



Relationship between academic stress, anxiety, and depression in university students studying Public Health

Relación entre estrés académico, ansiedad y depresión en estudiantes universitarios de Salud Pública

Freddy Alexander Cuadrado-Quishpe
alexander.cuadrado@epoch.edu.ec
Escuela Superior Politécnica de Chimborazo, Riobamba, Chimborazo, Ecuador
<https://orcid.org/0009-0006-9162-2199>

Emily Domenick Moreno-Carvajal
emily.moreno@epoch.edu.ec
Chimborazo Polytechnic University, Riobamba, Chimborazo, Ecuador
<https://orcid.org/0009-0002-3939-2489>

María Bernarda Robalino-Silva
bernarda.rodriguez@epoch.edu.ec
Chimborazo Polytechnic University, Riobamba, Chimborazo, Ecuador
<https://orcid.org/0009-0007-8522-9304>

Daniel Sebastián Tene-Guamán
daniels.tene@epoch.edu.ec
Chimborazo Polytechnic University, Riobamba, Chimborazo, Ecuador
<https://orcid.org/0009-0009-4520-772X>

ABSTRACT

Objective: To analyze the relationship between academic stress and anxiety-depression symptoms in public health university students. **Method:** Cross-sectional observational study of 241 sixth-semester students at ESPOCH (2024-2025 academic year). The SISCO Inventory and the HADS Scale were used. The analysis included Chi-square and Cramer's V coefficient to evaluate associations between categorical variables. **Results and conclusion:** 45.6% presented high stress. Statistically significant relationships were identified between academic stress and anxiety ($\chi^2=32.15$, $p<0.0001$, $V=0.258$), as well as with depression ($\chi^2=28.47$, $p<0.001$, $V=0.243$), both of moderate magnitude. Females showed greater vulnerability ($p=0.040$). The results confirm the urgency of implementing institutional programs that include emotional education, stress management techniques, and early detection, addressing academic stress as a public health problem in universities. **Descriptors:** psychological stress; anxiety; depression. (Source, **DeCS**).

RESUMEN

Objetivo: Analizar la relación entre estrés académico y sintomatología ansioso-depresiva en estudiantes universitarios de Salud Pública. **Método:** Estudio observacional transversal en 241 estudiantes de sexto semestre de la ESPOCH (período 2024-2025). Se emplearon el Inventario SISCO y la Escala HADS. El análisis incluyó Chi cuadrado y coeficiente V de Cramér para evaluar asociaciones entre variables categóricas. **Resultados y conclusión:** El 45.6% presentó estrés alto. Se identificaron relaciones estadísticamente significativas entre estrés académico y ansiedad ($\chi^2=32.15$, $p<0.0001$, $V=0.258$), así como con depresión ($\chi^2=28.47$, $p<0.001$, $V=0.243$), ambas de magnitud moderada. El sexo femenino mostró mayor vulnerabilidad ($p=0.040$). Los resultados confirman la urgencia de implementar programas institucionales que incluyan educación emocional, técnicas de manejo del estrés y detección temprana, abordando el estrés académico como problema de salud pública universitaria. **Descriptor:** estrés psicológico; ansiedad; depresión. (Fuente, **DeCS**).

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Short original



INTRODUCTION

Stress represents an adaptive response of the organism to demands that exceed its capacity for homeostatic balance (1). From a physiological perspective, this reaction branches into two modalities: eustress, characterized by its stimulating effect on individual performance, and distress, whose prolonged manifestation can lead to multiple alterations in physical and psychological health (2). Although it does not constitute a nosological entity per se, its chronicity represents a significant risk factor for the development of various pathologies.

In the context of higher education, stress arises from the mismatch between perceived academic demands and the personal resources available to meet them (3). This condition, called academic stress, emerges when students experience distress in the face of educational, social, and economic demands that act as specific stressors. Previous research on medical students at the University of Buenos Aires reported prevalences close to 98.4%, highlighting the magnitude of the phenomenon (1,4).

Associated symptoms include physical manifestations such as chronic fatigue and insomnia, along with emotional disturbances including persistent restlessness, difficulty concentrating, and impaired academic performance (5). Of particular relevance is the accumulated evidence linking sustained exposure to academic stress with a substantial increase in the likelihood of developing anxiety and depressive disorders, especially in health science-related disciplines (6,7). The World Health Organization has recognized the educational environment as a priority area for preventive mental health interventions (8).



Validated psychometric instruments are used to quantify these variables. The SISCO Inventory, developed by Barraza Macías, allows for the identification of stress levels, relevant stressors, physical and emotional symptoms, and coping strategies in their cognitive, physiological, and behavioral dimensions (9). Similarly, the HADS Scale is a self-administered questionnaire with 14 items distributed across two subscales, anxiety (HADS-A) and depression (HADS-D), which has demonstrated high reliability in student populations for the detection of anxiety and depression symptoms (10).

The aim of this study is to analyze the relationship between academic stress levels and the presence of anxiety and depression symptoms in public health university students.

METHOD

An observational, descriptive, and analytical cross-sectional study was conducted during the 2024-2025 academic year. The target population comprised sixth-semester students from the Faculty of Public Health at the Escuela Superior Politécnica de Chimborazo (ESPOCH), located in Riobamba, Chimborazo province, Ecuador, specifically in the fields of gastronomy, medicine, nutrition and dietetics, and health promotion (N=250). The final sample included 241 participants who voluntarily responded to the online survey using the Forms platform.

Two standardized and validated scales were used:

SISCO Academic Stress Inventory (11): Measures the frequency and intensity of academic stressors and reactions to stress, classifying them into Low (≤ 16 points), Moderate (17-22 points), and High (≥ 23 points) levels.



Hospital Anxiety and Depression Scale (HADS) (12): Assesses anxiety and depressive symptoms using 14 items with ranges Normal (≤ 14), Mild (15-21), and Moderate-Severe (≥ 22).

Responses were coded numerically (scale 0-5) and total scores were calculated for each dimension. A Global Classification was established considering: Low (all domains at Low-Normal level), Medium (one domain at Moderate-Mild level), High (one domain at High-Moderate-Severe level), and Very High (two or more domains at High-Moderate-Severe level).

Descriptive statistics were used in the form of frequencies and percentages. Chi-square independence tests were used to evaluate associations between categorical variables. Comparisons of total scores by gender and career were performed using Mann-Whitney U and Kruskal-Wallis tests. The strength of association was determined using Cramér's V coefficient (13), interpreting values of 0.1 as weak association, 0.3 as moderate, and 0.5 as strong. Processing was performed with Python 3.10, using pandas and scipy.stats libraries.

Anonymity, confidentiality, and informed consent were guaranteed for all participants. The protocol was approved by the institutional ethics committee.

RESULTS

Prevalence of academic stress

Of the 241 students evaluated, 42 (17.4%) had low levels of academic stress, 89 (36.9%) had moderate levels, and 110 (45.6%) had high levels.

Relationship between stress and anxiety

Chi-square analysis revealed a statistically significant relationship between academic stress level and anxiety level ($\chi^2=32.15$, $p<0.0001$). r Cramér's V coefficient was 0.258, indicating a moderate association. In the high-stress group,



41.8% (46 students) presented moderate-severe anxiety, compared to 16.7% (7 students) in the low-stress group.

Relationship between stress and depression

Similarly, a significant relationship was identified between academic stress and depressive symptoms ($\chi^2=28.47$, $p<0.001$, Cramér's $V=0.243$). Among students with high stress, 29.1% reported moderate-severe depression, while in the low stress group this proportion was 9.5%.

Differences by degree program

The analysis by degree program showed that medical students had a higher proportion of high stressors (40% of the group) compared to gastronomy students (10%). Statistical analysis confirmed a significant association ($p<0.0001$) with moderate magnitude.

Differences by gender

Females showed a higher prevalence of Very High overall classification (30% vs. 18% in males), with a statistically significant difference ($p=0.040$, Cramér's $V=0.187$). Stress reactions did not show significant differences by gender ($p=0.149$, Cramér's $V=0.127$).

Overall classification

The distribution of the overall classification was: 90 students (37.3%) at the Low level, 85 (35.3%) at the Medium level, 78 (32.4%) at the High level, and 79 (32.8%) at the Very High level.



DISCUSSION

The data obtained confirm the existence of significant relationships between academic stress and anxiety-depressive symptoms in the university population of Public Health . The moderate magnitude of these associations, measured using Cramér's V, suggests the involvement of additional contextual and personal factors that modulate the individual response to stress (14,15).

The greater vulnerability observed in females is consistent with previous research that has documented differences in emotional reactivity, perception of self-efficacy, and coping strategies between genders (16,17). This pattern could be explained by the confluence of biopsychosocial factors, including differentiated social pressures, family expectations, and self-imposed demands that intensify emotional responses (18).

With regard to differences by degree program, health sciences disciplines have particular characteristics that increase exposure to stressors: high academic workload, demanding practical requirements, and early exposure to situations of professional responsibility (19,20). This phenomenon justifies the development of specific interventions tailored to the curricular particularities of each discipline.

CONCLUSION

The existence of significant relationships between academic stress and anxiety-depressive symptoms in the public health university population is confirmed.

Females tended to report higher levels of stress and anxiety more frequently, which is consistent with recent evidence describing greater emotional vulnerability and psychosocial burden in female university students.

Among the limitations of the study is its cross-sectional design, which prevents the establishment of temporal causal relationships. Likewise, the exclusive use of self-



report instruments may introduce social desirability biases. However, the sample robustness and psychometric validation of the instruments used strengthen the reliability of the results.

The implementation of institutional programs is recommended, including: emotional education workshops, training in stress management techniques, strengthening peer support networks, and teacher training for early detection of symptoms. Future research with a longitudinal design would allow for the identification of critical periods of vulnerability throughout the academic career, as well as the evaluation of the effectiveness of specific interventions. The inclusion of variables such as perceived social support, resilience, and sleep quality would contribute to a more comprehensive understanding of the phenomenon.

The results emphasize the urgency of addressing academic stress as a public health problem in university settings, requiring comprehensive institutional policies that promote healthy and equitable academic environments.

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CONFLICT OF INTEREST

There is no conflict of interest with individuals or institutions linked to the research.

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AUTHORS' CONTRIBUTIONS

Freddy Alexander Cuadrado-Quishpe: Conceptualization, methodology, statistical analysis, writing of the original manuscript. **Emily Domenick Moreno-Carvajal:** Data collection, information processing, manuscript review. **María Bernarda Robalino-Silva:** Data analysis, interpretation of results, analytical review of content. **Daniel Sebastián Tene-Guamán:** Literature search, methodological design, final review of the manuscript.

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