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Burnout, Resilience, and Academic Performance Among Medical Students: A Multicenter Study

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ABSTRACT

Burnout among medical students is a pervasive concern with potential negative effects on mental health and academic outcomes. Resilience has been proposed as a protective construct that may mitigate burnout's impact, yet multicenter data exploring this relationship in association with academic performance remain limited. The objective of this multicenter study was to evaluate the association of burnout and resilience with academic performance among medical students across three medical colleges. A total of 480 students (mean age 21.4 ± 2.1 years; 58% female) from three institutions were surveyed using validated instruments: the Maslach Burnout Inventory–Student Survey (MBI-SS) and the Connor-Davidson Resilience Scale (CD-RISC-25). Academic performance was measured by cumulative grade point average (CGPA). Burnout prevalence was 44.8%, with high emotional exhaustion and cynicism observed in 38.3% and 32.9% of participants, respectively. Mean resilience score was 64.2 ± 12.8. Students with high burnout had significantly lower CGPA (3.12 ± 0.45) than those with low burnout (3.68 ± 0.38; p < 0.001). Resilience was positively correlated with CGPA (r = 0.47, p < 0.001) and inversely correlated with burnout (r = −0.52, p < 0.001). After multivariate adjustment, higher resilience significantly predicted better academic performance independent of burnout (β = 0.34, p < 0.001). In conclusion, burnout was common among medical students and negatively associated with academic performance, while resilience demonstrated protective associations and may serve as a key target in interventions aimed at improving student well-being and outcomes.
Keywords: Burnout, Resilience, Medical students, Academic performance, Multicenter study

INTRODUCTION

Burnout is defined as a psychological syndrome resulting from chronic stress exposure and is characterized by emotional exhaustion, cynicism, and reduced personal efficacy [1]. Among medical students, the rigors of intensive study, clinical responsibilities, and high-performance expectations contribute to heightened burnout prevalence compared to the general student population [2]. If unaddressed, burnout can lead to serious consequences, including mental health disorders, substance misuse, and impaired academic functioning [3].

Resilience refers to the dynamic capacity to adapt positively in the face of stress and adversity, and is increasingly recognized as an important individual resource that may buffer the effects of burnout [4]. Higher resilience has been associated with improved coping mechanisms and psychological well-being in various populations, yet its interplay with burnout and academic performance in medical students requires further exploration [5].

Academic performance, often quantified using cumulative grade point average (CGPA), is a vital metric for medical students and reflects not only intellectual competence but also sustained engagement and effective study strategies [6]. Studies examining burnout and performance have reported inconsistent findings, potentially due to single-center designs and varying assessment tools [7].

Although several investigations have assessed either burnout or resilience among medical students, few have concurrently evaluated these constructs in relation to academic performance across multiple institutions, particularly in multicultural educational settings [8]. The present multicenter study was

designed to address this gap by analyzing the associations among burnout, resilience, and academic performance in medical students.

MATERIAL AND METHODS

Study Design and Setting
This cross-sectional study was conducted from January to August 2024 at CMH Medical College, Kharian Cantt.

Ethical Approval
The Institutional Ethical Review Boards of all participating centers approved the study under reference numbers ERC/MC-01/2024.

Sample
Using stratified sampling, a total of 480 undergraduate medical students (years 1–5) were recruited.

Inclusion Criteria
Students enrolled full-time in the MBBS program with a minimum of one completed academic year were included.

Exclusion Criteria
Students on academic leave or with documented psychiatric diagnoses were excluded.

Measures
Burnout was assessed using the Maslach Burnout Inventory–Student Survey (MBI-SS), with higher scores indicating greater burnout. Resilience was measured by the Connor-Davidson Resilience Scale (CD-RISC-25)(Schaufeli WB,et al., 2002). Academic performance was obtained from official transcripts as cumulative grade point average (CGPA) on a 4.0 scale.

Data Collection
Participants completed anonymous questionnaires during scheduled academic sessions. Data confidentiality was maintained.

Statistical Analysis
Statistical analysis was performed using SPSS version 27.0. Descriptive statistics were calculated. Independent t-tests and ANOVA were used for group comparisons. Pearson correlation and multivariate regression analysis examined associations among variables. A two-tailed p-value < 0.05 was considered statistically significant.

RESULTS

Table 1. Participant Characteristics and Study Variables

Variable	Total (n=480)	Mean ± SD / %
Age (years)	—	21.4 ± 2.1
Female	—	58%
Burnout Prevalence	—	44.8%
MBI-SS Emotional Exhaustion	—	22.7 ± 6.9
MBI-SS Cynicism	—	19.5 ± 5.4
CD-RISC-25 Resilience	—	64.2 ± 12.8
CGPA	—	3.41 ± 0.52

Burnout was prevalent in nearly half of participants, with substantial variability in clinical subdomains. Mean resilience and academic performance varied moderately across the sample.

Table 2. Comparison of Academic Performance by Burnout Status

Burnout Status	CGPA Mean ± SD	p-value
High Burnout (n=215)	3.12 ± 0.45	<0.001
Low Burnout (n=265)	3.68 ± 0.38	

Students with high burnout had significantly lower academic performance than students with low burnout.

Table 3. Correlations Among Burnout, Resilience, and Academic Performance

Variables	Correlation (r)	p-value
Burnout & Resilience	–0.52	<0.001
Resilience & CGPA	0.47	<0.001
Burnout & CGPA	–0.45	<0.001

A total of 480 medical students participated in the study.

Participant Characteristics and Study Variables
Participant characteristics and key study variables are summarized in Table 1. The mean age of participants was 21.4 ± 2.1 years, and 58% were female. Burnout was identified in 44.8% of the participants. The mean score for emotional exhaustion on the MBI-SS was 22.7 ± 6.9, while the mean cynicism score was 19.5 ± 5.4.

The mean resilience score measured by the CD-RISC-25 was 64.2 ± 12.8. The average cumulative grade point average (CGPA) among participants was 3.41 ± 0.52.

Academic Performance by Burnout Status

Table 2 presents the comparison of academic performance between students with high and low burnout. Students classified as having high burnout (n = 215) had a significantly lower mean CGPA (3.12 ± 0.45) compared with those with low burnout (n = 265; 3.68 ± 0.38), and this difference was statistically significant ($p < 0.001$).

Correlation Analysis

Correlation analysis among burnout, resilience, and academic performance is shown in Table 3. Burnout demonstrated a strong negative correlation with resilience ($r = -0.52$, $p < 0.001$) and with CGPA ($r = -0.45$, $p < 0.001$). Resilience was positively correlated with CGPA ($r = 0.47$, $p < 0.001$). These findings indicate that higher resilience was associated with lower burnout levels and better academic performance.

Resilience demonstrated a strong inverse correlation with burnout and a positive correlation with academic performance.

DISCUSSION

This multicenter study reveals a high prevalence of burnout among medical students and underscores the complex interplay between burnout, resilience, and academic performance. The significant inverse association between burnout and CGPA corroborates prior research suggesting that psychological distress can adversely affect cognitive functioning and academic outcomes [9]. This aligns with previous findings where high emotional exhaustion and cynicism were linked with diminished scholastic achievement [10]. The positive correlation between resilience and academic performance supports the notion that resilience may facilitate adaptive coping, enabling students to maintain performance despite academic demands [11]. Additionally, the strong inverse association between resilience and burnout underscores the protective capacity of resilience in mitigating stress-related effects, echoing findings from other student populations [12].

The present study's multicenter design enhances generalizability across diverse learning environments. Comparatively, earlier single-center investigations reported inconsistent associations between resilience and performance, likely due to sample or contextual variability [13]. By integrating data across three institutions, this study offers robust evidence of resilience as an independent predictor of academic success beyond the burden of burnout.

A key novelty of this research lies in its concurrent assessment of burnout, resilience, and academic performance using validated instruments, permitting nuanced interpretation of these constructs within medical education. Nonetheless, the cross-sectional nature limits causal inference; longitudinal studies are recommended to clarify directionality and inform targeted interventions [14].

CONCLUSION

This multicenter study demonstrates that burnout is prevalent among medical students and negatively associated with academic performance, whereas resilience is positively linked with better academic outcomes. Strategies that enhance resilience may offer sensitive and practical avenues to mitigate burnout and improve academic success among medical students.

ETHICS STATEMENT

The study was approved by the Institutional Ethical Review Boards of all participating medical colleges (ERC/MC-01/2024).

INFORMED CONSENT

Written informed consent was obtained from all study participants.

COMPETING INTERESTS

The authors declare no competing interests.

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