

PREVALENCE OF ANXIETY SYMPTOMS AMONG MEDICAL RESIDENTS: A CROSS-SECTIONAL STUDY

Prevalencia de síntomas de ansiedad en residentes médicos: un estudio transversal

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Abstract

Background: Anxiety is a common emotional response to stress, but persistent symptoms may indicate an anxiety disorder. This study aimed to determine the prevalence of anxiety symptoms among medical residents in Santiago de los Caballeros, Dominican Republic. **Material and methods:** A descriptive, cross-sectional study was conducted from February to May 2021, involving 219 medical residents from various hospitals. Respondents provided informed consent and completed a virtual questionnaire with sociodemographic questions and the State-Trait Anxiety Inventory. Data were analyzed using the Chi-squared test. **Results:** Among the 219 medical resi-

Resumen

Antecedentes: La ansiedad es una respuesta común al estrés, pero los síntomas persistentes pueden indicar un trastorno de ansiedad. El objetivo es determinar la prevalencia de síntomas de ansiedad entre los residentes médicos en Santiago de los Caballeros, República Dominicana. **Material y métodos:** Se realizó un estudio descriptivo y transversal de febrero a mayo de 2021 con 219 residentes médicos de varios hospitales. Los encuestados completaron un cuestionario virtual con preguntas sociodemográficas y el Inventario de Ansiedad Rasgo-Estado. Los datos se analizaron con la prueba de Chi-cuadrado. **Resultados:** De los 219 residentes, el 66.2% eran

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dents, 66.2% were women, and the prevalence of anxiety symptoms was 48.9%. First-year (50.8%), second-year (48.0%), and third-year (50.0%) residents showed the highest likelihood of experiencing anxiety symptoms. Internal Medicine had the highest specialty-specific prevalence. Factors such as hours of sleep, alcohol consumption, smoking, and illicit substance use were examined; however, none, except for gender, were statistically significant. **Conclusions:** The high prevalence of anxiety symptoms among medical residents is a significant concern, highlighting the need for further investigation and the development of psychological interventions to support mental health and ensure the well-being of healthcare professionals and patients.

Keywords: Mental health, stress, psychological interventions, medical internship and residency, Dominican Republic.

Introduction

Anxiety is a common response to stress, characterized by fear and worry that influence decision-making¹. Persistent anxiety symptoms may indicate an anxiety disorder^{1, 2}. Medical residency is demanding, with sleep deprivation, long hours, and constant pressure to avoid errors in order to deliver optimal patient care³. Studies have shown a link between residency and mental health issues like anxiety, affecting residents' quality of life^{4, 5}. This can lead to deterioration in both mental and physical health and might even increase substance use. It also raises the risk of medical errors, compromising patient care⁶.

Research on this issue in the Dominican Republic is limited. Therefore, assessing the prevalence of anxiety symptoms in this group of people is crucial to implement measures to protect their mental health and ensure quality patient care. This cross-sectional study examines the prevalence anxiety symptoms among medical residents in Santiago de los Caballeros, Dominican Republic.

mujeres y la prevalencia de síntomas de ansiedad fue del 48.9%. Los residentes de primer año (50.8%), segundo año (48.0%) y tercer año (50.0%) mostraron la mayor probabilidad de síntomas de ansiedad. Medicina Interna tuvo la mayor prevalencia por especialidad. Factores como horas de sueño, consumo de alcohol, tabaquismo y uso de sustancias ilícitas se examinaron; sin embargo, solo el género fue estadísticamente significativo. **Conclusiones:** La alta prevalencia de síntomas de ansiedad entre los residentes médicos es preocupante, destacando la necesidad de más investigación y desarrollo de intervenciones psicológicas para apoyar la salud mental y el bienestar de los profesionales de la salud y los pacientes.

Palabras clave: Salud mental, estrés, intervenciones psicológicas, internado médico, República Dominicana.

Materials and methods

Study design

This cross-sectional descriptive study aimed to determine the incidence of anxiety symptoms among medical residents in both private and public hospitals in Santiago de los Caballeros. Data collection occurred between February and May 2021.

Sample

The study included medical residents from several hospitals in Santiago de los Caballeros, situated in the northern region of the Dominican Republic. Out of 507 residents, 231 participated, with 219 eligible for analysis. The sample size was calculated using the Raosoft sample size calculator, with a 5% margin of error and 95% confidence level.

Measures

Selection criteria

Participants with pre-existing mental health diagnoses were excluded to avoid bias from unrelated

psychiatric conditions. However, those diagnosed during their residency were included, as their conditions could be linked to residency stress. Two questions identified pre-existing diagnoses: the first questioned if the resident had a mental health diagnosis, and the second inquired when that diagnosis was made.

Sociodemographic information

Participants provided information on gender, healthcare facility, medical specialty, years in residency, weekly hours worked, daily sleep hours, and alcohol, tobacco, and illicit drug use in the previous six months.

Gender analysis

The study included sex and gender-based analyses to assess their impact on anxiety symptoms among medical residents. Sex was defined by biological attributes and gender by socially constructed roles. Data were analyzed for differences in anxiety symptoms between male and female residents, but the limited sample size of other gender identities meant the focus remained on binary categorizations.

State-Trait Anxiety Inventory (STAI)

The prevalence of anxiety symptoms was assessed using the State-Trait Anxiety Inventory (STAI)⁷, validated for use in the Dominican Republic. The STAI includes 40 items: 20 evaluate current feelings and 20 assess trait characteristics, with four response options each, scored from 1 to 4. Scores range from 20 to 80, with 20-31 indicating very low anxiety, 32-43 suggesting low anxiety (both anxiety-free), 44-55 as moderate anxiety, 56-67 as high anxiety, and 68-80 as very high anxiety. Medium, high, and very high scores indicate the presence of anxiety symptoms.

Statistical analysis

Data for statistical analysis were organized and tabulated using Microsoft Office 365's Excel. IBM SPSS version 28 was used for analysis and processing. Descriptive analysis was performed on sociodemographic characteristics. The relationship between sociodemographic variables and the prevalence of anxiety symptoms was examined using the Chi-squared test, with a p-value of less than 0.05 considered statistically significant. Sensitivity analyses were not conducted in this study.

Handling missing data

Missing data were addressed using multiple imputation techniques, which reduce bias and ensure the reliability and validity of the study's findings by providing comprehensive estimates for missing values.

Ethical considerations

The study was approved by the Bioethics Committee of the Faculty of Health Sciences (COBE-FACS) at the Pontificia Universidad Católica Madre y Maestra, Santiago campus (COBE-FACS-MED-017-3-2018-2019). It adhered to the ethical standards of the 1975 Declaration of Helsinki and relevant national regulations. Informed consent was obtained from all participants, ensuring their autonomy and the option to withdraw at any time. Data collection was conducted virtually to maintain privacy and confidentiality during the SARS-COV-2 pandemic.

Results

In this study, 219 medical residents from various years of residency and specialties completed the survey. Female participants comprised 66.2% of the respondents. The majority of residents were from Hospital Regional Universitario José María Cabral

y Báez (41.6%). Internal medicine was the most common specialty among residents (35.2%). The second and third years of residency were the most prevalent among participants, representing 33.3% and 35.6% of the sample, respectively. More than half of the medical residents reported working over 70 hours per week, and 71.2% reported sleeping fewer than six hours per day (Table 1). Regarding substance use, 79.5% reported alcohol use, 15.1% reported cigarette use, and 2.3% reported the use of other illicit drugs in the previous six months (Table 2).

Anxiety symptoms were present in 48.9% of residents, with the highest prevalence observed in the first (50.8%) and third (50.0%) years of residency (Table 2). Internal medicine had the highest frequency of anxiety symptoms (53.2%), followed by anesthesiology (52.6%) and pediatrics (50.0%) (Table 3). Other factors, as listed in Table 4, did not demonstrate statistical significance in the research, except for gender. Translating these findings into absolute risk over a meaningful time period was not applicable to this study.

Discussion

The study found that 48.9% of the 219 medical residents experienced anxiety symptoms, aligning with findings by Marzouk et al.⁴ and Pokhrel et al.⁵, where anxiety was prevalent in 43.6% and 45.3% of residents, respectively. Anxiety was prevalent across the first three years of residency (48.0%-50.8%), but only 20% in the fourth year, contrasting with Marzouk et al.⁴, which found that anxiety levels among first to fourth-year residents varied from 40.5% to 46.5%. This is possibly due to the SARS-COV-2 pandemic's impact on the health system, increasing anxiety levels. The decreased frequency of symptoms in fourth-year residents in the Dominican Republic is primarily related to workload allocation, which is higher during the

first three years of training. Although the small number of fourth-year residents (5 out of 219) may have affected accuracy as well. Also, Marzouk et al.⁴ used the Hospital Anxiety and Depression questionnaire, possibly accounting for differences in findings.

Internal medicine (53.2%), anesthesiology (52.6%), and pediatrics (50%) showed higher anxiety rates, similar to Arias-Ulloa et al.⁸ who reported anxiety rates of 50.0% in anesthesiology and 42.9% in pediatrics. However, they found lower anxiety rates in family medicine and internal medicine, both at 23.3%, compared to this study (53.2% and 50.0%, respectively). Lower anxiety rates in these specialties in their study may be due to more emergency program applications, contrary to our study; healthcare centers in the Dominican Republic often assign internal and family medicine residents to the emergency room to compensate for low emergency residents. This and the increased workloads during the pandemic might have affected anxiety levels. Residents in acute medicine (n=3) and geriatrics (n=3) also displayed anxiety symptoms, possibly due to the higher mortality rates among their patients.

Anxiety prevalence was similar between genders (48.6% for males, 49.0% for females), contrasting with Gong et al.⁹ and Tabalipa et al.¹⁰ which found that women were more likely to exhibit symptoms. The pandemic likely contributed to equalizing anxiety levels due to increased workload. Measurement differences also might have played a role; Gong et al.⁹ used the Self-Assessment Scale for Anxiety, and Tabalipa et al.¹⁰ used the Beck's Anxiety Inventory. While this current study primarily analyzed binary gender categories, future research should aim to include a broader range of gender identities to fully understand the impact of gender diversity on anxiety symptoms. Although the p-value was statistically significant

Table 1. Sociodemographic data

	No.	Percentage (%)
Gender		
Male	74	33.8%
Female	145	66.2%
Health Center		
Hospital Regional Universitario José María Cabral y Báez	91	41.6%
Centro de Salud Juan XXIII	7	3.2%
Hospital Presidente Estrella Ureña	54	24.7%
Hospital Infantil Regional Universitario Dr. Arturo Grullón	27	12.3%
Hospital Metropolitano de Santiago	11	5.0%
Centro Seguro Médico para Maestros (SEMMA) Santiago	8	3.7%
Clínica Unión Médica del Norte	13	5.9%
Clínica Corominas	8	3.7%
Medical specialty		
Anatomical pathology	1	0.5%
Anesthesiology	19	8.7%
Oral and maxillofacial	3	1.4%
General Surgery	15	6.8%
Emergency Medicine	17	7.8%
Physiatry	2	0.9%
Geriatrics	3	1.4%
Obstetrics Gynecology	19	8.7%
Imaging	14	6.4%
Family Medicine	7	3.2%
Internal Medicine	77	35.2 %
Clinical Nutrition	1	0.5%
Ophthalmology	5	2.3%
Orthopedics and Traumatology	4	1.8%
Pediatrics	26	11.9%
Urology	3	1.4%
Intensive therapy	3	1.4%
Year of residency		
First-year resident	63	28.8%
Second-year resident	73	33.3%
Third-year resident	78	35.6%
Fourth-year resident	5	2.3%
Time spent at work		
< 35 hours/week	6	2.7%

(continued)

Table 1. Sociodemographic data (*continued*)

	No.	Percentage (%)
35-44 hours/week	9	4.1%
45-59 hours/week	42	19.2%
60-69 hours/week	48	21.9%
≥ 70 hours/week	114	52.1%
Hours of sleep		
< 6 hours/day	156	71.2%
6-8 hours/day	61	27.9%
8 hours/day	2	0.9%
Alcohol consumption		
Yes	174	79.5%
No	45	20.5%
Tobacco use		
Yes	33	15.1%
No	186	84.9%
Consumption of Illicit Substances		
Yes	5	2.3%
No	214	97.7%

Table 2. Prevalence of anxiety symptoms

	With anxiety symptoms	Without anxiety symptoms	<i>p</i> -value
Gender			<i>p</i> = 0.002
Male	36 (48.6%)	38 (51.4%)	
Female	71 (49.0%)	74 (51.0%)	
Hours spent in training as residents			<i>p</i> = 0.255
< 35 hours/week	2 (33.3%)	4 (66.7%)	
35-44 hours/week	6 (66.7%)	3 (33.3%)	
45-59 hours/week	25 (59.5%)	17 (40.5%)	
60-69 hours/week	26 (54.2%)	22 (45.8%)	
≥ 70 hours/week	36 (42.1%)	66 (57.9%)	
Hours of sleep			<i>p</i> = 2.707
<6 hours/day	74 (47.4%)	82 (52.6%)	
6-8 hours/day	33 (54.1%)	28 (45.9%)	
≥ 8 hours/day	0 (0.0%)	2 (100%)	

(continued)

Table 2. Prevalence of anxiety symptoms (*continued*)

	With anxiety symptoms	Without anxiety symptoms	<i>p</i> -value
Alcohol consumption			<i>p</i> = 2.783
Yes	90 (51.7%)	84 (48.3%)	
No	17 (37.8%)	28 (62.2%)	
Tobacco use			<i>p</i> = 0.110
Yes	17 (51.5%)	16 (48.5%)	
No	90 (48.4%)	96 (51.6%)	
Consumption of illicit substances			<i>p</i> = 1.986
Yes	4 (80.0%)	1 (20.0%)	
No	103 (48.1%)	111 (51.9%)	

Table 3. Prevalence of anxiety symptoms and year of residence

Year of residency	With anxiety symptoms	Without anxiety symptoms	Total	<i>p</i> -value
First year of residency	32 (50.8%)	31 (49.2%)	63 (100%)	<i>p</i> = 0.609
Second year of residency	35 (48.0%)	38 (52.0%)	73 (100%)	
Third year of residency	39 (50.0%)	39 (50.0%)	78 (100%)	
Fourth year of residency	1 (20.0%)	4 (80.0%)	5 (100%)	
Total	107 (48.9%)	112 (51.1%)	219 (100%)	

Table 4. Prevalence of anxiety symptoms and specialty

Specialty	With anxiety symptoms	Without anxiety symptoms	Total	<i>p</i> -value
Anesthesiology	10 (52.6%)	9 (47.4%)	19 (100%)	<i>p</i> = 0.156
General Surgery	7 (46.7%)	8 (53.3%)	15 (100%)	
Emergency Medicine	8 (47.1%)	9 (52.9%)	17 (100%)	
Obstetrics-Gynecology	4 (21.0%)	15 (79.0%)	19 (100%)	
Imaging	3 (21.4%)	11 (78.6%)	14 (100%)	
Family Medicine	4 (57.1%)	3 (42.9%)	7 (100%)	
Internal Medicine	41 (53.2%)	36 (46.8%)	77 (100%)	
Pediatrics	13 (50.0%)	13 (50.0%)	26 (100%)	

($p = 0.002$), the actual percentages (48.6% vs. 49.0%) are very similar, suggesting that the difference may not be clinically meaningful.

Residents working 35-44 hours per week reported higher anxiety (66.7%), but this was not statistically significant due to a small sample size (9 out of 219 in this category). Chinese studies indicat-

ed higher anxiety for those working 60+ hours per week⁹ and performing two-to-three night shifts⁴. The pandemic likely compressed the time to complete workloads, affecting results. Additionally, the options of 45-59 hours and 60-69 hours received the most responses, with 59.5% and 54.2% reporting anxiety, respectively, which aligns more closely with expectations.

One important factor is sleep. Residents sleeping less than 8 hours per day exhibited higher anxiety levels. Even though this was not statistically significant, it suggests that most medical residents in the Dominican Republic don't sleep the recommended amounts. This aligns with a Nepalese study that found that anxiety was rare in individuals who slept adequately⁵.

Regarding substance use, 51.7% of alcohol consumers experienced anxiety symptoms. Although the results were not statistically significant, there was a link between not drinking alcohol and having fewer anxiety symptoms. This aligns with a Brazilian study that noted a significant association between alcohol consumption and increased anxiety levels among medical residents¹¹. 51.5% of tobacco users reported anxiety, but this was not significant possibly due to the small number of 33 users out of 219. In a study from Bahrain, 8.6% of doctors smoked, with no significant anxiety relationship¹². In our study, 80% of illicit substance users reported anxiety, however no statistical significance as the sample included only five residents, four of whom exhibited anxiety symptoms.

Our research had limitations, including data collection during the COVID-19 pandemic, with the virtual survey method possibly introducing self-report and social desirability biases. Additionally, participants may have omitted information due to memory bias. Despite these limitations, there are notable strengths in this study, such as being approved by a bioethics committee, and utilizing validated assessment instruments. This is the first study of its kind in the Dominican Republic, resulting in low publication bias and no conflicts of interest. Future research should include larger, multicentered samples with stratified probability sampling to address imbalances in specialties and residency years. Another important limitation is the absence of multivariate analysis, which would have allowed for the identification of adjusted predictors of anxiety symptoms. Furthermore, future studies should seek to incorporate non-binary and

gender-diverse identities in order to better understand how gender diversity impacts mental health outcomes. Additionally, the use of online self-administered questionnaires may have introduced self-selection bias and underreporting of symptoms due to social stigma, particularly around mental health.

Conclusions

Anxiety symptoms were identified in 48.9% of medical residents in Santiago de los Caballeros, Dominican Republic, with the highest prevalence among first-year residents and those in internal medicine. Anxiety levels were similar across genders. Higher anxiety was reported among residents working 35-44 hours per week and those sleeping less than 8 hours per night. Over half of the residents who consumed alcohol and four out of five who used illicit substances reported anxiety symptoms. However, apart from gender, none of the correlations investigated were statistically significant.

These findings underscore the importance of targeted mental health promotion programs to treat and prevent anxiety among medical residents. Incorporating psychological and mental health services in healthcare facilities is crucial. Future research should aim to include larger sample sizes, particularly in specialties with fewer respondents, and consider multicentered studies with stratified sampling to address category imbalances, especially concerning specialties and years of residency.

Conflict of interest

The authors declare that there are no conflicts of interest.

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Author contributions

All authors contribute equally.

Ethical statement

Informed consent was obtained from all subjects who participated in the study.

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