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Impact of Burnout on Academic Performance and Well-Being among Medical Students: A Systematic Review

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ABSTRACT

Medical student burnout has become a significant issue in the global community, with growing evidence of its negative implications on academic performance and mental health. Although there is an increasing body of research in this field, unified data on the extent and implications of burnout is scarce in the low- and middle-income contexts. **Objective:** To systematically review the impact of burnout on academic performance and well-being among undergraduate medical students. **Methods:** The systematic literature search was performed in PubMed, Scopus, Google Scholar, and Cochrane Library to identify research published from 2018 to 2024. Original English-language observational studies assessing burnout with validated measures and reporting academic or well-being outcomes were found. The selection of studies was done in accordance with PRISMA. The quality of methodology was determined with the help of the NIH Quality Assessment Tool. A narrative synthesis approach was used. **Results:** The qualitative synthesis included 15 studies. The prevalence of burnout was between 34.3% and 63.5. The most affected domain was emotional exhaustion. Increased burnout was always correlated to lower GPA/CGPA, worse examination results, lower learning motivation, worse quality of life, worse anxiety, depression, sleep problems, and stress. **Conclusions:** Burnout is highly prevalent among medical students and significantly compromises both academic performance and mental well-being. Institutional strategies focusing on workload regulation, mental health support, and improvement of learning environments are urgently needed.

INTRODUCTION

Medical education is generally considered one of the most rigorous academic training programs with long working hours, high exams, competitive orientation, as well as early exposure to emotionally stressful clinical conditions [1]. Such stresses expose medical students to a significant risk of psychological pressure, especially burnout. Burnout is a multidimensional condition characterized by emotional weariness, depersonalization, and a decrease in individual achievement. Being undetected, it may have an adverse impact on the ability to learn, professional growth, and the sustainability of a career in the future. Burnout is an issue that has been increasingly important in medical establishments across the globe in recent years [2, 3]. Burnout among medical students has been reported to occur in different geographical regions, and research has shown an increasing prevalence rate and growing

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psychological morbidity [4, 5]. The most prominent aspect is always emotional exhaustion, likely to be followed by anxiety, depressive symptoms, and sleep disorders. There is also a correlation between burnout and a lack of concentration, motivation, and academic activity. These expressions not only undermine the mental health of students but can also lead to poor academic performance and clinical outcomes. Burnout is, therefore, a major problem in the sustainability of educational quality and the healthcare workforce [6]. Student progress and professional readiness are monitored through academic performance. There is new evidence that burnout can greatly disrupt learning outcomes such as GPA, examination performance, and academic motivation [7]. Students having high levels of burnout can exhibit a low level of study efficiency, rise cases of absenteeism, and a decrease in academic confidence. At the same time, burnout leads to a state of worse well-being, which is expressed not only through psychological distress but also through low quality of life and sleep problems. The presence of academic deficiency and the deterioration of well-being highlight the challenge of the multidimensionality of burnout [8, 9].

Although a growing interest exists across the world, the scale of burnout and its outcomes among medical students are not sufficiently documented, especially in the context of low- and middle-income countries. Differences in the measures of an outcome, the tools of assessment, and the institutional environment have restricted the generalizability of individual studies. Therefore, this study aims to synthesize recent evidence on the impact of burnout on academic performance and well-being among medical students, with the rationale of informing targeted institutional strategies to improve student mental health, academic success, and overall educational quality.

METHODS

The systematic review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines to ensure transparency and methodological rigor. The review synthesized evidence on the effects of burnout on academic performance and well-being among undergraduate medical students.

A systematic electronic literature search was conducted across PubMed/MEDLINE, Scopus, Google Scholar, and the Cochrane Library. Articles published between January 2018 and December 2024 were identified using Medical Subject Headings (MeSH) terms and free-text keywords combined with Boolean operators (AND/OR). The main search terms included: burnout, medical students, academic performance, quality of life, depression, anxiety, sleep quality, and well-being. Reference lists of relevant articles were manually screened to identify additional eligible studies. Original observational studies published in English between 2018 and 2024 were included. Studies were eligible if they: (1) assessed burnout among undergraduate medical students using validated instruments, and (2) reported at least one academic performance outcome (e.g., GPA, CGPA, examination results, academic success, or learning motivation) or well-being outcome (e.g., quality of life, depression, anxiety, psychological distress, or sleep quality). Only full-text articles involving human participants were considered. Database filters and reference management software were used to automatically exclude non-English records and conference abstracts. Non-original publications, animal studies, and duplicate citations were excluded. Additionally, systematic reviews, meta-analyses, narrative reviews, pilot studies, editorials, conference abstracts, and studies involving non-medical student populations were excluded. A total of 632 records were identified. After eliminating duplicates and ineligible records, titles and abstracts of 418 studies were screened. Subsequently, 71 full-text articles were assessed for eligibility, and 15 articles that met all inclusion criteria were included in the qualitative synthesis. Data were extracted independently using a standardized proforma that incorporated: author name, year of publication, country, study design, sample size, academic level, burnout assessment tool, academic performance outcomes, well-being outcomes, burnout prevalence, and key results. The NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies were used to assess methodological quality. The following domains were evaluated: clarity of objectives, definition of study population, validity of burnout measurement tools, justification of sample size, control of confounding variables, and validity of outcome measures. Studies were classified as having low risk of bias, some concerns, or high risk of bias. Due to heterogeneity in burnout measurement tools and outcome definitions, a narrative synthesis approach was employed. Results were summarized and described qualitatively in organized tables presenting burnout prevalence, severity, and effects on academic performance and well-being (Figure 1).

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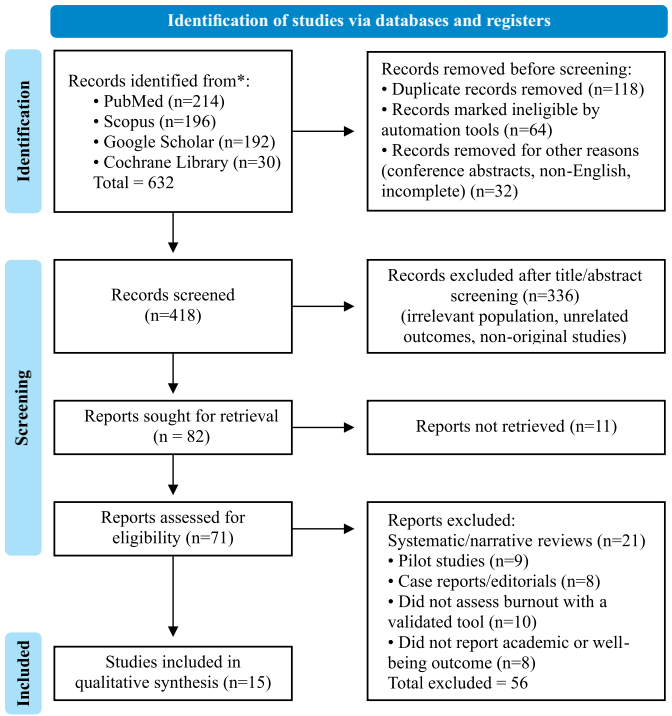

Figure 1: The Analysis of Studies

RESULTS

Among the records that were initially identified, 64 were filtered automatically before being subjected to manual title and abstract screenings. The studies included in the study were mostly cross-sectional studies that were held in various geographical locations such as Asia, Africa, Europe, and North America, with a wide international coverage of the medical student population. The 15 included studies were conducted across diverse geographical settings, including Ethiopia, Uganda, Serbia, Thailand, Pakistan, Mexico, Saudi Arabia, Indonesia, the USA, and Egypt. Sample sizes ranged from 144 participants [11] to 3,400 participants, with a median sample size of 400 students. Most studies (n=12) included mixed academic levels encompassing both preclinical and clinical years, while three studies focused specifically on preclinical students. The Maslach Burnout Inventory-Student Survey (MBI-SS) was the most commonly used assessment tool (n=10), followed by other validated instruments, including the Academic Burnout Inventory, MBI, and various burnout scales. Academic performance outcomes were assessed as primary outcomes in 6 studies, measuring indicators such as GPA, CGPA, examination performance, academic success, and learning motivation. Well-being outcomes were reported as primary outcomes in 9 studies, examining quality of life, depression, anxiety, psychological distress, and sleep quality. The remaining studies reported these outcomes as secondary variables. The study presents the detailed characteristics of all included studies (Table 1).

Table 1: Characteristics of Included Studies (2018–2024)

Sr. No.	References	Country	Study Design	Sample Size (n)	Academic Level	Burnout Instrument	Academic Performance Outcome	Well-Being Outcome
1	[10]	USA	Cross-sectional	315	Mixed	MBI-SS	Not primary	Wellness/burn-out levels
2	[11]	Ethiopia	Cross-sectional	144	Mixed	MBI	Not primary	Not primary
3	[12]	Uganda	Cross-sectional	355	Mixed	MBI-SS	Not primary	Not primary
4	[13]	Serbia	Cross-sectional	760	Mixed	Burnout Scale	Not primary	Not primary
5	[14]	Thailand	Cross-sectional	1,095	Mixed	MBI-SS	GPA assessed	Depression assessed
6	[15]	Pakistan	Cross-sectional	400	Mixed	Academic Burnout Inventory	CGPA assessed	Not primary
7	[16]	Pakistan	Cross-sectional	318	Mixed	MBI	Not primary	Sleep quality assessed
8	[17]	Mexico	Cross-sectional	231	Pre-clinical	MBI-SS	Not primary	Psychological distress
9	[18]	Serbia	Cross-sectional	760	Mixed	Burnout Scale	Performance assessed	Not primary
10	[19]	Serbia	Cross-sectional	812	Mixed	MBI-SS	Performance assessed	Not primary
11	[20]	Pakistan	Cross-sectional	3,400	Mixed	Burnout Inventory	Not primary	Quality of life
12	[21]	Saudi Arabia	Cross-sectional	444	Mixed	MBI-SS	Academic performance assessed	Anxiety/ depression
13	[22]	Indonesia	Cross-sectional	385	Pre-clinical	Academic Burnout Scale	Learning motivation assessed	Not primary
14	[23]	Pakistan	Cross-sectional	1100	Mixed	MBI-SS	Not primary	Burnout prevalence + determinants
15	[24]	Various	Cross-sectional	385	Mixed	MBI-SS	Not primary	Not primary

MBI-SS = Maslach Burnout Inventory, Student Survey. Academic performance outcomes include GPA, CGPA, exam results, and other academic indicators. Well-being outcomes include quality of life, depression, anxiety, sleep quality, distress, etc.

The prevalence of burnout among medical students ranged from 34.3% to 63.5% across all included studies, demonstrating considerable variation influenced by geographical context, measurement tools, and cut-off criteria. The lowest prevalence

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(34.3%) was reported by Haile et al. in Ethiopia using the MBI with standard cut-offs [11], while the highest prevalence (63.5%) was documented by Aljadani *et al.* in Saudi Arabia using validated local cut-offs for the MBI-SS. Emotional exhaustion consistently emerged as the most severely affected burnout domain across studies, with prevalence rates ranging from 49.5% to over 60% in several cohorts. Depersonalization was reported in 32% to 45% of students, while low personal accomplishment affected 40% to 50% of participants. Several studies identified significant demographic and contextual risk factors for burnout, including female gender (reported in studies by Haile *et al.* [11], Ilić *et al.* [13], and Baqai *et al.* [23]), clinical-year status [12], sleep deprivation (Irshad *et al.*), psychological distress [17], and poor learning environments [20]. The COVID-19 pandemic was noted as an exacerbating factor in studies conducted during 2020-2022, with Jezzini-Martinez *et al.* reporting elevated burnout rates (58.2%) during this period [17]. The results provide a comprehensive overview of burnout prevalence, severity across domains, assessment methods, and key observations from each study (Table 2).

Table 2: Prevalence and Severity of Burnout among Medical Students (2018–2024)

Sr. No.	References	Burnout Tool	Burnout Domain Assessed	Cut-off / Definition Used	Prevalence of Burnout	Key Observations
1	[10]	MBI-SS	EE, DP, PA	High EE ≥ 14, High DP ≥ 6, Low PA ≤ 22	Overall burnout 52.7%	Emotional exhaustion was the most prevalent domain
2	[11]	MBI	EE, DP, PA	High EE ≥ 27, High DP ≥ 10, Low PA ≤ 33	Overall burnout 34.3%	Higher burnout among female students
3	[12]	MBI-SS	EE, DP, PA	Standard MBI-SS cut-offs	Overall burnout 54.0%	Higher prevalence in clinical years
4	[13]	Burnout Scale	Overall burnout risk	Author-defined high-risk criteria	High burnout risk 41.2%	Females had significantly higher burnout
5	[14]	MBI-SS	EE, DP, PA	Thai validated cut-offs	EE: 49.5%, DP: 32.0%, Low PA: 40.4%	Burnout strongly associated with depression
6	[15]	Academic Burnout Inventory	Overall burnout	Scale-specific cut-off	Overall burnout 47.8%	Burnout inversely correlated with CGPA
7	[16]	MBI	EE, DP, PA	Standard MBI cut-offs	Overall burnout 38.1%	Sleep deprivation predicted burnout
8	[17]	MBI-SS	EE, DP, PA	Standard MBI-SS cut-offs	Overall burnout 58.2%	Higher burnout during COVID-19
9	[18]	Burnout Scale	Overall burnout	Author-defined	Overall burnout 36.9%	Burnout significantly reduced academic success
10	[19]	MBI-SS	EE, DP, PA	Standard cut-offs	High burnout risk 44.3%	Strong association with anxiety symptoms
11	[20]	Burnout Inventory	Overall burnout	Author-defined	Overall burnout 46.0%	Poor learning environment increased burnout
12	[21]	MBI-SS	EE, DP, PA	Saudi validated cut-offs	Overall burnout 63.5%	Burnout predicted poor academic performance
13	[22]	Academic Burnout Scale	Exhaustion, cynicism	Author-defined	Moderate–severe burnout 51.0%	Burnout inversely related to learning motivation
14	[23]	MBI-SS	EE, DP, PA	Pakistani validated cut-offs	Overall burnout 61.2%	Burnout is higher in females
15	[24]	MBI-SS	EE, DP, PA	Egyptian validated cut-offs	Overall burnout 45.8%	Burnout is associated with anxiety and depression

The association between burnout and academic performance was consistently negative across all studies that assessed this relationship. Five studies directly measured academic outcomes and demonstrated statistically significant inverse correlations between burnout severity and academic indicators. Puranitee *et al.* found that higher levels of emotional exhaustion and depersonalization were significantly associated with lower GPA ($p<0.01$) among Thai medical students [14]. Similarly, Saeed *et al.* reported that overall burnout significantly reduced CGPA among Pakistani students ($p=0.002$), with students in the highest burnout tertile showing markedly lower cumulative academic performance [15]. Ilić and Ilić demonstrated that burnout was a strong predictor of poor academic success ($p<0.001$) in Serbian students, even after controlling for demographic variables [18]. Aljadani *et al.* found that burnout, particularly emotional exhaustion and depersonalization domains, negatively affected examination performance ($p<0.05$) in Saudi medical students [21]. Felaza and Findyartini reported that academic burnout, specifically the exhaustion component, significantly decreased learning motivation among Indonesian preclinical students ($p<0.001$), which subsequently affected academic engagement and performance [22]. Regarding well-being outcomes, burnout showed strong and consistent associations with multiple adverse mental health indicators. Shahzad and Wajid documented that overall burnout significantly reduced quality of life ($p<0.001$) in a large Pakistani cohort, with burned-out students reporting substantially lower physical, psychological, social, and environmental quality of life scores [20]. Jezzini-Martinez *et al.* found that emotional exhaustion and depersonalization were positively associated with increased psychological distress ($p<0.01$) among Mexican first-year students during the COVID-19 pandemic [17]. Puranitee *et al.* reported that burnout strongly predicted depression ($p<0.001$), with emotional exhaustion showing the strongest correlation [14]. Irshad *et al.* identified that burnout, particularly emotional exhaustion,

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was significantly linked to poor sleep quality ($p<0.05$) among Pakistani students in integrated modular curricula [16]. Baqai *et al.* demonstrated that emotional exhaustion and depersonalization increased psychological stress levels ($p<0.01$) [23], while Ilić *et al.* found that high burnout risk strongly predicted anxiety symptoms ($p<0.001$) in Serbian medical students [19]. These findings collectively indicate that burnout exerts detrimental effects on both academic performance and comprehensive mental health and well-being outcomes. Table 3 systematically presents the specific associations between burnout domains and academic and well-being outcomes across all included studies (Table 3).

Table 3: Impact of Burnout on Academic Performance and Well-Being among Medical Students

References	Outcome Domain	Outcome Measured	Burnout Domain Associated	Direction of Association	Statistical Significance	Key Finding
[14]	Academic	GPA	EE, DP	Negative	p<0.01	Higher burnout is associated with lower GPA
[15]	Academic	CGPA	Overall burnout	Negative	p=0.002	Burnout significantly reduced CGPA
[16]	Well-being	Sleep quality	EE	Negative	p<0.05	Burnout linked to poor sleep quality
[17]	Well-being	Psychological distress	EE, DP	Positive	p<0.01	Burnout increased distress
[18]	Academic	Academic success	Overall burnout	Negative	p<0.001	Burnout predicted poor academic performance
[19]	Well-being	Anxiety symptoms	Overall burnout	Positive	p<0.001	High burnout strongly predicted anxiety
[20]	Well-being	Quality of life	Overall burnout	Negative	p<0.001	Burnout significantly reduced the quality of life
[21]	Academic	Exam performance	EE, DP	Negative	p<0.05	Burnout significantly reduced exam scores
[22]	Academic	Learning motivation	Exhaustion	Negative	p<0.001	Burnout decreased learning motivation
[14]	Well-being	Depression	EE, DP	Positive	p<0.001	Burnout strongly predicted depression
[23]	Well-being	Psychological stress	EE, DP	Positive	p<0.01	Burnout increases stress levels

Methodological quality assessment using the NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies revealed that 6 studies (40%) demonstrated low risk of bias, while 9 studies (60%) raised some concerns. All 15 studies had clearly defined research objectives and well-defined study populations. All studies employed validated burnout assessment instruments, ensuring measurement reliability. However, only 6 studies, like Puranitee *et al.* [14], Ilić and Ilić [18], Ilić *et al.* [13], Shahzad *et al.* [20], Aljadani *et al.* [21], and Baqai *et al.* [23], provided adequate justification for sample size calculation, while the remaining 9 studies did not report formal power analysis or sample size determination methods. Regarding confounding variables, 6 studies adequately adjusted for potential confounders, including age, gender, academic year, socioeconomic status, and mental health history through multivariate analysis. The remaining 9 studies only partially controlled confounders, typically through stratified analysis or univariate comparisons, raising some concerns about residual confounding. All studies used reliable and validated outcome measures for both academic performance (GPA, CGPA, standardized examinations) and well-being indicators (validated depression, anxiety, and quality of life scales). The predominance of cross-sectional study designs across all included studies limits causal inference, though the consistency of findings across diverse settings strengthens the evidence base. No studies were classified as high risk of bias. Table 4 presents the detailed risk of bias assessment for each included study across all evaluated domains (Table 4).

Table 4: Risk of Bias Assessment of Included Studies (NIH Quality Assessment Tool)

Sr. No.	References	Clear Objective	Defined Population	Valid Burnout Tool	Sample Size Justified	Confounders Adjusted	Outcome Measures Reliable	Overall Risk of Bias
1	[10]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
2	[11]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
3	[12]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
4	[13]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
5	[14]	Yes	Yes	Yes	Yes	Yes	Yes	Low risk
6	[15]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
7	[16]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
8	[17]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
9	[18]	Yes	Yes	Yes	Yes	Yes	Yes	Low risk
10	[19]	Yes	Yes	Yes	Yes	Yes	Yes	Low risk
11	[20]	Yes	Yes	Yes	Yes	Yes	Yes	Low risk
12	[21]	Yes	Yes	Yes	Yes	Yes	Yes	Low risk
13	[22]	Yes	Yes	Yes	No	Partial	Yes	Some concerns
14	[23]	Yes	Yes	Yes	Yes	Yes	Yes	Low risk
15	[24]	Yes	Yes	Yes	No	Partial	Yes	Some concerns

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DISCUSSION

This systematic review shows that the prevalence of burnout among medical students is a global phenomenon and adversely affects the academic performance and psychological well-being of these students. In multiple countries, increased emotional exhaustion and depersonalization have correlated with lower GPA, CGPA, exam performance, academic success, and learning motivation. This evidence is consistent with international evidence [25-27]. An investigation from Indonesia, which used the MBI-SS to assess burnout, found that burnout significantly reduced academic performance amid the COVID-19 pandemic [28]. Similarly, an investigation from Iraq found that burnout reduced students' academic functioning and satisfaction with well-being [29]. First, the pooled burnout prevalence across 15 international studies (2018–2024) ranged from 34.3% to 63.5% (median 47%). Emotional exhaustion was the consistently dominant domain, affecting 49.5-60% of students, followed by low personal accomplishment (40-50%) and depersonalization (32-45%). This hierarchical pattern remained consistent across Asia, Africa, Europe, and North America, indicating emotional exhaustion as the primary manifestation of medical student burnout globally. Second, burnout demonstrated consistent statistically significant associations with adverse academic performance. Five studies reported significant inverse correlations: higher burnout predicted lower GPA ($p<0.010$) [14], reduced CGPA ($p=0.002$) [15], poorer examination performance ($p<0.05$) [21], decreased academic success ($p<0.001$) [18], and diminished learning motivation ($p<0.001$) [22]. This consistency across different educational systems and cultural contexts confirms that burnout meaningfully impairs academic functioning. Third, burnout domains, particularly emotional exhaustion and depersonalization, showed strong correlations with adverse mental health outcomes: depression ($p<0.001$) [14], anxiety ($p<0.001$) [13], poor sleep quality ($p<0.05$) [16], psychological distress ($p<0.01$) [17], elevated stress ($p<0.01$) [23], and reduced quality of life ($p<0.001$) [20]. These relationships indicate burnout as a central mediating factor connecting academic stressors to comprehensive health deterioration. Fourth, regarding methodological quality, 40% of studies (n=6) demonstrated low risk of bias with adequate sample size justification and comprehensive confounder adjustment, while 9 (60%9) raised some concerns due to lack of formal sample size calculation and partial confounder control. All 15 studies utilized validated burnout instruments and reliable outcome measures. However, universal reliance on cross-sectional designs limits causal inference, necessitating cautious interpretation. Studies listing academic or well-being outcomes as "not primary" were included because: (1) all reported statistical analyses examining burnout-outcome relationships using validated instruments; (2) primary/secondary designation reflected authors' research priorities, not methodological rigor; (3) studies with primary outcomes (n=6 academic, n=9 well-being) demonstrated the most robust associations, receiving greater interpretive weight; (4) inclusion of non-primary findings enabled triangulation across broader evidence, strengthening confidence in observed patterns. The findings correlate burnout with adverse mental health outcomes consistent with recent global literature. Saudi Arabian research demonstrates significant associations between burnout, anxiety, and depression affecting academic performance and quality of life [21]. Croatian and Spanish studies reported a high prevalence of poor sleep quality, psychological distress, and depressive symptoms among medical students, strongly correlated with burnout [30, 31]. Adesola *et al.* reported exceptionally high burnout prevalence (81.1%) in Nigeria [32], substantially exceeding our 34.3–63.5% synthesis range. This discrepancy reflects: (1) resource-constrained environment with large classes (>200 students), limited faculty, inadequate infrastructure, and frequent academic disruptions; (2) national economic instability and healthcare system strain; (3) locally adapted cut-off criteria potentially more sensitive than standardized international thresholds; (4) cultural factors including high family expectations where medical education represents substantial socioeconomic investment; (5) COVID-19 pandemic impact involving prolonged closures, inadequately resourced online learning, and clinical exposure anxiety. These converging factors, systemic resource limitations, socioeconomic pressures, cultural expectations, and pandemic disruptions plausibly explain markedly elevated burnout in low-resource settings, underscoring the need for context-specific interventions. Recent data indicate that emotional disengagement and burnout worsened during the COVID-19 pandemic, highlighting medical students' susceptibility during higher academic and psychological stress periods [33-35]. The COVID-19 pandemic represents a significant confounder requiring deeper analysis. Four studies conducted during 2020-2022 [16, 17] reported elevated burnout (38.1-58.2%) compared to pre-pandemic estimates. The pandemic introduced unmeasured confounders: (1) abrupt online learning transitions with variable technological access; (2) social isolation and disrupted peer support; (3) heightened health anxiety with clinical exposure; (4) economic hardship; (5) academic progression uncertainty. As noted in Table 4, 60% of studies demonstrated only partial confounder control, meaning pandemic-related variables were frequently

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unaccounted for in analyses. These limits isolate burnout's independent effect, as observed associations may partially reflect pandemic-related stress. Additional inadequately controlled confounders included baseline mental health status (only 4 studies adjusted), socioeconomic status (5 studies), academic aptitude (3 studies), and family support (rarely measured). These unmeasured confounders, particularly during the global health crisis, suggest pandemic-era studies may overestimate burnout's independent impact. Future research should employ longitudinal designs with comprehensive confounder measurement, particularly pandemic-related stressors, to accurately quantify burnout's causal role. The convergence of findings from Asia, Africa, Europe, and the Middle East demonstrates that burnout is multidimensional with negative impacts on medical students' academic performance and mental health globally. These findings highlight the need for structured institutional measures, including workload management, early psychological screening and support, mentorship programs, sleep hygiene education, and coping skills training to mitigate burnout and protect students' well-being.

English-language limitations may exclude relevant non-English studies. Cross-sectional study prevalence limits causal interpretation of burnout-outcome relationships. Incomplete confounder adjustment, particularly for pandemic-related stressors, affects effect size interpretability. Heterogeneity in burnout measurement tools and outcome definitions precluded meta-analysis. Inclusion of studies with non-primary outcomes may introduce measurement bias, though sensitivity consideration of primary-outcome studies confirmed the consistency.

CONCLUSIONS

Burnout among medical students is a widespread and serious concern that significantly compromises academic performance and mental well-being. Emotional exhaustion and depersonalization are the most affected domains and are consistently associated with poorer academic outcomes, reduced quality of life, and increased psychological distress. Targeted institutional interventions focusing on academic workload management, mental health support, and learning environment improvement are urgently required to enhance both academic success and student well-being.

Authors' Contribution

Conceptualization: HI
Methodology: FMK
Formal analysis: MTE, BH, FMK
Writing and Drafting: HI, MTE, BH, SS, FMK, SSF
Review and Editing: HI, MTE, BH, SS, FMK, SSF

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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