 4.00$, $p = 0.015$). Over half of the participants (52.1%) perceived ER-related stress as affecting their academic performance. Pearson correlation revealed a moderate, statistically significant negative association between perceived stress and GPA ($r = -0.40$, $p < 0.001$).

Conclusion: Perceived stress during ER clinical rotations adversely affects academic performance among BSN students, especially in public hospital settings. Targeted interventions, including structured mentorship, supportive supervision, and accessible counseling services, are recommended to reduce stress and enhance both academic achievement and professional development.

Keywords: Nursing Students, Emergency Room, Perceived Stress scale, Grade Point Average**.**

Introduction

Nursing is a healthcare profession that involves "a combination of clinical skills, compassionate care, critical thinking and health education" (1). Nursing education integrates theoretical knowledge with hands-on clinical experience to prepare students to become competent and professional nurses. Experiences with real patients in clinical settings are considered more effective and enriching than simulated practice in laboratories (2). Stress is defined as the body's and mind's response to specific or non-specific challenges or pressures. When these demands become too much to handle or deal, they can disturb our physical, mental, and emotional balance, affecting our health and behavior (3). Due to its widespread impact, stress has also been described as "20th century sickness"(4). The emotional, and physical responses to pressure can cause mental and physical symptoms like anxiety, fatigue, and poor concentration, which can reduce learning abilities and academic performance (5). Nursing students develop professional skills in clinical settings, but the emergency room in hospitals provides a stressful environment for students. This stress not only impacts their psychological, physical, and professional growth, but many studies highlight its negative effect on academic performance (6). Everyone experiences stress, but the way it is perceived and managed plays a crucial role in overall well-being and academic success (7). BS nursing students face high academic stress due to demanding coursework, frequent assessments, and intensive ER clinical training, which can adversely impact their GPA and overall well-being if not effectively managed (8). Stress is a significant concern for nursing students, particularly during clinical rotations in high-pressure environments such as the emergency room (ER). In ER, students face sudden patient emergencies, rapid decision making, use of advanced medical equipment, and interaction with distressed patients and families, all of which can elevate perceived stress. High stress levels in this setting negatively impact students' academic performance (GPA) (9). Globally, emergency departments serve as the front-line of the healthcare system, offering urgent care to patients with sudden deterioration, accidents, or life threatening injuries (10). This immediate response is crucial for saving lives and stabilizing patients. Nursing students placed in such an environment often experience high levels of stress due to patient severity, worked load, and fear of making mistakes (11). Stress in clinical settings is not merely an academic concern but also a patient safety issue. According to World Health Organization (WHO) 2023 stress-induced errors among healthcare trainees contribute significantly to adverse events, costing healthcare systems millions annually.

Theoretical Framework:

This study is anchored in Lazarus and Folkman's transactional model of stress and coping, which states that stress results from the dynamic interaction between an individual and the environment. According to this model, stress occurs when individuals perceive environmental demands as exceeding their available coping resources(12). In emergency room (ER), nursing students frequently face emotionally and cognitively intense situations; when these demands are appraised as unmanageable, they can impair concentration and memory, potentially leading to lower academic performance (GPA). These stress responses, as described by the Transactional Model, may negatively affect how students engage with learning opportunities in the clinical setting. Furthermore, Students often struggle with patient interaction due to inexperience and fear of making mistakes, further exacerbating stress and anxiety during clinical rotations (3,9).

Problem statement:

Nursing students are routinely exposed to high-stress environments during clinical rotations, particularly in the emergency room (ER), where the demands of patient care, rapid decision-making, and fear of making errors converge. Such intense stress can negatively affect students'

health and performance, potentially impairing concentration, memory, learning abilities and overall academic performance. Although clinical stress among nursing students is widely recognized globally, there is limited empirical evidence examining the relationship between perceived stress and academic performance, specifically GPA, among BSN students within emergency room (ER) rotations in Peshawar. Given the high patient inflow and fast-paced nature of emergency departments, it is crucial to understand how perceived stress influences students GPA. Addressing this gap is essential not only for promoting student well-being but also for ensuring safe, competent patient care, as highly stressed students may be more prone to errors. Therefore, investigating the relationship between perceived stress and GPA among BSN students in ER settings provides the foundation for developing targeted strategies to support students academically, psychologically and professionally.

Rationale:

Clinical rotation plays a vital role in nursing education by bridging theoretical knowledge with clinical practice. Among these settings, the emergency department is considered the most challenging due to its high patient inflow and need for rapid decision-making. This demanding environment is a significant source of emotional and psychological stress for nursing students. A high level of perceived stress during ER rotations may hinder student's clinical performance and negatively affect their academic achievement, self-confidence, and overall professional development. Although stress in nursing education is widely discussed, there is a limited research focusing specifically on how stress in a high-pressure environment like the ER influences academic performance. The findings of this study will establish a crucial baseline for understanding the relationship between perceived stress and GPA. Ultimately, the result may inform the development of targeted interventions aimed at reducing stress, with the long-term goal of achieving low stress levels (PSS-10 score ≤13) in at least 70% of students while maintain a mean GPA of ≥3.0 during ER rotations."

Methodology:

Research Design:

This will employ an Analytical cross-sectional study design to assess relationship between perceived stress and academic performance among BSN students in ER. While this design is efficient for examining relationship at single point in time, it doesn't allow for the establishment of temporal sequence or causal inference.

Study Setting:

This study will be conducted in Peshawar, Khyber Pakhtunkhwa, Pakistan, involving five nursing collages; Government College of Nursing Khyber Teaching Hospital, Government College of Nursing Hayatabad Medical Complex, Rehman College of Nursing; Rufaida Nursing College, and Farkhanda Nursing College. These institutions provide access to students with varying academic backgrounds and clinical experiences, particularly in stressful environment like ER. The inclusion of public and private institutions enhances the generalizability of the finding related to stress and academic performance during clinical rotation in ER. A mix of public and private institutions was purposively selected to capture a diverse range of clinical experiences and patient loads, thereby enhancing the generalizability of the findings across different training environments in Peshawar.

Population:

Undergraduate nursing students enrolled in Generic-BSN program, who have completed at least four or greater than four weeks of ER clinical rotation. And who completed ER clinical rotation in the previous semester.

Sample Size and Sampling Technique:
The sample size was calculated using the Rao-Soft sample size calculator, resulting in a required sample of 300 participants from a total population of 1350 nursing students. To account for a potential non-response rate of 10%, the final target sample size was increased to 334 participants. The calculation was based on 95% confidence level and a 5% margin of error.
A stratified sampling technique will be used, with strata defined by institution and academic year (3rd and 4th). Within each stratum, participants will be selected using convenience sampling due to time and accessibility constraints.

Data Collection Tool:
Data were collected using a structured, adapted questionnaire consisting of two sections.
Section A: included demographic characteristics such as age, gender, academic year, type of hospital (public/private), and self-reported GPA. The reported GPA was verified through institutional academic records with administrative permission to ensure accuracy.
Section B: included the Perceived Stress Scale (PSS-10) developed by Cohen, Kamarck, and Mermelstein (1983). The PSS-10 consists of 10 items rated on a 5-point Likert scale (0 = Never to 4 = Very Often), with total scores ranging from 0 to 40. Stress levels were categorized as:

- Low stress (0–13)
- Moderate stress (14–26)
- High stress (27–40)

The internal consistency reliability of the PSS-10 was assessed using Cronbach's alpha coefficient. A value of ≥ 0.70 was considered acceptable.

Data Collection Procedure:
Data collection was conducted over a period of two months after obtaining ethical approval from the Institutional Review Board (IRB) and written informed consent from all participants. Eligible BSN students who had completed at least four weeks of emergency room (ER) clinical rotations were invited to participate. The purpose of the study, confidentiality, and voluntary nature of participation were clearly explained to all students. Structured questionnaires, including the validated Perceived Stress Scale (PSS-10), were distributed and completed on-site. The PSS-10 was chosen for its reliability and widespread use in assessing stress among nursing students. Self-reported GPAs were cross-verified with official academic records to ensure accuracy. Participants were selected using stratified sampling by institution and academic year, with convenience sampling within each stratum; the limitation of convenience sampling in terms of generalizability was acknowledged. Completed questionnaires were collected immediately, and responses were anonymized. Participants were reminded that they could withdraw at any point without any consequences.

Statistical Analysis:
Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS) version 24.
Descriptive statistics were used to summarize the study variables. Frequencies and percentages were calculated for categorical variables (e.g., gender, stress levels, hospital type), while means

and standard deviations were computed for continuous variables (e.g., GPA and total perceived stress score).

To compare mean perceived stress scores between students in public and private hospitals, an Independent Sample t-test was performed.

Pearson's correlation coefficient (r) was used to examine the strength and direction of the linear relationship between perceived stress (PSS-10 total score) and academic performance (GPA).

Prior to inferential analysis, the normality of continuous variables was assessed. A p-value of less than 0.05 ($p < 0.05$) was considered statistically significant.

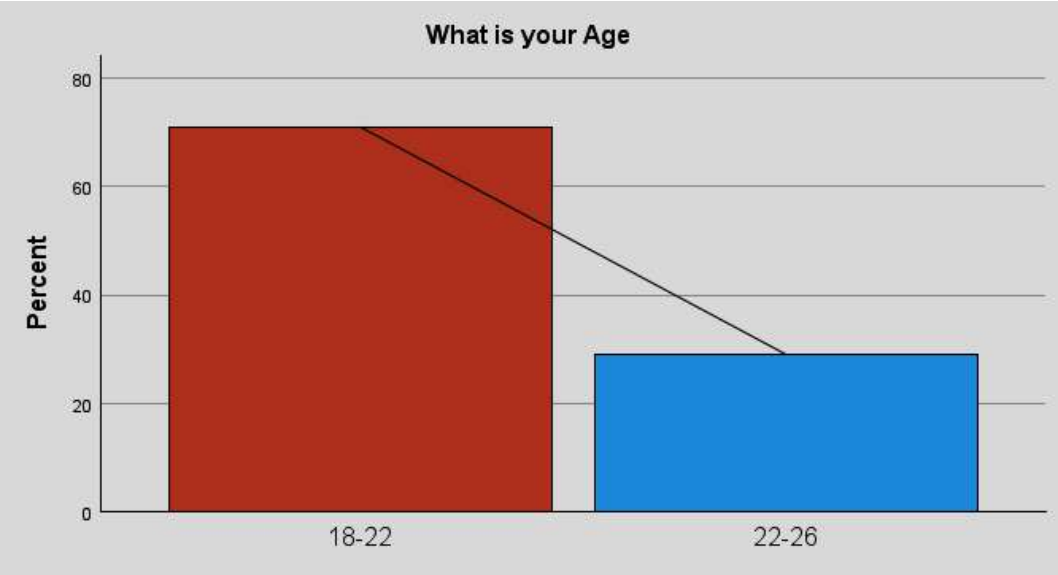
Results / Findings

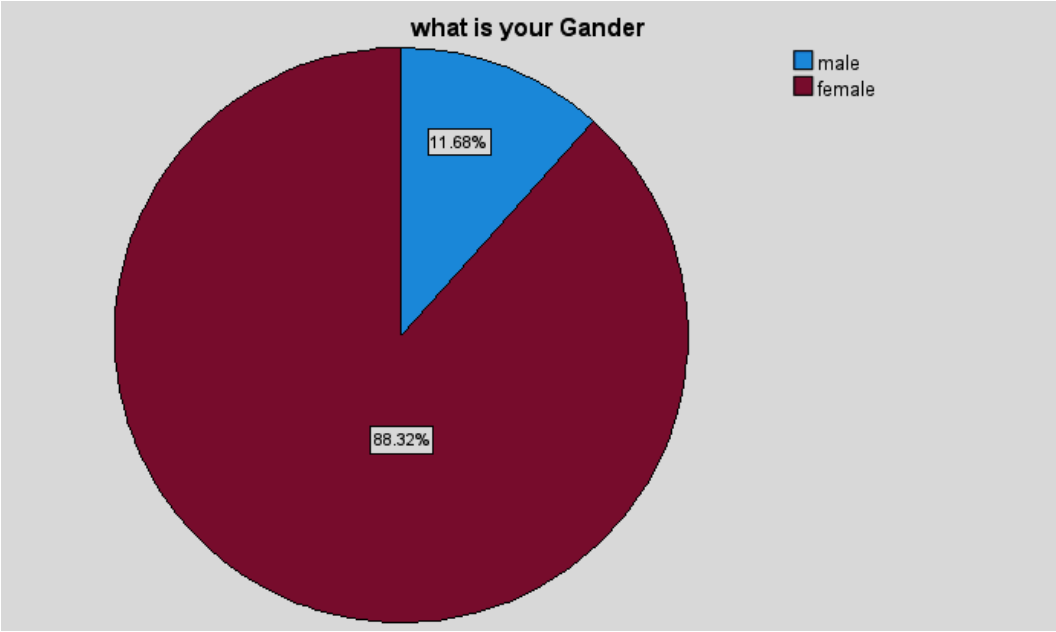
Demographic characteristics of the participants:

The demographic distribution of the study participants is presented in **Table 4.1**. A total of 334 respondents were included in the study. The age distribution showed that the majority of participants were between 18 and 22 years (71.0%). With respect to gender, females constituted the predominant proportion of the sample (88.32%), whereas males accounted for 11.68%. In terms of marital status, most participants were unmarried (91.3%), with only a small proportion being married (8.7%). Regarding the year of study, 61.7% of the respondents were in their second year, while 38.3% were in the fourth year of study.

◆ **Table 4.1:**

Distribution of Participants by Demographic Variables(n=334)					
	Category	**Frequency(n)**	**Percentage (%)**	**Valid Percent**	**Cumulative Percent**
Age	18–22 years	237	71.0	71.0	71.0
	22–26 years	97	29.0	29.0	100.0
Gender	Male	39	11.68	11.68	11.68
	Female	295	88.32	88.32	100.0
Marital status	Married	29	8.7	8.7	8.7
	Unmarried	305	91.3	91.3	100.0
Year of study	2nd year	206	61.7	61.7	61.7
	4th year	128	38.3	38.3	100.0





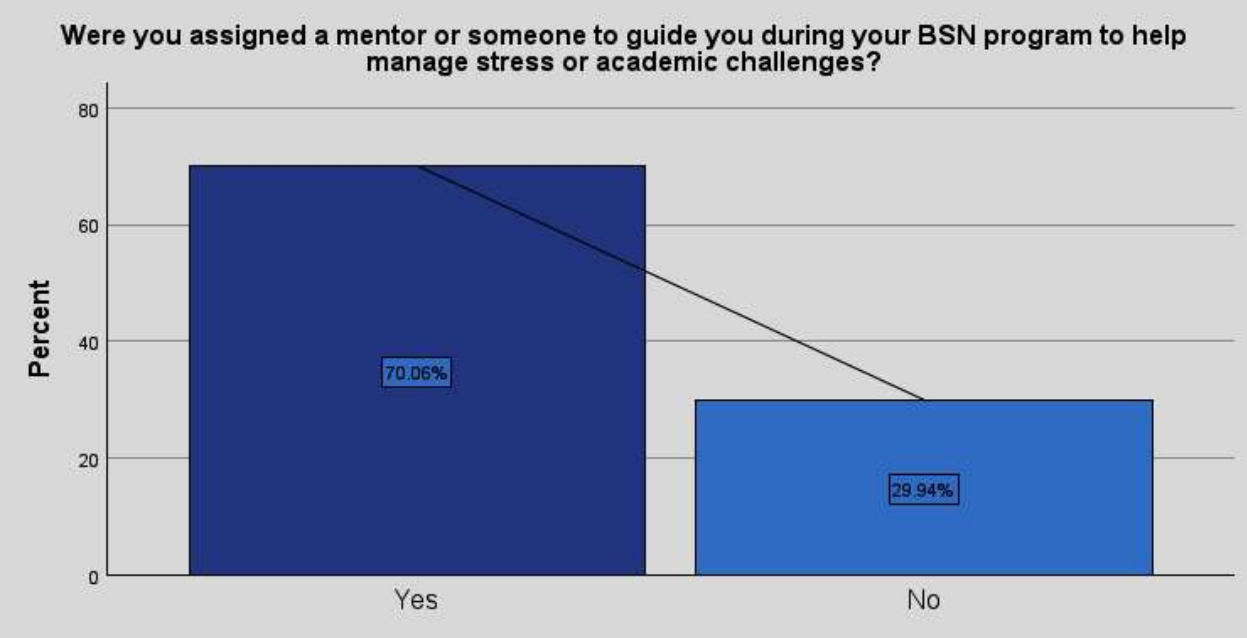
Mental Health, Mentorship, Supervisory Support, and access to counseling Characteristics of the participants:

Table 4.2 shows that the majority of participants reported no prior mental health diagnosis (71.1%), while 28.9% indicated a diagnosis. Most participants had been assigned a mentor (70.1%) and perceived their supervisors as supportive, with 58.4% rating them as supportive and 3.6% as very supportive. Fewer participants viewed their supervisors as somewhat supportive (28.4%) or not supportive (9.6%). Access to counseling services was nearly evenly split, with 49.7% reporting availability. These findings suggest that while mentorship and supervisory support were generally positive, a substantial proportion of participants had mental health concerns and limited access to formal counseling, highlighting areas for potential improvement in institutional support.

Table 4.2:

Mental Health, Mentorship, and Supervisory Support Characteristics of the participants(n=334)

Variable	Category	Frequency (n)	Percentage (%)	Valid Percent	Cumulative Percent
Mental health diagnosis	NO	234	71.1	71.1	71.1
	Yes	95	28.9	28.9	100.0
Mentor assigned	Yes	234	70.1	70.1	70.1
	No	100	29.9	29.9	100.0
Supervisor support	Not supportive	32	9.6	9.6	9.6
	somewhat supportive	95	28.4	28.4	38.0
	Supportive	195	58.4	58.4	96.4
	Very supportive	12	3.6	3.6	100.0
Access to counseling support	Yes	163	48.7	49.7	100.0
	No	172	51.3	53.3	53.3
Missing	System	0	00		



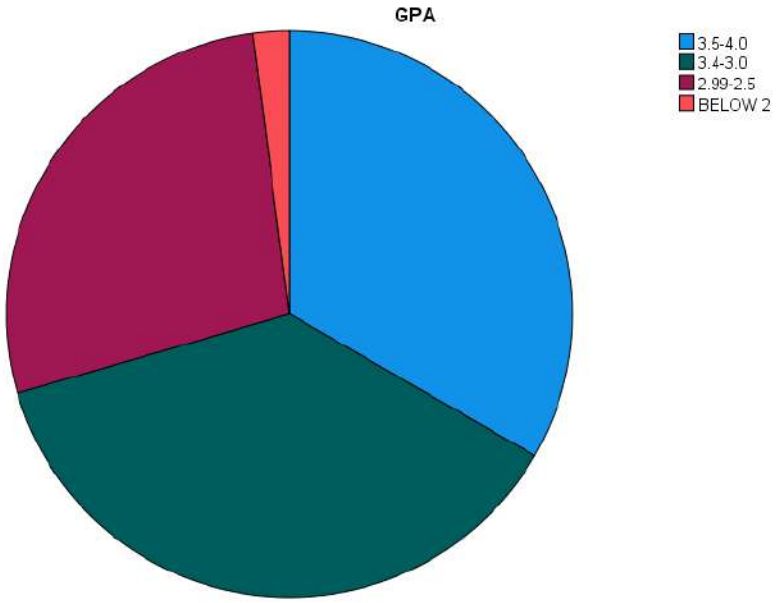
Distribution of GPA Levels Among Participants:

Table 4.3 shows that most students reported relatively high GPAs. Specifically, **37.2%** of participants had GPAs between **3.0 and 3.4**, and **32.3%** fell in the **3.5–4.0** range. Together, these categories account for **69.5%** of the sample. An additional **27.4%** of students reported GPAs

between **2.5 and 2.99**, while only **2.1%** had a GPA **below 2.0**. Overall, the distribution indicates that the majority of participants maintained GPAs above 3.0 (*N* = 334)

Table 4.3:

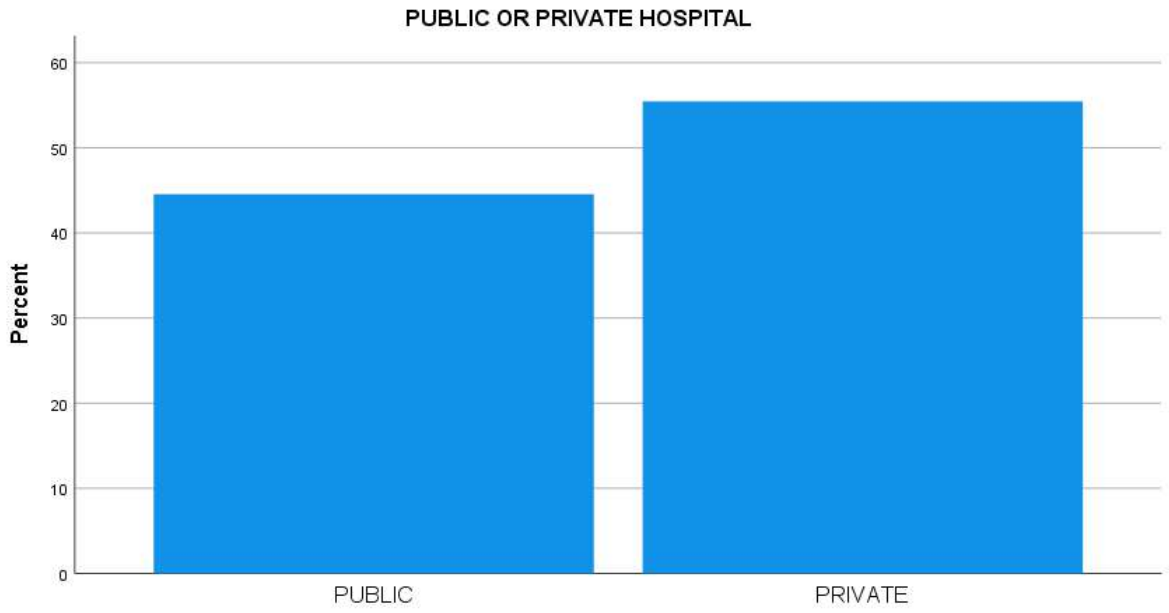
GPA					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**3.5-4.0**	108	32.3	32.3	32.3
	3.4-3.0	126	37.2	37.2	70.5
	2.99-2.5	93	27.4	27.4	97.9
	BELOW 2	7	2.1	2.1	100.0
	Total	334	100.0	100.0	



Distribution of Participants by Hospitals Type:
The sample consists of 334 participants. Among them, 151 participants (44.5%) were in public hospitals, while 183 participants (54.7%) in private hospitals. This indicates that a slightly higher proportion of students in private hospitals compared to public hospitals.

Table 4.4:

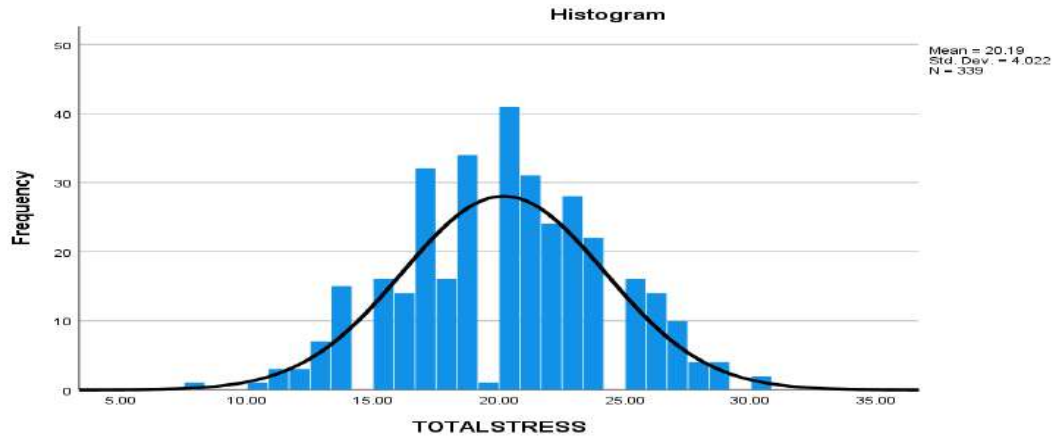
PUBLIC OR PRIVATE HOSPITAL					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	**PUBLIC**	151	44.3	44.5	44.5
	PRIVATE	183	54.7	54.7	100.0
	Total	334	100.0	100.0	
Missing	**System**	00.0	00.0		



Distribution of Total Stress Scores:

The distribution of total stress scores was examined among the 334 participants as shown in figure 1.1. Stress scores ranged from 8 to 30. The most frequently reported stress score was 20 (*n* = 41, 12.1%), followed by 19 (*n* = 34, 10.0%) and 17 (*n* = 32, 9.4%). Most participants reported moderate levels of stress, with scores clustering between 17 and 23. Very few participants reported extremely low stress (scores below 12) or very high stress (scores above 28). Overall, the distribution indicates that the majority of respondents experienced moderate stress levels.

Figure 1.1:

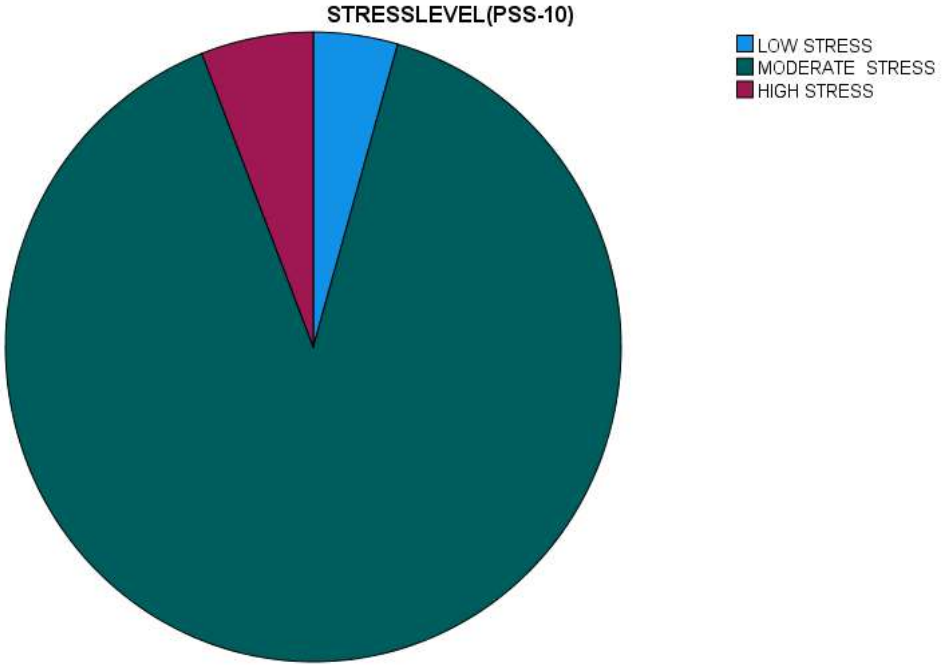


Perceived Stress Levels Among Participants:

Perceived stress levels were assessed using the Perceived Stress Scale (PSS-10). The results showed that the majority of participants experienced **moderate levels of stress** (**88.7%**, *n* = 299). A smaller proportion of students reported high stress levels **(**5.9%**,** *n* = 20), while **4.4%** (*n* = 15) reported low stress levels. Overall, these findings indicate that most participants in the study were experiencing moderate perceived stress, with a notable minority reporting high stress (*N* = 334).

Table 4.5:

STRESSLEVEL(PSS-10)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	LOW STRESS	15	4.4	4.4	4.4
	MODERATE STRESS	299	88.7	88.7	93.1
	HIGH STRESS	20	5.9	5.9	100.0
	Total	334	100.0	100.0	

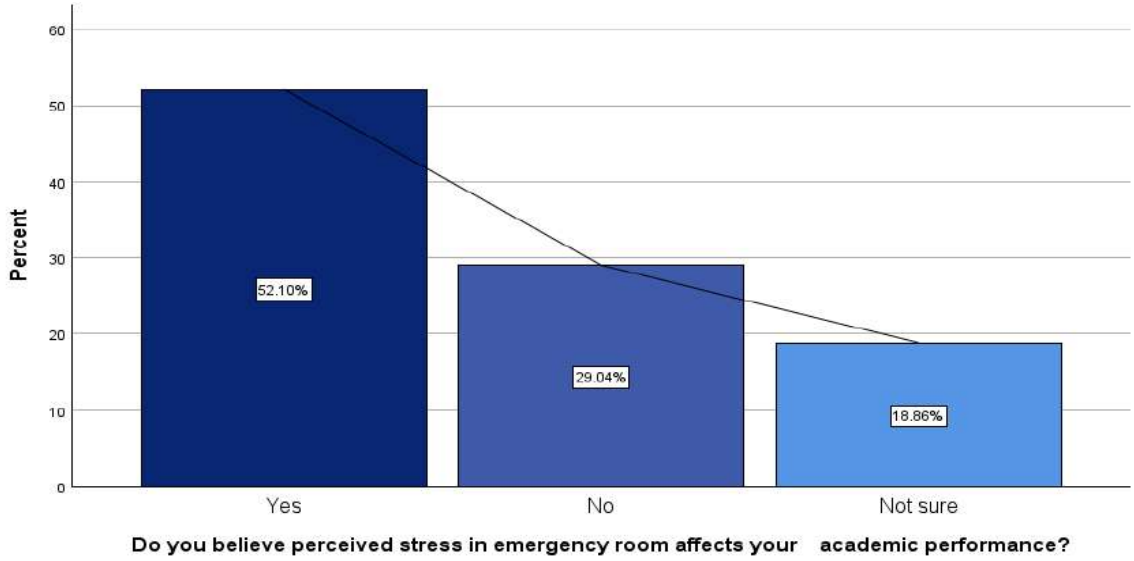


Students' Perceptions of the effect of Emergency Room Stress on Academic Performance: Table 4.4 shows that more than half of the respondents (52.1%) believed that perceived stress in the emergency room affects their academic performance (GPA), indicating that stress in this clinical setting may have a negative influence on students' academic outcomes. However, 29.0% of the respondents reported that emergency room stress does not affect their academic performance, suggesting the presence of effective coping strategies among some students. Additionally, 18.9% of the respondents were uncertain about the impact of such stress on their academic performance. Overall, the findings suggest that a substantial proportion of students perceive emergency room–related stress as influencing their academic performance.

Table 4.6:

Do you believe perceived stress in emergency room affects your academic performance? (n=334)					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	174	52.1	52.1	52.1
	No	97	29.0	29.0	81.1

	Not sure	63	18.8	18.9	100.0
	Total	334	99.7	100.0	
Missing	**System**	00.0	00.0		
Total		334	100.0		



Comparing Total Stress between Public and Private Hospitals:

An Independent Samples t-test was conducted to compare total stress scores between students in public and private hospitals. Students in public hospitals (Mean = 20.78, Standard Deviation = 3.99) reported significantly higher stress compared to students in private hospitals (Mean = 19.71, Standard Deviation = 4.00), t-value = 2.448, Degrees of Freedom = 332, p = 0.015, 95% Confidence Interval [0.21, 1.93]. This indicates that students in public hospitals experience greater stress during emergency room clinical rotations than those in private hospitals.

Table 4.7:

Variables	Hospital Types	N	Mean (M)	SD	t	df	p-value	95% CI of Mean Difference
Total Stress	**Public**	151	20.78	3.99	2.448	332	0.015	0.21 – 1.93
	Private	183	19.71	4.00				

Correlation between GPA and Perceived Stress:

A Pearson correlation analysis was conducted to examine the relationship between Grade Point Average (GPA) and perceived stress, as measured by the PSS-TOTAL as shown in table 4.7. The analysis revealed a statistically significant negative correlation between GPA and perceived stress, r (334) = -0.40, p < 0.001. This indicates that higher levels of perceived stress are associated with lower academic performance. The strength of the correlation is moderate, suggesting a meaningful inverse relationship between stress and GPA in this sample of 334 participants.

Table 4.8:

Correlations			
		GPA	PSS-TOTAL
GPA	Pearson Correlation	1	-.40
	Sig. (2-tailed)		
	N	334	334
PSSTOTAL	Pearson Correlation	-.40	1
	Sig. (2-tailed)	<0.001	
	N	334	334

4. DISCUSSION

This study investigated perceived stress and its relationship with academic performance (GPA) among BSN students during emergency room (ER) clinical rotations in Peshawar. The findings provide important insights into the prevalence, determinants, and consequences of stress in high-pressure clinical settings.

4.1 Interpretation of Findings:

The majority of participants (88.7%) reported moderate stress, while 5.9% experienced high stress and 4.4% reported low stress. This indicates that most nursing students face substantial stress during ER rotations, consistent with the demanding nature of emergency care, which involves rapid decision-making, exposure to patient suffering, and high patient inflow. The clustering of stress scores in the moderate range suggests that students are experiencing a level of stress that may be manageable but is still sufficient to interfere with concentration, learning, and clinical performance.

An Independent Samples t-test revealed that students in public hospitals experienced significantly higher stress (M = 20.78) compared to those in private hospitals (M = 19.71, p = 0.015). This difference likely reflects contextual factors: public hospitals in Peshawar generally face higher patient volumes, limited resources, and staffing shortages, which intensify the cognitive and emotional demands on students. In contrast, private hospitals may provide a more structured environment with lower patient-to-student ratios and enhanced supervision, mitigating stress levels.

A key finding is the moderate negative correlation between perceived stress and GPA (r = -0.40, p < 0.001), indicating that higher stress is associated with lower academic performance. This supports the transactional model of stress and coping proposed by Lazarus and Folkman, which posits that stress arises when perceived demands exceed available coping resources. The finding aligns with international studies reporting inverse relationships between stress and academic outcomes. For example, Yilmaz (6) and studies from Sweden, Jordan, and China found that stress in high-intensity clinical environments negatively affects concentration, memory, and GPA. Local studies in Peshawar, Mardan, and Swat similarly demonstrated that higher perceived stress corresponds with lower academic performance among nursing students.

Comparison with Previous Studies:

These findings corroborate global evidence that ER clinical rotations are among the most stressful experiences for nursing students. Research from Saudi Arabia and Iran highlights that unfamiliarity with the ER environment, fear of clinical errors, and exposure to trauma significantly increase stress levels, adversely affecting learning and GPA. Similarly, studies in Malaysia and

Hong Kong identified academic workload and unexpected clinical situations as significant contributors to stress.

While the prevalence of moderate stress in this study (88.7%) is higher than in some international studies, it aligns with reports from local regions like Peshawar, Mardan, and Karachi, where most nursing students reported moderate stress during clinical rotations. The higher stress levels in public hospitals also reflect previous findings that institutional and environmental factors, including patient load and mentorship quality, play a critical role in students' stress experiences.

Implications:

The findings have several implications for nursing education, student well-being, and patient's safety:

1. **Educational Interventions:** Structured stress management programs, including mindfulness training, resilience workshops, and time management sessions, are needed to help students cope with ER-related stress.
2. **Support Systems:** Enhanced mentorship, supportive supervision, and access to counseling services can buffer the negative effects of stress and improve academic and clinical performance.
3. **Institutional Policy:** Public hospitals may benefit from workload adjustments, improved staffing, and structured rotations to reduce excessive stress.
4. **Patient Safety:** Reducing stress among nursing students is critical for patient safety, as stress-induced errors are more likely in high-pressure environments (WHO, 2023).
5. **Early Identification:** Regular monitoring of stress levels using validated tools like PSS-10 can help identify at-risk students and provide timely interventions.

Limitations:

Several limitations should be considered:

1. **Cross-Sectional Design:** The study design allows identification of associations but cannot establish causal relationships between stress and academic performance.
2. **Sampling Method:** Convenience sampling within strata may limit generalizability, as participants may not fully represent the broader nursing student population.
3. **Self-Reported Data:** Although GPA was verified through records, self-reported stress levels may be subject to reporting bias.
4. **Unmeasured Variables:** Factors such as individual coping strategies, personality traits, and social support were not assessed and may influence stress and academic outcomes.
5. **Single-City Focus:** Conducting the study in Peshawar limits generalizability to other regions or countries with differing healthcare and educational contexts.

Conclusion:

In summary, this study demonstrates that BSN students in Peshawar experience predominantly moderate stress during ER clinical rotations, with higher stress observed in public hospitals. There is a moderate inverse relationship between perceived stress and academic performance, indicating that students with higher stress levels tend to have lower GPAs. These findings underscore the critical need for institutional interventions, supportive supervision, and mental health resources to help students manage stress, optimize learning, and ensure both educational and patient care outcomes.

Recommendations

Based on the study findings, the following recommendations are proposed for nursing educators, administrators, and policymakers:

1. **Stress Management Programs:** Implement structured stress reduction interventions, such as mindfulness training, resilience workshops, time management training, and relaxation techniques, specifically tailored for students in high-pressure clinical settings like the ER.
2. **Enhanced Mentorship and Supervision:** Strengthen mentorship programs and provide supportive supervision during ER rotations to help students navigate clinical challenges, build confidence, and reduce perceived stress.
3. **Mental Health Support Services:** Improve access to counseling and psychological support services within nursing institutions to address mental health concerns early and prevent stress-related academic decline.
4. **Workload Management:** Consider strategies to balance clinical assignments, patient exposure, and academic workload, particularly in public hospitals with higher patient inflow, to reduce stress and cognitive overload.
5. **Orientation and Preparation Programs:** Provide pre-rotation orientation sessions to familiarize students with ER procedures, protocols, and expectations, thereby reducing anxiety and stress arising from unfamiliarity.
6. **Regular Assessment of Stress:** Integrate regular assessment of stress levels using validated tools like PSS-10 during clinical rotations to identify at-risk students and provide timely interventions.
7. **Further Research:** Conduct longitudinal studies to assess causal relationships between stress and academic performance and evaluate the effectiveness of stress-reduction interventions in nursing education.

Implementing these recommendations could improve student well-being, maintain or enhance academic performance, and ultimately ensure safer, more effective patient care in high-pressure clinical environments

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