Anxiety and Depression Symptoms and Associated Factors Among Medical-Surgical Specialty Students at a University: A Descriptive Study

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ARTICLE INFORMATION

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ABSTRACT

Introduction: Medical residents commonly experience depressive and anxiety symptoms at higher rates compared to the general population. These symptoms have been associated with various sociodemographic risk factors as well as academic and healthcare demands.

Objective: To determine the frequency of depressive or anxiety symptoms and associated factors among medical-surgical specialty students.

Methods: A cross-sectional study was conducted in 2021, involving residents in medical-surgical specialties at a university in Medellín. Participants provided informed consent to participate. Three instruments were used: a sociodemographic and clinical survey, the Beck Anxiety Inventory, and the Beck Depression Inventory-II. Chi-square or Fisher's exact tests were used to explore associations, and prevalence ratios (PR) with 95% confidence intervals were estimated. Multivariate analysis using binomial regression was also performed.

Results: The study included 80 residents, of whom 57.5% were female. The median age was 28 (27-30 years). 17.5% had a personal history of mental illness, and 33.8% had a family history of mental illness. 72.5% consumed alcohol. 40% had depressive symptoms, and 11.3% had both anxiety and depressive symptoms. Factors associated with depressive symptoms were mistreatment, long working hours, and sleep disturbances. In the multivariate analysis, only sleep disturbance remained significantly associated (PR 8.7; 95% CI 1.2-63.2; p = 0.03). The variable associated with anxiety symptoms was mistreatment (PR 4.2; 95% CI 1.2-15.7; p = 0.02).

Conclusion: A higher prevalence of depressive symptoms, contrary to expectations, was found compared to anxiety symptoms. The variables associated with depressive or anxiety symptoms were consistent with previous reports.

Síntomas ansiosos, depresivos y factores asociados en estudiantes de especialidades médico-quirúrgicas en una universidad: estudio descriptivo

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RESUMEN

Introducción: los médicos residentes presentan con mayor frecuencia síntomas depresivos y ansiosos comparados con la población general, los cuales se han asociado a factores de riesgo sociodemográficos y a la demanda académica y asistencial.

Objetivo: determinar la frecuencia de síntomas depresivos o ansiosos y factores asociados en estudiantes de especialidades médico-quirúrgicas.

Métodos: estudio transversal que incluyó residentes de especialidades médico-quirúrgicas de una universidad de Medellín en 2021. Se aplicaron tres instrumentos: encuesta sociodemográfica y clínica, el inventario de ansiedad de Beck y el inventario de depresión de Beck-II. Se utilizó la prueba chi cuadrado o Fisher para explorar asociaciones, se estimaron razones de prevalencia (RP) con intervalos de confianza del 95% y análisis multivariado por regresión binomial.

Resultados: se incluyeron 80 residentes, de los cuales, el 57,5% eran mujeres; la mediana de edad fue 28 (27 - 30 años); 17,5% tenían algún antecedente personal y el 33,8% tenía un antecedente familiar de enfermedad mental; 72,5% consumían alcohol; 40% presentaron síntomas depresivos, y 11,3% sintomatología ansiosa y depresiva. Los factores asociados a síntomas depresivos fueron: maltrato, jornada laboral extensa y alteración del sueño. Este último fue el único factor que permaneció asociado en el análisis multivariado (RP 8,7; IC 95% 1,2 – 63,2; p =0,03). La variable asociada con síntomas ansiosos fue el maltrato (RP 4,2; IC 95% 1,2 – 15,7; p = 0,02).

Conclusión: se encontró mayor prevalencia de sintomatología depresiva que ansiosa, contrario a lo esperado; las variables asociadas a sintomatología depresiva o ansiosa son similares a lo reportado previamente.

INTRODUCTION

High frequencies of psychiatric disorders have been reported globally in the adult population, depression and anxiety being the most prevalent. These disorders are a significant cause of disability in terms of loss of healthy life years (1), thus they are considered public health issues. According to the World Health Organization (WHO), the global prevalence of depressive disorder is 4.4% (2), and for anxiety disorders, it is 3.6% (2). In Colombia, these figures are similar, with an estimated 4.7% of the population suffering from depression and 5.8% from anxiety (3).

Among university students aged 18 to 24, up to 41.9% exhibit various mental disorders affecting numerous aspects, including academic performance, with a predominance of depression and anxiety symptoms, especially in medical residency students. Risk factors for depression and anxiety identified include female gender, academic pressure, and financial difficulties (1,4–7).

Medical residents experience a higher frequency of depression and depressive symptoms (25-79.6%), as well as anxiety and anxiety symptoms (39-69.9%) (8) due to factors such as their medical specialty, the year of their residency, gender, and the assessment scale used (6,9). Various risk factors have been associated with these symptoms in students of medical-surgical residencies, including personal history of mental disorders, psychoactive substance use, marital status, interpersonal conflicts, financial burden, academic semester, high academic demand, academic achievements, and the specialty chosen (9–11).

The aim of the present study was to determine the frequency of depressive and anxiety symptoms, and the associated factors in residents of medical-surgical specialties at a university in Medellín.

METHODS

An analytical cross-sectional observational study targeting the full population of medical-surgical specialty residents at a private institution in Medellín, selected based on eligibility criteria, was conducted. It encompassed students from any medical-surgical specialty who were in the latter half of their first year or in their second, third, or fourth year of residency during the first semester of 2021 and agreed to participate through informed consent. Exclusions were made for participants who improperly or incompletely filled out the requested survey information.

Following approval from the institution's managers, a pilot test was conducted to evaluate and adjust the survey before distribution to all potential participants. The survey, designed to be self-administered and anonymous, queried variables obtained from participant responses:

I. Sociodemographic, epidemiological, and clinical characteristics: age, sex, marital status, socioeconomic status, family type, presence of children, economic resources and residency financing, year of residency, medical-surgical specialty, personal and family history of depression and anxiety, psychoactive substance use, alcohol consumption, cigarette smoking, medication use (opioids, antidepressants, anxiolytics, mood stabilizers, among others), and factors reported as associated with the development of depressive and anxiety symptoms (work hours, sleep disturbances, and any form of mistreatment received during residency). The residency year variable was converted into residency stage: first year = beginning, second year = intermediate, and third or fourth year = end.

II. Anxiety symptoms scale (Beck Anxiety Inventory, BAI): a score >16 on this scale was considered indicative of anxiety symptoms (12).

III. Depression symptoms scale (Beck Depression Inventory-II, BDI-II): Scores allowed for classification of depression symptom severity into: any depressive symptom (0–13 points), mild (14–19 points), moderate (20–28 points), and severe (29–63 points) (11).

The information collected was entered into an electronic form designed in Excel with validated fields to restrict value entry, thus preventing data entry errors.

Statistical Analysis

Qualitative variables were expressed through absolute and relative frequencies, and quantitative variables were analyzed using the median and interquartile range due to the assumption of non-normality not being met. The chi-square test or Fisher's test was used for comparing qualitative variables between students with and without depressive or anxiety symptoms. To estimate the association magnitude between factors and depressive or anxiety symptoms, prevalence ratios (PR) and their 95% confidence intervals (CI95%) were calculated. Multivariate binomial regression was performed to adjust the results for potential confounding variables, including only those variables that showed a p value <0.25 in the bivariate analysis. All data were processed using the IBM SPSS statistical package, version 25.

Ethical Considerations

The study was conducted in accordance with the ethical principles outlined in the 2013 amendment of the Helsinki Declaration. Classified as minimal risk research according to resolution 8430 of 1993 by the Colombian Ministry of Health and Social Protection for inquiring into sensitive aspects, approval was sought from the institution's Ethics Committee and informed consent was obtained from all participants.

RESULTS

The study aimed to include 113 residents from various medical-surgical specialties. Of these, 82 agreed to participate, but two were excluded due to improper survey completion, resulting in a final sample of 80 residents. Among the respondents, 46 (57.5%) were women, with a median age of 28 years (IQR: 27-30 years), and 57 (71.2%) of the residents were from socioeconomic levels 4 and 5 (Table 1). Thirty-two residents (40%) exhibited symptoms of depression of varying severity, and 9 (11.3%) displayed anxiety symptoms (Figure 1), all of whom also had depressive symptoms. The prevalence of anxiety symptoms was consistent across the beginning (11.1%), middle (13.3%), and end (8.7%) of residency with a p value of 0.869. Similarly, the frequency of depressive symptoms was comparable at all residency stages—beginning: 40.7%, middle: 36.7%, end: 43.5%, with a p value of 0.878.

Table 1. Sociodemographic Background of Residents in Medical-Surgical Specialties

Characteristics	N=80 (%n)
Female Gender	46 (57.5)
Age (years) *	28 (27 - 30)
Marital Status	
Single	63 (78.8)
Married	10 (12.5)
Common-law partnership	7 (8.8)
With children	7 (8.9)
Family Type	
Nuclear	66 (82.5)
Extended	7 (8.8)
Blended	4 (5.0)
Other †	3 (3.8)
Socioeconomic Level	
3	4 (5.0)
4	23 (28.7)
5	34 (42.5)
6	19 (23.8)
Study Financing	
First-degree family	36 (45)
Self-financing	15 (18.8)
Bank loan	17 (21.3)
Other sources ‡	9 (11.3)
Specialty	
Internal Medicine	14 (17.7)
Gynecology and Obstetrics	10 (12.7)
Orthopedics	8 (10.1)
Pediatrics	8 (10.1)
Anesthesia	6 (7.6)
Dermatology	6 (7.6)
Psychiatry	6 (7.6)
Ophthalmology	5 (6.3)
Physical Medicine and Sports	5 (6.3)
General Surgery	4 (5)
Pain and Palliative Care	4 (5)
Radiology	3 (3.8)

* Median and Interquartile range
† Other (single-person, single-parent)
‡ Other sources (ICETEX, Fondos Sapiencia)
Source: authors' creation
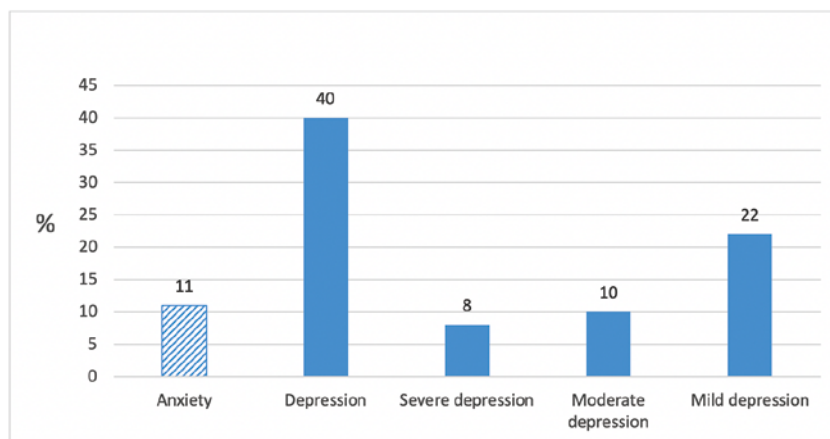
Figure 1. Frequency of Anxiety and Depressive Symptoms in 80 Medical-Surgical Specialty Residents

Source: authors' creation

Regarding the participants' backgrounds, 14 (17.5%) had a personal history of mental illness, primarily depression and anxiety; 58 (72.5%) consumed alcohol; 56 (70.0%) experienced sleep disturbances; 23 (28.7%) reported mistreatment with verbal harassment being the most common form of mistreatment, reported by 19 (86.2%), followed by bullying, reported by 7 (30.4%) (Table 2).

Table 2. Clinical and Epidemiological Background

Characteristics	(%n/N)
History of mental illness	14/80 (17.5)
Type of mental illness*	
Anxiety	10/80 (12.5)
Depression	4/80 (5.0)
ADHD	2/80 (2.5)
Bipolar disorder	1/80 (1.25)
Insomnia	1/80 (1.25)
Binge eating disorder	1/80 (1.25)
Executive dysfunction	1/80 (1.25)
Psychiatric medications	18/80 (22.5)
Prescribed by:	
Specialist	16/18 (88.9)
Self-medication	2/18 (11.1)
Family history of mental illness	27/80 (33.8)
Alcohol consumption	58/80 (72.5)
Cigarette smoking	4/80 (5.0)
General medical diagnosis	24/80 (30.0)
Medications for general medical condition	13/24 (54.2)
Prescribed by:	
Specialist	11/13 (84.6)
General practitioner	1/13 (7.7)
Not reported	1/13 (7.7)
Long working hours	65/80 (81.3)

Table 2. Clinical and Epidemiological Background (continuation)

Characteristics	(%n/N)
Sleep disturbances	56/80 (70)
Increase	16/56 (28.6)
Decrease	40/56 (71.4)
Restorative sleep	37/80 (46.3)
Mistreatment	23/80 (28.7)
Type of mistreatment	
Verbal harassment	19/23 (82.6)
Bullying	7/23 (30.4)
Time abuse	1/23 (4.3)
Sexual harassment	1/23 (4.3)
Emotional harassment	1/23 (4.3)
Psychological harassment	1/23(4.3)

* Some participants had multiple psychiatric comorbidities.
ADHD: Attention Deficit Hyperactivity Disorder
Source: authors' creation

The factors associated with depressive symptoms were long working hours, sleep disturbances, and mistreatment. In the multivariate analysis, the only factor that remained significant was sleep disturbances (PR 8.7; 95% CI 1.2 - 63.2; p = 0.03) (Table 3). Regarding factors related to anxiety symptoms, a statistically significant association was observed with mistreatment, even in the presence of other variables (RP 4.2; 95% CI 1.2 – 15.7; p = 0.02) (Table 4).

Table 3. Demographic and Clinical Factors and Their Relationship With Depressive Symptoms

Factors	Depressive Symptoms			Bivariate Analysis		Multivariate Analysis	
	n	Yes (%n)	No (%n)	PR (IC 95%)	P value	PR (IC 95%)	P value
Sex							
Male	34	12 (35.3)	22 (64.7)	0.8 (0.5 – 1.4)	0.46		
Female	46	20 (43.5)	26 (56.5)				
Family history of mental illness							
Yes	27	13 (481)	14 (51.9)	1.3 (0.7 – 2.2)	0.28		
No	53	19 (35.8)	34 (64.2)				
Children							
Yes	7	3 (42.9)	4 (57.1)	1.1 (0.4 – 2.6)	0.87		
No	73	29 (39.7)	44 (60.3)				
Long working hours							
Yes	65	31 (47.7)	34 (52.3)	7,2 (1.1 – 48.3)	0.003	2,2 (0.4 – 11.4)	0.34
No	15	1 (6.7)	14 (93.3)				
Sleep disturbances							
Yes	56	31 (55.4)	25 (44.6)	13.3 (1.9 – 91.8)	<0.001	8.7 (1.2 – 63.2)	0.03
No	24	1 (4.2)	23 (95.8)				
Mistreatment							
Yes	23	14 (60.9)	9 (39.1)	1.9 (1.2 – 3.2)	0.016	1.3 (0.8 – 2.1)	
No	57	18 (31.6)	39 (68.4)				0.15

PR: Prevalence Ratio
Source: Authors' creation

Table 4. Sociodemographic and Clinical Factors and Their Relationship With Anxiety Symptoms

Factors	Anxiety Symptoms			Bivariate Analysis		Multivariate Analysis	
	n	Yes (%n)	No (%n)	PR (CI 95%)	P value	PR (CI 95%)	P value
Sex							
Male	34	2 (5.9)	32 (94.1)				
Female	46	7(15.2)	39 (84.8)	0.4 (0.9– 1.7)	0.19	0.5 (0.1-2.1)	0.39
Family history of mental illness							
Yes	27	6 (22.2)	21 (77.8)				
No	53	3 (5.7)	50 (94.3)	3.9 (1.0-14.4)	0.02	3.5 (1.1-11.9)	0.04
Children							
Yes	7	1 (14.3)	6 (85.7)				
No	73	8(11.0)	65 (89.0)	1.3 (0.2-8.9)	0.8		
Long working hours							
Yes	65	8 (12.3)	57 (87.7)				
No	15	1(6.7)	14 (93.3)	1.8 (0.2- 13.6)	0.5		
Sleep disturbances							
Yes	56	8 (14.3)	48 (85.7)				
No	24	1 (4.2)	23 (95.8)	3.4 (0.4 -25.9)	0.2	1.9 (0.2 -15.1)	0.54
Mistreatment							
Yes	23	6 (26.1)	17 (73.9)				
No	57	3 (5.3)	54 (94.7)	4.9 (1.3 -18.2)	0.01	4.2 (1.2-15.7)	0.02

PR: Prevalence Ratio
Source: Authors' creation

When only the results of residents without a history of mental illness were evaluated (n = 66), the same pattern was observed. The following factors were associated with depressive symptoms: long working hours (PR: 11.6; 95% CI 0.8 - 178.3; p = 0.003), sleep disturbances (PR: 11.5; 95% CI 1.7 - 79.7; p < 0.0001) and experiencing mistreatment (PR: 2.0; 95% CI: 1.1 - 3.7). Regarding anxiety symptoms, the only factor that showed a trend of association was mistreatment (PR: 5.1; 95% CI: 0.94 - 27.8; p = 0.073).

DISCUSSION

The training period for medical residents is marked by increased stress and emotional issues, potentially leading to negative impacts on cognitive functioning. This study offers insights into the mental health status regarding anxiety and depression symptoms among residents across various medical-surgical specialties. There is a noted scarcity of evidence on this issue within our context.

In this study, medical resident students, when compared to the general population, exhibited a higher frequency of anxiety and depressive symptoms (8). Moreover, a greater frequency of depressive symptoms over anxiety symptoms was observed, aligning with other studies that reported prevalence rates between 19% and 43.2%. Such varied outcomes could be attributed to the use of different scales for symptom measurement or the specific academic period of the residents. Despite reports that prevalence increases as residency progresses (5,6,8,12,13), our study did not observe this trend.

Regarding the severity of depression symptoms, mild forms were most common, followed by moderate and severe, akin to Ahmed I et al., who reported 27.3% with mild symptoms, 10.1% moderate, and 1.3% severe (14), contrary to Olum R et al., who noted a predominance of moderate depressive symptoms in their population (15).

The perception of sleep disturbances remained uniquely associated with depressive symptoms, reflecting similar findings in other studies that evaluated sleep problems in terms of reduced (63.49%) or excessive (44.44%) hours (1,11). Although extended working hours and mistreatment were not associated with depressive symptoms following multivariate analysis, there is evidence suggesting these factors are linked to both depressive and anxiety symptoms (5).

The frequency of anxiety symptoms was found to be lower than depressive symptoms, aligning with other studies that reported higher levels of psychological stress, burnout, and anxiety symptoms (3,5,8). This finding contrasts with the study by Aguirre-Hernández R et al., which reported a higher prevalence of anxiety (59.1%) compared to depressive symptoms (32.3%) (16).
Additionally, our study found that all residents with anxiety symptoms also suffered from depressive symptoms, consistent with previous research where anxiety symptoms have been correlated or associated with the presence of depressive symptomatology (14,17).

A significant portion of participants (17.5%) had a history of mental illness, prompting a post-hoc analysis in the subgroup of residents without such a history to examine if excluding residents diagnosed with any mental illness would affect the results. This subgroup displayed the same outcomes as the entire sample, suggesting that the observed effects might be attributed to factors inherent to the medical residency period, despite the reduced sample size.

In our study, residents who experienced mistreatment reported more anxiety symptoms, mirroring findings from other studies where mistreatment and abuse, along with factors like long hours, high workload, and patient suffering exposure, have been linked to such symptoms. Furthermore, academic pressure, low remuneration, and personal aspects such as age, gender, experiences lived, and family relationships have been associated with depressive symptoms (5,11,12,18).

An important aspect to consider is that this study was conducted during the second year of the COVID-19 pandemic, which limited sample recruitment due to difficulties accessing various practice sites where the residents were located. Nevertheless, 72.5% of potential participants were recruited. Despite employing various strategies for sample recruitment, some specialties were not represented in this group of residents, limiting the generalizability of the findings and the ability to establish a relationship between specialty type and depression and anxiety symptoms. Similarly, the context of the pandemic period must be taken into account when interpreting the results, as it could have influenced the depressive and anxiety symptoms exhibited by the residents.

One of the strengths of our study is the exploration of a relatively unexamined population, as determined by our literature review. The significance of our findings is amplified by the fact that early diagnosis and intervention in resident physicians can lead to personal benefits for the students and enhance patient care by reducing the likelihood of medical errors and improving patient safety and care.

CONCLUSIONS

In this group of residency students, an increased frequency of depression and anxiety symptoms was observed during their training process compared to the general population, aligning with international findings. It is essential for medical specialty programs in our environment to develop strategies that positively impact the mental health of their students. Additionally, addressing psychological aspects to reduce the risk of developing more significant mental disorders is crucial.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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