

Perceived Stress and Big Five Personality Traits among Medical and Health Sciences Students: A Multinational Cross-Sectional Study

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Abstract

Medical and health sciences students may experience substantial stress because of demanding curricula, individual personality differences, and changing academic requirements across years of study. This study estimated the prevalence of perceived stress and examined its relationship with Big Five personality traits among students across academic years in African and Arab countries. In this multinational cross-sectional study, undergraduate medical and health sciences students from universities in Egypt, Yemen, Syria, Saudi Arabia, Sudan, and Nigeria completed the 10-item Perceived Stress Scale (PSS-10) and a 26-item short form of the Big Five Inventory (BFI). A total of 1,753 students participated. The mean PSS-10 score was 21.82 ± 6.44 ; 67.3% of participants reported moderate stress, 23.4% reported high stress, and 9.2% reported low stress. Agreeableness was the most common dominant personality trait (40.2%), whereas neuroticism was the sole dominant trait in 6.4% of participants. Dominant personality trait was significantly associated with stress category ($p < 0.001$); 60.2% of students with dominant neuroticism were in the high-stress category. Stress scores correlated positively with neuroticism ($r = 0.528$, $p < 0.001$) and negatively with extraversion ($r = -0.276$), openness ($r = -0.100$), and conscientiousness ($r = -0.122$) (all $p < 0.001$). In the adjusted ordinal regression model, female sex and neuroticism were associated with higher stress categories, whereas extraversion and conscientiousness were inversely associated. Academic year, social media use, caffeine intake, and nationality were associated with stress in unadjusted analyses but were not independent predictors after adjustment. Perceived stress was common in this multinational sample, and personality traits showed the strongest independent associations with stress. These findings support targeted, context-sensitive student mental health programs.

1. Introduction

Stress is a state of mental or emotional strain arising from adverse or demanding circumstances. It is common among university students worldwide and is frequently related to academic demands, time constraints, and social pressures. Excessive stress may impair cognitive functioning and academic performance and may contribute to mental health problems, including anxiety and depression (Shankar & Park, 2016).

Medical students may be particularly vulnerable because of demanding curricula and high performance expectations. Long study hours, frequent examinations, large volumes of information, and clinical responsibilities have all been identified as potential contributors to stress in this population (Ragab et al., 2021).

Personality traits are among the factors that shape how students perceive and respond to stress (Bernard University Lyon 1, 2023). The Five-Factor Model describes five broad traits: neuroticism, extraversion, openness, agreeableness, and conscientiousness. These traits may influence stress vulnerability, coping responses, emotional regulation, and resilience (Luo et al., 2023; Ulrich & Krull, 2020).

Neuroticism is consistently associated with greater stress and less adaptive coping because individuals with high neuroticism are more prone to anxiety, emotional instability, and negative affect (Gomez et al., 2015). By contrast, extraverted individuals may benefit from social interaction and positive experiences that buffer stress (Ulrich & Krull, 2020). Openness has been associated with flexible coping, problem-solving, and support-seeking (Besser & Shackelford, 2007). Agreeableness may promote supportive relationships and reduce interpersonal

conflict (Rettew et al., 2021), whereas conscientiousness may facilitate self-discipline, organization, and goal-directed behavior, thereby supporting the management of academic demands (Campbell-Sills et al., 2006).

Although many studies have examined personality and stress among medical students, most have been conducted within single-country settings. Stress experiences and personality profiles may vary across cultural, social, educational, and political contexts. Multinational evidence from the Middle East and Africa remains limited. This study therefore examined the prevalence of perceived stress and its associations with personality traits, sociodemographic characteristics, and selected lifestyle factors among medical and health sciences students from six countries.

2. Methodology

2.1. Study Design and Setting

This multinational cross-sectional study was conducted online during 2024. The target population comprised undergraduate students enrolled in medical or health-related programs at universities in Egypt, Yemen, Syria, Saudi Arabia, Sudan, and Nigeria. Students from all academic years were eligible.

2.2. Sample Size Calculation

The sample size was calculated to detect a correlation between Five-Factor personality traits and perceived stress, based on the moderate associations ($r \approx 0.30$) reported by Ebstrup et al. (2011). The required sample size was estimated using Fisher's z-transformation formula for correlation studies:

$$n = ((Z_{\alpha/2} + Z_{\beta}) / (0.5 \ln((1 + r) / (1 - r))))^2 + 3$$

Assuming a two-sided significance level of 0.05 ($Z = 1.96$), 80% statistical power ($Z = 0.84$), and an expected effect size of $r = 0.30$, the minimum required sample size was 85 participants. The target was increased to 100–120 participants to allow for potential missing data. The calculated minimum was substantially exceeded, and 1,753 students were ultimately recruited, increasing the precision of the estimates.

2.3. Eligibility Criteria

Eligible participants were undergraduate students enrolled during 2024 in medicine or another health-related program, including dentistry, pharmacy, physical therapy, veterinary medicine, oral medicine, and nursing, at a participating university. Participation was voluntary and required electronic informed consent. Students who were not enrolled in a medical or health-related program or were not enrolled during 2024 were excluded.

2.4. Primary Outcome

The primary outcome was perceived stress, assessed using the 10-item Perceived Stress Scale (PSS-10). Each item is rated on a five-point scale from 0 (never) to 4 (very often). Scores for positively worded items (items 4, 5, 7, and 8) are reversed before all item scores are summed, producing a total score from 0 to 40. Higher scores indicate greater perceived stress. Scores were categorized as low (0–13), moderate (14–26), or high (27–40) perceived stress (Cohen et al., 1983).

2.5. Key Exposures and Predictors

Personality traits were assessed using a 26-item short form of the Big Five Inventory adapted from the original 44-item instrument. The measure covered openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Other stress-related variables included caffeine intake, smoking status, and coping mechanisms.

2.6. Potential Confounders

Potential confounders considered included age, gender, body mass index, academic year, place of residence, university, and nationality. No effect modifiers were predefined.

2.7. Data Collection and Study Instruments

Data were collected using a self-administered online questionnaire distributed through Google Forms via social media, student groups, and academic networks in the participating countries. The questionnaire collected sociodemographic information (age, sex, residence, university, academic year, and academic performance), personality traits, selected stress-related behaviors, and perceived stress. Items used Likert-scale, multiple-choice, and free-text response formats, as appropriate.

2.8. Bias Control

To reduce reporting bias and protect confidentiality, participation was anonymous and voluntary, and the same standardized questionnaire was used for all participants. No personal identifiers were collected, and participants were informed that they could withdraw at any time.

2.9. Ethical Approval

The study protocol was approved by the Research Ethics Committee of South Valley University, Egypt (SVU-MED-QMSRU4242816). Electronic informed consent was obtained from all participants before data collection. Anonymity and confidentiality were maintained, and an information sheet described the study purpose, confidentiality measures, and research-team contact details.

2.10. Statistical Analysis

Data were analyzed using IBM SPSS Statistics, version 26.0 (IBM Corp., Armonk, NY, USA). Quantitative variables were summarized as mean $\pm$ standard deviation (SD) and range (minimum-maximum), whereas categorical variables were summarized as frequencies and percentages. The distribution of continuous variables was assessed before analysis. Independent-samples t tests and one-way analysis of variance (ANOVA) were used to compare mean stress scores across demographic and nationality groups, as appropriate. Chi-square tests were used to examine associations between categorical variables. Pearson's correlation coefficient was used to assess relationships between perceived stress scores and the Big Five personality trait scores.

Ordinal logistic regression was used to identify factors independently associated with perceived stress category, treated as an ordered outcome (low, moderate, and high). The fully adjusted model included age, gender, nationality, academic year, daily social media use, smoking status, caffeine intake, and the five Big Five

personality trait scores. Results are presented as adjusted odds ratios (AORs) with 95% confidence intervals (CIs). An AOR greater than 1 indicates higher odds of membership in a higher stress category, whereas an AOR less than 1 indicates lower odds. The proportional-odds assumption was assessed using the test of parallel lines. Complete-case analysis included 1,747 participants. A p value < 0.05 was considered statistically significant.

3. Results

A total of 1,753 students from health-related faculties participated (Figure 1). The mean age was 21.06 ± 2.03 years. Most participants were female (68.9%) and Egyptian (78.4%). Middle-year students represented 39.4% of the sample, followed by first-year students (36.4%) and final-year students (24.2%). Daily social media use exceeded four hours for 43.8% of participants. Current smoking was uncommon (2.3%), whereas 80.9% reported caffeine intake (Table 1).

Table 1. Sociodemographic characteristics and lifestyle factors of participants

Variable	Category/statistic	Summary (n = 1,753)
Age, years	Mean $\pm$ SD	21.06 $\pm$ 2.03
Gender	Male	546 (31.1%)
	Female	1,207 (68.9%)
Nationality	Egypt	1,374 (78.4%)
	Yemen	156 (8.9%)
	Syria	43 (2.5%)
	Saudi Arabia	37 (2.1%)
	Sudan	35 (2.0%)
	Nigeria	108 (6.2%)
Academic year	First-year students	638 (36.4%)
	Middle-year students	690 (39.4%)
	Final-year students	425 (24.2%)
Daily social media use	<1 h/day	67 (3.8%)
	1-2 h/day	256 (14.6%)
	2-4 h/day	662 (37.8%)
	>4 h/day	768 (43.8%)
Smoking status	Current smoker	40 (2.3%)
	Non-smoker	1,599 (91.2%)
	Passive smoker	114 (6.5%)
Caffeine intake	Yes	1,419 (80.9%)
	No	334 (19.1%)

Data are presented as mean $\pm$ SD for quantitative variables and n (%) for categorical variables.

The mean perceived stress score was 21.82 $\pm$ 6.44. Most participants reported moderate perceived stress (67.3%); 23.4% reported high stress, and 9.2% reported low stress (Table 2).

Table 2. Descriptive statistics for perceived stress scores and categories

Variable	Statistic/category	Summary (n = 1,753)
Stress score	Mean $\pm$ SD	21.82 $\pm$ 6.44
	Minimum-maximum	1-40
Stress category	Low perceived stress	162 (9.2%)
	Moderate perceived stress	1,180 (67.3%)
	High perceived stress	411 (23.4%)

PSS-10 scores were categorized as low (0-13), moderate (14-26), or high (27-40) perceived stress.

Agreeableness was the most common sole dominant personality trait (40.2%), followed by conscientiousness (13.5%) and openness (13.1%). Equal highest scores for two traits were classified as combined dominant categories (Table 3).

Table 3. Descriptive statistics for Big Five personality traits and dominant trait categories

Variable	Statistic/category	Value
Extraversion	Mean $\pm$ SD	11.65 $\pm$ 3.14
	Minimum-maximum	5.00-20.00
Neuroticism	Mean $\pm$ SD	12.06 $\pm$ 3.24
	Minimum-maximum	5-20
Agreeableness	Mean $\pm$ SD	15.96 $\pm$ 3.08
	Minimum-maximum	5-20
Openness	Mean $\pm$ SD	14.16 $\pm$ 3.32
	Minimum-maximum	5-20
Conscientiousness	Mean $\pm$ SD	13.75 $\pm$ 2.94
	Minimum-maximum	5-20
Dominant trait category	Extraversion	90 (5.1%)
	Neuroticism	113 (6.4%)
	Agreeableness	705 (40.2%)
	Openness	230 (13.1%)
	Conscientiousness	237 (13.5%)
	Openness and neuroticism	33 (1.9%)
	Agreeableness and openness	217 (12.4%)
	Agreeableness and conscientiousness	128 (7.3%)

Combined dominant categories indicate equal highest scores for two personality traits.

Stress category differed significantly according to dominant personality trait ($p < 0.001$). Among students with dominant neuroticism, 60.2% were in the high-stress category. By contrast, 6.7% of students with dominant extraversion were in the high-stress category, and 83.3% were in the moderate category. Most students with dominant agreeableness or conscientiousness were also in the moderate-stress category (Table 4).

Table 4. Distribution of perceived stress categories according to dominant personality trait

Dominant personality trait	Low stress, n (%)	Moderate stress, n (%)	High stress, n (%)	Total, n	p value
Extraversion	9 (10.0%)	75 (83.3%)	6 (6.7%)	90	<0.001
Neuroticism	2 (1.8%)	43 (38.1%)	68 (60.2%)	113	
Agreeableness	60 (8.5%)	487 (69.1%)	158 (22.4%)	705	
Openness	34 (14.8%)	152 (66.1%)	44 (19.1%)	230	
Conscientiousness	18 (7.6%)	154 (65.0%)	65 (27.4%)	237	
Openness and neuroticism	0 (0.0%)	30 (90.9%)	3 (9.1%)	33	
Agreeableness and openness	19 (8.8%)	149 (68.7%)	49 (22.6%)	217	
Agreeableness and conscientiousness	20 (15.6%)	90 (70.3%)	18 (14.1%)	128	

Values are n (row %). The chi-square test compared the distribution of stress categories across dominant personality traits.

Neuroticism showed a positive correlation with perceived stress score ($r = 0.528$, $p < 0.001$; Figure 2). Extraversion ($r = -0.276$), openness ($r = -0.100$), and conscientiousness ($r = -0.122$) were negatively correlated with stress (all $p < 0.001$; Figure 3 shows the association with extraversion). Agreeableness was not significantly correlated with stress ($r = 0.046$, $p = 0.053$) (Table 5).

Table 5. Correlations between personality trait scores and perceived stress score

Personality trait	Pearson r	p value
Extraversion	-0.276	<0.001
Neuroticism	0.528	<0.001
Agreeableness	0.046	0.053
Openness	-0.100	<0.001
Conscientiousness	-0.122	<0.001

Pearson correlation coefficients are reported. Correlations with $p < 0.01$ were statistically significant.

Gender, academic year, daily social media use, and caffeine intake were associated with perceived stress category in unadjusted analyses. Female students had a higher proportion of high perceived stress than male students (26.6% vs 16.5%, $p < 0.001$). Middle-year students had the highest proportion of high stress (25.2%),

followed by first-year (23.8%) and final-year students (20.0%) ($p = 0.002$). High stress was most frequent among students who used social media for more than four hours per day (28.1%, $p = 0.001$) and was more frequent among caffeine consumers than non-consumers (24.7% vs 18.0%, $p = 0.026$). Age and smoking status were not significantly associated with stress category (Table 6).

Table 6. Perceived stress categories according to demographic and lifestyle variables

Variable	Category	Low stress, n (%)	Moderate stress, n (%)	High stress, n (%)	p value
Age, years	Mean $\pm$ SD	20.93 $\pm$ 1.97	21.09 $\pm$ 1.93	21.07 $\pm$ 2.34	0.633
Gender	Male	81 (14.8%)	375 (68.7%)	90 (16.5%)	<0.001
	Female	81 (6.7%)	805 (66.7%)	321 (26.6%)	
Academic year	First-year students	66 (10.3%)	420 (65.8%)	152 (23.8%)	0.002
	Middle-year students	73 (10.6%)	443 (64.2%)	174 (25.2%)	
	Final-year students	23 (5.4%)	317 (74.6%)	85 (20.0%)	
Daily social media use	<1 h/day	6 (9.0%)	48 (71.6%)	13 (19.4%)	0.001
	1-2 h/day	34 (13.3%)	172 (67.2%)	50 (19.5%)	
	2-4 h/day	56 (8.5%)	474 (71.6%)	132 (19.9%)	
	>4 h/day	66 (8.6%)	486 (63.3%)	216 (28.1%)	
Smoking status	Current smoker	3 (7.5%)	25 (62.5%)	12 (30.0%)	0.853
	Non-smoker	149 (9.3%)	1,080 (67.5%)	370 (23.1%)	
	Passive smoker	10 (8.8%)	75 (65.8%)	29 (25.4%)	
Caffeine intake	Yes	126 (8.9%)	942 (66.4%)	351 (24.7%)	0.026
	No	36 (10.8%)	238 (71.3%)	60 (18.0%)	

Data are mean $\pm$ SD for age and n (row %) for categorical variables. One-way ANOVA compared mean age across stress categories; chi-square tests compared categorical variables.

Mean stress and personality scores differed significantly across nationality groups (all $p < 0.05$). Syrian students had the highest mean stress score, followed by Yemeni and Egyptian students, whereas Saudi and Nigerian students had lower mean scores. These comparisons should be interpreted cautiously because the nationality groups were markedly unequal in size (Table 7).

Table 7. Comparison of perceived stress and personality trait scores across nationalities

Nationality	Stress score	Extraversion	Neuroticism	Agreeableness	Openness	Conscientiousness
Egypt	22.07 ± 6.44	11.72 ± 3.12	12.41 ± 3.13	16.06 ± 3.03	14.07 ± 3.29	13.73 ± 2.93
Yemen	22.37 ± 6.67	11.186 ± 3.03	11.68 ± 3.26	15.82 ± 3.27	14.83 ± 3.53	13.75 ± 2.9
Syria	23.3 ± 5.8	10.84 ± 3.28	12.16 ± 2.45	15.97 ± 2.93	12.88 ± 3.18	12.6 ± 2.79
Saudi Arabia	18.37 ± 6.68	13.8 ± 3.29	10.81 ± 3.49	16.24 ± 3.72	14.73 ± 3.79	13.97 ± 2.94
Sudan	20.28 ± 6.05	12.68 ± 3.17	10.94 ± 3.1	16.8 ± 2.88	15.48 ± 3.26	14.4 ± 2.25
Nigeria	18.94 ± 5.17	10.69 ± 2.9	8.95 ± 2.86	14.93 ± 3.1	14.22 ± 2.94	14.3 ± 3.20
p value	<0.001	<0.001	<0.001	0.005	0.001	0.031
Eta squared	0.023	0.022	0.073	0.009	0.012	0.007

Values are mean ± SD unless otherwise indicated. One-way ANOVA was used for comparisons across nationality groups.

In the fully adjusted ordinal logistic regression model, female students had higher odds of membership in a higher stress category than male students (AOR = 1.518, 95% CI 1.178-1.956, $p = 0.001$). Neuroticism was the strongest positive personality correlate: each one-point increase was associated with 41.3% higher odds of being in a higher stress category (AOR = 1.413, 95% CI 1.355-1.473, $p < 0.001$).

Extraversion and conscientiousness were inversely associated with stress category. Each one-point increase in extraversion was associated with 11.3% lower odds of membership in a higher stress category (AOR = 0.887, 95% CI 0.853-0.923, $p < 0.001$), and each one-point increase in conscientiousness was associated with 14.0% lower odds (AOR = 0.860, 95% CI 0.823-0.898, $p < 0.001$). Age, nationality, academic year, daily social media use, smoking status, caffeine intake, agreeableness, and openness were not independently associated with stress category (Table 8).

Table 8. Fully adjusted ordinal logistic regression of factors associated with perceived stress category

Predictor	Adjusted OR	95% CI	B coefficient	p value
Age	1.052	0.981-1.128	0.051	0.154
Female vs male	1.518	1.178-1.956	0.417	0.001
Syria vs Egypt	1.127	0.574-2.211	0.120	0.728
Yemen vs Egypt	1.179	0.787-1.767	0.165	0.424
Saudi Arabia vs Egypt	0.677	0.320-1.434	-0.390	0.308
Sudan vs Egypt	1.039	0.482-2.239	0.038	0.923
Nigeria vs Egypt	1.049	0.657-1.675	0.048	0.841
Middle-year vs first-year students	0.964	0.725-1.283	-0.036	0.803
Final-year vs first-year students	0.864	0.590-1.264	-0.146	0.451
Social media <1 h/day vs >4 h/day	0.805	0.457-1.419	-0.216	0.454
Social media 1-2 h/day vs >4 h/day	0.795	0.570-1.110	-0.229	0.178
Social media 2-4 h/day vs >4 h/day	0.929	0.732-1.179	-0.073	0.545
Current smoker vs non-smoker	1.684	0.809-3.502	0.521	0.163
Passive smoker vs non-smoker	0.852	0.545-1.333	-0.160	0.484
Caffeine intake: yes vs no	1.134	0.861-1.493	0.125	0.372
Extraversion score	0.887	0.853-0.923	-0.120	<0.001
Neuroticism score	1.413	1.355-1.473	0.345	<0.001
Agreeableness score	1.012	0.968-1.057	0.011	0.612
Openness score	1.009	0.968-1.051	0.009	0.675
Conscientiousness score	0.860	0.823-0.898	-0.151	<0.001

Outcome: ordered perceived stress category (low, moderate, high). Reference categories were male, Egypt, first-year students, social media use >4 h/day, non-smoker, and no caffeine intake. The model included 1,747 complete cases and was adjusted for age, gender, nationality, academic year, daily social media use, smoking status, caffeine intake, and all five personality trait scores. Model log-likelihood = -1172.823; AIC = 2389.6. OR = odds ratio; CI = confidence interval.

4. Discussion

This multinational cross-sectional study found a high burden of perceived stress among medical and health sciences students. More than two-thirds of participants reported moderate stress and almost one-quarter reported high stress. Personality traits showed the strongest associations with stress: neuroticism was positively associated with stress, whereas extraversion and conscientiousness were inversely associated in the adjusted model. Female sex also remained independently associated with higher stress category. Although

academic year, social media use, caffeine intake, and nationality were associated with stress in unadjusted comparisons, these associations did not persist after adjustment.

The mean PSS-10 score was 21.82 ± 6.44 , and 90.7% of participants reported moderate or high perceived stress. This finding is consistent with literature describing medical education as a high-pressure environment (Dyrbye et al., 2006; Ebrahim et al., 2024). Intensive curricula, frequent examinations, large information loads, clinical exposure, and uncertainty about future careers may contribute to sustained psychological strain. Chronic stress can adversely affect academic performance and psychological well-being and may increase vulnerability to burnout, depression, and suicidal behavior.

The findings support an important relationship between personality and perceived stress. Agreeableness was the most common dominant trait category, but neuroticism showed the strongest positive correlation with stress ($r = 0.528$). Among participants with dominant neuroticism, 60.2% were in the high-stress category. This pattern is consistent with the tendency of individuals with higher neuroticism to experience emotional instability, anxiety, and negative affect and to appraise demanding situations as more threatening (Costa & McCrae, 1992).

Extraversion, conscientiousness, and openness were negatively correlated with stress. Students with dominant extraversion had the lowest proportion of high stress (6.7%), which may reflect access to social support, positive affect, and more active coping. Conscientiousness may support stress management through organization, self-discipline, and goal-directed behavior. Openness showed a smaller inverse correlation, possibly reflecting cognitive flexibility and adaptive coping. Agreeableness was not significantly correlated with stress, suggesting that interpersonal cooperation alone may not substantially influence perceived academic stress.

The adjusted regression analysis reinforced these patterns. Each one-point increase in neuroticism was associated with approximately 41% higher odds of membership in a higher stress category. By contrast, each one-point increase in extraversion and conscientiousness was associated with approximately 11% and 14% lower odds, respectively. These findings are broadly consistent with models in which neuroticism increases threat appraisal and negative affect, whereas extraversion and conscientiousness support social and organized coping resources (Liu et al., 2023). However, the literature is not entirely consistent; Liu et al. (2021), for example, reported a positive association between extraversion and stress in a different context.

Female students had a higher proportion of high perceived stress than male students (26.6% vs 16.5%) and remained at increased odds of higher stress after adjustment. Similar differences have been attributed to variations in emotional reactivity, coping patterns, academic pressures, and sociocultural expectations (Verma et al., 2011), although some studies have reported smaller or no gender differences depending on the population and measurement approach (Hamideh, 2011).

Stress category also differed by academic year in the unadjusted analysis. Middle-year students had the highest proportion of high stress (25.2%), potentially reflecting the transition from basic sciences to clinical training, increased workload, and early clinical exposure. Other studies have identified final-year students as a higher-risk group, indicating that the relationship between academic stage and stress may vary across curricula and settings (Alam et al., 2025). Academic year was not independently associated with stress in the adjusted model.

Students reporting more than four hours of daily social media use had the highest proportion of high stress in the unadjusted analysis. Excessive use may coexist with sleep disruption, academic distraction, cyberbullying, or negative social comparison (Keles et al., 2020). Caffeine consumers also had a higher unadjusted prevalence of high stress. Caffeine could increase physiological arousal, but reverse causation is equally plausible because students under greater stress may consume more caffeine to manage fatigue and workload. Neither social media use nor caffeine intake remained independently associated with stress after adjustment.

Unadjusted stress and personality scores differed across nationality groups. Syrian and Yemeni students had higher mean stress scores, whereas Saudi and Nigerian students had lower mean scores. These differences may reflect a range of unmeasured cultural, educational, socioeconomic, or political factors. However, nationality was not independently associated with stress in the adjusted model, and nationality should not be interpreted as a direct measure of sociopolitical instability, trauma exposure, or institutional support. The marked imbalance in country-specific sample sizes further limits cross-national interpretation.

4.1. Clinical and Educational Implications

The findings have several potential implications for medical and health sciences education:

1. Screening and support: Universities should consider confidential, voluntary screening for perceived stress and provide timely referral pathways. Personality information, if used, should guide supportive care rather than label or stigmatize students.
2. Tailored interventions: Support programs may include resilience training, cognitive-behavioral strategies, peer support, and stress-management workshops. Students with lower conscientiousness may particularly benefit from time-management and organizational support, whereas students with limited social support may benefit from structured opportunities for connection.
3. Institutional wellness strategies: Medical schools should reduce stigma surrounding mental health difficulties and integrate wellness initiatives that address academic workload, healthy sleep, responsible social media use, and reliance on caffeine.
4. Support for international and conflict-affected students: Institutions serving diverse student populations should ensure culturally responsive services and assess contextual stressors directly rather than relying on nationality as a proxy.

4.2. Limitations

Several limitations should be considered when interpreting these findings.

1. First, the cross-sectional design captures exposures and outcomes at a single time point and therefore cannot establish temporal sequence or causality so a cohort study is indicated.
2. Second, recruitment was conducted online through social media, student groups, and academic networks. This approach appears to represent non-probability, voluntary sampling and may have introduced self-

selection and coverage bias. However, this was the available method to collect the data from different multi-national universities.

3. Third, although the overall sample was large, it was substantially imbalanced by nationality, gender, and faculty. Egyptian students comprised 78.4% of participants, females comprised 68.9%, and medical students accounted for 77.8% of the faculty distribution shown. We can this data to generalize the results on those population.
4. Fourth, all variables were self-reported in a single online questionnaire. Recall error, social desirability, and common-method bias may therefore have influenced the reported associations.

5. Conclusion

Perceived stress was common among medical and health sciences students in this multinational sample. Neuroticism and female sex were independently associated with higher stress categories, whereas extraversion and conscientiousness were inversely associated. Differences by academic year, social media use, caffeine intake, and nationality were observed in unadjusted analyses but did not remain significant after adjustment. These findings support the development of accessible, culturally responsive, and individualized student mental health services. Nevertheless, the results should be interpreted in light of the cross-sectional design, self-reported measures, non-probability recruitment, and markedly unequal representation across countries and faculties.

Declarations

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Author Contribution

Shorouk Fathi Abd-Elmaksoud & Marwa Fouad Ebrahim: Drafted the discussion section and critically revised the manuscript. Eslam Abdelfattah Sadek: Performed the statistical analysis and data curation. Nezar Abo-Halawa & Eptehal Mohammed Dongol: Conceived the study concept, supervised the project, and critically revised the manuscript. Ahmed Refaat Abdellah, Rabab Abdalrahim, Abdelrahman A. Ebaid, Abdeljwad Mohamed Miftah, Yazeed Albalawi, Mohamed E. A. Mostafa, Ghufraan Tawfik Hussein Farag, & Hussein Abdalraheem Hussein Ali: Conceived the study concept, conducted data collection, and participated in drafting the manuscript.

Data Availability

Data are available upon reasonable request.

References

1. Alam MJ, Pratik MIK, Khan AH, et al. Prevalence and level of stress among final-year students at a health science institute in Bangladesh. *Disco Ment Health*. 2025; 5:9. doi:10.1007/s44192-025-00136-2 IF: 2.7 Q2 NA.
2. Alansari B. A cross-cultural comparison of the five personality factors in two Arabic cultures. *Eury Psychiatry*. 2015;30(1):410.
3. Bernard University Lyon 1. Association of personality traits with the efficacy of stress management interventions for medical students. 2023.
4. Besser A, Shackelford TK. Mediating and moderating factors in the relationship between personality traits and stress: a comprehensive review. *Stress Health*. 2007;23(1):1–12.
5. Campbell-Sills L, Cohan SL, Stein MB. Relationship between resilience and personality traits in medical students. *J Psychiatry Res*. 2006;41(4):263–270.
6. Cohen S, Lamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behave*. 1983;24(4):385–396.
7. Costa PT, McCrae RR. *NEO Personality Inventory Manual*. Odessa (FL): Psychological Assessment Resources; 1992.
8. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Accad Med*. 2006;81(4):354–373.
9. Ebrahim OS, Sayed HA, Rabie S, Hegazy N. Perceived stress and anxiety among medical students at Helwan University: a cross-sectional study. *J Public Health Res*. 2024;13(1). doi:10.1177/22799036241227891 IF: 1.8 Q3 B4.
10. Ebstrup JF, Eplov LF, Persinger C, Jørgensen T. Association between the five factor personality traits and perceived stress: is the effect mediated by general self-efficacy? *Anxiety Stress Coping*. 2011;24(4):407–419.
11. Gomez R, Cooper A. Neuroticism and emotional regulation: key factors in stress among students. *Pers Individua Dif*. 2015; 87:34–38.
12. Hamideh SH. Stressors and reactions to stressors among university students. *Int J Soc Psychiatry*. 2011;57(1):69–80.
13. John OP, Donahue EM, Kendle RL. *The Big Five Inventory—Versions 4a and 54*. Berkeley (CA): University of California, Berkeley, Institute of Personality and Social Research; 1991. *Big Five Inventory (BFI-2)*. University of California, Berkeley. Available from: <https://colby.edu/psych/personality-lab/bfi-2/>
14. Keles B, McCrae N, Grealish A. A systematic review: the influence of social media on depression, anxiety and psychological distress in adolescents. *Int J Adoles Youth*. 2020;25(1):79–93.
15. Lievens F, Cutesier P, De Fruit F, De Misener J. Medical students' personality characteristics and academic performance: a five-factor model perspective. *Med Educ*. 2002;36(11):1050–1056.

16. Liu A, Yu Y, Sun S. How is the Big Five related to college students' anxiety: the role of rumination and resilience. *Pers Individua Dif.* 2023; 200:111901.
17. Liu S, Mitropoulos A, Zhang CQ, Garcia-Barrera MA, Rhodes RE. Personality and perceived stress during the COVID-19 pandemic: testing the mediating role of perceived threat and efficacy. *Pers Individua Dif.* 2021; 168:110351.
18. Luo J, Zhang B, Cao M, Roberts BW. The stressful personality: a meta-analytical review of the relation between personality and stress. *Pers Soc Psyche Rev.* 2023;27(2):128–194.
19. Puthran R, Zhang MW, Tam WW, Ho RC. Prevalence of depression amongst medical students: a meta-analysis. *Med Educ.* 2016;50(4):456–468.
20. Ragab L, et al. Stress and its correlates among medical students in six medical colleges: an attempt to understand the current situation. *Middle East Curr Psychiatry.* 2021; 28:75.
21. Rettew DC, McGinnis EW, Copeland W, Nardone HY, Bai Y, Hudziak JJ, et al. Personality trait predictors of adjustment during the COVID pandemic among college students. *Plops One.* 2021;16(3): e0248895.
22. Shankar NL, Park CL. Effects of stress on students' academic performance. *J Educe Health Promote.* 2016; 5:141.
23. Stress [Def. 1]. Oxford English Dictionary Online. Oxford University Press; n.d. Available from: <https://www.oxfordlearnersdictionaries.com> (accessed August 30, 2015).
24. Ulrich G, Krull JL. Personality traits predict long-term physical health via affect reactivity to daily stressors. *Psyche Sci.* 2020;31(11):1306–1318.
25. Verma R, Balhara YP, Gupta CS. Gender differences in stress response: role of developmental and biological determinants. *Indian Psychiatry J.* 2011;20(1):4.

Figures

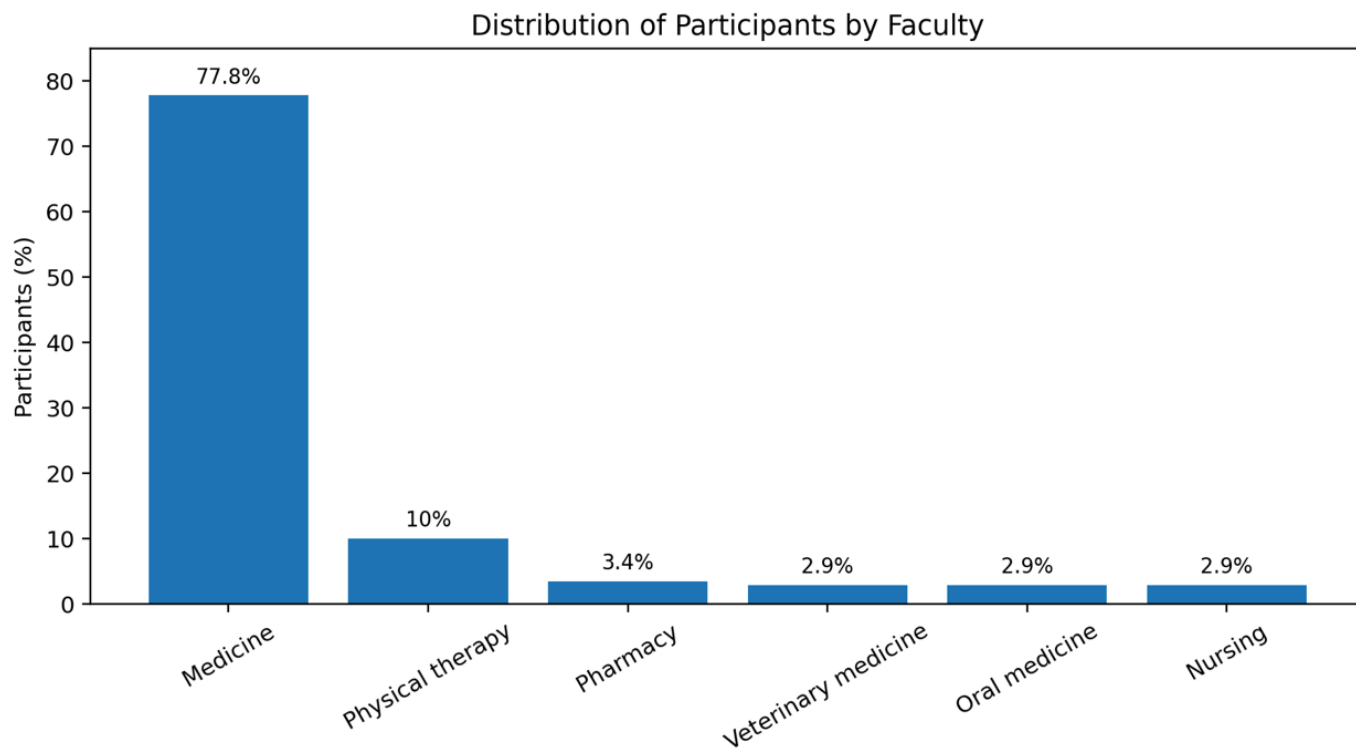


Figure 1

Distribution of participants across health-related academic faculties.

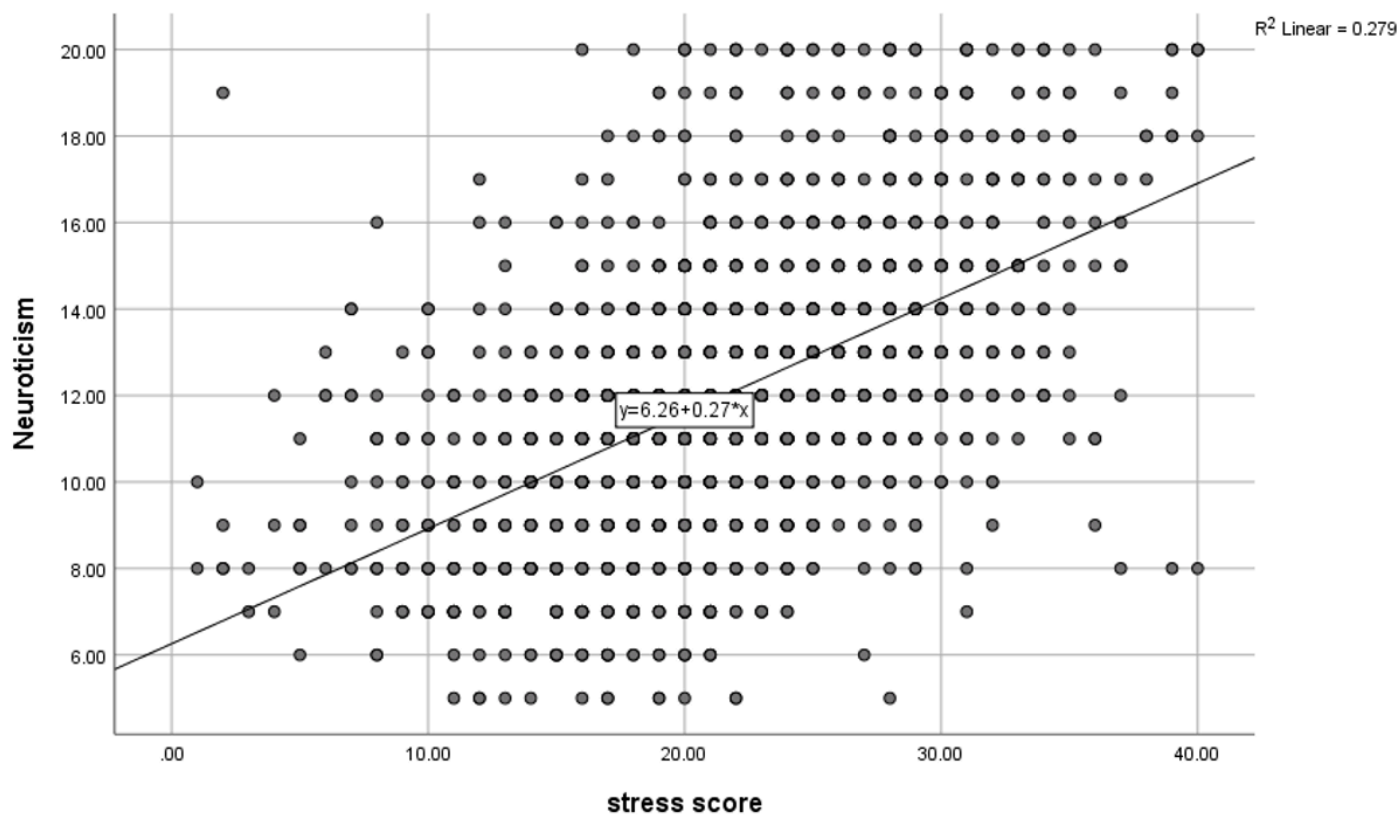


Figure 2

Positive correlation between neuroticism and perceived stress score.

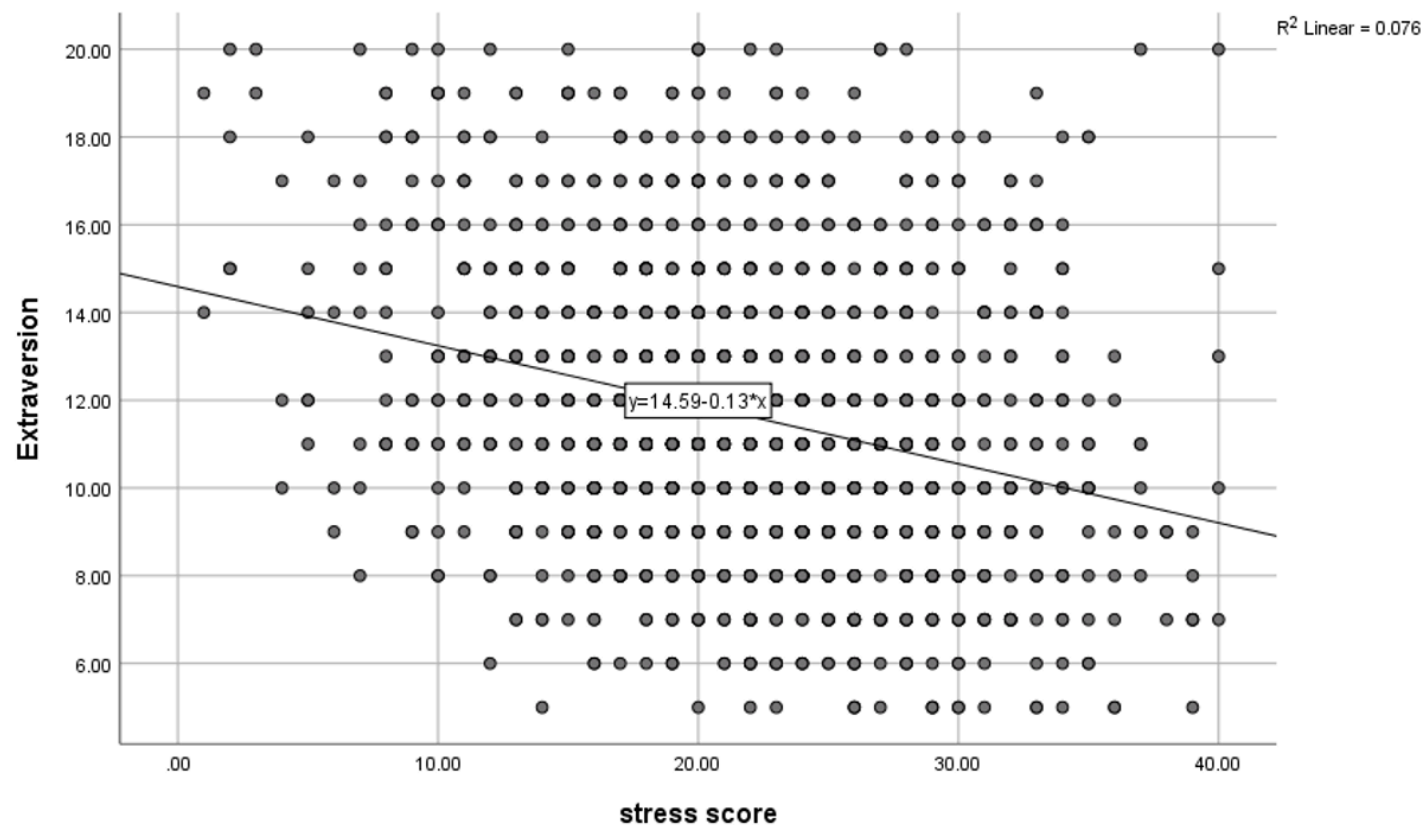


Figure 3

Negative correlation between extraversion and perceived stress score.