

Depression, anxiety, and stress: a mental health overview in university students

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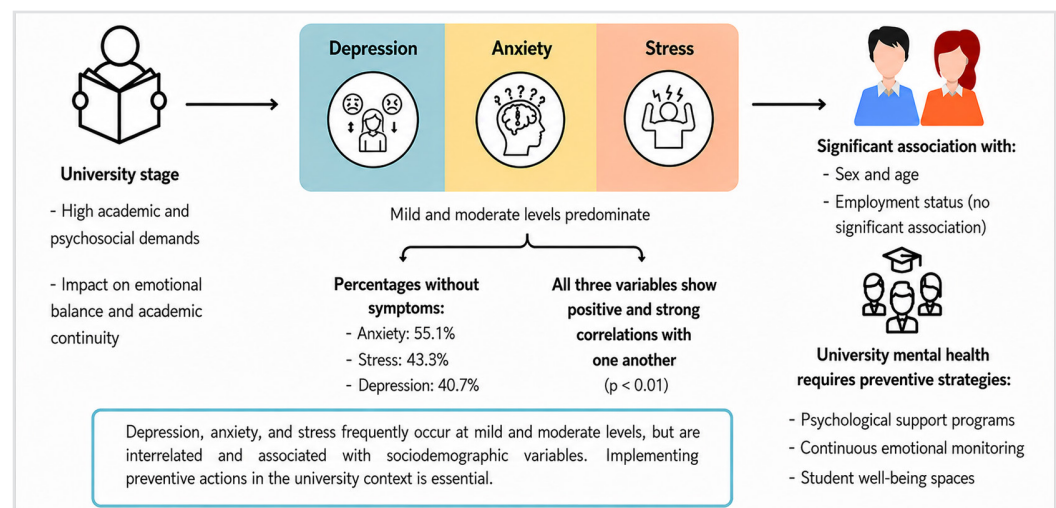
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Highlights

- Depression, anxiety, and stress were assessed in 381 Peruvian university students.
- More than 40% presented symptoms, predominantly mild and moderate.
- Depression and stress were higher in women than in men.
- Students aged 18 to 20 years presented more emotional symptoms than those over 20 years of age.
- All three variables were strongly correlated with one another ($p < 0.01$).
- Strengthening prevention and psychological support in university settings is proposed.

Graphical Abstract



Abstract

The university stage entails academic and psychosocial demands that may affect students' emotional balance and academic continuity. In this context, depression, anxiety, and psychological stress are frequent problems requiring institutional monitoring. The study aimed to assess depression, anxiety, and stress in a sample of Peruvian university students and to identify their association with sex, age, and employment status. A quantitative, non-experimental, cross-sectional study was conducted with 381 students of both sexes. The DASS-21 Scale, with adequate psychometric properties, was applied to assess the variables. Associations were analyzed using the Chi-Square test and Cramer's V coefficient, as well as the correlations among the three variables using Spearman's rho coefficient. More than half of the students presented no symptoms, particularly regarding anxiety (55.1%), followed by stress (43.3%) and depression (40.7%). Mild and moderate levels predominated, while severe cases were infrequent. Significant associations were found between depression and sex and age, anxiety and age, and stress and sex and age ($p < 0.05$). Furthermore, all three variables showed positive and strong correlations with one another ($p < 0.01$). It is concluded that depression, anxiety, and stress are prevalent among university students, predominantly at mild and moderate levels, although severe cases persist. These conditions are associated with sex and age and are interrelated, underscoring the need for preventive actions in the university context.

Keywords: Depression. Anxiety. Psychological Stress. University Students. Mental Health.

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INTRODUCTION

University education is characterized as a stage of great opportunities, but also of significant demands. Students must adapt to a competitive academic environment in which the volume of readings, assignments, exams, and projects increases, while simultaneously developing autonomy, discipline, and responsibility in managing their time^{1,2}. Added to this are external factors such as the need to balance personal, professional, and academic life, as well as family and social pressure to achieve satisfactory results³. The combination of these demands makes the university an environment that, while fostering learning and personal growth, can also generate considerable emotional exhaustion⁴. In this sense, mental health assumes an important role in understanding how such demands impact students' lives and condition their overall well-being.

Mental health is understood as a state of well-being that enables individuals to recognize their capacities, cope with the everyday stresses of life, and participate actively in their community⁵. Recent reports indicate that more than one billion people live with some form of mental disorder, placing these conditions among the leading causes of disability worldwide⁶. In recent years, the university population has received special attention, as evidence points to a sustained increase in emotional problems following the pandemic. A multicenter study conducted in Portugal and Brazil found that more than half of students presented symptoms of depression, anxiety, and stress, reaching prevalences above 70% in some cases⁷. In Peru, a study conducted in the Amazon region reported that 42.7% of the university students assessed presented depressive symptoms, 52.4% anxiety, and 28.7% stress, confirming the relevance of these conditions in the country⁸.

In the university context, mental health is typically assessed using indicators such as depression, anxiety, and stress, as these reflect the emotional impact of academic and personal demands on students' well-being. Depression — one of the most extensively studied disorders in the university population — is understood as a persistent state of sadness, hopelessness, and loss of interest in habitual activities⁹. It is associated with feelings of emotional emptiness, self-devaluation, and fatigue, which limit the individual's daily functioning¹⁰. In the university environment, triggering factors commonly include separation from the family environment, pressure to maintain good academic performance,

economic difficulties, lack of social support, and, in some cases, experiences of discrimination or violence¹¹. This condition is not limited to a transient discomfort but constitutes a clinical condition that seriously affects motivation and the capacity to enjoy academic life¹².

The consequences of depression in university students are multiple, ranging from decreased concentration and apathy toward fulfilling academic tasks to a reduction in the quality of interpersonal relationships¹³. In more severe cases, it may lead to social withdrawal and even suicidal ideation, making this a threat to the continuation of studies and to the student's life itself¹⁴. The literature has indicated that those who experience depressive episodes tend to present greater risk of academic dropout and difficulties in projecting professional goals, reinforcing the need for preventive and early detection strategies in educational institutions¹⁵.

Regarding anxiety, it constitutes an anticipatory emotional response to situations perceived as threatening, and is functional insofar as it prepares the organism to face challenges¹⁶. However, when it becomes excessive and persistent, it transforms into a disorder that interferes with academic and personal development¹⁷. Among university students, anxiety commonly manifests in relation to exams, oral presentations, task accumulation, and fear of failure¹⁸. Its causes may be related to self-imposed demands, environmental pressure, lack of time management skills, and prior experiences of insecurity or social rejection¹⁹.

The consequences of anxiety are expressed at both the physical and psychological levels. Physiological symptoms include tachycardia, insomnia, excessive sweating, and a sensation of breathlessness²⁰, while in the cognitive domain, recurrent thoughts of failure, difficulty concentrating, and a sense of inability to meet academic demands emerge²¹. All of this generates a vicious cycle, as symptoms intensify distress and reduce academic efficacy, which in turn heightens concern and a constant perception of threat. If not treated in a timely manner, anxiety may become chronic and constitute a risk factor for other mental health problems²².

Stress is one of the main challenges of university life. It is understood as the organism's reaction to demands perceived as exceeding the available resources to address them²³. Although, at moderate levels, it may motivate the fulfillment of responsibilities, it becomes harmful when maintained over

a prolonged period or when the pressure exceeds the capacity to adapt²⁴. Triggering factors include tight deadlines for assignment submission, an accumulation of assessments, an excessive course load, and the difficulty of balancing academic demands with rest, social life, or — in many cases — paid employment^{25,26}.

Stress in students has repercussions across multiple dimensions: physical, emotional, and behavioral. At the physical level, headaches, muscle tension, persistent fatigue, and sleep problems are reported²⁷. At the emotional level, irritability, a sense of frustration, and loss of motivation are frequent. At the behavioral level, procrastination, abandonment of recreational activities, and increased consumption of alcohol, caffeine, or other substances are observed^{28,29}. When uncontrolled, stress compromises overall health and may affect academic performance, contributing to poor results, failure, or even dropout³⁰. It is therefore essential that universities implement programs to reduce sources of stress and reinforce students' coping skills.

In addition to the risk factors represented by depression, anxiety, and stress, the presence of protective elements that decisively influence students' psychological well-being must be recognized. Among these stand out social support from family members, friends, and faculty; the creation of academic support networks; regular physical activity; a sense of belonging to the institution; and the development of socio-emotional competencies^{31,32,33}. These elements strengthen resilience, reduce vulnerability to mental health problems, and foster adaptation to the demands of university life. To the extent that universities promote these factors, it will be possible to prevent the emergence of more severe symptoms and contribute to students' com-

prehensive development.

In the current literature, the magnitude of mental health problems in university students has been documented in different contexts: at the international level, a study in Bangladesh showed that 36% of students presented anxiety symptoms and 39.8% depression symptoms, also identifying socio-demographic factors and digital habits as significant predictors³⁴. In South America, a study conducted at universities in Brazil and Portugal reported that between 55% and 71% of students presented symptoms of depression, anxiety, and stress, evidencing the high prevalence of these conditions in the region⁷. In Peru, a study with Dentistry students found that 42.8% presented depression symptoms, 68.4% anxiety, and 48.1% stress, confirming the relevance of these issues in the local context³⁵.

The present study is relevant because it examines a frequent and underaddressed problem in the university context. Although the university is a space of academic and professional formation, it also exposes its population to tensions that may alter emotional stability. Generating empirical data on these factors is important for substantiating institutional policies, preventive actions, and psychological support services compatible with students' needs. Furthermore, the research may contribute to reducing the stigma surrounding mental health and to fostering an academic environment that incorporates well-being as a prerequisite for learning and student retention. In this regard, the results offer useful evidence to guide strategies aimed at improving student adaptation and engagement.

Finally, the objective of the present study was to assess depression, anxiety, and stress in a sample of Peruvian university students and to identify their association with sex, age, and employment status.

METHODOLOGY

Sampling design

A quantitative approach was used, with statistical analysis of numerical data to examine the relationship between the variables under study. The design was non-experimental, as Depression, Anxiety, and Stress were assessed without any intervention on their values. A cross-sectional analytical scheme was applied; information was collected at a single time point and used to describe and compare these conditions within the sample.

Participants

The study involved a sample of 381 students enrolled in the academic cycle 2025-I at a public university in the Peruvian Amazon. For data collection, approximately 450 students were invited to participate through the distribution of an online questionnaire via WhatsApp academic groups. Of this total, 381 students validly completed the questionnaire, corresponding to an approximate response rate of 84.7%. Given this modality of access and participation, non-probabilistic voluntary sampling was used.

Regarding academic training, participants came from different undergraduate programs offered by the institution, primarily in the fields of education, administration, and accounting. Concerning academic progress, students from different academic cycles were included, allowing representation of initial, intermediate, and advanced levels of university education. Furthermore, participants belonged to different academic shifts (morning, afternoon, and evening), in accordance with the institution's curricular organization.

Students regularly enrolled in the 2025-I academic semester pursuing undergraduate studies who agreed to participate voluntarily through informed consent were included. Excluded were those who did not fully complete the questionnaire, presented inconsistent or duplicate responses, or were in a situation of temporary academic leave or absence during the data collection period.

Instrument

Data collection was conducted using the Depression, Anxiety, and Stress Scale (DASS-21), a self-report instrument developed to assess the presence and severity of symptoms associated with Depression, Anxiety, and Stress in general and university populations. It consists of 21 items distributed across three dimensions – depression, anxiety, and stress – with seven items for each. Responses are evaluated using a 4-point Likert scale ranging from 0 (“did not apply to me”) to 3 (“applied to me very much”).

Its brevity and ease of comprehension have favored its use in studies with university students. Importantly, the DASS-21 enables the identification of emotional symptom levels but does not constitute a clinical diagnostic instrument for mental disorders. Regarding psychometric properties, high reliability levels have been reported ($\alpha = 0.969$), and, in the Peruvian population, evidence of adequate internal consistency³⁶.

RESULTS

Of the total participants, 67.7% were women and 32.3% were men. Regarding age, 62.5% were between 18 and 20 years old, while the remaining 37.5% corresponded to students over 20 years of age. As for employment status, 65.1% were not working and 34.9% were engaged in some professional activity.

Procedure

Data were collected in accordance with a previously defined plan. Collection took place during the intermediate weeks of the 2025-I academic semester. First, authorization was requested from and granted by the university authorities for the conduct of the study. Subsequently, students were invited via WhatsApp, receiving the survey link and a brief explanation of the study's objective and instructions for correct completion.

Once the target total of 381 participants was reached, the form was closed and data collection concluded.

Data analysis

Data analysis was conducted in three stages to ensure accurate results. First, a figure was produced showing the percentage distribution of the main variables (depression, anxiety, and stress). Subsequently, an inferential analysis was conducted to explore the association between these variables and the sociodemographic factors sex, age, and employment status, using the Chi-Square test (X^2) and Cramer's V coefficient to estimate the strength of the association.

Finally, correlations were calculated using Spearman's rho coefficient; those with $p < 0.05$ were considered significant, and those with $p < 0.01$ were considered highly significant. All data processing and statistical analysis were performed using IBM SPSS Statistics software, version 25.

Ethical considerations

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Each student was informed of the research objectives and characteristics, and participation was voluntary, with full freedom to withdraw at any time.

Furthermore, measures were implemented to protect the privacy and confidentiality of information, ensuring both the anonymity of participants and responsible, secure management of the collected data.

Figure 1 shows differences in the distribution of the three assessed variables. The highest proportion of students without symptoms was recorded for anxiety (55.1%), followed by stress (43.3%) and depression (40.7%). At the intermediate levels, the mild and moderate categories stand out, reaching 16.5% and 20.2% for depression, 20.5% and 24.4% for stress,

and 13.4% and 24.9% for anxiety.

In turn, severe and extremely severe cases represented smaller though still relevant proportions, jointly ranging between 6% and 12% of students across

each dimension. These results demonstrate that, while a considerable proportion of the population presents no symptoms, an important segment exhibits varying degrees of emotional impairment.

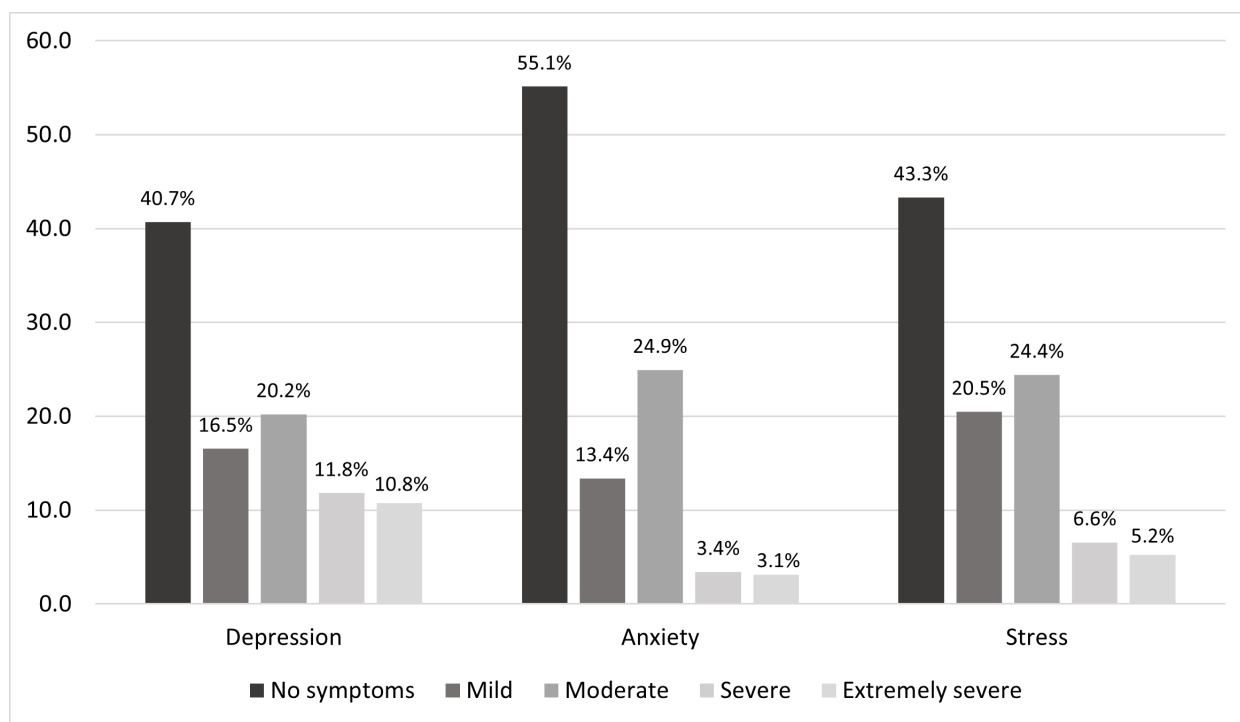


Figure 1 - Percentage distribution of depression, anxiety, and stress levels.

As shown in Table 1, depression presented a statistically significant association with sex ($p < 0.05$; Cramer's $V = 0.166$) and age ($p < 0.05$; Cramer's $V = 0.267$), while no association was found with employment status ($p > 0.05$). In terms of magnitude, the association with sex was weak, while the association with age reached moderate intensity, indicating that these variables only partially explain the variability in the depressive symptom levels observed.

In the distribution of depression levels, women concentrated a higher proportion of moderate cases (27.5%) and extremely severe cases (7.0%), compared to men (17.9% and 1.6%, respectively). Regarding age, students aged 18 to 20 years recorded higher proportions at the moderate (30.7%) and severe (8.8%) levels, while those over 20 years were more frequently in the no symptoms category (55.2%), although they also presented a higher proportion at the extremely severe level (8.4%).

Table 1 - Association between depression and sociodemographic variables in university students in Puerto Maldonado, 2025.

Variables		Depression					p*	Cramer's V
		NS	Mild	Mod.	Sev.	Ext. Sev.		
Sex	Males	60 (48.8%)	30 (24.4%)	22 (17.9%)	9 (7.3%)	2 (1.6%)	$p < 0.05$	0.166
	Females	105 (40.7%)	48 (18.6%)	71 (27.5%)	16 (6.2%)	18 (7.0%)		
Age	18 to 20 years	86 (36.1%)	50 (21.0%)	73 (30.7%)	21 (8.8%)	8 (3.4%)	$p < 0.05$	$p < 0.05$
	Over 20 years	79 (55.2%)	28 (19.6%)	20 (14.0%)	4 (2.8%)	12 (8.4%)		
Employment status	Employed	58 (43.6%)	30 (22.6%)	33 (24.8%)	6 (4.5%)	6 (4.5%)	$p > 0.05$	0.072
	Not employed	107 (43.1%)	48 (19.4%)	60 (24.2%)	19 (7.7%)	14 (5.6%)		

*Chi-Square test

Note: NS = No symptoms; Mod. = Moderate; Sev. = Severe; Ext. Sev. = Extremely severe.

According to Table 2, anxiety showed a statistically significant association only with age ($p < 0.05$; Cramer's $V = 0.178$). The coefficient value indicates a low-intensity association, suggesting that age explains only a limited proportion of the variability in the anxiety levels observed.

In the distribution of anxiety levels, students aged 18 to 20 years presented higher proportions in the mild (17.6%) and moderate (26.1%) categories, while among those over 20 years, the no symptoms category predominated (63.6%), with lower representation at the mild (6.3%) and moderate (23.1%) levels.

Table 2 - Association between anxiety and sociodemographic variables in university students in Puerto Maldonado, 2025.

Variables		Anxiety					p*	Cramer's V
		NS	Mild	Mod.	Sev.	Ext. Sev.		
Sex	Males	75 (61.0%)	12 (9.8%)	29 (23.6%)	4 (3.3%)	3 (2.4%)	$p > 0.05$	0.094
	Females	135 (52.3%)	39 (15.1%)	66 (25.6%)	9 (3.5%)	9 (3.5%)		
Age	18 to 20 years	119 (50.0%)	42 (17.6%)	62 (26.1%)	8 (3.4%)	7 (2.9%)	$p < 0.05$	0.178
	Over 20 years	91 (63.6%)	9 (6.3%)	33 (23.1%)	5 (3.5%)	5 (3.5%)		
Employment status	Employed	68 (57.1%)	24 (18.0%)	32 (24.1%)	6 (4.5%)	3 (2.3%)	$p > 0.05$	0.097
	Not employed	142 (57.3%)	27 (10.9%)	63 (25.4%)	7 (2.8%)	9 (3.6%)		

*Chi-Square test

Note: NS = No symptoms; Mod. = Moderate; Sev. = Severe; Ext. Sev. = Extremely severe.

According to Table 3, stress showed a statistically significant association with sex ($p < 0.05$; Cramer's $V = 0.258$) and age ($p < 0.05$; Cramer's $V = 0.213$), while no differences were found based on employment status ($p > 0.05$). The coefficient values suggest associations of moderate magnitude, indicating that sex and age are related to stress levels, though they only partially explain the variability.

In the distribution of stress levels, women con-

centrated higher proportions in the severe (15.5%) and extremely severe (14.3%) categories, compared to men (4.1% and 3.3%, respectively). Regarding age, students aged 18 to 20 years reported more cases at the severe (15.1%) and extremely severe (13.0%) levels, while among those over 20 years, the no symptoms category predominated (52.4%), with lower proportions in the higher-severity categories.

Table 3 - Association between stress and sociodemographic variables in university students in Puerto Maldonado, 2025.

Variables		Stress					p*	Cramer's V
		NS	Mild	Mod.	Sev.	Ext. Sev.		
Sex	Males	63 (51.2%)	25 (20.3%)	26 (21.1%)	5 (4.1%)	4 (3.3%)	$p > 0.05$	0.258
	Females	92 (35.7%)	38 (14.7%)	51 (19.8%)	40 (15.5%)	37 (14.3%)		
Age	18 to 20 years	80 (33.6%)	42 (17.6%)	49 (20.6%)	36 (15.1%)	31 (13.0%)	$p < 0.05$	0.213
	Over 20 years	75 (52.4%)	21 (14.7%)	28 (19.6%)	9 (6.3%)	10 (7.0%)		
Employment status	Employed	58 (43.6%)	22 (16.5%)	26 (19.5%)	13 (9.8%)	14 (10.5%)	$p > 0.05$	0.056
	Not employed	97 (39.1%)	41 (16.5%)	51 (20.6%)	32 (12.9%)	27 (10.9%)		

*Chi-Square test

Note: NS = No symptoms; Mod. = Moderate; Sev. = Severe; Ext. Sev. = Extremely severe.

According to Table 4, highly significant and direct correlations were identified among all three assessed emotional variables ($p < 0.01$). Depression showed a direct correlation with Anxiety ($\rho = 0.676$) and with Stress ($\rho = 0.715$). Likewise, Anxiety also showed a

direct correlation with Stress ($\rho = 0.774$).

These results indicate that higher levels of depression tend to be accompanied by higher levels of anxiety and stress, evidencing a close relationship among the three variables.

Table 4 - Correlation between depression, anxiety, and stress in university students in Puerto Maldonado, 2025.

Variables	Depresión	Ansiedad	Estrés
Depression	1	–	–
Anxiety	0.676**	1	–
Stress	0.715**	0.774**	1

** p<0.01

DISCUSSION

The university stage demands constant effort and adaptive capacity. Added to these demands are personal and social responsibilities that may generate overload and alter emotional equilibrium. In this scenario, Depression, Anxiety, and Stress affect psychological well-being, academic performance, and persistence in higher education. This study aimed to assess the presence of these conditions in Peruvian university students.

The results show that, while an important proportion of students presents no symptoms, a considerable group manifests depression, anxiety, or stress at different levels of severity. Mild and moderate degrees were most frequent across the three dimensions, underscoring the need for preventive measures, since these may progress to more severe conditions. Although severe and extremely severe cases are less numerous, they reflect significant emotional impairment. This finding partially coincides with previous studies that have also reported depression, anxiety, and stress in the university population^{8,37}.

Furthermore, it is important to highlight that a considerable proportion of students presented no symptoms across the three dimensions assessed, especially regarding anxiety. This result suggests that not all university experiences necessarily translate into emotional distress. In such cases, protective factors may be operating – such as family and social support, development of coping strategies, or favorable academic environmental conditions – aspects already identified as relevant to the psychological well-being of university students³². However, these variables were not assessed in the present study, so their analysis may be addressed in future research.

Regarding sex, the findings showed significant differences in depression and stress. Women concentrated more cases at the moderate and extremely severe levels, while men were more frequently distributed in less severe categories. Similarly, in the case of stress, women recorded higher proportions of symptoms at the severe and extremely severe levels, while men were predominantly distributed

across lower impairment levels. This is consistent with some previous research^{38,39} and may be explained by the fact that women tend to experience academic and social pressure with greater intensity, which may increase emotional vulnerability and the emergence of more severe symptoms, while men tend to report lower levels, possibly due to differences in perception, expression, or coping with psychological distress^{40,41}.

Regarding age, the results showed significant differences in depression, anxiety, and stress. Students aged 18 to 20 years concentrated more cases at the moderate and severe levels, indicating greater vulnerability during the initial stage of university education. In contrast, among those over 20 years of age, the absence of symptoms predominated, although, for depression, a higher proportion at the extremely severe level was also recorded. This pattern is consistent with recent research^{42,43} and may be explained by the fact that younger students often possess fewer coping resources and less experience in managing academic demands, making them more susceptible to psychological distress^{44,45}. In contrast, those over 20 years of age may have developed more consolidated coping strategies, although a subgroup also experiences more intense forms of emotional impairment.

Although statistically significant associations were identified between some sociodemographic variables and levels of depression, anxiety, and stress, the Cramer's V coefficients indicated predominantly weak to moderate magnitudes. This suggests that factors such as sex and age explain only a limited portion of the observed variability, with other academic, personal, or contextual elements likely also influencing students' mental health.

The results should also be interpreted considering the regional context in which the study was conducted. Universities located in the Peruvian Amazon present particular socio-educational characteristics – such as limited access to specialized mental health services, diverse socioeconomic conditions, and academic adaptation processes

that may differ from those observed in other regions of the country. These contextual factors may influence how students experience and cope with the demands of university life, making their consideration relevant for a broader understanding of well-being and emotional distress levels in this population.

Regarding employment status, the results showed no significant differences in levels of depression, anxiety, or stress. Both working and non-working students presented similar proportions across the different symptom categories. This indicates that, at least in this sample, having paid employment did not represent a factor that clearly aggravated or attenuated emotional distress. For some students, working may represent an added burden on top of academic demands, while for others it may signify a source of income and support that helps address those demands. This difference in perceptions may explain the absence of marked contrasts between the two groups.

This study also found a direct and significant correlation between depression, anxiety, and stress. This result is consistent with what has been reported in the literature, where it is recognized that these three dimensions of emotional distress tend to manifest jointly in the university population. In other words, students who present higher levels in one of these variables also tend to present elevated levels in the others. Similar results have been documented in previous research^{46,47}.

This study's strengths include the joint analysis of depression, anxiety, and stress in university students. Beyond identifying their presence, it de-

scribes how these conditions are distributed according to severity level. Although diverse research exists on mental health in the university population, the continued production of evidence in specific regional contexts remains necessary. In this regard, the results provide information on students at a public university located in the Peruvian Amazon – a context that has received less attention in the scientific literature. Furthermore, the analysis of sociodemographic variables such as sex, age, and employment status allows the recognition of differences among subgroups and provides elements that may contribute to guiding prevention and support actions in the university environment.

Among the study's main limitations, it is acknowledged that the research was conducted at only one university, which restricts the possibility of generalizing results to other educational contexts. Furthermore, the use of self-report questionnaires may be subject to perception biases and the tendency to provide socially acceptable responses. Additionally, the age variable was categorized into only two groups, which may have reduced the variability of available information and limited the identification of more specific differences among age subgroups. Furthermore, the use of an online questionnaire distributed via WhatsApp may have generated a degree of participant self-selection, given that participation depended on the voluntary decision to respond to the survey. Finally, the timing of questionnaire administration during the academic semester may have influenced the reported symptom levels, considering that demands and assessments tend to vary throughout the academic period.

CONCLUSIONS

It is concluded that mental health problems maintain a significant presence among university students. Although a portion of the participants reported no symptoms, an important group presented signs of depression, anxiety, and stress at varying levels. This situation demonstrates that emotional distress remains frequent and demands attention in the academic environment.

The analysis showed differences according to sex and age: women recorded more cases at elevated levels of depression and stress, while students aged 18 to 20 years concentrated higher proportions of moderate and severe symptoms across all three variables. Furthermore, the correlations obtained confirm the close

relationship between depression, anxiety, and stress, such that an increase in any one of these indicators is associated with increases in the others. These findings reinforce the need for a comprehensive approach that considers the interaction among different emotional manifestations.

Based on these findings, it is pertinent to strengthen prevention and mental health promotion strategies in the university context, particularly for the groups showing higher levels of symptomatology. The implementation of psychological support services, stress management workshops, and early detection mechanisms may contribute to the timely addressing of these issues and to the improvement of student well-being.

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All authors have read and agreed to the published version of the manuscript.

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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