

Factors associated with psychological distress and academic performance among medical students in Palestine: a convergent mixed-methods study

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Abstract

Background

Medical education is associated with substantial psychological stress, and students in Palestine may experience additional strain related to political instability, mobility restrictions, and financial uncertainty. This study assessed psychological distress and self-reported academic performance among Palestinian undergraduate medical students and explored the academic, lifestyle, psychosocial, economic, and political factors associated with these outcomes.

Methods

A convergent mixed-methods study was conducted from October 2024 to October 2025 across five Palestinian universities. The quantitative component included a cross-sectional survey of 391 undergraduate medical students. Psychological distress was measured using the 12-item General Health Questionnaire (GHQ-12; Likert scoring range 0–36) and categorized into normal/minimal, mild, moderate, and severe distress. Associations were examined using bivariate analyses and multivariable ordinal logistic regression. The qualitative component included semi-structured interviews with 20 students; data were analyzed thematically to contextualize the quantitative findings.

Results

The mean GHQ-12 score was 15.63 +/- 7.08. Overall, 258 students (66.0%) had some degree of psychological distress, including 86 (22.0%) with mild distress, 78 (19.9%) with moderate distress, and 94 (24.0%) with severe distress. In bivariate analyses, distress level was associated with gender, main household breadwinner, physical inactivity, unhealthy diet, irregular study patterns, lack of moral support, low motivation, absenteeism, class participation, perceived impact of recent political events, financial strain, political anxiety, and impaired concentration. In multivariable ordinal logistic regression, higher distress was independently associated with unhealthy or partially healthy diet, lack of moral support, lower motivation, lower self-rated academic level, living alone, and frequent political anxiety. Self-reported academic performance was associated with living arrangement, study hours, study pattern, class participation, and the perceived academic impact of recent political events. Qualitative themes highlighted family and social support, disrupted routines, academic workload, limited psychological support, career uncertainty, political instability, financial strain, and social media-related comparison as important influences on well-being and academic functioning.

Conclusions

Psychological distress was highly prevalent among Palestinian medical students and reflected an interaction between academic demands, psychosocial support, lifestyle behaviors, and contextual political and economic stressors. Medical schools should develop multi-level, context-sensitive support systems that integrate accessible mental health services, academic mentoring, flexible educational policies, and strategies to strengthen student engagement and resilience.

Background

Medical education is widely recognized as a demanding educational pathway that exposes students to sustained cognitive, emotional, and professional stress (1, 2). Intensive curricula, frequent examinations, clinical responsibilities, and competition for postgraduate opportunities can contribute to stress, anxiety, depressive symptoms, burnout, and impaired well-being (3). These outcomes are important for medical education because psychological distress can affect learning, attendance, academic engagement, professional identity formation, and future clinical functioning (4, 5).

International evidence has shown that mental health problems are common among medical students, with anxiety and depressive symptoms reported at high levels across different settings (7, 8, 18, 19). However, the determinants of student well-being are not limited to academic workload. Lifestyle behaviors, social support, family responsibilities, financial pressure, and future career uncertainty may all shape mental health and academic functioning (6, 9, 24–27).

In Palestine, medical students face additional contextual stressors related to political instability, movement restrictions, economic uncertainty, and limited institutional resources (10–13, 20–23). These conditions may disrupt commuting, clinical training, concentration, motivation, study routines, and perceptions of future career opportunities. Despite the growing literature on medical student mental health, evidence from Palestine remains limited and often focuses on single institutions or isolated psychological outcomes rather than integrating academic, lifestyle, psychosocial, socioeconomic, and political factors. A mixed-methods approach can provide both an estimate of the magnitude of distress and an explanation of how students experience these overlapping pressures.

This study therefore aimed to assess psychological distress and self-reported academic performance among Palestinian undergraduate medical students and to explore factors associated with both outcomes using a convergent mixed-methods design.

Methods

Study design and setting

This study used a convergent mixed-methods design, integrating a quantitative cross-sectional survey with qualitative semi-structured interviews. Quantitative and qualitative data were collected during the same overall study period and interpreted together to provide a comprehensive understanding of factors influencing mental health and academic performance. Data were collected between October 2024 and

October 2025 from undergraduate medical students enrolled at five Palestinian universities: An-Najah National University, Arab American University, Al-Quds University (Abu Dis), Hebron University, and Polytechnic University.

Study population, eligibility, and sampling

The target population was Palestinian undergraduate medical students in years 1–6, including both pre-clinical and clinical phases. Students were eligible if they were currently enrolled in an undergraduate medical programme in Palestine, were in the pre-clinical or clinical phase, provided informed consent, and completed the questionnaire. Medical graduates, interns not enrolled as undergraduate students, non-medical students, students who had withdrawn from or discontinued medical school, and incomplete submissions that prevented GHQ-12 or key outcome scoring were excluded.

The required sample size was calculated using OpenEpi for a finite population of 10,361 students, assuming a 50% expected frequency, a 95% confidence level, and a 5% margin of error. The minimum required sample was 371 students; 391 students were included in the final quantitative analysis. Convenience sampling was used for the survey. The link was distributed through established student WhatsApp and Facebook groups across universities and academic years, with assistance from student representatives. Participation was voluntary and no incentives were offered. For the qualitative component, students were recruited by convenience sampling and then purposively selected to ensure variation by gender and stage of training.

Data collection and measures

A structured self-administered questionnaire collected information on sociodemographic characteristics, health and lifestyle variables, family and socioeconomic background, study-related behaviors, political and financial impact variables, psychological distress, and self-reported academic performance. Psychological distress was assessed using the Arabic 12-item General Health Questionnaire (GHQ-12), a widely used screening tool for psychological distress (30). Items were scored using the Likert method (0-1-2-3), producing total scores from 0 to 36, with higher scores indicating greater distress. Distress was categorized into normal/minimal, mild, moderate, and severe categories according to the score thresholds used in the study analysis.

Self-reported academic performance was assessed as acceptable, good, very good, or excellent. Semi-structured interviews were conducted with 20 students using an interview guide developed specifically for this study (Additional file 1). The guide included open-ended questions that explored family and social circumstances, lifestyle habits, academic pressures, political and economic stressors, coping strategies, career concerns, and social media use. Because the interviews addressed sensitive topics, data were captured using detailed field notes and member checking was performed at the end of each

interview by summarizing key points for participant confirmation or correction. Qualitative reporting was guided by COREQ principles (15).

Statistical analysis

Quantitative data were analyzed using IBM SPSS. Continuous variables were summarized as means and standard deviations, and categorical variables as frequencies and percentages. Associations between categorical variables and psychological distress level or academic performance were examined using chi-square tests or Fisher exact tests when appropriate. Independent-samples t-tests, one-way analysis of variance, or non-parametric alternatives were used for continuous variables as appropriate. Variables with theoretical relevance and/or evidence of bivariate association were included in a multivariable ordinal logistic regression model to identify factors independently associated with increasing psychological distress category. Adjusted odds ratios (ORs), 95% confidence intervals (CIs), and p-values are reported. A p-value ≤ 0.05 was considered statistically significant. Missing GHQ-12 or key outcome data resulted in exclusion; other missing data were handled using k-nearest neighbors imputation based on similarity across relevant variables.

Qualitative analysis

Qualitative field notes were analyzed using thematic analysis as described by Braun and Clarke (16). The analysis involved repeated reading for familiarization, systematic coding, grouping of codes into preliminary themes, iterative review and refinement of themes, and development of interpretive summaries. Themes were compared across interviews to identify shared and divergent experiences related to students' mental health and academic functioning.

Ethical approval

Ethical approval was obtained from the Institutional Review Board of the Faculty of Medicine and Health Sciences at An-Najah National University before data collection (IRB protocol number: Med. Feb. 2025/30). The study was performed in accordance with relevant guidelines and regulations, including the Declaration of Helsinki. Administrative approvals were obtained from the relevant faculties or authorized bodies at participating universities. All participants received information about the study objectives, voluntary participation, confidentiality, and the right to withdraw without penalty. Written or electronic informed consent was obtained before participation. No personally identifiable data were collected, and data access was restricted to the research team.

Results

Participant characteristics

A total of 391 undergraduate medical students were included in the quantitative analysis (Table 1). The mean age was 21.70 +/- 1.89 years. Most participants were female (235/391, 60.1%) and unmarried (385/391, 98.5%). Students were recruited from five universities, with more than half enrolled at An-Najah National University (220/391, 56.3%). Sixth-year students represented the largest academic-year group (118/391, 30.2%), followed by fifth-year students (94/391, 24.0%). Most students lived with their families (233/391, 59.6%); 101 (25.8%) lived with classmates in dormitories or boarding houses and 57 (14.6%) lived alone.

More than half of participants reported no exercise (208/391, 53.2%), and 201 (51.4%) reported not following a healthy diet. Most students were non-smokers (317/391, 81.1%) and consumed one to two cups of caffeine per day (258/391, 66.0%). Most were not employed (347/391, 88.7%). Fathers were the main household breadwinner for 222 students (56.8%), and 99 students (25.3%) were first-generation university students.

Study-related characteristics and contextual stressors

Self-rated academic performance was most commonly reported as very good (163/391, 41.7%) or good (150/391, 38.4%), with fewer students reporting excellent (46/391, 11.8%) or acceptable performance (32/391, 8.2%) (Table 2). The most common daily study duration was 4-6 hours (144/391, 36.8%), followed by 2-4 hours (137/391, 35.0%). Most students studied alone (339/391, 86.7%) and inside their residence (318/391, 81.3%). Only 49 students (12.5%) reported continuous daily study until tasks were completed, while 161 (41.2%) studied intermittently but completed tasks. Moral support was reported by 250 students (63.9%). Motivation was most often moderate (157/391, 40.2%), while 49 students (12.5%) reported no motivation at all.

Political and financial pressures were common (Table 3). A total of 168 students (43.0%) reported always encountering barriers related to the political situation, and 105 (26.9%) reported that such barriers always affected them. Recent political events moderately or greatly affected the GPA of 185 students (47.3%). Personal expenses were sometimes or always affected by the political situation for 302 students (77.2%). Political anxiety was reported as often or always by 231 students (59.1%), and 210 students (53.7%) reported that the political situation negatively affected concentration.

Psychological distress

The mean GHQ-12 score was 15.63 +/- 7.08, with scores ranging from 1 to 36 (Table 4). Overall, 133 students (34.0%) were classified as having normal/minimal distress, whereas 258 (66.0%) had some level of psychological distress. Mild distress was present in 86 students (22.0%), moderate distress in 78 (19.9%), and severe distress in 94 (24.0%). GHQ-12 item responses showed substantial symptoms of strain and worry: 150 students (38.4%) felt under pressure more than usual and 106 (27.1%) much more

than usual, while 131 (33.5%) reported sleep loss more than usual and 40 (10.2%) much more than usual.

Bivariate factors associated with psychological distress

In bivariate analyses, psychological distress level was significantly associated with gender ($p = 0.015$) and main household breadwinner ($p = 0.031$). Severe distress was more frequent among female students (64/235, 27.2%) than male students (30/156, 19.2%). Students whose mother was the main household breadwinner had the highest proportion of severe distress (10/19, 52.6%). Other sociodemographic variables, including marital status, residence, academic year, university, living arrangement, chronic disease, work status, birth order, parental education, family income, first-generation status, and personal expenses, were not significantly associated with distress level.

Lifestyle, academic, psychosocial, and political factors showed stronger associations with distress. Severe distress was highest among students who did not exercise (67/208, 32.2%; $p = 0.001$) and among those not following a healthy diet (57/201, 28.4%; $p = 0.005$). Study pattern was associated with distress ($p = 0.002$), with severe distress more common among students who did not study daily or did not complete tasks. Lack of moral support had a strong association with distress (57/141, 40.4% severe distress among those without support versus 37/250, 14.8% among those with support; $p < 0.001$). Motivation showed a clear gradient: severe distress was present in 29 of 49 students (59.2%) who were not motivated at all, compared with 4 of 46 (8.7%) who were very highly motivated ($p < 0.001$).

Academic engagement was also associated with distress. Severe distress was highest among students absent more than five times (32/84, 38.1%; $p < 0.001$) and among those who never participated in class (17/40, 42.5%; $p = 0.008$). Political stressors were significant correlates: severe distress was highest among students greatly affected by recent political events (23/51, 45.1%; $p = 0.004$), those whose expenses were always affected by the political situation (44/139, 31.7%; $p = 0.034$), and those who always experienced political anxiety (41/105, 39.0%; $p < 0.001$). Students reporting a negative political effect on concentration also had higher severe distress (58/210, 27.6%; $p = 0.008$).

Bivariate factors associated with academic performance

Sociodemographic variables were largely not associated with self-rated academic performance. Living arrangement was the only significant sociodemographic factor ($p = 0.020$). Students living with family reported higher proportions of very good (102/233, 43.8%) and excellent performance (35/233, 15.0%) compared with students living with classmates, among whom excellent performance was reported by 4 of 101 (4.0%). Gender ($p = 0.055$) and academic year ($p = 0.097$) approached significance but did not meet the statistical threshold.

Academic performance was associated with several study-related variables. Study hours per day were significant ($p = 0.015$), with students studying 4-6 hours per day reporting higher proportions of very good or excellent performance than those studying less than two hours. Study pattern was significantly associated with performance ($p = 0.001$); students who completed study tasks had more favorable performance distributions than those who studied intermittently without completing tasks. Class participation was strongly associated with academic performance ($p < 0.001$), with 10 of 35 students (28.6%) who always participated reporting excellent performance. The perceived impact of recent political events on academic performance was also significant ($p = 0.025$); excellent performance was reported by 17 of 82 students (20.7%) whose GPA was not affected, compared with 3 of 51 students (5.9%) who were greatly affected.

Multivariable ordinal logistic regression for psychological distress

The adjusted ordinal logistic regression model for psychological distress is shown in Table 5. The model had a McFadden pseudo R-squared of 0.172. In the adjusted model, unhealthy diet (OR = 4.46, 95% CI 1.78-11.19, $p = 0.001$) and partially healthy diet (OR = 2.81, 95% CI 1.12-7.02, $p = 0.027$) were associated with higher odds of being in a more severe distress category compared with a healthy diet. Lack of moral support was also independently associated with higher distress (OR = 2.95, 95% CI 1.85-4.71, $p < 0.001$).

Motivation was one of the strongest predictors. Compared with very highly motivated students, those not motivated at all had substantially higher odds of more severe distress (OR = 10.95, 95% CI 4.36-27.44, $p < 0.001$), followed by slightly motivated students (OR = 5.60, 95% CI 2.44-12.80, $p < 0.001$) and moderately motivated students (OR = 2.42, 95% CI 1.22-4.81, $p = 0.012$). Self-rated acceptable academic level was associated with higher distress compared with excellent academic level (OR = 4.10, 95% CI 1.51-11.17, $p = 0.006$). Living with family was associated with lower odds of higher distress compared with living alone (OR = 0.47, 95% CI 0.25-0.90, $p = 0.024$). Political anxiety retained a strong independent association: compared with students who always experienced political anxiety, students reporting lower anxiety frequency had significantly lower odds of more severe distress. Female gender was associated with lower adjusted odds of higher distress (OR = 0.45, 95% CI 0.28-0.71, $p = 0.001$), despite the higher unadjusted proportion of severe distress among females; this adjusted finding should be interpreted in the context of the other variables included in the model.

Qualitative findings

The qualitative interviews generated eight interrelated themes (Table 6). First, family and personal circumstances shaped well-being through both support and pressure. Students described family emotional support as stabilizing, but also reported that parental illness, bereavement, high expectations, and pressure to succeed increased vulnerability, particularly during examinations.

Second, social and relational factors influenced students' coping capacity. Supportive friends and partners helped buffer academic stress, while living away from family, living alone, or carrying heavy family responsibilities increased loneliness and stress. Third, personal routines and daily activities affected mental health. Poor sleep, fast-food consumption, and unstructured routines impaired concentration, while task lists, personal interests, and moderate physical activity helped some students maintain balance.

Fourth, academic and institutional issues were central. Students described heavy workload, frequent examinations, competition in large cohorts, difficulty organizing group study, and limited access to psychological support services. Fifth, psychological stressors and coping capacity varied by individual experience; previous traumatic or stressful events, perceived inadequate faculty responses, and lack of preparedness for crises related to regional instability intensified emotional strain. Sixth, career uncertainty and competition for postgraduate training opportunities created anxiety and affected motivation. Seventh, students described the challenge of balancing academic, social, and spiritual well-being, with spiritual or religious practices acting as a source of emotional stability for some. Finally, social media had mixed effects, providing motivation for some but also contributing to time loss, comparison, feelings of inadequacy, and additional pressure.

The qualitative data helped explain the quantitative findings by showing how academic demands, family expectations, support systems, lifestyle routines, financial pressures, and political instability were experienced together rather than as isolated exposures.

Discussion

This convergent mixed-methods study found a high burden of psychological distress among Palestinian undergraduate medical students. Two-thirds of participants had some degree of distress, and almost one quarter had severe distress. These findings are consistent with international literature showing that medical students are vulnerable to anxiety, depression, burnout, and other forms of psychological distress (3,7,8,18,19). However, the Palestinian context adds important educational and structural dimensions. Students' narratives showed that distress was shaped not only by medical school workload, but also by political instability, movement restrictions, financial pressure, and uncertainty about future training opportunities.

The quantitative and qualitative results converged in showing that distress among medical students is multifactorial. Academic variables such as motivation, study pattern, absenteeism, class participation, and self-rated academic level were strongly related to distress and performance. This supports the view that student well-being and academic functioning are closely connected in medical education (4,5). Students with lower motivation and weaker academic engagement were more likely to report severe distress, while students with more structured study routines and active participation reported better academic performance. These findings suggest that academic advising and study-skills support should be integrated with mental health support rather than treated as separate services.

Lifestyle behaviors were also important. Physical inactivity and unhealthy dietary patterns were associated with distress in bivariate analyses, and diet remained independently associated with distress in the adjusted model. This is consistent with evidence linking physical activity and diet quality with mental well-being (24-26). Qualitative interviews added depth by showing how irregular sleep, excessive caffeine, reliance on fast food, and examination-related fatigue disrupted emotional regulation and concentration. Because lifestyle factors are modifiable, medical schools may be able to support student well-being through practical interventions such as protected wellness time, accessible physical activity opportunities, nutrition awareness, and sleep-health education.

Psychosocial support emerged as a central protective factor. Students who lacked moral support had markedly higher odds of more severe distress, and interviews showed that family, friends, classmates, and romantic partners could buffer stress. Conversely, loneliness, living away from family, and weak peer support intensified distress. This finding is particularly relevant to medical education because students often experience isolation during demanding academic periods. Peer mentoring, structured student support groups, and accessible counselling services may be beneficial, especially for students living alone or away from their families.

Political and financial stressors were highly prevalent and independently important. More than half of participants reported that the political situation negatively affected concentration, and political anxiety was one of the strongest predictors of distress. Qualitative findings showed that movement restrictions, uncertainty, financial strain, and concerns about career opportunities were experienced as persistent background stressors. These findings are consistent with prior work on Palestinian students and communities exposed to chronic insecurity and constrained access to services (12,20-23). For medical schools in conflict-affected settings, student support requires more than individual coping advice; institutions need flexible attendance and assessment policies, proactive academic communication during crises, and systems for identifying students whose learning is disrupted by external conditions.

The relationship between gender and distress deserves careful interpretation. Female students had a higher unadjusted proportion of severe distress, consistent with some international literature on student mental health (7,18). However, in the adjusted model, female gender was associated with lower odds of higher distress after accounting for academic, lifestyle, psychosocial, and political variables. This apparent reversal may reflect confounding, suppression effects, or differences in how distress-related exposures clustered by gender. Rather than treating gender as a simple explanatory factor, future analyses should explore potential mediating pathways such as social support, family expectations, residence, motivation, and exposure to specific stressors.

Academic performance was associated primarily with learning behaviors and living arrangement rather than most fixed sociodemographic characteristics. Students studying 4-6 hours daily, following more organized study patterns, and participating actively in class had better self-rated academic performance. Living with family was also associated with more favorable academic performance and lower adjusted

distress compared with living alone. These findings suggest that the immediate educational and social environment may be more relevant to academic functioning than background characteristics alone.

Strengths and limitations

This study has several strengths. It recruited students from five Palestinian universities and included both pre-clinical and clinical years. It used a validated distress screening tool, incorporated a broad range of academic, lifestyle, psychosocial, socioeconomic, and political variables, and combined quantitative analysis with qualitative interviews to improve interpretability. The use of multivariable ordinal logistic regression allowed assessment of independent associations with distress severity.

Several limitations should also be acknowledged. Convenience sampling may have introduced selection bias and limits generalizability. The cross-sectional design prevents causal inference and cannot determine whether distress preceded or resulted from academic and lifestyle factors. Academic performance was self-reported rather than verified using official GPA records, which may introduce reporting bias. Some subgroup categories were small, limiting precision. The qualitative component relied on detailed field notes rather than full audio transcripts because of contextual sensitivity, which may have limited the depth of verbatim analysis. Finally, the GHQ-12 is a screening tool and does not provide clinical psychiatric diagnoses.

Implications for medical education

The findings support a multi-level approach to student support in Palestinian medical schools and similar resource-limited or conflict-affected settings. Recommended actions include integrating accessible mental health services into medical schools, strengthening peer and faculty mentoring, providing structured academic advising, promoting healthier lifestyle routines, and adopting flexible academic policies during periods of political disruption. Medical schools should also consider proactive outreach for students with low motivation, poor study structure, frequent absenteeism, living alone, or high political anxiety, as these factors were associated with higher distress or lower academic functioning.

Conclusion

Psychological distress is highly prevalent among Palestinian medical students and is shaped by overlapping academic, lifestyle, psychosocial, economic, and political factors. Distress was independently associated with diet, moral support, motivation, self-rated academic level, living arrangement, and political anxiety. Academic performance was most closely related to living arrangement, study habits, class participation, and the perceived academic impact of political events. These findings highlight the need for context-sensitive institutional strategies that address both individual well-being and the structural realities affecting medical education in Palestine.

Abbreviations

CI

confidence interval

COREQ

Consolidated Criteria for Reporting Qualitative Research

GHQ-12

12-item General Health Questionnaire

GPA

grade point average

IRB

Institutional Review Board

OR

odds ratio

SD

standard deviation

SPSS

Statistical Product and Service Solutions.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Institutional Review Board of the Faculty of Medicine and Health Sciences at An-Najah National University (IRB protocol number: Med. Feb. 2025/30). Administrative approvals were obtained from the participating universities. All study procedures involving human participants were performed in accordance with relevant guidelines and regulations, including the Declaration of Helsinki. Written or electronic informed consent was obtained from all participants before participation.

Consent for publication

Not applicable.

Availability of data and materials

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

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

All writers have contributed to their commitment to their work, including writing, analysis, and interpretation of the data

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Tables

Table 1. Participant sociodemographic, lifestyle, and socioeconomic characteristics

Variable	Category	n (%) / mean $\pm$ SD
Age (years)	-	21.70 $\pm$ 1.89
Gender	Male	156 (39.9)
Gender	Female	235 (60.1)
Height (cm)	-	165.03 $\pm$ 23.93
Weight (kg)	-	68.55 $\pm$ 16.89
Marital status	Unmarried	385 (98.5)
Marital status	Married	6 (1.5)
Residence	City	212 (54.2)
Residence	Village	166 (42.5)
Residence	Camp	13 (3.3)
Academic year	First year	47 (12.0)
Academic year	Second year	34 (8.7)
Academic year	Third year	40 (10.2)
Academic year	Fourth year	58 (14.8)
Academic year	Fifth year	94 (24.0)
Academic year	Sixth year	118 (30.2)
University	An-Najah National University	220 (56.3)
University	Al-Quds University (Abu Dis)	50 (12.8)
University	Polytechnic University	14 (3.6)
University	Arab American University	59 (15.1)
University	Hebron University	48 (12.3)
Living with	With family	233 (59.6)
Living with	With classmates (dorm)	101 (25.8)
Living with	Alone (studio)	57 (14.6)
Chronic disease	No	373 (95.4)
Chronic disease	Yes	18 (4.6)
Regular medications	No	352 (90.0)
Regular medications	Yes	34 (8.7)

Regular medications	Yes during exam periods	5 (1.3)
Exercise	Do not practice	208 (53.2)
Exercise	Less than 3 hours/week	101 (25.8)
Exercise	More than 3 hours/week	67 (17.1)
Exercise	Daily	15 (3.8)
Smoking	Do not smoke	317 (81.1)
Smoking	Occasionally smoke	29 (7.4)
Smoking	Smoke (cigarettes/hookah/e-cigarettes)	45 (11.5)
Diet	Not following a healthy diet	201 (51.4)
Diet	Follow a diet but not always	165 (42.2)
Diet	Following a healthy diet	25 (6.4)
Caffeine cups/day	Do not drink at all	49 (12.5)
Caffeine cups/day	1-2 cups	258 (66.0)
Caffeine cups/day	3-5 cups	73 (18.7)
Caffeine cups/day	More than 5 cups	11 (2.8)
Herbal supplements use	Do not use	304 (77.7)
Herbal supplements use	Use	87 (22.3)
Work status	Do not work	347 (88.7)
Work status	Yes (part-time)	37 (9.5)
Work status	Yes (full-time)	7 (1.8)
Birth order	The oldest	131 (33.5)
Birth order	In the middle	193 (49.36)
Birth order	The youngest	67 (17.14)
Main breadwinner	Father	222 (56.8)
Main breadwinner	Mother	19 (4.9)
Main breadwinner	Both parents	135 (34.5)
Main breadwinner	Other	15 (3.8)
Family income	Less than 1800	14 (3.6)
Family income	1800-3000	51 (13.0)

Family income	3000-5000	87 (22.3)
Family income	5000-8000	93 (23.8)
Family income	More than 8000	146 (37.3)
Father education	Less than high school	50 (12.8)
Father education	High school	79 (20.2)
Father education	Diploma	33 (8.4)
Father education	Bachelor	153 (39.1)
Father education	Graduate studies	76 (19.4)
Mother education	Less than high school	54 (13.8)
Mother education	High school	70 (17.9)
Mother education	Diploma	49 (12.5)
Mother education	Bachelor	176 (45.0)
Mother education	Graduate studies	42 (10.7)
Parents in medical field	No	330 (84.4)
Parents in medical field	Yes, one in allied medical professions	35 (9.0)
Parents in medical field	Yes, one in medicine	21 (5.4)
Parents in medical field	Yes, both in allied medical professions	2 (0.5)
Parents in medical field	Yes, both in medicine	3 (0.8)
First-generation student	No	292 (74.7)
First-generation student	Yes	99 (25.3)
Personal expenses	Less than 500	73 (18.7)
Personal expenses	500-1000	162 (41.4)
Personal expenses	1000-1500	92 (23.5)
Personal expenses	More than 1500	64 (16.4)

Table 2. Study-related characteristics

Variable	Category	n (%)
Self-rated academic level, n (%)	Acceptable	32 (8.2)
Self-rated academic level, n (%)	Good	150 (38.4)
Self-rated academic level, n (%)	Very good	163 (41.7)
Self-rated academic level, n (%)	Excellent	46 (11.8)
Study hours/day, n (%)	Less than 2 hours	60 (15.3)
Study hours/day, n (%)	2-4 hours	137 (35.0)
Study hours/day, n (%)	4-6 hours	144 (36.8)
Study hours/day, n (%)	More than 6 hours	50 (12.8)
Study with, n (%)	Alone	339 (86.7)
Study with, n (%)	With one person	42 (10.7)
Study with, n (%)	With a group	10 (2.6)
Preferred study time, n (%)	Morning	101 (25.8)
Preferred study time, n (%)	Evening	123 (31.5)
Preferred study time, n (%)	Doesn't matter	167 (42.7)
Study place, n (%)	Inside the residence	318 (81.3)
Study place, n (%)	Outside (café/library/etc.)	73 (18.7)
Study pattern, n (%)	Continuous daily until tasks completed	49 (12.5)
Study pattern, n (%)	Intermittent daily but tasks completed	161 (41.2)
Study pattern, n (%)	Sometimes not daily	92 (23.5)
Study pattern, n (%)	Intermittent and tasks not completed	89 (22.8)
Study method, n (%)	Theoretical	61 (15.6)
Study method, n (%)	Auditory and theoretical	104 (26.6)
Study method, n (%)	Reading and writing	104 (26.6)
Study method, n (%)	Auditory	6 (1.5)
Study method, n (%)	Kinesthetic	9 (2.3)
Study method, n (%)	No specific pattern	107 (27.4)
Moral support, n (%)	No	141 (36.1)
Moral support, n (%)	Yes	250 (63.9)

Motivation, n (%)	Not motivated at all	49 (12.5)
Motivation, n (%)	Slightly motivated	58 (14.8)
Motivation, n (%)	Moderately motivated	157 (40.2)
Motivation, n (%)	Highly motivated	81 (20.7)
Motivation, n (%)	Very highly motivated	46 (11.8)
Submitting assignments, n (%)	Never	3 (0.8)
Submitting assignments, n (%)	Rarely	4 (1.0)
Submitting assignments, n (%)	Sometimes	29 (7.4)
Submitting assignments, n (%)	Often	116 (29.7)
Submitting assignments, n (%)	Always	239 (61.1)
Absences, n (%)	Never	133 (34.0)
Absences, n (%)	Once or twice	109 (27.9)
Absences, n (%)	3-5 times	65 (16.6)
Absences, n (%)	More than 5 times	84 (21.5)
Using extra materials, n (%)	Never	5 (1.3)
Using extra materials, n (%)	Rarely	27 (6.9)
Using extra materials, n (%)	Sometimes	76 (19.4)
Using extra materials, n (%)	Often	140 (35.8)
Using extra materials, n (%)	Always	143 (36.6)
Using a schedule, n (%)	Never	82 (21.0)
Using a schedule, n (%)	Rarely	53 (13.6)
Using a schedule, n (%)	Sometimes	111 (28.4)
Using a schedule, n (%)	Often	115 (29.4)
Using a schedule, n (%)	Always	30 (7.7)
Class participation, n (%)	Never	40 (10.2)
Class participation, n (%)	Rarely	89 (22.8)
Class participation, n (%)	Sometimes	135 (34.5)
Class participation, n (%)	Often	92 (23.5)
Class participation, n (%)	Always	35 (9.0)

Table 3. Political and financial impact variables

Variable	Category	n (%)
Barriers, n (%)	Never	68 (17.4)
Barriers, n (%)	Rarely	48 (12.3)
Barriers, n (%)	Sometimes	107 (27.4)
Barriers, n (%)	Always	168 (43.0)
Barriers effect, n (%)	Never	75 (19.2)
Barriers effect, n (%)	Rarely	48 (12.3)
Barriers effect, n (%)	Sometimes	163 (41.7)
Barriers effect, n (%)	Always	105 (26.9)
Recent events impact on GPA, n (%)	Not affected	82 (21.0)
Recent events impact on GPA, n (%)	Slightly affected	124 (31.7)
Recent events impact on GPA, n (%)	Moderately affected	134 (34.3)
Recent events impact on GPA, n (%)	Greatly affected	51 (13.0)
Expenses affected, n (%)	Never	40 (10.2)
Expenses affected, n (%)	Rarely	49 (12.5)
Expenses affected, n (%)	Sometimes	163 (41.7)
Expenses affected, n (%)	Always	139 (35.5)
Political impact on jobs, n (%)	No effect	9 (2.3)
Political impact on jobs, n (%)	A little	29 (7.4)
Political impact on jobs, n (%)	Somewhat	168 (43.0)
Political impact on jobs, n (%)	A lot	185 (47.3)
Political anxiety, n (%)	Never	10 (2.6)
Political anxiety, n (%)	Rarely	16 (4.1)
Political anxiety, n (%)	Sometimes	134 (34.3)
Political anxiety, n (%)	Often	126 (32.2)
Political anxiety, n (%)	Always	105 (26.9)
Effect on concentration, n (%)	Negative	210 (53.7)
Effect on concentration, n (%)	Neutral	170 (43.5)
Effect on concentration, n (%)	Positive	11 (2.8)

Table 4. GHQ-12 total score and distress level

Measure	Level / Statistic	n	%	Mean	SD	Min	Max
GHQ-12 total score	Overall	391	100.0	15.63	7.08	1	36
GHQ distress level	Normal	133	34.0	-	-	-	-
GHQ distress level	Mild distress	86	22.0	-	-	-	-
GHQ distress level	Moderate distress	78	19.9	-	-	-	-
GHQ distress level	Severe distress	94	24.0	-	-	-	-
	Total	391	100.0	-	-	-	-

Table 5. Multivariable ordinal logistic regression of psychological distress

Variable	Adjusted OR	95% CI	p-value
Age (per year)	0.94	(0.83 - 1.05)	0.264
Gender (Female)	0.45	(0.28 - 0.71)	0.001*
Diet (Ref: Healthy)			
Unhealthy	4.46	(1.78 - 11.19)	0.001*
Partially healthy	2.81	(1.12 - 7.02)	0.027*
Moral support (No)	2.95	(1.85 - 4.71)	<0.001*
Motivation (Ref: Very highly motivated)			
Not motivated at all	10.95	(4.36 - 27.44)	<0.001*
Slightly motivated	5.60	(2.44 - 12.80)	<0.001*
Moderately motivated	2.42	(1.22 - 4.81)	0.012*
Highly motivated	1.46	(0.67 - 3.16)	0.341
Political anxiety (Ref: Always)			
Never	0.05	(0.01 - 0.21)	<0.001*
Rarely	0.10	(0.03 - 0.35)	<0.001*
Sometimes	0.21	(0.12 - 0.37)	<0.001*
Often	0.38	(0.23 - 0.65)	<0.001*
Self-academic level (Ref: Excellent)			
Acceptable	4.10	(1.51 - 11.17)	0.006*
Good	1.64	(0.83 - 3.27)	0.156
Very good	1.70	(0.86 - 3.35)	0.127
Living with (Ref: Alone)			
With family	0.47	(0.25 - 0.90)	0.024*
With classmates (dorm)	0.77	(0.40 - 1.46)	0.419
Exercise (Ref: Daily)			
Do not practice	2.75	(0.88 - 8.61)	0.081
<3 hours/week	2.30	(0.72 - 7.34)	0.160
>3 hours/week	2.18	(0.67 - 7.12)	0.195
Residence (Ref: Camp)			

City	0.57	(0.18 - 1.74)	0.322
Village	0.42	(0.13 - 1.31)	0.134
Personal expenses (Ref: >1500)			
<500	1.17	(0.55 - 2.49)	0.686
500-1000	0.98	(0.52 - 1.85)	0.942
1000-1500	0.68	(0.36 - 1.28)	0.231
Expenses affected (Ref: Always)			
Never	1.26	(0.59 - 2.70)	0.542
Rarely	0.70	(0.36 - 1.38)	0.305
Sometimes	0.74	(0.46 - 1.18)	0.207

Table 6. Qualitative themes related to mental health and academic performance

Theme	Key findings	Illustrative quote
Family and personal circumstances	Family support enhanced stability; family illness, bereavement, high expectations, and fear of failure increased emotional vulnerability.	"When my family is emotionally supportive, I feel more stable and able to focus on my studies."
Social and relational factors	Friends and partners buffered stress, while living away from family, loneliness, and family responsibilities increased strain.	"Living with my family is comforting, but it can also be distracting."
Personal and day-to-day activities	Poor sleep, fast food, excessive caffeine, and unstructured routines impaired concentration; task lists and personal interests supported balance.	"During exams, my sleep is very irregular, and it really affects my focus."
Academic and institutional issues	Heavy workload, frequent exams, competition, limited psychological services, group-study challenges, and part-time work affected well-being and performance.	"The workload is heavy, and it feels like there is always another exam."
Psychological stressors and coping capacity	Constant pressure, previous stressful experiences, inadequate faculty responses, and lack of preparedness for crises increased distress.	"The pressure never really stops; it is always there."
Career uncertainty and future concerns	Residency opportunities, competition, and unclear career pathways contributed to anxiety and fluctuating motivation.	"I worry a lot about whether I will find a residency position."
Academic, social, and spiritual balance	Maintaining relationships was difficult; recreation and spiritual or religious practices supported emotional balance.	"My spiritual practices help me stay emotionally balanced."
Social media and comparison	Social media was both motivational and stressful; excessive use caused time loss and comparison-related inadequacy.	"Sometimes I open TikTok and suddenly four hours are gone without me noticing."

Supplementary Files

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