

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

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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 students in Palestine face academic demands alongside political instability, movement restrictions, and economic uncertainty. We assessed psychological distress and examined its correlates, while exploring bivariate associations with self-reported academic performance.

Methods: This convergent mixed-methods study was conducted across five Palestinian universities during 2024–2025. A cross-sectional survey included 391 undergraduate medical students. Psychological distress was measured using the Arabic 12-item General Health Questionnaire (GHQ-12) and analyzed using bivariate tests and multivariable ordinal logistic regression. Twenty semi-structured interviews were analyzed thematically. The two strands were integrated during interpretation through side-by-side comparison, narrative weaving, and a joint display.

Results: Mean GHQ-12 score was 15.63 ± 7.08 ; 66.0% of students were classified above the study-defined normal/minimal band. Higher distress categories were associated with unhealthy or partially healthy diet, lack of moral support, lower motivation, acceptable self-rated academic level, living alone, and frequent political anxiety. Self-reported academic performance showed bivariate associations with living arrangement, study hours and pattern, class participation, and perceived academic effects of political events. Qualitative findings complemented these associations by describing loneliness, disrupted routines, workload, limited psychological support, career uncertainty, financial strain, movement-related stress, and social-media comparison.

Conclusions: Psychological distress was common and was associated with modifiable academic, psychosocial, lifestyle, and contextual factors. Palestinian medical schools should combine accessible

mental-health support with academic mentoring, contingency policies during disruption, and targeted support for socially isolated students.

Keywords: medical students; psychological distress; GHQ-12; academic performance; Palestine; mixed-methods study; medical education

Background

Medical education is widely recognized as a demanding educational pathway that exposes students to sustained cognitive, emotional, and professional stress (1–3). Intensive curricula, frequent examinations, clinical responsibilities, and competition for postgraduate opportunities can contribute to anxiety, depressive symptoms, burnout, and impaired well-being, with potential consequences for attendance, learning, academic engagement, and future clinical functioning (3–5,17,18).

The determinants of student well-being extend beyond academic workload. Lifestyle behaviors, social support, family responsibilities, financial pressure, social isolation, and uncertainty about future careers may all shape psychological well-being and academic functioning (6,9,23–27). A recent regional review also documents a substantial burden of depressive symptoms among medical students across Arab countries, although estimates vary by setting and measurement approach (31).

Palestinian medical education occurs within an unusually constrained social and political environment. Since October 2023, movement restrictions, road closures, checkpoint delays, recurrent violence, and disruptions to essential services have intensified in parts of the West Bank, with documented effects on access to education and health services (33,34). These pressures coexist with longstanding economic uncertainty and may disrupt commuting, clinical training, concentration, study routines, and perceptions of future career opportunities. Previous Palestinian studies have reported substantial symptoms of depression, anxiety, hopelessness, and distress among students, but much of the evidence has been limited to individual institutions or single psychological outcomes (12,19,20,22,30).

This study therefore aimed to assess psychological distress among Palestinian undergraduate medical students, identify factors associated with increasing distress severity after multivariable adjustment, examine bivariate associations with self-reported academic performance, and use qualitative data to explain, expand, or contextualize the quantitative findings through a convergent mixed-methods design (28,29).

Methods

Study design and setting

This study used a convergent mixed-methods design combining a quantitative cross-sectional survey with qualitative semi-structured interviews. The two strands addressed the same overall research problem, were analyzed separately, and were integrated during interpretation. Integration used side-by-side comparison and narrative weaving to identify areas of convergence, complementarity, and divergence, with a joint display developed to link key quantitative associations to qualitative themes and resulting meta-inferences (28,29). The overall project period was October 2024 to October 2025 and involved students enrolled at five Palestinian universities: An-Najah National University, Arab American University, Al-Quds University (Abu Dis), Hebron University, and Palestine Polytechnic University.

Consistent with the ethics statement, participant-facing recruitment and data collection occurred only after IRB approval in February 2025; the earlier date refers to the overall project period rather than pre-approval participant data collection.

Study population, eligibility, and sampling

The target population was Palestinian undergraduate medical students in years 1–6, including pre-clinical and clinical phases. Students were eligible if they were currently enrolled in an undergraduate medical programme in Palestine, were in a 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 submissions with insufficient GHQ-12 or key outcome data were excluded.

The quantitative sample size was calculated in OpenEpi for a finite population of 10,361 students, assuming a 50% expected frequency, 95% confidence level, and 5% margin of error. This calculation was designed to provide precision for a prevalence estimate rather than statistical power for every individual regression coefficient; therefore, association analyses should be interpreted as exploratory. The minimum calculated sample was 371, and 391 students were included in the quantitative analysis.

Convenience sampling was used for the survey. The survey link was distributed through established student WhatsApp and Facebook groups across participating universities and academic years, with assistance from student representatives. Because distribution occurred through open group channels and the number of unique eligible students who viewed the invitation was not known, a conventional survey response rate could not be calculated. Participation was voluntary and no incentives were offered. The achieved sample was not proportionally stratified by university; An-Najah National University contributed more than half of participants, which is considered when interpreting representativeness.

For the qualitative strand, students were initially approached through convenience routes and then purposively selected to increase variation by gender and stage of training. Twenty students were interviewed to obtain in-depth accounts across these planned dimensions of variation. The sample size was selected pragmatically to permit in-depth exploration across these planned dimensions. Formal saturation was not prospectively documented in the available study records and is therefore not claimed retrospectively.

Data collection and measures

A structured self-administered questionnaire collected 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 screening instrument with established Arabic-language psychometric evidence in university students (14). Items were scored using the Likert method (0–1–2–3), producing a total score from 0 to 36, with higher scores indicating greater distress. For descriptive and ordinal analyses, scores were grouped into study-defined severity bands: normal/minimal (0–9), mild (10–15), moderate (16–21), and severe (22–36). These four bands were analytic categories and should not be interpreted as diagnostic thresholds. In the Arabic university-student validation study, the GHQ-12 showed Cronbach's $\alpha = 0.86$ and an optimal binary screening cut-off of 15/16, with sensitivity 0.88 and specificity 0.84 (14).

Self-reported academic performance was assessed using the categories acceptable, good, very good, and excellent. Because the survey collected no personally identifiable information and included multiple universities, individual responses could not be linked to official institutional GPA records. The categories therefore represent students' perceptions rather than objectively verified performance and were analyzed as an ordinal self-rating rather than converted to a common numeric GPA across institutions. In this manuscript, "moral support" refers to perceived emotional encouragement and supportive interpersonal contact reported by the student.

Semi-structured interviews were conducted with 20 students using a study-specific interview guide (Additional file 1). The guide contained 13 core questions plus optional probes and explicitly addressed psychological well-being, academic workload and performance, motivation, family and social support, living arrangement and daily routine, lifestyle, financial stressors, political context, coping, social media, and institutional support. Optional probes asked participants for examples and explored effects on concentration or attendance, coping, differences during examinations or clinical training, and desired support. Because the topics were considered sensitive, the interviews were not audio-recorded; data were captured using detailed field notes. At the end of each interview, the interviewer summarized the main points and invited the participant to confirm or correct the summary. Consequently, participant statements derived from these interviews are treated as field-note reconstructions or paraphrased accounts rather than verbatim quotations. Reporting was informed by COREQ, particularly items related to participant selection, interview procedures, data capture, participant checking, analysis, and presentation of themes (15). Research-team/reflexivity items such as interviewer characteristics, exact interview duration, and interview setting were not documented in the materials available for this revision and should be completed from the study records if available.

Statistical analysis

Quantitative data were analyzed using IBM SPSS Statistics. Continuous variables were summarized using means and standard deviations when appropriate, and categorical variables using frequencies and percentages. Associations between categorical variables and psychological distress category or self-reported academic performance were examined using chi-square tests or Fisher's exact tests when expected cell counts were small. Continuous variables were compared using independent-samples t tests, one-way analysis of variance, or non-parametric alternatives as appropriate. A two-sided p value ≤ 0.05 was considered statistically significant.

Variables were considered for the multivariable ordinal logistic regression model for psychological distress on the basis of theoretical relevance and/or evidence of bivariate association. Adjusted odds ratios (ORs), 95% confidence intervals (CIs), and p values are reported, and McFadden's pseudo- R^2 is provided as a measure of model explanatory fit. No mediation analysis was performed, and the adjusted associations should not be interpreted causally. An equivalent multivariable model was not performed for self-reported academic performance; associations with that outcome are therefore presented and interpreted as bivariate only. Missing GHQ-12 or key outcome data resulted in exclusion. Other missing values were handled using k-nearest-neighbors imputation; the value of k, distance metric, variables used for similarity, and pre-imputation missingness proportion were not contained in the available analysis record and require confirmation from the original statistical workflow for full reproducibility.

Qualitative analysis

Qualitative field notes were analyzed using thematic analysis following Braun and Clarke (16). Analysis involved repeated reading for familiarization, systematic coding of relevant meaning units, grouping codes into candidate themes, iterative review of theme boundaries and internal coherence, and development of interpretive summaries. Themes were compared across interviews to identify recurring and divergent experiences related to psychological well-being and academic functioning. Credibility was supported by end-of-interview participant confirmation of the interviewer's summary and by iterative comparison across cases. Because audio recordings and verbatim transcripts were not available, the analysis emphasized thematic meaning rather than fine-grained linguistic interpretation. The number of coders and the existence of a formal codebook/audit trail were not documented in the materials available for this revision and should be reported from the original qualitative records if available.

Mixed-methods integration

Quantitative and qualitative findings were first analyzed independently. Integration then occurred at the interpretation stage through (1) side-by-side comparison of statistically associated variables with relevant qualitative themes, (2) narrative weaving within the Results and Discussion, and (3) a joint display linking quantitative findings, qualitative explanations, and meta-inferences. Convergence was defined as agreement between strands, complementarity as qualitative information that explained or expanded a quantitative association, and divergence as findings that differed or arose in only one strand. Qualitative themes were not treated merely as confirmation; they were used to propose plausible contextual mechanisms and to identify issues not directly measured in the survey, such as social-media comparison and career uncertainty (28,29).

Ethical approval

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). The study was performed in accordance with relevant guidelines and regulations, including the Declaration of Helsinki. Administrative approvals were obtained from 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. The originally supplied table reported an implausibly large standard deviation for height; because the raw height data were unavailable for verification and height was not used in the

reported analyses, height was omitted from the revised descriptive table rather than replaced with an unverified value.

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 political or mobility barriers, and 105 (26.9%) reported that such barriers always affected them personally. Recent political events moderately or greatly affected self-reported academic performance for 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). Using the study-defined analytic bands, 133 students (34.0%) were classified as normal/minimal, 86 (22.0%) as mild, 78 (19.9%) as moderate, and 94 (24.0%) as severe. Because these bands are descriptive analytic categories rather than diagnostic thresholds, the distribution should not be interpreted as the prevalence of clinically diagnosed psychiatric disorders.

Bivariate factors associated with psychological distress

In bivariate analyses, psychological distress category was 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 category in bivariate testing.

Lifestyle, academic, psychosocial, and political factors showed several bivariate 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 ($p = 0.002$). Lack of moral support showed a strong association: severe distress occurred in 57 of

141 students (40.4%) without support versus 37 of 250 (14.8%) with support ($p < 0.001$). Motivation showed a clear gradient, with severe distress 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 associated with distress category: severe distress was highest among students who reported being 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%; $p < 0.001$). A negative political effect on concentration was also associated with higher distress ($p = 0.008$).

Bivariate factors associated with self-reported academic performance

Sociodemographic variables were largely not associated with self-reported 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%) than students living with classmates, among whom excellent performance was reported by 4 of 101 (4.0%). Gender ($p = 0.055$) and academic year ($p = 0.097$) did not meet the prespecified statistical threshold.

Academic performance was associated with several study-related variables in bivariate analyses. Study hours per day were associated with performance ($p = 0.015$), as was study pattern ($p = 0.001$). 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 associated with the outcome ($p = 0.025$); excellent performance was reported by 17 of 82 students (20.7%) who reported no effect compared with 3 of 51 (5.9%) who reported a great effect. These findings are unadjusted and should not be interpreted as independent associations.

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^2 of 0.172, indicating modest explanatory power. 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 associated with higher distress (OR = 2.95, 95% CI 1.85–4.71, $p < 0.001$). The relatively wide confidence intervals for some estimates warrant cautious interpretation.

Motivation showed one of the strongest adjusted associations. Compared with very highly motivated students, those not motivated at all had 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 than excellent academic level (OR = 4.10, 95% CI 1.51–11.17, $p = 0.006$). Living with family was associated with lower odds of a higher distress category compared with living alone (OR = 0.47, 95% CI 0.25–0.90, $p = 0.024$). Political anxiety retained a graded adjusted association, with lower reported anxiety frequencies associated with lower odds of higher distress relative to students who always experienced political anxiety. Female gender was associated with

lower adjusted odds of higher distress (OR = 0.45, 95% CI 0.28–0.71, $p = 0.001$), despite a higher unadjusted proportion of severe distress among females. This change in direction is interpreted cautiously below and no mediation or interaction analysis is claimed.

Qualitative findings

The interviews generated eight interrelated themes. Because the interviews were documented through field notes rather than audio transcripts, the examples below are presented as reconstructed or paraphrased field-note summaries and not as verbatim quotations (Table 6).

Family and personal circumstances could either stabilize or intensify stress. Students described emotional encouragement from family as helping them feel more secure and able to focus, whereas parental illness, bereavement, high expectations, and pressure to succeed heightened vulnerability during demanding periods. Social and relational support similarly buffered stress, while living away from family or living alone was associated in students' accounts with loneliness, reduced day-to-day emotional support, and greater difficulty managing academic pressure. Students living with classmates could obtain companionship, but shared living also created challenges when routines and study preferences differed.

Daily routines were closely linked to well-being and concentration. Students described poor sleep, reliance on fast food, excessive caffeine, and unstructured days during examinations as worsening fatigue and concentration, whereas task lists, personal interests, and moderate physical activity helped some maintain balance. Academic and institutional pressures included heavy workload, frequent examinations, competition in large cohorts, difficulties organizing group study, and limited access to psychological support. Career uncertainty and competition for postgraduate training opportunities further affected motivation and future-oriented anxiety.

Political and economic stressors were described as persistent background pressures rather than isolated events. Students linked movement restrictions, uncertainty about travel and clinical access, financial strain, and regional instability to disrupted routines, concentration difficulties, and worry about future opportunities. Spiritual or religious practices were described by some students as sources of emotional stability. Social media had mixed effects: it could provide information or motivation, but students also described time loss, comparison with peers, feelings of inadequacy, and additional pressure. These latter issues expanded the survey findings because social-media comparison and career uncertainty were not directly captured as central quantitative predictors.

Table 6. Qualitative themes and illustrative field-note summaries (not verbatim quotations)

Integrated quantitative and qualitative findings

The joint display (Table 7) demonstrates how the two strands converged and complemented one another. The qualitative data were used not simply to confirm statistical associations but to explain how those associations were experienced and to identify additional contextual influences.

Table 7. Joint display integrating quantitative and qualitative findings

Discussion

This convergent mixed-methods study identified a high burden of psychological distress among Palestinian undergraduate medical students and a set of academic, lifestyle, psychosocial, and political factors associated with distress severity. The GHQ-12 findings should be interpreted as screening results

using study-defined analytic bands rather than psychiatric diagnoses. Previous Palestinian and regional studies have also documented substantial depressive, anxiety, and distress symptoms among medical students and other student populations, although direct prevalence comparisons are limited by differences in instruments and scoring methods (12,19,20,30,31).

Integration of quantitative and qualitative findings

Integration strengthened interpretation by showing where the two strands converged, where the qualitative data explained quantitative associations, and where interviews expanded beyond the survey. The association between lack of moral support and distress was complemented by students' descriptions of family and peer support as stabilizing resources. Similarly, the lower adjusted odds of distress among students living with family, compared with those living alone, were contextualized by accounts of loneliness, reduced immediate support, and practical difficulties among students living away from family. These findings suggest that living arrangement should be interpreted as a social and environmental context rather than a simple demographic characteristic.

The diet association was also enriched by qualitative accounts of fast food, poor sleep, caffeine, fatigue, and disrupted examination-period routines. This pattern suggests that diet may be part of a broader cluster of stress-related behaviors rather than an isolated exposure. Because the study is cross-sectional, it is equally plausible that distress contributes to unhealthy routines, that unhealthy routines contribute to distress, or that both reflect common underlying pressures. The findings therefore support association rather than causation.

Low motivation had one of the largest adjusted associations with distress, while interviews linked motivation to academic workload, perceived institutional support, crisis-related uncertainty, and competition for postgraduate opportunities. Political anxiety was similarly contextualized by accounts of movement restrictions, financial strain, disrupted routines, and uncertainty. Social-media comparison and career uncertainty emerged more strongly in the qualitative data than in the quantitative model, demonstrating expansion rather than simple confirmation. This is an important contribution of the convergent design.

Academic, lifestyle, and psychosocial correlates

Academic engagement and psychological well-being were closely related. Lower motivation and acceptable self-rated academic level remained associated with higher distress after adjustment, while study pattern, study hours, class participation, and perceived political effects on academic performance were associated with self-reported academic performance in bivariate analyses. Because no multivariable academic-performance model was fitted, these latter findings may be confounded and should not be interpreted as independent effects.

Lifestyle behaviors were also relevant. Physical inactivity and unhealthy dietary patterns were associated with distress in bivariate analyses, and diet remained associated in the adjusted model. Prior literature links physical activity and diet quality with mental well-being (23–25), but the direction of association cannot be established here. Practical medical-school interventions could include protected wellness time, realistic sleep-health and nutrition support during examination periods, and access to physical activity opportunities rather than framing lifestyle solely as individual responsibility.

Perceived moral support was strongly associated with distress, and interviews highlighted the value of family, friends, classmates, and partners. Social isolation is a recognized academic stressor (6), and the

present findings particularly raise concern for students living alone. Institutions could consider peer-buddy systems, mentoring, and low-barrier check-ins for students living away from family, while avoiding assumptions that all family environments are supportive.

Political and economic context

Political anxiety and perceived political effects on concentration were common. The interviews suggested several pathways through which the wider context may influence students: disrupted movement and clinical access, financial pressure, uncertainty about schedules, and concern about future training opportunities. OCHA and WHO reports during the study period documented intensified movement restrictions and disruptions to access to education and health services in the West Bank (33,34). These findings support context-sensitive educational planning, including flexible attendance policies, make-up opportunities when movement is restricted, remote-learning contingencies when feasible, and clear crisis communication.

Gender finding and model interpretation

The change in direction of the gender association requires particular caution. Female students had a higher unadjusted proportion of severe distress, but female gender was associated with lower odds of a higher distress category after adjustment. Such a reversal is compatible with confounding or statistical suppression when gender is correlated with other variables included in the model. However, the available analysis does not identify a specific mediator or suppressor, and no formal mediation or interaction analysis was performed. It would therefore be inappropriate to attribute the adjusted finding to biological sex or to any single psychosocial pathway. Future analyses should examine gender-stratified distributions and interactions with living arrangement, support, motivation, diet, and political anxiety.

The model's McFadden pseudo- R^2 of 0.172 indicates modest explanatory power, which is expected for a multifactorial outcome but also shows that substantial variation in distress remains unexplained. Estimates with wide confidence intervals, particularly for diet and motivation categories, should be interpreted as imprecise. Full reporting of proportional-odds diagnostics, multicollinearity assessment, goodness-of-fit, and sensitivity analyses would further strengthen the regression analysis if the original dataset and analysis code are available.

Regional context and comparison with the literature

The findings are consistent with earlier Palestinian research reporting depressive and anxiety symptoms among medical students (30) and with broader evidence that medical students are vulnerable to psychological distress (3,7,8,17,18). The recent Arab-region scoping review by Al-Amer et al. (31) reinforces that depression is a substantial concern across medical schools in the region, although prevalence estimates vary considerably by country, instrument, and study design. The Palestinian context adds chronic uncertainty, mobility restrictions, and institutional disruption to stressors common to medical education. Comparisons should therefore prioritize studies using similar instruments and scoring methods rather than treating prevalence values as directly interchangeable.

Strengths and limitations

This study has several strengths. It included students from five Palestinian universities and both pre-clinical and clinical stages; used an Arabic GHQ-12 with published psychometric evidence; assessed academic, lifestyle, psychosocial, socioeconomic, and political variables; and used qualitative interviews

to contextualize and expand the quantitative results. Explicit integration through narrative weaving and a joint display strengthens the mixed-methods interpretation.

Several limitations require emphasis. First, convenience recruitment through social-media groups creates potential selection bias, and a conventional response rate could not be calculated because the number of unique eligible students who viewed the invitation was unknown. Participation was also institutionally imbalanced, with 56.3% of the sample from An-Najah National University. Findings therefore should not be interpreted as statistically representative of all Palestinian medical students, and institutional clustering may have influenced results.

Second, the cross-sectional design prevents temporal or causal inference. Associations between distress, motivation, diet, academic functioning, and political anxiety may be bidirectional or confounded. The distress regression model had modest explanatory power. The absence of fully reported proportional-odds diagnostics, multicollinearity assessment, unadjusted ordinal-regression estimates, interaction testing, and sensitivity analyses limits assessment of model robustness. The k-nearest-neighbors imputation procedure was also not reported with enough detail to allow full reproducibility.

Third, academic performance was self-reported using broad ordinal categories and was not verified against official GPA records. This introduces possible recall, classification, and social-desirability bias and may be affected by differences in grading conventions across universities. Moreover, academic-performance associations were bivariate only, so residual confounding is likely.

Fourth, the qualitative strand relied on detailed field notes rather than audio recordings and verbatim transcripts. This approach may have reduced data richness, limited the precision of participant language, and increased dependence on interviewer interpretation. End-of-interview participant confirmation provided some credibility support, but the absence of verbatim transcripts limited auditability. Formal saturation, interviewer characteristics, exact interview duration and setting, the number of coders, and a codebook/audit trail were not documented in the materials available for this revision. Accordingly, illustrative statements are reported as paraphrased field-note reconstructions rather than verbatim quotations. Future work should use audio recording and full transcription when safe and acceptable, document reflexivity and interview context prospectively, and retain an explicit coding audit trail.

Fifth, the overall project period spanned approximately one year, during which academic schedules, economic pressures, movement restrictions, and political conditions may have changed. Although participant-facing recruitment and data collection were undertaken after the February 2025 ethical approval, students recruited at different points may still have responded under different contextual conditions. Finally, the four GHQ-12 severity bands used here were study-defined analytic categories rather than validated diagnostic classifications; the GHQ-12 is a screening instrument and cannot establish psychiatric diagnoses.

Implications for medical education

The findings support a multi-level, context-sensitive approach to student support. Feasible priorities include confidential and low-barrier counselling; faculty and peer mentoring; structured academic advising for students with low motivation or disorganized study routines; targeted social-support initiatives for students living alone or far from family; and practical sleep, nutrition, and physical-activity support during high-demand periods. In conflict-affected settings, these measures should be paired with

flexible attendance and assessment policies, rapid communication when travel is disrupted, remote or hybrid contingency options where feasible, and pathways for students facing acute financial or mobility barriers. Such strategies address both individual well-being and the educational environment rather than placing responsibility solely on students.

Conclusions

Psychological distress was common among the participating Palestinian medical students and was associated with academic, psychosocial, lifestyle, and political factors. In adjusted analysis, distress severity was associated with diet, perceived moral support, motivation, self-rated academic level, living arrangement, political anxiety, and gender; the gender finding changed direction after adjustment and requires cautious interpretation. Self-reported academic performance was associated only at the bivariate level with living arrangement, study behaviors, class participation, and perceived political impact. The mixed-methods integration suggests that social isolation, disrupted routines, academic pressure, financial strain, movement-related uncertainty, career concerns, and social-media comparison may help contextualize these associations. Longitudinal studies using more representative sampling, objective academic outcomes, full qualitative transcription, and complete regression diagnostics are needed.

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 authors contributed to study-related activities, analysis and/or interpretation, and manuscript preparation or critical revision. All authors reviewed and approved the final manuscript.

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References

1. Dyrbye LN, Shanafelt TD. A narrative review on burnout experienced by medical students and residents. *Med Educ*. 2016;50(1):132–149.
2. Malau-Aduli BS, Roche P, Adu M, Jones K, Alele F, Drovandi A. Perceptions and processes influencing the transition of medical students from pre-clinical to clinical training. *BMC Med Educ*. 2020;20:279.
3. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med*. 2006;81(4):354–373.
4. Allison MA, Attisha E, Lerner M, De Pinto CD, Beers NS, Gibson EJ, et al. The link between school attendance and good health. *Pediatrics*. 2019;143(2).
5. Dahlin ME, Runeson B. Burnout and psychiatric morbidity among medical students entering clinical training: a three-year prospective questionnaire and interview-based study. *BMC Med Educ*. 2007;7:6.
6. Walsham W, Perlman TT, Sihotang DJ. Unraveling the threads: a comprehensive exploration of the interplay between social isolation and academic stress among students. 2023;17(3):237–255.
7. Lasheras I, Gracia-García P, Lipnicki DM, Bueno-Notivol J, López-Antón R, de la Cámara C, et al. Prevalence of anxiety in medical students during the COVID-19 pandemic: a rapid systematic review with meta-analysis. *Int J Environ Res Public Health*. 2020;17(18):6603.
8. Rotenstein LS, Ramos MA, Torre M, Segal JB, Peluso MJ, Guille C, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: a systematic review and meta-analysis. *JAMA*. 2016;316(21):2214–2236.
9. Sperling EL, Hulett JM, Sherwin LB, Thompson S, Bettencourt BA. Prevalence, characteristics and measurement of somatic symptoms related to mental health in medical students: a scoping review. *Ann Med*. 2023;55(2):2242781.
10. Chung JH, Park YS. A study on the relationship between academic stress and mental health among high school students in South Korea. 2024;3(1):54–65.
11. Sirkeci I, Cohen JH. COVID-19 and migration: Understanding the pandemic and human mobility. London: Transnational Press; 2020.
12. Veronese G, Pepe A, Diab M, Jamey YA, Kagee A. Living under siege: resilience, hopelessness, and psychological distress among Palestinian students in the Gaza Strip. *Glob Ment Health*. 2021;8:e40.
13. Shaw TM, DeLaet DE. Transition of adolescents to young adulthood for vulnerable populations. 2010;31(12):497–505.
14. Daradkeh TK, Ghubash R, El-Rufaie OEF. Reliability, validity, and factor structure of the Arabic version of the 12-item General Health Questionnaire. *Psychol Rep*. 2001;89(1):85–94.
15. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19(6):349–357.
16. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101.
17. Quek TTC, Tam WWS, Tran BX, Zhang M, Zhang Z, Ho CSH, et al. The global prevalence of anxiety among medical students: a meta-analysis. *Int J Environ Res Public Health*. 2019;16(15):2735.

18. Frajerman A, Morvan Y, Krebs MO, Gorwood P, Chaumette B. Burnout in medical students before residency: a systematic review and meta-analysis. *Eur Psychiatry*. 2019;55:36–42.
19. Radwan E, Radwan A, Radwan W, Pandey D. Prevalence of depression, anxiety and stress during the COVID-19 pandemic: a cross-sectional study among Palestinian students aged 10–18 years. 2021;9(1):187.
20. Thabet A, Elheloub M, Vostanis P. Exposure to war traumatic experiences, post-traumatic growth and resilience among university students in Gaza. 2015.
21. Hobfoll SE, Watson P, Bell CC, Bryant RA, Brymer MJ, Friedman MJ, et al. Five essential elements of immediate and mid-term mass trauma intervention: empirical evidence. *Psychiatry*. 2007;70(4):283–315.
22. Marie M, Hannigan B, Jones A. Mental health needs and services in the West Bank, Palestine. *Int J Ment Health Syst*. 2016;10:23.
23. Stubbs B, Koyanagi A, Hallgren M, Firth J, Richards J, Schuch F, et al. Physical activity and anxiety: a perspective from the World Health Survey. *J Affect Disord*. 2017;208:545–552.
24. Schuch FB, Vancampfort D, Firth J, Rosenbaum S, Ward PB, Silva ES, et al. Physical activity and incident depression: a meta-analysis of prospective cohort studies. *Am J Psychiatry*. 2018;175(7):631–648.
25. O'Neil A, Quirk SE, Housden S, Brennan SL, Williams LJ, Pasco JA, et al. Relationship between diet and mental health in children and adolescents: a systematic review. *Am J Public Health*. 2014;104(10):e31–e42.
26. Huckins JF, DaSilva AW, Wang W, Hedlund E, Rogers C, Nepal SK, et al. Mental health and behavior of college students during the early phases of the COVID-19 pandemic: longitudinal smartphone and ecological momentary assessment study. *J Med Internet Res*. 2020;22(6):e20185.
27. Keles B, McCrae N, Grealish A. A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents. *Int J Adolesc Youth*. 2020;25(1):79–93.
28. Battista A, Torre D, Konopasky A. Essential concepts for effective mixed methods research in the health professions: AMEE Guide No. 173. *Med Teach*. 2025;47(5):766–778.
29. Schifferdecker KE, Reed VA. Using mixed methods research in medical education: basic guidelines for researchers. *Med Educ*. 2009;43(7):637–644.
30. Shawahna R, Hattab S, Al-Shafei R, Tab'ouni M. Prevalence and factors associated with depressive and anxiety symptoms among Palestinian medical students. *BMC Psychiatry*. 2020;20:244.
31. Al-Amer R, Alshawish E, Soudah O, Salameh B, Vaismoradi M, Alhalaiqa F, et al. Prevalence of depression among medical students across the Arab region: a scoping review. *BMC Med Educ*. 2025;25:1324.
32. Kerr Winter B, Salamma RM, Qabaja KA. Medical education in Palestine. *Med Teach*. 2015;37(2):125–130.
33. United Nations Office for the Coordination of Humanitarian Affairs, Occupied Palestinian Territory. Movement and Access in the West Bank | September 2024. 25 September 2024.
34. World Health Organization. WHO concerned about escalating health crisis in West Bank. 14 June 2024.

Tables

Table 1. Participant sociodemographic, lifestyle, and socioeconomic characteristics

† Variable showed a statistically significant bivariate association with psychological distress in the reported analysis. ‡ Variable showed a statistically significant bivariate association with self-reported academic performance. Several prespecified categories contain fewer than 20 participants and should be interpreted cautiously. Height was omitted because the supplied value (165.03 ± 23.93 cm) could not be verified from raw data and was not used in the reported analyses.

Variable	Category	n (%) / mean $\pm$ SD
Age (years)	-	21.70 $\pm$ 1.89
Gender†	Male	156 (39.9)
	Female	235 (60.1)
Weight (kg)	-	68.55 $\pm$ 16.89
Marital status	Unmarried	385 (98.5)
	Married	6 (1.5)
Residence	City	212 (54.2)
	Village	166 (42.5)
	Camp	13 (3.3)
Academic year	First year	47 (12.0)
	Second year	34 (8.7)
	Third year	40 (10.2)
	Fourth year	58 (14.8)
	Fifth year	94 (24.0)
	Sixth year	118 (30.2)
University	An-Najah National University	220 (56.3)
	Al-Quds University (Abu Dis)	50 (12.8)
	Palestine Polytechnic University	14 (3.6)
	Arab American University	59 (15.1)
	Hebron University	48 (12.3)
Living arrangement‡	With family	233 (59.6)
	With classmates (dorm)	101 (25.8)
	Alone (studio)	57 (14.6)
Chronic disease	No	373 (95.4)
	Yes	18 (4.6)
Regular medications	No	352 (90.0)
	Yes	34 (8.7)
	Yes during exam periods	5 (1.3)
Exercise†	Do not practice	208 (53.2)
	Less than 3 hours/week	101 (25.8)
	More than 3 hours/week	67 (17.1)
	Daily	15 (3.8)
Smoking	Do not smoke	317 (81.1)
	Occasionally smoke	29 (7.4)
	Smoke (cigarettes/hookah/e-cigarettes)	45 (11.5)
Diet†	Not following a healthy diet	201 (51.4)
	Follow a diet but not always	165 (42.2)
	Following a healthy diet	25 (6.4)
Caffeine cups/day	Do not drink at all	49 (12.5)
	1-2 cups	258 (66.0)
	3-5 cups	73 (18.7)
	More than 5 cups	11 (2.8)
Herbal supplements use	Do not use	304 (77.7)
	Use	87 (22.3)
Work status	Do not work	347 (88.7)
	Yes (part-time)	37 (9.5)
	Yes (full-time)	7 (1.8)
Birth order	The oldest	131 (33.5)
	In the middle	193 (49.36)

Variable	Category	n (%) / mean $\pm$ SD
Main household breadwinner†	The youngest	67 (17.14)
	Father	222 (56.8)
	Mother	19 (4.9)
	Both parents	135 (34.5)
	Other	15 (3.8)
Family income	Less than 1800	14 (3.6)
	1800-3000	51 (13.0)
	3000-5000	87 (22.3)
	5000-8000	93 (23.8)
	More than 8000	146 (37.3)
Father education	Less than high school	50 (12.8)
	High school	79 (20.2)
	Diploma	33 (8.4)
	Bachelor	153 (39.1)
	Graduate studies	76 (19.4)
Mother education	Less than high school	54 (13.8)
	High school	70 (17.9)
	Diploma	49 (12.5)
	Bachelor	176 (45.0)
	Graduate studies	42 (10.7)
Parents in medical field	No	330 (84.4)
	Yes, one in allied medical professions	35 (9.0)
	Yes, one in medicine	21 (5.4)
	Yes, both in allied medical professions	2 (0.5)
	Yes, both in medicine	3 (0.8)
First-generation student	No	292 (74.7)
	Yes	99 (25.3)
Personal expenses	Less than 500	73 (18.7)
	500-1000	162 (41.4)
	1000-1500	92 (23.5)
	More than 1500	64 (16.4)

Table 2. Study-related characteristics

Variable	Category	n (%)
Self-rated academic level	Acceptable	32 (8.2)
	Good	150 (38.4)
	Very good	163 (41.7)
	Excellent	46 (11.8)
Study hours/day‡	Less than 2 hours	60 (15.3)
	2-4 hours	137 (35.0)
	4-6 hours	144 (36.8)
	More than 6 hours	50 (12.8)
Study with	Alone	339 (86.7)
	With one person	42 (10.7)
	With a group	10 (2.6)
Preferred study time	Morning	101 (25.8)
	Evening	123 (31.5)
	Doesn't matter	167 (42.7)
Study place	Inside the residence	318 (81.3)
	Outside (café/library/etc.)	73 (18.7)
Study pattern†‡	Continuous daily until tasks completed	49 (12.5)
	Intermittent daily but tasks completed	161 (41.2)
	Sometimes not daily	92 (23.5)
	Intermittent and tasks not completed	89 (22.8)
Study method	Theoretical	61 (15.6)
	Auditory and theoretical	104 (26.6)
	Reading and writing	104 (26.6)
	Auditory	6 (1.5)
	Kinesthetic	9 (2.3)
	No specific pattern	107 (27.4)
Moral support†	No	141 (36.1)
	Yes	250 (63.9)
Motivation†	Not motivated at all	49 (12.5)
	Slightly motivated	58 (14.8)
	Moderately motivated	157 (40.2)
	Highly motivated	81 (20.7)
	Very highly motivated	46 (11.8)
Submitting assignments	Never	3 (0.8)
	Rarely	4 (1.0)
	Sometimes	29 (7.4)
	Often	116 (29.7)
	Always	239 (61.1)

Variable	Category	n (%)
Absences†	Never	133 (34.0)
	Once or twice	109 (27.9)
	3-5 times	65 (16.6)
	More than 5 times	84 (21.5)
Using extra materials	Never	5 (1.3)
	Rarely	27 (6.9)
	Sometimes	76 (19.4)
	Often	140 (35.8)
	Always	143 (36.6)
Using a schedule	Never	82 (21.0)
	Rarely	53 (13.6)
	Sometimes	111 (28.4)
	Often	115 (29.4)
	Always	30 (7.7)
Class participation‡	Never	40 (10.2)
	Rarely	89 (22.8)
	Sometimes	135 (34.5)
	Often	92 (23.5)
	Always	35 (9.0)

† Variable showed a statistically significant bivariate association with psychological distress. ‡ Variable showed a statistically significant bivariate association with self-reported academic performance. These symbols summarize variable-level associations reported in the Results; they do not represent category-specific tests.

Table 3. Political and financial context variables

Variable	Category	n (%)
Frequency of encountering political or mobility barriers	Never	68 (17.4)
	Rarely	48 (12.3)
	Sometimes	107 (27.4)
	Always	168 (43.0)
Frequency of personal impact of political/mobility barriers	Never	75 (19.2)
	Rarely	48 (12.3)
	Sometimes	163 (41.7)
	Always	105 (26.9)
Perceived impact of recent political events on self-reported academic performance ^{†‡}	Not affected	82 (21.0)
	Slightly affected	124 (31.7)
	Moderately affected	134 (34.3)
	Greatly affected	51 (13.0)
Personal expenses affected by the political situation [†]	Never	40 (10.2)
	Rarely	49 (12.5)
	Sometimes	163 (41.7)
	Always	139 (35.5)
Perceived political impact on future job opportunities	No effect	9 (2.3)
	A little	29 (7.4)
	Somewhat	168 (43.0)
	A lot	185 (47.3)
Frequency of political anxiety [†]	Never	10 (2.6)
	Rarely	16 (4.1)
	Sometimes	134 (34.3)
	Often	126 (32.2)
	Always	105 (26.9)
Perceived political effect on concentration [†]	Negative	210 (53.7)
	Neutral	170 (43.5)
	Positive	11 (2.8)

[†] Variable showed a statistically significant bivariate association with psychological distress. [‡] Variable showed a statistically significant bivariate association with self-reported academic performance. Labels have been expanded for clarity and “GPA” has been replaced with “self-reported academic performance” to reflect the measurement method.

Table 4. GHQ-12 total score and study-defined distress categories

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	-	-	-	-
	Mild distress	86	22.0	-	-	-	-
	Moderate distress	78	19.9	-	-	-	-
	Severe distress	94	24.0	-	-	-	-
	Total	391	100.0	-	-	-	-

GHQ-12 items were scored 0–1–2–3 (range 0–36). Study-defined analytic bands were normal/minimal 0–9, mild 10–15, moderate 16–21, and severe 22–36. These bands are descriptive analytic categories and are not diagnostic thresholds.

Table 5. Multivariable ordinal logistic regression of psychological distress

OR >1 indicates higher odds of being in a more severe study-defined distress category; OR <1 indicates lower odds, relative to the stated reference group. * $p < 0.05$. McFadden pseudo- $R^2 = 0.172$. Sparse reference categories and wide confidence intervals warrant cautious interpretation. Unadjusted ordinal-regression ORs and full proportional-odds/multicollinearity diagnostics were not available in the supplied output and should be added if recoverable from the original analysis.

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 psychological well-being and academic functioning

Theme	Key findings	Illustrative field-note summary (paraphrased; not verbatim)
Family and personal circumstances	Family support enhanced stability; family illness, bereavement, high expectations, and fear of failure increased emotional vulnerability.	Family emotional support was described as improving stability and concentration, while family expectations or illness could increase pressure.
Social and relational factors	Friends and partners buffered stress, while living away from family, loneliness, and family responsibilities increased strain.	Living with family was described as emotionally supportive but sometimes distracting; living alone or away from family was linked to loneliness and reduced immediate support.
Personal and day-to-day activities	Poor sleep, fast food, excessive caffeine, and unstructured routines impaired concentration; task lists and personal interests supported balance.	Examination periods were described as disrupting sleep and daily routines, with perceived consequences for concentration.
Academic and institutional issues	Heavy workload, frequent exams, competition, limited psychological services, group-study challenges, and part-time work affected well-being and performance.	Students described sustained workload and frequent examinations as persistent academic pressure.
Psychological stressors and coping capacity	Constant pressure, previous stressful experiences, inadequate faculty responses, and lack of preparedness for crises increased distress.	Students described ongoing pressure and variable coping capacity, particularly after stressful experiences or during periods of instability.
Career uncertainty and future concerns	Residency opportunities, competition, and unclear career pathways contributed to anxiety and fluctuating motivation.	Uncertainty about residency and postgraduate opportunities was described as a source of anxiety and fluctuating motivation.
Academic, social, and spiritual balance	Maintaining relationships was difficult; recreation and spiritual or religious practices supported emotional balance.	Spiritual or religious practices and recreation were described by some students as supporting emotional balance.
Social media and comparison	Social media was both motivational and stressful; excessive use caused time loss and comparison-related inadequacy.	Social-media use was described as potentially motivating but also as contributing to time loss, self-comparison, and perceived inadequacy.

Because interviews were documented using detailed field notes rather than audio recordings, illustrative statements are presented as paraphrased field-note summaries rather than verbatim quotations.

Table 7. Joint display integrating quantitative and qualitative findings

Quantitative finding	Qualitative contribution	Integrated interpretation / meta-inference
Lack of moral support: adjusted OR 2.95 for a higher distress category	Students described family, friends, classmates, and partners as emotional buffers; limited support increased loneliness and strain.	Convergence/complementarity: perceived social support may shape how students experience academic and contextual stress.
Living with family vs living alone: adjusted OR 0.47 for a higher distress category	Living alone/away from family was linked to loneliness and reduced immediate support; family co-residence could be supportive but sometimes distracting, while shared accommodation offered companionship with possible routine conflicts.	Complementarity: living arrangement may reflect social connection, practical support, and study-environment differences rather than residence status alone.
Unhealthy diet: adjusted OR 4.46; partially healthy diet: OR 2.81	Students linked examination periods with fast food, poor sleep, caffeine, fatigue, and disrupted routines.	Complementarity: diet may mark a broader cluster of stress-related routines; directionality cannot be established cross-sectionally.
Lower motivation showed a strong graded adjusted association with distress	Students connected motivation with workload, institutional pressure, crisis preparedness, and uncertainty about future opportunities.	Complementarity: low motivation and distress may coexist within a wider cycle of academic and future-oriented stress; mediation was not tested.
Political anxiety remained strongly associated with distress	Students described movement restrictions, instability, financial strain, and uncertainty as persistent background stressors affecting concentration and attendance.	Convergence/complementarity: political stress may operate through educational, financial, mobility, and anticipatory pathways.
Self-reported academic performance showed bivariate associations with study pattern, study hours, class participation, living arrangement, and perceived political impact	Students described workload, disrupted routines, group-study difficulties, and external barriers as affecting concentration and academic functioning.	Convergence: academic functioning appears embedded in both learning behaviors and contextual constraints; adjusted academic-performance effects were not estimated.
No central quantitative measure of social-media comparison or career uncertainty	Students described both motivational benefits and harmful comparison/time loss on social media, and anxiety about postgraduate opportunities.	Expansion: the qualitative strand identified potentially important exposures not directly modeled in the survey and priorities for future research.

The joint display is interpretive. Qualitative findings are used to explain, expand, or contextualize quantitative associations; they do not establish causal mechanisms.

Supplementary material

Additional file 1. Semi-structured interview guide (submitted separately).