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RESILIÊNCIA E SAÚDE MENTAL ENTRE ESTUDANTES DE MEDICINA: ASSOCIAÇÕES COM SINTOMAS DE DEPRESSÃO, ANSIEDADE E ESTRESSE

RESILIENCE AND MENTAL HEALTH AMONG MEDICAL STUDENTS: ASSOCIATIONS WITH SYMPTOMS OF DEPRESSION, ANXIETY, AND STRESS

RESILIENCIA Y SALUD MENTAL ENTRE ESTUDIANTES DE MEDICINA: ASOCIACIONES CON SÍNTOMAS DE DEPRESIÓN, ANSIEDAD Y ESTRÉS

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Resumo

Objetivo: Analisar a associação entre resiliência e sintomas de depressão, ansiedade e estresse em estudantes de Medicina brasileiros. Métodos: Estudo transversal e analítico realizado com 599 estudantes de Medicina de diferentes instituições de ensino superior do Brasil. A saúde mental foi avaliada por meio da Depression, Anxiety and Stress Scale (DASS-21) e a resiliência pela Connor-Davidson Resilience Scale (CD-RISC-10). Foram realizadas análises de correlação de Pearson e regressão linear múltipla ajustadas por sexo, diagnóstico prévio de transtorno mental, prática de atividade física e acompanhamento psicológico e/ou psiquiátrico. Resultados: A resiliência apresentou correlação negativa e significativa com os escores de depressão, ansiedade e estresse. Nos modelos ajustados, manteve associação inversa e independente com todos os desfechos avaliados. Entre as variáveis de ajuste, o diagnóstico prévio de transtorno mental e o acompanhamento psicológico e/ou psiquiátrico associaram-se a maiores escores de sofrimento psíquico. Coeficientes numericamente maiores foram observados entre os estudantes com diagnóstico prévio de transtorno mental nas análises estratificadas, embora testes formais de interação não tenham sido realizados. Conclusão: Maiores níveis de resiliência estiveram

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associados a menores níveis de depressão, ansiedade e estresse, sugerindo um importante papel desse construto na saúde mental de estudantes de Medicina. Os achados reforçam a relevância da resiliência no contexto da formação médica e sugerem que esse construto pode ter especial relevância em grupos com maior vulnerabilidade psíquica.

Palavras-chave: ansiedade; depressão; estresse; estudantes de medicina; resiliência.

Abstract

Objective: To analyze the association between resilience and symptoms of depression, anxiety, and stress among Brazilian medical students. Methods: This cross-sectional analytical study included 599 medical students from different higher education institutions across Brazil. Mental health was assessed using the Depression, Anxiety and Stress Scale (DASS-21), and resilience was measured using the Connor-Davidson Resilience Scale (CD-RISC-10). Pearson correlation analyses and multiple linear regression models were performed, adjusting for sex, previous diagnosis of mental disorder, regular physical activity, and psychological and/or psychiatric follow-up. Results: Resilience showed a significant negative correlation with depression, anxiety, and stress scores. In the adjusted models, resilience remained independently and inversely associated with all assessed outcomes. Among the adjustment variables, previous diagnosis of a mental disorder and psychological and/or psychiatric follow-up were associated with higher levels of psychological distress. Numerically larger coefficients were observed among students with a previous diagnosis of a mental disorder in stratified analyses, although formal interaction tests were not performed. Conclusion: Higher levels of resilience were associated with lower levels of depression, anxiety, and stress, suggesting an important role of this construct in the mental health of medical students. These findings reinforce the relevance of resilience in the context of medical education and suggest that this construct may be particularly relevant among students with greater psychological vulnerability.

Keywords: anxiety; depression; stress; medical students; resilience.

Resumen

Objetivo: Analizar la asociación entre la resiliencia y los síntomas de depresión, ansiedad y estrés en estudiantes de Medicina brasileños. Métodos: Este estudio analítico de corte transversal incluyó a 599 estudiantes de Medicina de diferentes instituciones de educación superior de Brasil. La salud mental fue evaluada mediante la Depression, Anxiety and Stress Scale (DASS-21), y la resiliencia fue medida mediante la Connor-Davidson Resilience Scale (CD-RISC-10). Se realizaron análisis de correlación de Pearson y modelos de regresión lineal múltiple ajustados por sexo, diagnóstico previo de trastorno mental, práctica regular de actividad física y seguimiento psicológico y/o psiquiátrico. Resultados: La resiliencia mostró una correlación negativa y significativa con las puntuaciones de

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depresión, ansiedad y estrés. En los modelos ajustados, la resiliencia permaneció asociada de manera independiente e inversa con todos los desenlaces evaluados. Entre las variables de ajuste, el diagnóstico previo de trastorno mental y el seguimiento psicológico y/o psiquiátrico se asociaron con niveles más altos de malestar psicológico. Se observaron coeficientes numéricamente mayores entre los estudiantes con diagnóstico previo de trastorno mental en los análisis estratificados, aunque no se realizaron pruebas formales de interacción. Conclusión: Niveles más altos de resiliencia se asociaron con niveles más bajos de depresión, ansiedad y estrés, lo que sugiere un papel importante de este constructo en la salud mental de los estudiantes de Medicina. Estos hallazgos refuerzan la relevancia de la resiliencia en el contexto de la formación médica y sugieren que este constructo puede tener una relevancia especial en grupos con mayor vulnerabilidad psicológica.

Palabras clave: ansiedad; depresión; estrés; estudiantes de medicina; resiliencia.

1. Introduction

The concept of resilience, widely disseminated in psychology and incorporated into discussions on health education, refers to the ability to cope with adversity and adapt positively to stressful situations while maintaining healthy functioning in the face of life's challenges (Lopes & Martins, 2011). In the context of medical education, this competence has been increasingly valued as a resource for dealing with the academic, emotional, and relational demands inherent to professional training (Kanashiro, 2026).

Understanding the mental health of medical students requires recognition that medical training is associated with high levels of academic, psychological, and social pressure. Several studies have demonstrated a higher prevalence of symptoms of depression, anxiety, and stress in this population when compared with the general population (Bicalho et al., 2025). In addition, this context is characterized by overload, overstimulation, and exhaustion, factors that may significantly compromise students' well-being and academic performance (Barbosa-Medeiros & Caldeira, 2021).

Research has also reported a high occurrence of depressive symptoms among medical students, particularly among those with lower levels of physical activity, enrolled in public institutions, and belonging to lower-income families

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(Bicalho et al., 2025). This process of psychological distress is multifactorial in nature and is influenced by individual, academic, and institutional factors. Among these, the hidden curriculum and the stigma associated with mental disorders stand out, as they often hinder the search for psychological support and appropriate treatment (Pontes, 2026).

Given this reality, resilience has been widely discussed as a potential protective factor for the mental health of medical students. Its value in the academic environment stems from its ability to promote adaptive coping strategies, contributing to the reduction of the impact of stressors inherent to medical training and to the promotion of psychological well-being in this population. However, other studies have argued that the excessive emphasis on resilience may produce subtle adverse effects, such as emotional self-silencing, the normalization of overload, and the internalization of the idea that demonstrating vulnerability is a sign of weakness (Moutier, 2021). Recent studies have shown that an exclusive focus on the development of individual resilience may shift responsibility for coping with psychological distress onto the student, favoring adaptation to dysfunctional academic environments rather than encouraging changes in the institutional structures that contribute to mental health problems (Moutier, 2021; Wasson et al., 2023).

Therefore, resilience should not be understood solely as the ability to face and overcome adversity, resulting in personal transformation and growth. Rather, it is a dynamic process of adaptation to adversity, developed through the interaction between risk and protective factors present across different life contexts. This process manifests itself at the individual, family, and social levels and is influenced by lived experiences and appropriate interventions (Tempski, 2018). In light of the above, the aim of this study was to analyze the association between resilience and symptoms of depression, anxiety, and stress among medical students.

2. Methods

This was a cross-sectional analytical study conducted among medical

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students from different Brazilian higher education institutions. Data collection was carried out online between September and November 2025 through an anonymous electronic questionnaire disseminated nationwide via social media platforms and student academic organizations. A non-probabilistic convenience sampling strategy was employed, complemented by snowball sampling. Eligible participants were medical students aged 18 years or older who were regularly enrolled in a medical program and provided electronic informed consent through the virtual signing of the Informed Consent Form. Incomplete questionnaires were excluded. A total of seven questionnaires were excluded before the final analyses, including two from participants younger than 18 years and five due to incomplete responses.

Mental health was assessed using the 21-item Depression, Anxiety and Stress Scale (DASS-21), a validated instrument for use in Portuguese, composed of three subscales (depression, anxiety, and stress), each containing seven items (Vignola & Tucci, 2014). Each item is scored on a four-point Likert scale ranging from 0 (“did not apply to me at all”) to 3 (“applied to me very much or most of the time”). Scores were calculated using the original DASS-21 subscales and were not multiplied by two. Higher scores indicating greater symptom severity.

Resilience was assessed using the 10-item Connor-Davidson Resilience Scale (CD-RISC-10), which has also been validated for use in Brazil. Its items are rated on a five-point Likert scale ranging from 0 (“never”) to 4 (“almost always”). Total scores range from 0 to 40, with higher scores indicating greater resilience (Connor & Davidson, 2003; Pesce et al., 2005).

Previous diagnosis of a mental disorder was assessed through self-report using the question: “Have you ever received a formal diagnosis of a mental disorder?”. Psychological and/or psychiatric follow-up was assessed through the question: “Are you currently receiving psychological or psychiatric care?”. Both variables were categorized as yes or no.

Statistical analyses were performed using SPSS software (version 22). Continuous variables were described using means and standard deviations, whereas categorical variables were presented as absolute and relative

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frequencies. The association between resilience and depression, anxiety, and stress scores was assessed using Pearson's correlation coefficient.

Multiple linear regression models were constructed with depression, anxiety, and stress scores as the outcome variables and resilience score as the main independent variable. Covariates were selected a priori based on previous literature and theoretical plausibility, considering factors consistently associated with mental health outcomes among medical students. The models were adjusted for sex, previous diagnosis of a mental disorder, regular physical activity, and psychological and/or psychiatric follow-up. Multicollinearity was assessed using variance inflation factors (VIF), and no evidence of relevant multicollinearity was identified, with all VIF values remaining close to 1 and below commonly accepted thresholds. Statistical significance was set at $p < 0.05$.

The study was approved by the Research Ethics Committee of Centro Universitário UNIFIPMOC under opinion number 7,705,033 (CAAE 90365725.6.0000.5109), in accordance with Resolution No. 466/2012 of the Brazilian National Health Council.

3. Results and Discussion

The sample consisted of 599 medical students, with a mean age of 23.3 ± 5.7 years, a predominance of females (68.1%), and a higher proportion of students in the pre-clinical years (56.9%) (Table 1).

Table 1. Sociodemographic, clinical, and behavioral characteristics of medical students (n = 599)

Variables	**n (%)**
Age (years), mean ± SD	23.35 ± 5.71
Sex	
Female	408 (68.1)
Male	191 (31.9)

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Variables	n (%)
Academic stage	
Pre-clinical years (1st–4th)	341 (56.9)
Clinical years (5th–8th)	218 (36.4)
Internship (9th–12th)	40 (6.7)
Current employment status	
Not engaged in paid work	504 (84.1)
Engaged in paid work	95 (15.9)
Previous diagnosis of a mental disorder	
No	293 (48.9)
Yes	299 (49.9)
Prefer not to answer	7 (1.2)
Living arrangement	
Does not live with family members	263 (43.9)
Lives with family members	336 (56.1)
Relocation to attend medical school	
No	291 (48.6)
Yes	308 (51.4)
Regular physical activity	
No	199 (33.2)
Yes	400 (66.8)
Psychological and/or psychiatric follow-up	
No	392 (65.4)
Yes	207 (34.6)

Note: Data are presented as absolute and relative frequencies [n (%)], except for age, which is presented as mean ± standard deviation.

Regarding mental health indicators, participants presented mean scores of 6.10 (SD = 4.34) for depression, 7.21 (SD = 4.88) for anxiety, and 8.46 (SD = 5.30) for stress. The mean resilience score was 26.98 (SD = 6.74). All scales demonstrated high internal consistency, with Cronbach's alpha coefficients ranging from 0.866 to 0.912 (Table 2).

Table 2. Descriptive statistics and internal consistency of the mental health and resilience scales (n = 599)

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Variables	Mean ± SD	Cronbach's alpha
Depression (DASS-21)	6.10 ± 4.34	0.866
Anxiety (DASS-21)	7.21 ± 4.88	0.874
Stress (DASS-21)	8.46 ± 5.30	0.912
Resilience (CD-RISC-10)	26.98 ± 6.74	0.877

Note: SD: standard deviation; DASS-21: Depression, Anxiety and Stress Scale; CD-RISC-10: Connor-Davidson Resilience Scale.

To evaluate the relationship between resilience and mental health outcomes, a correlation analysis was performed. Resilience showed a negative and statistically significant correlation with all mental health outcomes, including depression ($r = -0.451$; $p < 0.001$), anxiety ($r = -0.407$; $p < 0.001$), and stress ($r = -0.414$; $p < 0.001$).

Based on the associations observed in the correlation analysis, multiple linear regression models were constructed. In these models, resilience remained independently and inversely associated with all assessed outcomes. For depression, each increase in resilience score was associated with a significant reduction in depression score ($\beta = -0.395$; $p < 0.001$), with the model explaining 25.1% of the variability in the outcome (adjusted $R^2 = 0.251$). For anxiety, resilience also remained an independent predictor ($\beta = -0.327$; $p < 0.001$), with an adjusted R^2 of 0.280. Similarly, a significant association was observed with stress ($\beta = -0.344$; $p < 0.001$), with an adjusted R^2 of 0.258 (Table 3).

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Table 3. Multiple linear regression models for depression, anxiety, and stress among medical students (n = 599)

Variable	B (95% CI)	β	p-value
Depression			
Resilience	-0.254 (-0.301 to -0.208)	-0.395	<0.001
Sex	-0.242 (-0.905 to 0.421)	-0.026	0.473
Previous diagnosis of mental disorder	0.885 (0.433 to 1.337)	0.142	<0.001
Regular physical activity	-1.074 (-1.727 to -0.421)	-0.117	0.001
Psychological and/or psychiatric follow-up	0.438 (0.153 to 0.723)	0.109	0.003
Anxiety			
Resilience	-0.237 (-0.288 to -0.186)	-0.327	<0.001
Sex	-1.937 (-2.669 to -1.205)	-0.185	<0.001
Previous diagnosis of mental disorder	1.322 (0.822 to 1.821)	0.188	<0.001
Regular physical activity	-0.430 (-1.151 to 0.291)	-0.041	0.242
Psychological and/or psychiatric follow-up	0.725 (0.410 to 1.039)	0.160	<0.001
Stress			
Resilience	-0.271 (-0.327 to -0.214)	-0.344	<0.001
Sex	-2.375 (-3.182 to -1.568)	-0.209	<0.001
Previous diagnosis of mental disorder	1.003 (0.453 to 1.553)	0.131	<0.001
Regular physical activity	-0.287 (-1.081 to 0.507)	-0.026	0.478
Psychological and/or psychiatric follow-up	0.609 (0.262 to 0.956)	0.124	0.001

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Note: B = unstandardized coefficient; β = standardized coefficient; CI = confidence interval. Models adjusted for sex, previous diagnosis of mental disorder, regular physical activity, and psychological and/or psychiatric follow-up. Depression model: adjusted $R^2 = 0.251$; anxiety model: adjusted $R^2 = 0.280$; stress model: adjusted $R^2 = 0.258$.

Among the adjustment variables, previous diagnosis of a mental disorder and psychological/psychiatric follow-up were consistently associated with higher depression, anxiety, and stress scores. Sex was associated with anxiety and stress, indicating higher levels of these outcomes among female students. Regular physical activity was associated with lower levels of depression but did not remain associated with anxiety and stress after adjustment (Table 3).

In stratified analyses according to previous diagnosis of a mental disorder, resilience remained inversely associated with depression scores in both groups. Numerically larger coefficients were observed among students with a previous diagnosis (β = -0.419; $p < 0.001$) compared with those without a diagnosis (β = -0.391; $p < 0.001$). A similar pattern was observed for anxiety (β = -0.366 vs. -0.288) and stress (β = -0.383 vs. -0.302). However, formal interaction tests were not performed, and these differences should be interpreted with caution.

The findings demonstrated significant associations between resilience and all assessed mental health outcomes. The implications of these findings are discussed in light of previous evidence.

This study analyzed the association between resilience and mental health indicators among medical students, demonstrating that higher levels of resilience were associated with lower levels of anxiety, depression, and stress, suggesting an important protective role in mental health. In addition, it was possible to evaluate the influence of sociodemographic and behavioral characteristics on these outcomes.

The findings of the present study corroborate previous evidence demonstrating an inverse association between resilience and depressive symptoms among medical students. In a study conducted with Brazilian medical

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students, Tempski et al. (2015) observed that higher levels of resilience were associated with better quality of life and a more positive perception of the educational environment. Similarly, Dias et al. (2022) found that resilience played a protective role against burnout and suicidal ideation among medical students. These findings may be explained by the fact that more resilient individuals tend to use adaptive coping strategies, exhibit a greater ability to deal with adversity, and demonstrate better emotional regulation, thereby reducing the negative impact of academic stressors on mental health (Tempski et al., 2015; Dias et al., 2022).

Regarding anxiety and stress, the findings of the present study are also consistent with the literature. Yuan et al. (2026) observed that psychological resilience acts as a mechanism capable of attenuating the effects of stress on academic motivation, promoting more adaptive outcomes. According to the authors, more resilient students tend to cope more effectively with adverse situations, thereby reducing the negative impacts of psychological stress. In the context of medical education, characterized by high workloads, intense academic demands, and a frequently competitive environment, resilience may represent an important psychological resource for minimizing emotional distress and facilitating adaptation to the demands inherent to medical training, contributing to the maintenance of students' psychological well-being (Tempski, 2018; Kanashiro, 2026).

One of the most relevant findings of the present study was the observation that, among students with a previous diagnosis of a mental disorder, the inverse association between resilience and mental health indicators was stronger. Previous studies have demonstrated that resilience constitutes an important protective factor against psychological distress among medical students, being associated with lower levels of burnout, depressive symptoms, and suicidal ideation (Dias et al., 2022). Additionally, evidence indicates that students with lower levels of resilience are more likely to develop psychological symptoms and experience poorer adaptation to the academic environment (Luibl et al., 2021; Tempski et al., 2015).

In the current study, female sex was associated with higher levels of anxiety

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and stress. Similar findings have been reported in the literature, demonstrating a higher frequency of psychological symptoms among women during medical school. In a study conducted among Brazilian medical students, Moutinho et al. (2017) observed higher levels of anxiety, stress, and depressive symptoms among women compared with men. Similarly, Bicalho et al. (2025) identified a higher likelihood of anxiety symptoms among female students, even after adjustment for sociodemographic and behavioral factors. The greater vulnerability observed among women has been attributed to the interaction of biological, psychosocial, and academic factors, including hormonal fluctuations, greater exposure to emotional and social demands, as well as higher levels of self-imposed pressure and perceived overload throughout medical education.

Regular physical activity was associated with lower levels of depression in the present study. Similar findings have been reported among medical students, indicating a lower frequency of depressive symptoms among physically active individuals (Bicalho et al., 2025). Although the mechanisms underlying this association are complex, evidence suggests that physical activity may contribute to the regulation of mood-related neurotransmitters, in addition to promoting sleep quality and psychological well-being (Kandola et al., 2020). Furthermore, prospective studies have demonstrated a lower risk of developing depression among individuals who engage in regular physical activity (Schuch et al., 2018).

Although resilience was associated with better mental health indicators, strengthening resilience should not be understood as the sole strategy for addressing psychological distress in medical education. The literature has demonstrated that mental disorders among medical students result from a complex interaction of individual, academic, and institutional factors, including curriculum overload, high performance demands, and barriers to seeking psychological support (Pontes et al., 2026). Similarly, Dyrbye, Thomas, and Shanafelt (2005) emphasize that psychological distress in this population arises not only from personal characteristics but also from factors inherent to the educational environment, reinforcing the need for interventions that go beyond the development of individual skills.

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4. Conclusion

Higher levels of resilience were associated with lower levels of depression, anxiety, and stress in this sample of Brazilian medical students, suggesting that resilience may be an important factor related to mental health in medical education. Additionally, numerically larger coefficients were observed in stratified analyses among students with a previous diagnosis of a mental disorder, suggesting that this association may be particularly relevant in groups with greater psychological vulnerability. At the same time, promoting mental health in medical education requires not only attention to individual factors such as resilience, but also institutional strategies aimed at expanding access to psychological support, fostering healthier educational environments, and reducing the stigma surrounding mental disorders.

5. Limitations

This study has some limitations. First, its cross-sectional design precludes causal inferences regarding the associations observed between resilience and mental health indicators. Second, the use of self-reported measures may be subject to information bias, and the DASS-21 is a screening instrument that assesses symptoms rather than providing clinical diagnoses of mental disorders. Third, the online, non-probabilistic convenience and snowball sampling strategy may have introduced selection bias and limits the generalizability of the findings. In addition, no specific mechanism was implemented to formally identify duplicate responses. Information regarding participants' geographic region, type of institution (public or private), and number of participating institutions was not collected, which limited a more comprehensive characterization of the sample. Finally, characteristics of the educational environment were not directly measured, preventing a more complete assessment of institutional influences on students' mental health.

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