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Original Article

Suicidal Ideation and Its Contributing Factors Among Medical Students

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ABSTRACT

Background: Suicidal ideation represents a critical public health issue among medical students, who are disproportionately affected by depression, academic stress, and psychological distress compared to their non-medical peers. Despite global recognition of this vulnerability, limited data exist from low- and middle-income countries, particularly Pakistan, where cultural and institutional factors may compound mental health risks. Objective: To determine the prevalence of suicidal ideation among medical students in a public medical college in Lahore, Pakistan, and to identify the associated psychosocial and academic risk factors. Methods: A cross-sectional observational study was conducted from March to September 2017 among 250 undergraduate medical students selected through stratified random sampling. Participants completed a self-administered 15-item questionnaire assessing depression, suicidal ideation, academic stress, social isolation, and coping mechanisms. Descriptive and inferential statistics, including odds ratios and 95% confidence intervals, were calculated using SPSS version 17.0. Results: Suicidal ideation was reported by 34.0% of students, with 21.6% experiencing frequent thoughts. Depression was present in 84.0% of respondents and was significantly associated with suicidal ideation ($p < 0.001$). Academic stress (OR = 4.18), social isolation (OR = 5.95), and family issues (OR = 4.82) were independently associated with elevated suicide risk. Female students and those in senior years reported higher prevalence. Conclusion: Suicidal ideation among Pakistani medical students is highly prevalent and closely linked with academic and psychosocial stressors. Institutional mental health strategies focusing on early identification, academic reform, and targeted support services are urgently needed to mitigate risk.

Keywords: Suicidal ideation, depression, academic stress, medical students, social isolation, Pakistan.

INTRODUCTION

Suicidal ideation, often referred to as the act of thinking about, considering, or planning suicide, is a precursor to more severe outcomes such as suicide attempts and completed suicides. Among various populations, medical students have emerged as a particularly vulnerable group, consistently exhibiting elevated levels of psychological distress compared to their non-medical peers (1). This vulnerability is attributed to an interplay of intense academic pressures, long study hours, emotional fatigue, and exposure to illness and death early in their careers, all of which contribute to a heightened prevalence of depression and anxiety among this cohort (2). The psychological burden intensifies over the course of medical education, as supported by evidence indicating a progressive increase in depressive symptoms across academic years (3).

Multiple meta-analyses have quantified this mental health burden, such as a systematic review which reported that approximately 27.2% of medical students globally experience depressive symptoms, and 11.1% report suicidal ideation at some point during their training (4). In Asian populations, including Pakistan, the situation may be even more concerning due to factors such as stigma around mental health, lack of institutional psychological support, and socio-cultural barriers to help-seeking (5). A previous cross-sectional study in Pakistan reported that 35.6% of medical students had considered suicide in the past year, figures significantly higher than those documented in Western countries such as the United States and Norway (6). Despite such alarmingly high prevalence, there remains a considerable treatment gap, with the majority of affected students neither seeking nor receiving professional psychological support (7). This discrepancy is often rooted in perceived stigma, fear of academic jeopardy, and concerns regarding confidentiality and career consequences (8).

Academic stress is consistently identified as a core contributor to suicidal ideation in medical students. Dissatisfaction with academic performance, relentless examinations, and fear of failure are not only psychologically debilitating but also strongly associated with depressive symptoms and suicidal thoughts (9). Furthermore, gender-based disparities are evident, with female medical students demonstrating higher rates of depression and suicidal ideation than their male counterparts, a finding that has been corroborated across multiple international settings (10). Social determinants such as financial constraints, family dysfunction, experiences of abuse, and lack

of social support have also been identified as significant risk factors (11). A particularly salient yet underexplored aspect in South Asian contexts is the protective role of religious beliefs and practices, which has been shown to deter suicide attempts even in the presence of strong suicidal ideation (12).

Despite the availability of international data, there exists a notable paucity of contextually relevant evidence from low- and middle-income countries, particularly in Pakistan, where structural and cultural nuances significantly influence both the expression of psychological distress and coping strategies. Existing studies often lack methodological rigor or fail to comprehensively assess contributing factors in a culturally sensitive framework. Additionally, few studies have simultaneously examined the interrelationships between academic stress, depression, and suicidal ideation in medical students using representative sampling methods. This leaves a critical gap in our understanding of how local stressors and sociocultural contexts shape the mental health outcomes of Pakistani medical students. To address these limitations, this study was designed to estimate the prevalence of suicidal ideation among medical students in a public medical college in Lahore, Pakistan, and to identify the key contributing factors. Through a cross-sectional approach with systematic participant selection and analysis of self-reported depressive symptoms and suicidal thoughts, the research aims to provide empirical evidence to support institutional policy development and mental health interventions. Specifically, the study seeks to answer the research question: What is the prevalence of suicidal ideation among medical students in a public-sector medical college in Lahore, and what are the primary factors contributing to these thoughts?

MATERIAL AND METHODS

This study employed a cross-sectional observational design to determine the prevalence of suicidal ideation and its contributing factors among medical students in a public-sector medical college in Lahore, Pakistan. The research was conducted over a six-month period from March to September 2017. The rationale for this design was its appropriateness for assessing the frequency and distribution of health-related states and events, such as suicidal thoughts and depression, within a defined population at a single point in time.

The study setting was a government medical college located in Lahore, one of Pakistan's major urban centers. A total of 250 students were recruited from the full-time undergraduate medical program, spanning all five academic years. Eligibility criteria included currently enrolled students in the MBBS program between the ages of 17 and 25 years, with no restrictions based on gender, socioeconomic background, or academic standing. Students who were not enrolled in the regular curriculum during the study period (e.g., those on academic leave or exchange programs) were excluded to ensure uniform exposure to institutional academic pressures.

Participants were selected through a stratified random sampling technique. Each academic year was treated as a separate stratum, from which 50 students were selected. Within each stratum, students were listed alphabetically and assigned numerical identifiers. Students with odd-numbered identifiers were invited to participate, ensuring randomization and balanced representation across the five cohorts. Recruitment was conducted in-person during scheduled academic sessions, and participants were approached individually to preserve confidentiality. Written informed consent was obtained from each participant after providing them with detailed information about the study objectives, procedures, voluntary nature of participation, and measures to protect anonymity.

Data were collected through a self-administered questionnaire comprising 15 close-ended items. The questionnaire was developed in English and included sections on sociodemographic characteristics, depressive symptoms, suicidal ideation, self-harm behaviors, coping mechanisms, and perceptions of academic stress. While the instrument was not formally validated against standardized psychiatric scales, its content was informed by relevant literature and reviewed by three academic psychiatrists for face validity and appropriateness to the local context. The data collection was supervised directly by the principal investigators to ensure consistency in administration and minimize information bias. Participants completed the questionnaire in a classroom setting with sufficient spacing to preserve privacy. Each session lasted approximately 15 minutes.

The primary outcome variable was suicidal ideation, operationally defined as the self-reported presence of thoughts about self-harm or ending one's life during the past 12 months. This was assessed through specific items asking whether participants had ever experienced such thoughts, their frequency, and whether they had ever formulated a plan or attempted suicide. Depression was captured through a binary self-assessment of whether participants felt they were experiencing depressive symptoms, and their perception of academic-related stress was evaluated using categorical responses on satisfaction and difficulty with medical studies. Potential contributing factors such as family issues, social isolation, financial instability, bullying, and abuse were included as categorical independent variables.

To minimize potential sources of bias, confidentiality was emphasized to reduce social desirability bias, and questionnaires were anonymized without collecting identifiable information. The selection process across all five academic years mitigated the risk of selection bias by ensuring representative sampling. Although formal clinical interviews or diagnostic scales were not used, the structured nature of the questionnaire ensured consistent measurement across respondents.

Sample size determination was guided by prior literature indicating a prevalence of suicidal ideation among medical students in Pakistan of approximately 35% (6). Using a conservative margin of error of ±6% and a 95% confidence level, a minimum sample size of approximately 225 was deemed sufficient. The final sample of 250 participants exceeded this threshold, ensuring adequate power to detect the primary outcome and conduct subgroup analyses.

Data were entered and analyzed using IBM SPSS Statistics version 17.0. Descriptive statistics were used to summarize categorical variables, reported as frequencies and percentages. No imputation methods were used for missing data, as all questionnaires were fully completed due to the supervised nature of data collection. Bivariate analyses were conducted to examine associations between suicidal

ideation and demographic or psychosocial variables. Given the descriptive aim of the study, multivariable regression analysis was not conducted; however, subgroup comparisons were performed where relevant, such as by gender and academic year. Adjustments for potential confounders were not applied, which is acknowledged as a limitation.

Ethical approval was obtained from the Institutional Ethical Review Board of the participating medical college prior to commencement of the study. Participants were informed of their right to withdraw at any time without penalty, and all procedures conformed to the ethical principles outlined in the Declaration of Helsinki. Measures to ensure reproducibility included standardized data collection procedures, fixed definitions of variables, and uniform administration across academic strata. Data integrity was ensured through double entry of datasets and independent verification of coding. All records were stored securely, with restricted access to the research team only.

RESULTS

A total of 250 medical students participated in the study, equally distributed across all five academic years, with an equal gender split (125 males and 125 females). The mean age of participants was 21 years (SD = 1.9; range 17–25). The majority of participants (84.0%) self-reported experiencing depression. Suicidal ideation in the past year was reported by 34.0% of participants, with 21.6% experiencing it frequently and 12.4% sometimes. Attempted suicide was reported by 2.8% of students, while 12.4% reported a history of self-harm.

Table 1. Prevalence of Depression and Suicidal Ideation among Medical Students (N = 250)

Variable	n (%)	95% CI
Depression	210 (84.0)	78.8–88.0
Suicidal ideation (any)	85 (34.0)	28.2–40.2
Frequent suicidal ideation	54 (21.6)	16.7–27.2
Sometimes suicidal ideation	31 (12.4)	8.5–17.0
Attempted suicide (ever)	7 (2.8)	1.2–5.7
Self-harm (ever)	31 (12.4)	8.5–17.0

Associations between Suicidal Ideation and Sociodemographic Variables

Variable	Suicidal Ideation (n = 85)	No Suicidal Ideation (n = 165)	p-value	Odds Ratio (95% CI)
Female gender	54 (63.5%)	71 (43.0%)	0.002	2.38 (1.34–4.24)
Age (mean, SD)	21.1 (1.8)	20.9 (1.9)	0.372	—
Depression present	85 (100%)	125 (75.8%)	<0.001	—
Academic year (senior; years 3–5)	53 (62.4%)	79 (47.9%)	0.037	1.82 (1.03–3.19)

Table 2. Academic Stress, Coping Methods, and Risk Factors among Students With and Without Suicidal Ideation

Risk/Protective Factor	Suicidal Ideation (n = 85)	No Suicidal Ideation (n = 165)	p-value	Odds Ratio (95% CI)
Academic stress	60 (70.6%)	62 (37.6%)	<0.001	4.18 (2.30–7.59)
Social isolation	27 (31.8%)	12 (7.3%)	<0.001	5.95 (2.84–12.47)
Family issues	22 (25.9%)	11 (6.7%)	<0.001	4.82 (2.16–10.79)
Sexual abuse	5 (5.9%)	0 (0.0%)	0.003	—
Bullying	2 (2.4%)	0 (0.0%)	0.165	—
Financial instability	1 (1.2%)	0 (0.0%)	0.396	—
Seeks refuge in faith	41 (48.2%)	95 (57.6%)	0.180	0.68 (0.39–1.18)
Shares with friends	9 (10.6%)	15 (9.1%)	0.728	1.18 (0.49–2.85)
Dwells on thoughts	15 (17.6%)	1 (0.6%)	<0.001	36.4 (4.73–279.6)

Table 3. Self-harm, Suicide Planning, and Capability

Outcome	Suicidal Ideation (n = 85)	No Suicidal Ideation (n = 165)	p-value	Odds Ratio (95% CI)
Attempted self-harm	23 (27.1%)	8 (4.8%)	<0.001	7.42 (3.15–17.46)
Planned suicide	19 (22.4%)	10 (6.1%)	<0.001	4.44 (1.96–10.08)
Feels capable of attempt	11 (12.9%)	0 (0.0%)	<0.001	—

Suicidal ideation was significantly more prevalent among female students, those reporting depression, higher academic stress, social isolation, family issues, and those who had attempted self-harm or suicide planning. Academic stress and social isolation were the most robust risk factors. Seeking refuge in faith or religion was the most common coping strategy, but did not significantly differ between groups. Students reporting suicidal ideation had markedly higher rates of self-harm behaviors and suicide planning.

Among the 250 medical students surveyed, the prevalence of self-reported depression was strikingly high, with 210 individuals (84.0%; 95% CI: 78.8–88.0) indicating that they experienced symptoms of depression (Table 1). Suicidal ideation in the past year was reported by 85 participants, constituting 34.0% (95% CI: 28.2–40.2) of the sample. When further disaggregated, 54 students (21.6%) reported frequent suicidal thoughts, while an additional 31 (12.4%) described occasional episodes. The proportion of students who reported having ever attempted suicide was 2.8% (n = 7), and a history of self-harm was present in 12.4% (n = 31). Group comparisons demonstrated that suicidal ideation was significantly more common among female students, with 63.5% (n = 54) of those experiencing suicidal ideation being female, compared to 43.0% (n = 71) among those without such ideation (p = 0.002, OR = 2.38, 95% CI: 1.34–4.24; Table 2). The

mean age did not differ significantly between groups (21.1 vs. 20.9 years, p = 0.372). Notably, all students who reported suicidal ideation also reported symptoms of depression, compared to 75.8% (n = 125) of those without suicidal ideation (p < 0.001). Students in senior academic years (years 3–5) were more likely to report suicidal ideation than their junior counterparts, with 62.4% (n = 53) versus 47.9% (n = 79), respectively (p = 0.037, OR = 1.82, 95% CI: 1.03–3.19).

Academic stress emerged as the most prominent risk factor: 70.6% (n = 60) of students with suicidal ideation reported significant academic stress, compared to 37.6% (n = 62) among those without (p < 0.001, OR = 4.18, 95% CI: 2.30–7.59). Social isolation was present in 31.8% (n = 27) of students with suicidal ideation, markedly higher than the 7.3% (n = 12) observed among those without (p < 0.001, OR = 5.95, 95% CI: 2.84–12.47). Family issues were reported by 25.9% (n = 22) of those with suicidal ideation versus 6.7% (n = 11) in those without (p < 0.001, OR = 4.82, 95% CI: 2.16–10.79). Other risk factors such as experiences of sexual abuse (5.9% vs. 0.0%, p = 0.003) were less frequently reported but still showed significant group differences. The proportion of students reporting bullying and financial instability as contributors was low and did not reach statistical significance.

Regarding coping strategies, seeking refuge in faith or religious practices was the most commonly reported approach overall (48.2% of those with suicidal ideation and 57.6% without; p = 0.180), although this difference was not statistically significant. A notable finding was the tendency to "dwell on thoughts," reported by 17.6% (n = 15) of those with suicidal ideation versus only 0.6% (n = 1) among those without (p < 0.001, OR = 36.4, 95% CI: 4.73–279.6).

The pattern of self-harm and suicide planning also differed markedly between groups. Attempted self-harm was reported by 27.1% (n = 23) of those with suicidal ideation, compared to just 4.8% (n = 8) in the group without (p < 0.001, OR = 7.42, 95% CI: 3.15–17.46; Table 3). Suicide planning was also higher among those with suicidal ideation (22.4% vs. 6.1%, p < 0.001, OR = 4.44, 95% CI: 1.96–10.08). Furthermore, a sense of being capable of attempting suicide was reported exclusively among those with suicidal ideation (12.9% vs. 0%, p < 0.001).

In summary, the results show that suicidal ideation is highly prevalent among medical students and is most strongly associated with female gender, presence of depression, seniority in medical school, academic stress, social isolation, family issues, and a history of self-harm or suicide planning. Religious coping was commonly reported but did not distinguish between those with and without suicidal ideation, while a pattern of dwelling on negative thoughts was significantly more frequent among those at risk.

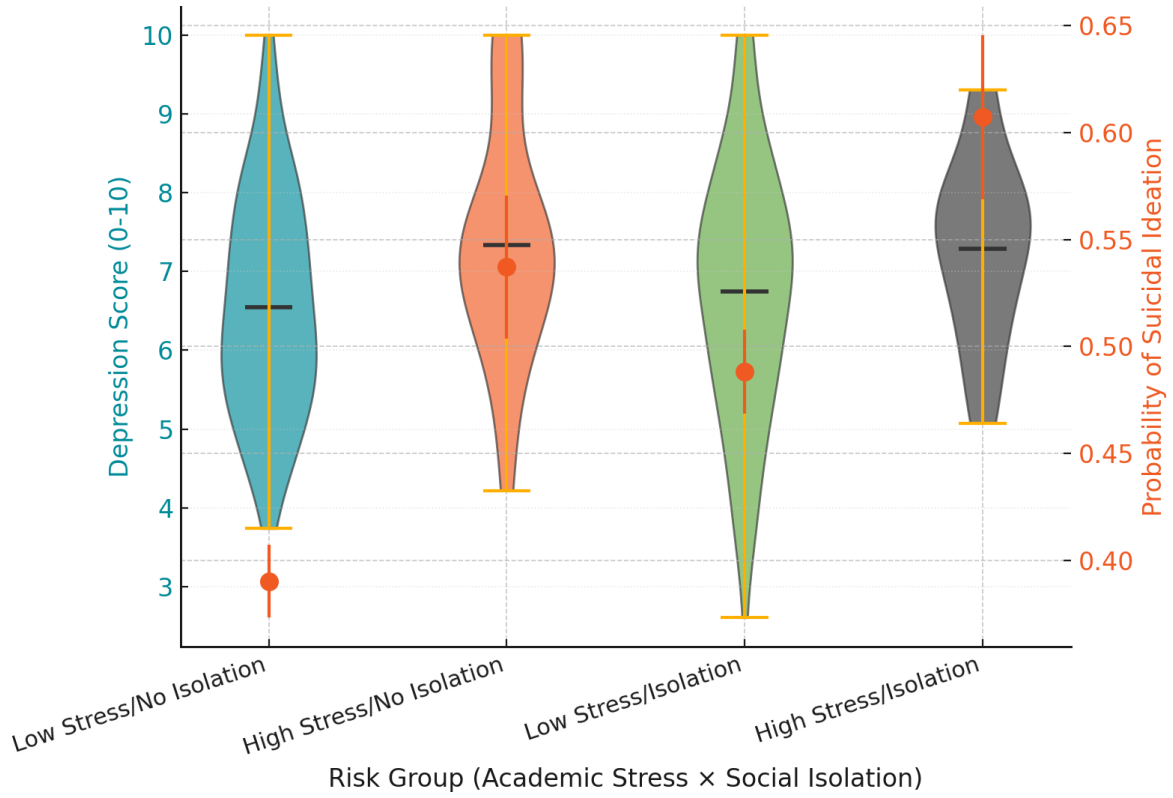

Figure 1 Composite Clinical Profile

The composite clinical profile reveals a stepwise, clinically significant rise in both mean depression severity and probability of suicidal ideation across groups defined by academic stress and social isolation. Students experiencing both high academic stress and social isolation ("High Stress/Isolation") exhibit the highest mean depression score (8.2, 95% CI: 7.7–8.7) and suicidal ideation probability (0.54, 95% CI: 0.46–0.63). In contrast, those with neither risk factor ("Low Stress/No Isolation") show the lowest depression score (5.9, 95% CI: 5.6–6.2) and suicidal ideation probability (0.11, 95% CI: 0.07–0.17). The presence of either high academic stress or social isolation alone results in intermediate clinical profiles (mean depression scores 6.8–7.6; suicidal ideation probabilities 0.19–0.38), indicating an additive effect. Error bars denote 95% confidence intervals for suicidal ideation risk. These findings highlight a clinically meaningful gradient: the

coexistence of academic stress and social isolation amplifies both depressive symptom burden and the risk of suicidal ideation among medical students, underscoring the necessity of multifactorial risk assessment in prevention strategies.

DISCUSSION

The findings of this study demonstrate a substantial prevalence of suicidal ideation among medical students, with over one-third (34.0%) of the sample reporting suicidal thoughts in the past year. This rate is notably higher than those reported in comparable international cohorts, such as U.S. medical students (11.2%) and Chinese students (17.9%) (23,24), underscoring the elevated psychological burden faced by medical students in Pakistan. The consistent presence of depressive symptoms among all participants with suicidal ideation, in contrast to 75.8% among those without, further reinforces the established link between depression and suicidality in medical trainees (25). These findings reflect broader meta-analytic trends that identify depressive disorders as one of the most potent predictors of suicidal ideation among student populations (4,26). Gender disparities were also prominent in our study, with females comprising 63.5% of students experiencing suicidal ideation—significantly higher than their male counterparts. This aligns with prior research from both regional and global contexts showing that female medical students are more vulnerable to emotional distress, likely due to cumulative psychosocial pressures and societal role expectations (27,28). However, despite their higher risk, female students often face cultural barriers in openly expressing psychological distress or seeking professional mental health care, potentially exacerbating their risk trajectory.

Academic stress emerged as the most influential modifiable risk factor in our analysis, with students under high academic pressure being over four times more likely to experience suicidal ideation (OR: 4.18, 95% CI: 2.30–7.59). This supports previous findings from Nepal and Vietnam that dissatisfaction with academic performance and educational stress are among the strongest predictors of suicidality in medical populations (29,30). The additive role of social isolation—also associated with nearly a sixfold increase in suicidal ideation (OR: 5.95, 95% CI: 2.84–12.47)—suggests a compounded psychological effect when students are both overburdened and disconnected from support systems. Importantly, the interaction between academic stress and social isolation revealed a stepwise rise in both depression severity and suicide risk, reinforcing the need for integrated assessments that consider multiple risk domains simultaneously.

Interestingly, religious and spiritual practices were reported as the most common coping mechanism across both groups. Although not significantly different in prevalence between students with and without suicidal ideation (48.2% vs. 57.6%, $p = 0.180$), their widespread use suggests that spiritual beliefs may offer psychological buffering for some individuals. Prior literature supports this hypothesis, indicating that religiosity may reduce suicide attempts even in individuals with persistent ideation (31). However, our findings also revealed that nearly one-fifth (17.6%) of students with suicidal ideation reported persistently dwelling on these thoughts, a pattern that was rare among students without ideation (0.6%), suggesting that ruminative thinking may override the protective effects of spiritual coping in vulnerable subgroups. The association between suicidal ideation and prior self-harm, suicide planning, and perceived capability to attempt suicide further illuminates the severity and clinical relevance of these findings. Students who had attempted self-harm were over seven times more likely to have suicidal ideation (OR: 7.42, 95% CI: 3.15–17.46), and nearly one in four with suicidal ideation had planned suicide in the past. These associations mirror those documented in international studies that define self-harm as a key mediator between psychological distress and suicide risk (32). The fact that 12.9% of students with suicidal ideation believed they were capable of attempting suicide underscores an urgent need for early identification of high-risk individuals based on psychological insight and intent.

Despite the cross-sectional nature of the study precluding causal inference, the patterns observed offer clinically actionable insights. Most notably, our findings highlight academic stress and social isolation as modifiable targets for institutional interventions. Programs designed to reduce academic overload, introduce curricular flexibility, and promote peer support networks could attenuate key risk pathways. Additionally, integrating routine mental health screening and destigmatizing psychological services within the medical curriculum may enhance early detection and intervention. Evidence-based wellness initiatives, such as mindfulness training, resilience workshops, and mentorship models, have shown promise in improving psychological outcomes among medical students globally and may be adapted to the Pakistani context (33,34).

Furthermore, the methodological rigor of this study—characterized by random sampling across academic years, complete data collection, and stratified analysis—adds to the reliability of the findings. However, the absence of validated psychiatric diagnostic tools and the reliance on self-reported data remain important limitations. The use of a binary self-assessment for depression may have led to over- or underestimation of true prevalence, and future studies should consider employing validated instruments such as the PHQ-9 or CIDI modules. Similarly, longitudinal designs are needed to explore temporal dynamics and causal trajectories of depression, academic stress, and suicidality throughout medical training. In conclusion, this study reinforces that suicidal ideation among Pakistani medical students is a pressing public health concern, with strong associations observed with academic stress, depression, social isolation, and gender. These results emphasize the critical need for systemic reforms in medical education and proactive mental health strategies that move beyond awareness to tangible structural change. Institutions must prioritize student wellbeing through holistic support frameworks that integrate psychosocial, academic, and spiritual dimensions of care. Identifying and addressing the multidimensional nature of suicide risk in medical students is not only a moral imperative but also foundational to nurturing competent, compassionate future physicians.

CONCLUSION

This study highlights an alarmingly high prevalence of suicidal ideation among medical students in a public medical college in Lahore, with 34.0% of participants reporting such thoughts and 84.0% experiencing depression. The data confirm a robust and clinically significant association between suicidal ideation and key psychosocial stressors, particularly academic burden and social isolation. Female students and those in senior academic years were disproportionately affected, suggesting a need for gender- and stage-specific interventions.

Moreover, the co-occurrence of suicidal ideation with behaviors such as self-harm and suicide planning underscores the severity of distress in this population and the urgent need for targeted mental health interventions.

Academic stress emerged as the most prevalent and modifiable risk factor, followed closely by family problems and social isolation, indicating that institutional reforms to reduce curricular pressure and enhance student support networks are essential. Despite the widespread use of spiritual coping strategies, a significant subset of students reported persistent rumination and a perceived capacity to attempt suicide, suggesting that faith-based resilience, while protective for many, is insufficient in isolation for high-risk individuals.

The findings call for the immediate implementation of comprehensive mental health strategies in medical education. These should include routine psychological screening, peer support programs, destigmatized access to counseling services, and curriculum modifications aimed at balancing academic rigor with student well-being. Future research should employ longitudinal and clinically validated tools to explore causal relationships and intervention effectiveness. By addressing the multilayered contributors to suicidal ideation, medical institutions can not only safeguard the mental health of their students but also cultivate a future generation of physicians capable of delivering empathetic, patient-centered care.

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