Research Square

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Prevalence and factors associated with stress, anxiety and depression among university students at the University of Dschang: a cross-sectional study

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Abstract

Background

Mental health disorders are a growing concern among university students, who face converging academic, social and economic pressures. Data from sub-Saharan African universities remain scarce, and no study had previously quantified this burden at the University of Dschang. We aimed to determine the prevalence of stress, anxiety and depression among students on the main campus and to identify the factors associated with each outcome.

Methods

We conducted a cross-sectional study with descriptive and analytical components between 1 January and 30 May 2026 among students enrolled on the main campus of the University of Dschang. Participants were selected by multistage stratified probabilistic sampling across all six faculties. Stress, anxiety and depression were measured with the 21-item Depression Anxiety Stress Scales (DASS-21) and sleep quality with the Pittsburgh Sleep Quality Index (PSQI; score > 5 defining poor sleep). Associations were examined by bivariable analysis followed by multivariable logistic regression using forward likelihood-ratio selection. Statistical significance was set at $p < 0.05$.

Results

Of 2,000 students approached, 1,453 were analysed (inclusion rate 72.7%); median age was 21 years (IQR 19–23) and 872 (60.0%) were women. The prevalence of stress was 44.7% (95% CI 42.3–47.3), of anxiety 73.2% (95% CI 70.8–75.2) and of depression 68.5% (95% CI 65.9–70.8). At least one disorder was present in 81.7% of participants and all three in 39.5%. Poor sleep quality, reported by 69.1%, was independently associated with all three outcomes (stress aOR 2.73 [95% CI 1.93–3.86], $p < 0.001$; anxiety aOR 2.42 [95% CI 1.49–3.92], $p < 0.001$; depression aOR 2.95 [95% CI 1.90–4.57], $p < 0.001$), as was high academic time pressure. Enrolment in the Faculty of Medicine and Pharmaceutical Sciences was associated with higher odds of anxiety (aOR 6.05 [95% CI 2.95–12.42]; $p < 0.001$) and depression (aOR 3.82 [95% CI 2.11–6.94]; $p < 0.001$) but with lower odds of stress (aOR 0.72 [95% CI 0.54–0.96]; $p = 0.024$). Regular physical activity was associated with lower odds of stress (aOR 0.67 [95% CI 0.49–0.92]; $p = 0.012$), and postgraduate enrolment with lower odds of anxiety (aOR 0.59 [95% CI 0.38–0.91]; $p = 0.016$).

Conclusion

Students at the University of Dschang carry a high and largely overlapping burden of psychological distress. Poor sleep quality and academic time pressure were associated with all three outcomes and

are modifiable. Because exposures and outcomes were measured simultaneously, these associations cannot be interpreted causally.

1. BACKGROUND

Mental health disorders account for a substantial and rising share of the global burden of disease, and the World Health Organization identifies them as a priority for health system strengthening [1]. University students are a group of particular concern, since the transition to higher education coincides with the age of onset of most common mental disorders and with academic, social and financial demands that arrive simultaneously [2].

Systematic reviews of college populations report pooled prevalences of approximately 33.9% for anxiety and 32.9% for depressive symptoms [3,4], and a nine-country comparison during the COVID-19 pandemic found rates of 27–48% [5]. Estimates from sub-Saharan Africa are fewer. A recent multi-country study of university staff and students in the region reported stress prevalences between 28% and 42% [6], and a Cameroonian study of nursing students found depression in 39.1% [7]. Comparable figures have been described among Ugandan students [8]. Two earlier studies conducted at the University of Dschang examined smartphone addiction and help-seeking behaviour among students [9,10], and a smaller DASS-21-based survey during the COVID-19 period reported depression, anxiety and stress prevalences of 31.7%, 29.5% and 2.4%, respectively but did not quantify the prevalence of stress, anxiety or depression using the same sampling frame as the present study [11].

Health science curricula have been repeatedly identified as a high-risk setting, with faculty-level gradients documented in North American medical schools [12] and higher depression prevalence among medical students in Saudi Arabia [13,14]. In low- and middle-income settings these academic pressures are compounded by economic ones, and the Lancet Commission on Global Mental Health identifies poverty and economic insecurity among the most consistent social determinants of common mental disorders [15].

Despite its position in the rankings of Central African universities, the University of Dschang aspires to greater international recognition, and this requires adequate training and outstanding results. However, this can lead to mental health issues. Such issues have been identified amongst staff at the University of Dschang [16], but there is very little data on the burden of anxiety, stress and depression amongst students at this university or identified the factors associated with them. We therefore conducted a cross-sectional study to determine the prevalence of these three conditions on the main campus and to identify their associated factors.

2. METHODS

2.1. Study design and setting

We conducted a cross-sectional study comprising a descriptive component, estimating the prevalence of stress, anxiety and depression, and an analytical component identifying factors associated with each outcome. The study took place on the main campus of the University of Dschang, Menoua division, West Region of Cameroon. Founded in 1993, the university is one of eleven state universities in Cameroon and hosts six faculties on its main campus: Medicine and Pharmaceutical Sciences, Science, Law and Political Sciences, Agronomy and Agricultural Sciences, Economics and Management, and Letters and Human Sciences. The campus draws students from across Cameroon and from other member states of the Central African Economic and Monetary Community. Data were collected between 1 January and 30 May 2026 during the 2025/2026 academic year.

2.2. Participants

The source population comprised all students enrolled on the main campus during the 2025/2026 academic year. Students were eligible if they were registered for the ongoing academic year and consented to participate. Participants who withdrew consent, or whose questionnaires were incomplete for the variables of interest, were excluded.

2.3. Sampling

Sampling was stratified probabilistically by faculty and department and clustered by level of study, with all six faculties represented. Faculties were first sampled with probability proportional to size. Within each faculty, three departments were selected at random from a pre-established list, and within each department three streams were selected at random. Within each stream, three levels of study were selected, and data were then collected by cluster according to the sample size allocated to that level. The allocation across faculties was proportional to their enrolment, which totalled 13,198 students.

2.4. Sampling size

The minimum sample size was calculated using the formula $n = Z^2 \times P(1 - P) / E^2$, with $Z = 1.96$, an assumed proportion P of 50% in the absence of any prior local estimate, and a margin of error E of 5%. This gave 385 participants, increased to 424 after allowing for 10% non-response. Given the size of the student population, the target was raised to 2,000 participants to improve precision and representativeness.

2.5. Variables and measurement

The three outcomes were stress, anxiety and depression, each measured with the corresponding seven-item subscale of the DASS-21 [17]. Items are rated on a four-point Likert scale from 0 (“did not apply to me at all”) to 3 (“applied to me very much or most of the time”). The instrument has established internal consistency and construct validity, has been validated in student populations, and is available in both English and French [18–20]. Established cut-offs were applied: stress ≥ 15, anxiety ≥ 8 and depression ≥ 10, with severity graded as mild, moderate, severe or extremely severe.

Sleep quality was assessed with the Pittsburgh Sleep Quality Index [21], comprising 19 self-rated items grouped into seven equally weighted components scored 0–3 and summed to a global score of 0–21, with higher scores indicating worse sleep. A global score above 5 defined poor sleep quality. Individual components, including sleep latency and sleep disturbances, were retained as separate exposures.

Explanatory variables were collected by structured questionnaire and comprised sociodemographic characteristics (age, sex, faculty, level of study, residence, displacement from the North-West or South-West regions, monthly allowance, parental education), academic characteristics (whether the programme was chosen or imposed, perceived time pressure, access to course materials, perceived academic performance, fear of academic failure, grade repetition) and lifestyle and health characteristics (screen time, physical activity, alcohol consumption, smoking).

2.6. Data collection

A structured, self-administered questionnaire was used, available in English and French. Data were collected using KoboToolbox and, where students preferred, printed paper copies, in face-to-face sessions. General student delegates provided contacts for class representatives, and appointments were made to present the study in selected classrooms. Each session began with an explanation of the study, presentation of the information sheet and the informed consent form. Anonymous study identifiers were assigned; no names were recorded. Electronic responses were stored on a password-protected server accessible only to the research team, and students were informed of their right to withdraw at any time.

2.7. Statistical analysis

Data were entered in KoboToolbox and analysed with SPSS version 23. Quantitative variables are presented as means with standard deviations or as medians with interquartile ranges according to their distribution, and qualitative variables as counts and proportions with 95% confidence intervals. Categorical variables were compared using the Chi-square test, with Fisher's exact test where expected cell counts were small.

For the analytical component, participants meeting the DASS-21 threshold for a given disorder were compared with those below it. Because the prevalence of anxiety and depression was high, the number of participants above the threshold exceeded the number below it; for these two outcomes the comparison groups were balanced by selecting, from among those meeting the threshold, a number equal to the participants below it (389 for anxiety and 458 for depression). Variables associated with an outcome in bivariable analysis were entered into a multivariable logistic regression model using forward likelihood-ratio selection. Results are presented as crude and adjusted odds ratios with 95% confidence intervals. Statistical significance was set at $p < 0.05$. Analyses were conducted on complete records.

2.8. Ethical considerations

Ethical clearance was obtained from the Regional Ethics Committee for Research on Human Health of the West Region (CRERSH-OU), reference N°/278/28/01/2026/CE/CRERSH-OU/VP. Administrative authorisation was granted by the Vice-chancellor of the University of Dschang and by the Deans of the six faculties. This study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from every participant. Participants identified as having severe symptoms were referred to a mental health specialist for management.

3. RESULTS

3.1. Participants

Of 2,000 students approached, 500 declined to participate (refusal rate 25.0%), yielding 1,500 completed questionnaires. Forty-four questionnaires were excluded for systematic missing data and three for implausible ages, giving a final analytical sample of 1,453 participants and an overall inclusion rate of 72.7%. Figure 1 presents the participants flow diagram.

3.2. Characteristics of participants

The population was young, with a median age of 21 years (IQR 19–23), and 872 participants (60.0%) were women. The Faculty of Medicine and Pharmaceutical Sciences contributed 424 participants (29.2%). Most students lived off campus, either alone (950; 65.4%) or with family (371; 25.5%), and 100 (6.9%) had relocated from the North-West or South-West regions because of the prevailing sociopolitical situation. A monthly allowance below 50,000 FCFA was reported by 1,266 students (87.1%). More than half (802; 55.2%) reported high or excessive academic time pressure, 875 (60.2%) rated their academic performance as poor or average, and 1,051 (72.3%) reported always or sometimes fearing academic failure. Insufficient physical activity was reported by 1,040 students (71.6%) and occasional or frequent alcohol consumption by 913 (62.8%). Full characteristics are given in Table 1.

3.3. Prevalence of stress, anxiety and depression

The median DASS-21 stress score was 14 (IQR 8–20) and 650 participants (44.7%; 95% CI 42.3–47.3) met the threshold for stress, of whom mild and moderate forms predominated; severe or extremely severe stress affected 9.1% of the whole sample. Anxiety was the most frequent outcome, with a median score of 12 (IQR 6–18) and a prevalence of 73.2% (1,064 participants; 95% CI 70.8–75.2); severe and extremely severe forms together accounted for 34.9% of the whole sample. The median depression score was 14 (IQR 8–20), and 995 participants (68.5%; 95% CI 65.9–70.8) met the threshold, with moderate to extremely severe forms representing 52.7% of the sample.

Poor sleep quality (PSQI > 5) was present in 1,004 participants (69.1%). At least one of the three disorders was present in 81.7% of participants and all three simultaneously in 574 (39.5%). Prevalences and severity distributions are shown in Table 2.

3.4. Factors independently associated with each outcome

Ten variables remained independently associated with stress. Poor sleep quality showed the strongest association (aOR 2.73 [95% CI 1.93–3.86]; $p< 0.001$), followed by insufficient access to course materials (aOR 2.23 [95% CI 1.45–3.44]; $p< 0.001$) and sleep disturbances (aOR 2.04 [95% CI 1.52–2.74]; $p< 0.001$). High academic time pressure (aOR 1.77 [95% CI 1.38–2.28], $p<0.001$) and alcohol consumption (aOR 1.38 [95% CI 1.06–1.79], $p=0.016$) were also associated with higher odds. Conversely, enrolment in the Faculty of Letters and Human Sciences (aOR 0.38 [95% CI 0.24–0.61], $p<0.001$), enrolment in the Faculty of Medicine and Pharmaceutical Sciences (aOR 0.72 [95% CI 0.54–0.96], $p<0.024$) and regular physical activity (aOR 0.67 [95% CI 0.49–0.92], $p<0.012$) were associated with lower odds. **Table 3** presents the factors associated with stress.

Nine variables were independently associated with anxiety. Enrolment in the Faculty of Medicine and Pharmaceutical Sciences (aOR 6.05 [95% CI 2.95–12.42], $p<0.001$) and in the Faculty of Science (aOR 5.18 [95% CI 2.70–12.51], $p<0.001$) showed the strongest associations. Fear of academic failure (aOR 2.03 [95% CI 1.37–3.02], $p<0.001$), poor sleep quality (aOR 2.42 [95% CI 1.49–3.92], $p<0.001$), high time pressure (aOR 1.70 [95% CI 1.20–2.42], $p=0.003$) and poor perceived performance (aOR 1.64 [95% CI 1.16–2.33], $p=0.005$) were also independently associated. Master's and PhD students had lower odds than undergraduates (aOR 0.59 [95% CI 0.38–0.91], $p=0.016$) (**Table 4**).

Eleven variables were independently associated with depression. Enrolment in the Faculty of Science (aOR 4.04 [95% CI 2.12–7.69], $p<0.001$) and in the Faculty of Medicine and Pharmaceutical Sciences (aOR 3.82 [95% CI 2.11–6.94], $p<0.001$) showed the strongest associations, followed by poor sleep quality (aOR 2.95 [95% CI 1.90–4.57], $p<0.001$) and high academic time pressure (aOR 2.34 [95% CI 1.70–3.22], $p<0.001$). A programme imposed by others (aOR 1.95 [95% CI 1.23–3.11], $p=0.005$), fear of academic failure (aOR 1.74 [95% CI 1.20–2.52], $p=0.004$) and poor perceived performance (aOR 1.64 [95% CI 1.18–2.28], $p=0.003$) were also independently associated. Postgraduate enrolment (aOR 0.64 [95% CI 0.42–0.97], $p=0.036$) and smoking (aOR 0.42 [95% CI 0.20–0.90], $p=0.026$) were associated with lower odds. These variables are presented in **Table 5**.

4. DISCUSSION

In this cross-sectional study of 1,453 students at the University of Dschang, 44.7% met DASS-21 criteria for stress, 73.2% for anxiety and 68.5% for depression. More than four in five students had at least one of the three conditions, and more than half of the students presented with sleep disorder. The extraordinary degree of comorbidity, nearly two in five students simultaneously meeting criteria for all three disorders underscores the severity of the mental health crisis at UDs. Sleep quality, academic time pressure, and faculty enrolment emerged as consistent cross-cutting determinants of all three outcomes.

The prevalences we observed exceed most published estimates. The pooled prevalence of stress in college students worldwide has been estimated at approximately 33.8% [3], and studies across sub-Saharan African universities have reported 28–42% [6]. A Cameroonian study of nursing students

reported 39.1% [7], closer to our estimate but still lower; our sample included students from a wider range of programmes. The anxiety prevalence of 73.2% is higher than the pooled estimate of 33.9% reported for college students [3] and higher than the 27–48% observed across nine countries during the COVID-19 pandemic [5], which is notable given that our study was conducted outside a pandemic period. The 75-83.4 % prevalence of depression reported among medical students in Saudi Arabia was higher than our findings and could be explained by the fact that the recruitment population consisted solely of medical students [13,14]. Similarly, our depression prevalence of 68.5% is more than double the pooled estimate of approximately 32.9% reported in systematic reviews [4], and higher than the prevalences generally below 50% documented across sub-Saharan African universities [6].

Several features of this setting may contribute. Financial precarity was near-universal, with 87.1% of students receiving less than 50,000 FCFA (88.56 USD) per month, and food insecurity among Cameroonian students has been documented [22]. Folkman's transactional model frames stress as arising when perceived demands exceed available coping resources [23]; in a population where 55.2% reported high or excessive time pressure and 60.2% perceived their academic performance as poor, such appraisals were widespread. Hobfoll's conservation of resources model [24] offers a complementary account of the high comorbidity we observed, predicting that simultaneous loss of financial, academic and health resources produce cumulative depletion, while the biopsychosocial model [25] situates these environmental stressors alongside individual vulnerability. A further contextual factor is that 6.9% of participants had been displaced by the sociopolitical crisis in the North-West and South-West regions, a source of chronic psychosocial stress previously described in this region [26].

The consistency of the association with sleep quality across all three outcomes is the most actionable finding. Poor sleep affected 69.1% of participants and was independently associated with stress, anxiety and depression, with the largest adjusted odds ratio observed for depression. Because sleep is both a symptom and a plausible contributor, and because it was measured concurrently, the direction of this association cannot be established from these data. This association was already found among medical students in Saudi Arabia, requiring screening and appropriate intervention for sleep problem [27].

The faculty findings deserve careful interpretation because they are not consistent across outcomes. Enrolment in the Faculty of Medicine and Pharmaceutical Sciences was associated with substantially higher odds of anxiety and depression, in keeping with faculty-level gradients described elsewhere [12,13], yet with modestly lower odds of stress. One possible explanation is that the DASS-21 stress subscale captures tension, irritability and over-reactivity, which may be construed differently by students in a professional curriculum where sustained workload is normative; but this study cannot distinguish between such an explanation and differential reporting, and the discrepancy should be regarded as unexplained [17].

Two protective associations are worth noting. Regular physical activity was associated with lower odds of stress, and postgraduate enrolment with lower odds of both anxiety and depression, which may reflect greater academic autonomy and a thesis-based rather than examination-based assessment structure.

Whilst the independence and adaptability of postgraduate students mean they are at a lower risk of stress, anxiety and depression [28,29], the role of sport in reducing these conditions is little known and needs to be more widely publicised [30]. The association between smoking and lower odds of depression should not be interpreted substantively; smoking was reported by only 3.9% of participants and the estimate is imprecise.

The near-absence of campus psychological support services and documented stigma surrounding mental health in this setting [10,31,32]mean that a substantial proportion of students with moderate to severe symptoms are unlikely to be identified or treated, with implications for academic attrition [15].

Limitations

Several limitations should be considered:

- First, the cross-sectional design measured exposures and outcomes simultaneously and therefore cannot establish temporality; no causal inference can be drawn, and reverse causation is plausible for several associations, particularly sleep quality.

- Second, the refusal rate of 25.0% may have introduced selection bias, and we did not collect information allowing respondents to be compared with those who declined.

- Third, the DASS-21 and PSQI are screening instruments measuring symptoms over defined recall periods; they do not establish clinical diagnoses, and the prevalences reported here should be read as symptom prevalences rather than diagnosed disorders.

- Fourth, self-report is subject to social desirability bias, which may be accentuated by stigma surrounding mental health in this setting [16,20].

- Fifth, for anxiety and depression the comparison groups were balanced by selecting a subset of participants above the threshold; this discarded information and reduced the precision of the corresponding estimates.

- Sixth, the planned sample of 2,000 was not achieved, which may have limited power for some subgroup analyses.

- Seventh, variable selection for the multivariable models used a forward likelihood-ratio (stepwise) procedure following bivariable screening, an approach known to produce optimistic p-values and inflated or unstable coefficient estimates; the adjusted odds ratios reported here should therefore be interpreted as hypothesis-generating rather than as a definitive, pre-specified confounder-adjusted model.

- Eighth, for anxiety and depression the multivariable models were fitted after under-sampling participants below the diagnostic threshold to balance group sizes; while this outcome-based sampling does not bias the odds ratio estimates themselves, it does mean the corresponding model intercepts,

and any measure derived from them, do not reflect the true sample prevalence. Finally, the study was conducted at a single university.

Generalisability

The findings apply to students enrolled on the main campus of the University of Dschang during the 2025/2026 academic year. Although sampling was probabilistic and covered all six faculties, extrapolation to other Cameroonian universities should be cautious, since the institutional culture, academic calendar and student living conditions described here are specific to this campus [19].

5. CONCLUSION

Students at the University of Dschang carry a high and largely overlapping burden of symptoms of stress, anxiety and depression, with more than four in five affected by at least one condition. Poor sleep quality and high academic time pressure were associated with all three outcomes and are both modifiable. These findings support the introduction of accessible campus mental health services, together with institutional attention to academic workload, sleep and the material conditions of student life. Because of the cross-sectional design, longitudinal studies are needed to establish the direction of these associations.

Abbreviations

aOR
Adjusted Odds Ratio
cOR
Crude Odd Ratio
CI
Confidence interval
DASS-21
Depression Anxiety Stress Scales-21-item
FAAS
Faculty of Agronomy and Agricultural Sciences
FEM
Faculty of Economics and Management
FLHS
Faculty of Letter and Human Sciences
FLPS
Faculty of Law and Political Sciences
FMPS
Faculty of Medicine and Pharmaceutical Sciences
FS

Faculty of Sciences
ILO
International Labour Organization
IQR
Interquartile range
PSQI
Pittsburgh Sleep Quality Index
RECHR-W
Regional Ethical Committee for Human Research of the West Region
SPSS
Statistical Package for the Social Sciences
WHO
World Health Organization

Declarations

Ethics approval and consent to participate. Ethical clearance was obtained from the Regional Ethics Committee for Research on Human Health of the West Region (No/278/28/01/2026/CE/CRERSH-OU/VP). Administrative authorisation was granted by the Rector of the University of Dschang and the Deans of the six faculties. All participants gave written informed consent.

Consent for publication: Not applicable.

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Authors' contributions:

NO, SRSN, GCVMN and SPC designed the study.

NO and SRSN collected data.

NO, CDN and SRSN analyzed the data.

SRSN drafted the paper

NO, CBE, GCVMN, FKL, SPC reviewed the paper.

All the authors read and approved the final draft for publication.

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Tables

Table 1: Characteristics of participants (N = 1,453)

Characteristic	Category	n	%
Age group (years)	< 20	388	26.7
	20–24	881	60.6
	25–29	174	12.0
	≥ 30	10	0.7
Sex	Male	581	40.0
	Female	872	60.0
Faculty	FMPS	424	29.2
	FS	342	23.5
	FLPS	207	14.2
	FAAS	200	13.8
	FEM	150	10.3
	FLHS	130	8.9
Level of study	Year 1	354	24.4
	Year 2	330	22.7
	Year 3	328	22.6
	Master 1	211	14.5
	Master 2	149	10.3
	PhD	81	5.6
Residence	Off-campus (alone)	950	65.4
	With family	371	25.5
	On-campus hostel	114	7.8
	Other	18	1.2
Displaced from NW/SW regions	Yes	100	6.9
Monthly allowance (FCFA)	< 25,000	616	42.4
	25,000–50,000	650	44.7
	50,000–75,000	139	9.6
	≥ 75,000	48	3.3
Father's education	Higher	833	57.3

Characteristic	Category	n	%
	Secondary	472	32.5
	None or primary	148	10.2
Mother's education	Secondary	617	42.5
	Higher	607	41.8
	None or primary	229	15.8
Study programme	Personal choice	1,245	85.7
	Imposed by others	208	14.3
Academic time pressure	High or excessive	802	55.2
Access to course materials	Rarely or never	151	10.4
Perceived academic performance	Poor or average	875	60.2
Fear of academic failure	Always or sometimes	1,051	72.3
Grade repetition (≥ 1 year)	Yes	255	17.6
Screen time ≥ 4 h/day	Yes	799	55.0
Insufficient physical activity	Yes	1,040	71.6
Alcohol consumption	Occasional or frequent	913	62.8
Smoking	Yes	57	3.9
Poor sleep quality (PSQI > 5)	Yes	1,004	69.1

FCFA: *Franc of the African Financial Community;* **NW/SW***: North-West and South-West regions*; **PSQI***: Pittsburgh Sleep Quality Index.,* ***FAAS:*** *Faculty of Agronomy and Agricultural Sciences;* ***FEM:*** *Faculty of Economics and Management;* ***FLHS:*** *Faculty of Letter and Human Sciences;* ***FLPS:*** *Faculty of Law and Political Sciences;* ***FMPS:*** *Faculty of Medicine and Pharmaceutical Sciences; FS: Faculty of Sciences*

Table 2: Prevalence and severity of stress, anxiety and depression (N = 1,453)

Outcome	Severity	n	% (95% CI)
Stress (score ≥ 15)	All severities	650	44.7 (42.3–47.3)
	Mild (15–18)	257	17.7 (15.8–19.8)
	Moderate (19–25)	260	17.9 (15.8–19.7)
	Severe (26–33)	114	7.8 (6.5–9.2)
	Extremely severe (≥ 34)	19	1.3 (0.8–1.9)
Anxiety (score ≥ 8)	All severities	1,064	73.2 (70.8–75.2)
	Mild (8–9)	128	8.8 (7.4–10.3)
	Moderate (10–14)	429	29.5 (27.2–31.8)
	Severe (15–19)	237	16.3 (14.4–18.2)
	Extremely severe (≥ 20)	270	18.6 (16.6–20.6)
Depression (score ≥ 10)	All severities	995	68.5 (65.9–70.8)
	Mild (10–13)	229	15.8 (13.9–17.7)
	Moderate (14–20)	456	31.4 (28.9–33.6)
	Severe (21–27)	201	13.8 (12.2–15.6)
	Extremely severe (≥ 28)	109	7.5 (6.2–8.9)
Any of the three disorders	—	1,187	81.7
All three simultaneously	—	574	39.5

CI, confidence interval. Severity categories are those of the DASS-21.

Table 3: Factors independently associated with stress

Variable	Crude OR (95% CI)	Crude *p*-value	Adjusted OR (95% CI)	Adjusted *p*-value
FMPS	0.68 (0.54–0.86)	***0.001***	0.72 (0.54–0.96)	***0.024***
FLSH	0.48 (0.32–0.72)	***<0.001***	0.38 (0.24–0.61)	***<0.001***
Study program imposed by others	1.46 (1.07–2.00)	***0.017***	1.54 (1.09–2.20)	***0.016***
High time pressure	1.86 (1.49–2.32)	***<0.001***	1.77 (1.38–2.28)	***<0.001***
Insufficient access to course materials	**3.39 (2.31–4.98)**	***<0.001***	**2.23 (1.45–3.44)**	***<0.001***
Sleep disorder (PSQI > 5)	**3.97 (3.12–5.06)**	***<0.001***	**2.73 (1.93–3.86)**	***<0.001***
Sleep latency > 30 min	1.37 (1.05–1.79)	***0.021***	1.38 (1.03–1.87)	***0.034***
Sleep disturbances (C5)	**3.16 (2.42–4.12)**	***<0.001***	**2.04 (1.52–2.74)**	***<0.001***
Physical activity	0.60 (0.46–0.79)	***<0.001***	0.67 (0.49–0.92)	***0.012***
Alcohol consumption	1.57 (1.25–1.98)	***<0.001***	1.378 (1.06–1.79)	***0.016***

FLHS: *Faculty of Letter and Human Sciences;* ***FMPS:*** *Faculty of Medicine and Pharmaceutical Sciences****;*** ***PSQI****: Pittsburgh Sleep quality Index*

Table 4: Factors independently associated with anxiety

Variable	Crude OR (95% CI)	Crude p-value	Adjusted OR (95% CI)	Adjusted *p*-value
FMPS	**3.03 (2.26–4.06)**	***<0.001***	**6.05 (2.95–12.42)**	***<0.001***
FS	1.42 (1.01–2.00)	***0.046***	**5.183 (2.701–12.51)**	***<0.001***
FEM	0.05 (0.01–0.20)	***<0.001***	0.19 (0.04–0.96)	***0.044***
Fear of academic failure	1.97 (1.40–2.77)	***<0.001***	**2.03 (1.37–3.02)**	***<0.001***
High time pressure	2.13 (1.40–2.84)	***<0.001***	1.70 (1.20–2.42)	***0.003***
Poor perceived performance	1.86 (1.39–2.50)	***<0.001***	1.64 (1.16–2.33)	***0.005***
Sleep disorder (PSQI > 5)	**3.84 (2.74–5.39)**	***<0.001***	**2.42 (1.49–3.92)**	***<0.001***
Sleep disturbances (C5)	2.67 (1.963–3.600)	***<0.001***	1.78 (1.25–2.55)	***0.002***
Master's & PhD level (ref. Bachelor's)	0.57 (0.42–0.77)	***<0.001***	0.59 (0.38–0.91)	***0.016***

FEM: *Faculty of Economics and Management;* ***FMPS:*** *Faculty of Medicine and Pharmaceutical Sciences;* ***FS****: Faculty of Sciences;* ***PSQI****: Pittsburgh Sleep quality Index*

Table 5: Factors independently associated with Depression

Variables	Crude OR (95% CI)	Crude p-value	aOR (95% CI)	Adjusted *p*
FMPS	2.23 (1.71–2.92)	**<0.001**	3.82 (2.11–6.94)	**<0.001**
FS	1.60 (1.17–2.18)	**0.003**	4.04 (2.12–7.69)	**<0.001**
Study program imposed by others	1.94 (1.31–2.87)	**0.001**	1.95 (1.23–3.11)	**0.005**
Fear of academic failure	1.88 (1.37–2.57)	**<0.001**	1.74 (1.20–2.52)	**0.004**
High time pressure	2.700 (2.07–3.53)	**<0.001**	2.34 (1.700–3.22)	**<0.001**
Poor perceived performance	2.00 (1.52–2.63)	**<0.001**	1.64 (1.18–2.28)	**0.003**
Sleep disorder (PSQI > 5)	4.86 (3.52–6.69)	**<0.001**	2.947 (1.90–4.57)	**<0.001**
Sleep latency > 30 min	1.71 (1.23–2.37)	**0.001**	1.68 (1.12–2.500)	**0.011**
Sleep disturbances (C5)	2.47 (1.87–3.28)	**<0.001**	1.58 (1.13–2.21)	**0.008**
Master's & PhD level (ref. Bachelor's)	0.61 (0.46–0.81)	**0.001**	0.64 (0.42–0.97)	**0.036**
Smoking	0.45 (0.25–0.86)	**0.013**	0.42 (0.200–0.90)	**0.026**

aOR: adjusted odds ratio; CI: confidence interval; ***FMPS:*** *Faculty of Medicine and Pharmaceutical Sciences; FS: Faculty of Sciences: PSQI: Pittsburgh Sleep quality Index*

Figures

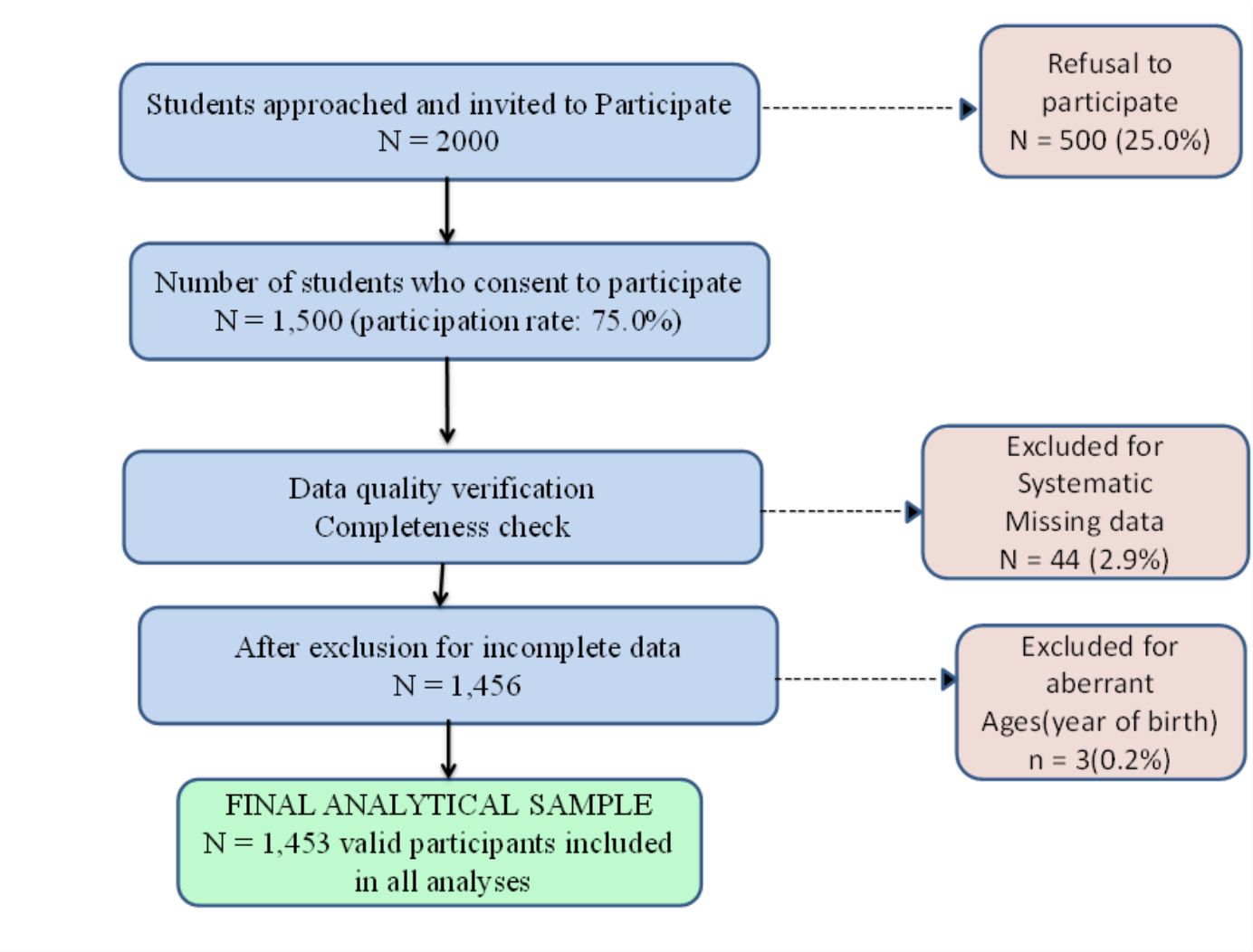


Figure 1

Participant flow chart

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