BRIEF COMMUNICATION

Analysis of the factors that induce stress in medical students

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ABSTRACT

Introduction: academic stress is a frequent phenomenon among university students, especially in Medicine, where academic workload and personal demands affect physical and psychological health.
Objective: to analyze the factors that induce stress in Medicine students at the Universidad Regional Autónoma de los Andes, Ambato.
Methods: an observational, descriptive, cross-sectional study was conducted with 87 fifth-semester Medicine students enrolled at the Universidad Regional Autónoma de los Andes, selected through non-probabilistic convenience sampling. A structured test with 96 items grouped into six domains (lifestyle, environment, symptoms, occupation, relationships, and personality) was applied. Results were classified into five stress zones. Informed consent, anonymity, and confidentiality were guaranteed.
Results: Zone 3 concentrated 39 % of the students, followed by Zone 4 with 32 % and Zone 5 with 27 %, considered high risk. The main stressors were personality (2097 points), interpersonal relationships (2060), and work/occupation (1883). Sociodemographic factors such as marital status and number of children were identified as increasing the final score in some cases.
Conclusions: the study showed that personality is the main stressor among Medicine students, followed by relationships and academic occupation. Although most students were located in intermediate zones, a significant number presented critical levels of stress, highlighting the need to implement psychological support strategies and coping programs to prevent negative consequences on their well-being and academic performance.

Keywords: Stress, Psychological; Students, Medical; Academic Performance; Mental Health.

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INTRODUCTION

Lazarus and Folkman,[1] define stress as a particular relationship between the individual and the environment, appraised by the person as exceeding or threatening their resources and, therefore, endangering their well-being. The literature emphasizes that academic stress arises from the inherent demands of the educational setting, becoming a commonly used term in contemporary society.[2]

Currently, stress is understood as a phenomenon involving not only physiological responses but also life events, characteristics of the social environment, and personal values, which may act either as stressors or as buffers against their negative effects on health and well-being.[3] Various authors describe it as any stimulus capable of threatening physical or psychological well-being, challenging coping capacity, and consequently functioning as an adaptive mechanism.[4]

Within the academic context, stress can be defined as a psychological process manifesting in three phases: first, stress-inducing stimuli from the environment are processed by the organism, generating systemic imbalance; second, this imbalance manifests through symptoms such as concentration difficulties, irritability, headaches, and alterations in eating patterns; and third, the individual activates coping strategies aimed at restoring lost equilibrium.[5]

The adaptation process triggered by stress involves physiological changes requiring activation of the neuroendocrine system, with repercussions on other systems, such as the immune system. In this context, various authors have reported alterations in the concentration of biomarkers including cortisol, interleukin-6 (IL-6), interleukin-10 (IL-10), interleukin-1 receptor antagonist (IL-1ra), tumor necrosis factor-alpha (TNF-α), and interleukin-2 (IL-2).[3]

University students constitute a population particularly vulnerable to academic stress due to the multiple changes involved in academic life. Often, they are unaware of the impact of this phenomenon and the symptoms it triggers, thereby increasing their risk of adverse effects.[6]

Generally, stress can be classified according to duration of exposure to the stressor into two categories: acute and chronic. Acute stress corresponds to an immediate response to a single traumatic event; it is transient and serves a protective and adaptive function.[7,8] In this initial phase, known as the alarm reaction, the sympathoadrenomedullary system discharges, releasing adrenaline and cortisol. The stimulus activates the paraventricular nucleus of the hypothalamus and the locus coeruleus in the brainstem, leading to the release of corticotropin-releasing factor and vasopressin.[9]

In light of the above, the present research was conducted with the objective of analyzing the factors that induce stress among medical students at the Universidad Regional Autónoma de los Andes, Ambato.

METHODS

An observational, cross-sectional, descriptive study was carried out at the Universidad Regional Autónoma de los Andes (UNIANDES), Ambato campus, Ecuador, within the academic setting of the Faculty of Medical Sciences. The study period spanned February to March 2025.

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The sample consisted of 87 students selected via non-probabilistic convenience sampling based on accessibility and willingness to participate. Inclusion criteria comprised enrollment in the fifth semester of the Medicine program across any section and voluntary consent to participate. Participants with incomplete or inconsistent questionnaires were excluded.

Procedures and techniques
Data collection was performed using Test No. 1 "Evaluating My Stress Level," a previously validated instrument in similar studies. The questionnaire included 96 items distributed across six domains: lifestyle, environment, symptoms, work/occupation, relationships, and personality. Each item was scored on a scale from 0 to 3 points according to the frequency or intensity of the described condition. Total scores placed each participant into one of five stress zones (1 to 5), with higher values indicating greater severity. Data were entered into an electronic spreadsheet and verified through double data entry to minimize transcription errors.

Statistical analysis
A descriptive analysis of variables was conducted using absolute frequencies, percentages, means, and standard deviations. Data processing was performed using Stata software version 14.1. Missing values were handled through complete-case analysis, and potential biases arising from non-probabilistic sampling were addressed in the methodological discussion.

Ethical considerations
The study received approval from the Ethics Committee of the Universidad Regional Autónoma de los Andes (UNIANDES). All participants received written information regarding the study's objectives and procedures and provided signed informed consent prior to completing the questionnaire. Data confidentiality and participant anonymity in reporting results were ensured. The research was conducted in accordance with the ethical principles established in the Declaration of Helsinki and applicable national regulations for research involving human subjects.

RESULTS

As indicated above, the most prevalent stress zone was Zone 3, with 34 individuals (39 %), followed by Zone 4 with 28 individuals (32 %), and Zone 5 with 24 individuals (27 %). Despite ranking third, the number of individuals in Zone 5 must not be underestimated—of the 87 students, 24 fall into this category, which is considered dangerous and necessitates professional support along with assistance from close contacts.

Figure 1 shows that the primary stress-inducing factors among medical students correspond to the personality domain (2097 points), closely followed by interpersonal relationships (2060 points), and academic work/occupation (1883 points). These findings indicate that stress is not solely dependent on academic workload but is strongly influenced by individual characteristics and the quality of social relationships. Physical and psychological symptoms (1846 points) and environment (1697 points) ranked at intermediate levels, suggesting that although they affect student well-being, their impact is less significant compared to internal and relational factors.
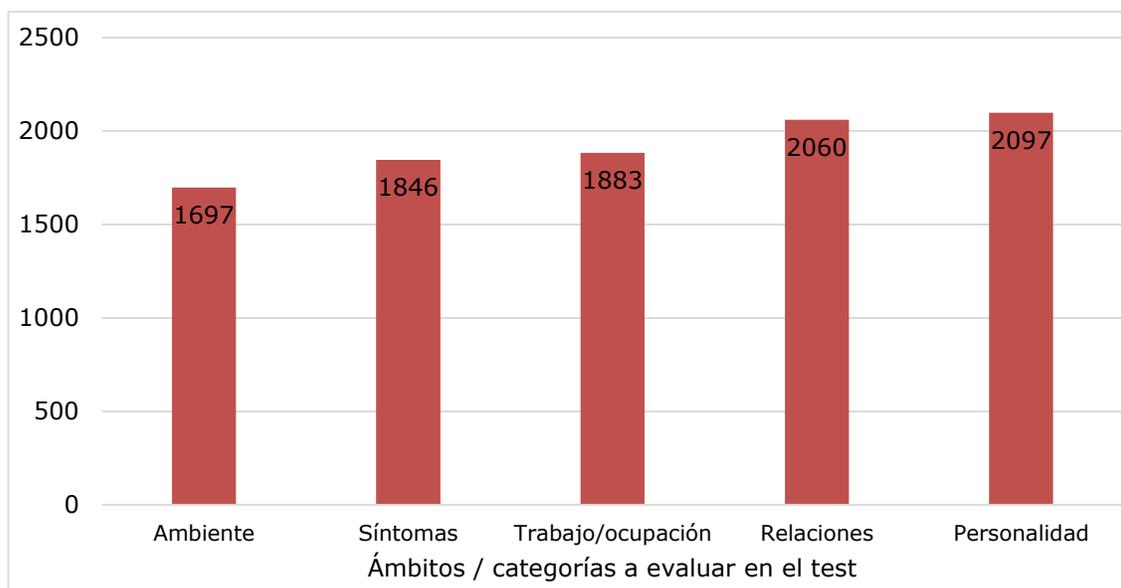
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Fig. 1 Stressors with the greatest impact on students' lives.

Regarding sociodemographic factors, the majority of students who accumulated additional stress points were single or widowed (71 cases) and those residing in large cities (27 cases), whereas having children or being unemployed had a lesser impact. Finally, the distribution across stress zones revealed that Zone 3 concentrated the largest number of students (39 %), followed by Zone 4 (32 %) and Zone 5 (27 %), the latter being classified as critical and requiring priority attention to prevent negative consequences on health and academic performance.

DISCUSSION

Concerning stressors, it was initially expected that "Work/Occupation" would emerge as the primary source of stress. However, analyses revealed that "Personality" was the most influential stressor, with a score of 2097, followed by "Relationships" (2060 points), and "Work/Occupation" in third place (1883 points). This highlights that the principal stress-inducing factor relates to the student's personality, which significantly affects daily activities and quality of life. This aspect warrants particular attention, as personality is intrinsic to the individual and, although potentially modifiable, is not as readily altered or improved as external factors like academic workload. These results suggest that students do experience stress due to their roles as students or, in some cases, external work responsibilities, consistent with findings reported by other authors.[10,11]

A recent study examined the relationship between social anxiety and academic stress with the risk of eating disorders, finding that 24 % of respondents were at risk, demonstrating a significant correlation between these variables. In multivariate analysis, predictors of eating disorder risk included perceived academic stress (odds ratio [OR] 1.09; 95 % confidence interval [CI] 1,03–1,16), indicating that academic stress has tangible repercussions on daily life, and without adequate support systems and resilience, adverse outcomes become more severe.[12]

Similarly, another study confirmed stress as a key contributor to unhealthy eating patterns, a common issue among university populations, further exacerbated by anxiety and depression.[13]

Along the same lines, a study investigated the negative association between the psychological domain and stress, revealing that symptom severity was unfavorably linked to students' quality of life—specifically, greater symptom severity correlated with lower mean scores across all assessed domains.[14]

CONCLUSIONS

It is concluded that the primary stress-inducing factor for fifth-semester medical students in the Faculty of Health Sciences is the "personality" domain, followed by "relationships," and finally "work/occupation." Regarding stress zones, the highest prevalence was observed in Zone 3, followed by Zone 4 and Zone 5, emphasizing the critical importance of not neglecting students identified in Zone 5, as previously noted.

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