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Risk factors and multicentre screening of mental health disorders in hospital rotating interns

Factores de riesgo y cribado multicéntrico de trastornos de salud mental en internos rotativos hospitalarios

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ABSTRACT

Depression and Anxiety are the most common mental disorders worldwide. Multiple factors, such as work-related stress, long periods, and night shifts, contribute to the development of these diseases in healthcare personnel, including students in the health field. An original, observational, cross-sectional study with a descriptive and inferential quantitative approach was developed. The general objective was to establish the epidemiological profile of mental health disorders (depression, Anxiety, and suicidal behaviours) among rotating medical, nursing, and nutrition interns at hospitals in Zone 3 (Cotopaxi, Chimborazo, Pastaza, and Tungurahua) using the PHQ-9 and GAD-7. The prevalence of Anxiety and depression was high, affecting 49 % (95 %CI 45-53 %) and 47 % (95 %CI 43-51 %) of interns, respectively, with mild forms predominating. Suicidal ideation was reported by 9 % (95 %CI 7-11 %) of participants, and suicide attempts by 3 % (95 %CI 2-5 %). A considerable

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percentage of affected interns had no prior mental health diagnosis before starting their internship. Multivariate analyses demonstrated strong associations between Anxiety and depression (OR 27.05 95 %CI 17.6-41.6; p=0.000), suicidal ideation and attempt (Anxi. OR 9.94 p=0.000; Depr. OR 7.57 p=0.000), extended work shifts (>24 hours), reduced sleep duration (<7 hours), and being a medical intern. Incoming cohorts showed a lower probability of depression compared with outgoing cohorts, suggesting a potential cumulative effect of internship exposure, which should be reinforced with additional longitudinal studies. The findings revealed an underdiagnosis of mental health disorders and highlight the influence of workload and rest associated with rotating practices, which underscores the need for systematic screening and institutional preventive strategies.

Keywords: Anxiety Disorders; Depressive Disorder; Self-Injurious Behavior; Mass Screening; Patient Health Questionnaire.

RESUMEN

Mundialmente, la depresión y la ansiedad han sido los trastornos mentales más comunes. Múltiples factores, como el estrés laboral, largos periodos y turnos nocturnos, contribuyen al desarrollo de estas enfermedades, afectando incluso a estudiantes sanitarios. Se desarrolló un estudio original, observacional, transversal, cuantitativo, descriptivo e inferencial para establecer el perfil epidemiológico de los trastornos de salud mental en internos rotativos de medicina, enfermería y nutrición en los hospitales pertenecientes a la Zona 3 usando el PHQ-9, GAD-7. La prevalencia de ansiedad y depresión fue del 49 % (IC95 % 45-53 %) y 47 % (IC95 % 43-51 %) respectivamente, con predominio de las formas leves. El 9% (IC95% 7-11%) reportó ideación suicida y el 3 % (IC95 % 2-5 %) intentos autolíticos. Un porcentaje considerable de los internos afectados no tenían diagnóstico previo de salud mental antes de iniciar su internado. Se demostró una fuerte asociación entre la ansiedad y la depresión (OR 27.05 IC95 % 17.6-41.6; p=0.000), la ideación suicida e intento autolítico (Anxi. OR 9.94 p=0.000; Depr. OR 7.57 p=0.000), las jornadas laborales prolongadas (más de 24 horas), la reducción del sueño (menos de 7 horas), y ser interno de medicina. Adicionalmente, las cohortes de ingreso mostraron una menor probabilidad de presentar estos trastornos en comparación con las de egreso. Los hallazgos revelaron un subdiagnóstico de trastornos de salud mental y resaltan la influencia de la carga laboral, y descanso asociadas a las prácticas rotativas; estos resultados deben ser reforzados con estudios longitudinales, sin embargo, se debe implementar un cribado sistemático y estrategias preventivas institucionales.

Palabras clave: trastornos de ansiedad; trastorno depresivo; conductas autolesivas; cribado masivo; cuestionario de salud del paciente.

INTRODUCTION

Depression and Anxiety are the most common mental disorders worldwide, which represent a global concern due to their increasing prevalence, mainly after the COVID-19 pandemic, by approximately 25 % among

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health personnel, according to the World Health Organization (WHO). [1,2] Multiple factors, such as work-related stress resulting from work overload, long periods, and night shifts, contribute significantly to the development of these diseases.[3–5] The longer period of training and the level of demand required for students in the health field when they are involved in hospital settings are necessary for the development of knowledge and clinical skills; nevertheless, these requirements, plus the inherently unfavorable labor environments and schedules, lead to a higher proportion of students who are experiencing psychological distress, such as depression and burnout.[6]

An additional concern regarding these kinds of mental disorders is their direct relationship with the unfavourable outcomes, such as suicidal behaviours, which represent a public health problem.[7] Therefore, the implementation of an early evaluation with validated tools is crucial to identify mental health disorders faster and more accurately, to provide interventions, and follow-up to prevent death and improve quality of life for health personnel and students in hospital settings.[8] There are some scales for screening of depression and Anxiety reported in the scientific literature; the most used are the Patient Health Questionnaire-2 and 9 (PHQ-2 and PHQ-9), whose questions map directly to DSM-5 criteria for major depression, and General Anxiety Disorder-7 (GAD-7).[9–11] Benefits of screening for both depression and Anxiety using these tools include improved rates of detection and the opportunity to receive earlier intervention, which improves the outcomes related to these diseases.[9]

This research arose under the necessity of knowing about the current reality of mental health disorders and their associated risk factors in students who were rotating in Hospitals during their internship year, leading the authors to propose the following hypothesis: there is a high prevalence of depression, Anxiety, and suicidal behaviours in rotating medical, nursing, and nutrition interns.

The general objective proposed is to establish the epidemiological profile of mental health disorders (depression, Anxiety, and suicidal behaviours) in rotating medical, nursing, and nutrition interns at the Hospitals belonging to Zone 3 (Cotopaxi, Chimborazo, Pastaza, and Tungurahua) of the following cohorts: September 2023-August 2024; September 2024-August 2025; May 2024-April 2025; May 2025-April 2026. According to this general approach, specific objectives state to determine the prevalence of depression, Anxiety, and suicidal behaviours using the PHQ-9 and GAD-7 questionnaires, to describe the main social-demographic factors of the study population, to determine the association between the presence of mental disorders and the social-demographic/health/labor variables, and to establish recommendations for recognition and action in response to the results obtained that prevent adverse outcomes in students in the health field.

METHODOLOGY

An original, observational, cross-sectional study with a descriptive and inferential quantitative approach was developed.

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

The word cohort is used fairly in this research; it is convenient to clarify that the methodological design does not correspond to a cohort study because the measurement was carried out only once per student, and the word cohort refers to the group of students admitted to the rotating internship on different dates.

No sample size calculation was performed since all interns in the corresponding cohorts were considered to be evaluated (population: 632 interns in the health field). This population represents the total number of interns in Zone 3 who met the eligibility criteria described below. The data was primarily collected from the Riobamba General Teaching Hospital, where the research was conducted, and from which the largest number of evaluations were obtained; additionally, by the support of the coordinators of the Teaching and Research Unit, the evaluation was also applied to rotating interns at the hospitals in Latacunga, Puyo, and Ambato, with the aim of including interns working in other hospitals and obtaining more accurate results. The following universities were included:

- Escuela Superior Politécnica de Chimborazo (ESPOCH): medical and nutrition interns.
- Universidad Nacional de Chimborazo (UNACH): medical and nursing interns.
- Universidad Regional Autónoma de los Andes (UNIANDES): medical interns.
- Universidad Estatal de Bolívar (UEB): nursing interns.
- Universidad Técnica de Ambato (UTA): nutrition interns

Inclusion Criteria

- Rotating medical, nursing, and nutrition interns.
- Interns of the following cohorts:

-September-2023 – August-2024 (outgoing),
-September-2024 – August-2025 (incoming),
-May-2024 – April-2025 (outgoing),
-May-2025 – Apr-2026 (incoming).

Exclusion criteria

- Students who are not willing to answer the surveys freely and voluntarily.

After applying the eligibility criteria, a total sample of 618 students was obtained, and an electronic form (eForm) in REDCap (Research Electronic Data Capture) was used to collect information on the study variables. The eForm was configured not to collect either personal information or contact data; all the research was conducted with anonymous data to protect the integrity and rights of the students. To ensure correct data collection, students were assigned to groups in each hospital, where they received an oral explanation of the research's purpose. Finally, all students who provided informed consent answered the questionnaires.

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

The eForm was completed just once by the students on two separate dates as described below:
The first date was from September 1 to 5, 2024, and the second date was from May 1 to 5, 2025.

The data included were:

- Social-demographic, lifestyle habits, and previous history of mental health conditions questions. The question regarding hours of sleep was not evaluated with a validated instrument; the number of hours that students subjectively consider to be average rest was reported.

- PHQ-9 and GAD-7 questions in their Spanish version.[12–16]

Presence and severity of depression and Anxiety were determined according to the following:

- PHQ-9 scores for depression: 0-4 no depression; 5-9 mild; 10-14 moderate; 15-19 moderately severe; =/>20 severe. The last question measures the presence of suicidal ideation.[9]

- GAD-7 scores for Anxiety: 0-4 no anxiety; 5-9 = mild; 10-14 = moderate; 15-21 severe.[11]

The data were imported into the statistical package STATA 19, where the analyses were performed. In univariate analysis (descriptive), percentages and proportions were used to show the results of qualitative variables and means for quantitative variables. Multivariate analysis (inferential) was performed using Odds Ratios (OR), Chi-square test, and Binary logistic regression to reduce confounding factors. All the results show the 95 % Confidence Intervals and p-values.

To minimise reverse causality in multivariate analyses, the questionnaires were administered to both incoming and outgoing cohorts of interns.

The study guarantees compliance with bioethical principles to protect the safety and rights of participants. Since the present investigation poses no risk to the participants, the UNACH Ethics Committee issued an exemption letter (document code: 35-11-junio-2025-CEISH-UNACH).

The results of this research are reported according to the STROBE guidelines for cross-sectional studies.

RESULTS

The descriptive analyses are presented in Tables 1 and 2 below.

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

Table 1. Sample and number of interns by cohorts

	n	Mean	95 % CI
Total data - Interns of medicine, nutrition, and nursing.	618	-	-
Age	-	24 years	24.5 – 24.9 years
Number of students who decided not to participate	14		
eForm completed in September 2024	- Sep-23 – Aug-24 (outgoing) = 80 - Sep-24 – Aug-25 (Incoming) = 93	-	-
eForm completed in May 2025	- May-24 – Apr-25 (outgoing) = 216 - May-25 – Apr-26 (Incoming) = 229	-	-

Sep: September; Apr: April; Aug:August

Table 1 summarizes the study population, including a total of 618 rotating interns from medicine, nursing, and nutrition, with a mean age of approximately 24 years (95% CI: 24.5–24.9). Data collection was conducted in two periods (September 2024 and May 2025), covering four cohorts classified as incoming and outgoing. A greater number of participants were included in the May cohorts compared to September, indicating a higher representation of interns during that period. Only a small number of eligible students (n = 14) declined participation, suggesting a high response rate and good representativeness of the target population.

Table 2. Descriptive analyses, baseline data

	Proportion	95 %CI		Proportion	95 %CI
COHORT			**DIAGNOSIS BEFORE INTERNSHIP**		
Sep-23 – Aug-24 (outgoing)	13 %	10-16 %			
Sep-24 – Aug-25 (Incoming)	15 %	12-18 %	No (521)	84 %	81-87 %
May-24 – Apr-25 (outgoing)	35 %	32-40 %	Outgoing cohort n= 242		
May-25 – Apr-26 (Incoming)	37 %	34-41 %	Incoming cohort n= 279		

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

SEX			Yes (n=97)	16 %	13-19 %
Men	36 %	33-40 %	Outgoing cohort n=55		
Women	64 %	60-68 %	Incoming cohort n=42		
INTERNSHIP MAJOR					
Nutrition Int.	6 %	4-8 %	**GAD-7**		
Nurse Int.	21 %	18-24 %	Without Anxiety	51 %	47-55 %
Medicine Int.	73 %	70-77 %	With Anxiety	49 %	45-53 %
ETHNICITY			**GAD-7 LEVELS**		
Other	0.2 %	0.002-1 %	No Anxiety	51 %	47-55 %
Afro-descendant/White	0.5 %	0.1-1.5 %	Mild Anxiety	34 %	31-38 %
Indigenouns	4 %	2.9-6 %	Moderate Anxiety	10 %	8-13 %
Mixed	95 %	93-97 %	Severe Anxiety	5 %	3-7 %
UNIVERSITY			**PHQ-9**		
Private	20 %	17-23 %	Without Depression	53 %	49-57 %
Public	80 %	77-83 %	With Depression	47 %	43-51 %
SEXUAL ORIENTATION			**PHQ-9 LEVELS**		
Homs/Bis/other	3 %	2-4.2 %	No Depression	53 %	49-57 %
Heterosexual	97 %	96-98 %	Mild Depression	31 %	28-35 %
SLEEP HOURS			Moderate Depression	8 %	6-10 %
7 or over	17 %	14-20 %	Moderate-Severe Depression	6 %	4-8 %
less than 7	83 %	80-86 %	Severe Depression	3 %	2-5 %
SOCIO-ECONOMIC CONDITION			**SUICIDAL IDEATION**		
Dependent	75 %	72-79 %	No	91 %	89-93 %
Independent	25 %	21-28 %	Yes	9 %	7-11 %
MARITAL STATUS			**SUICIDAL ATTEMPT**		
Single	93 %	91-92 %	No	97 %	95-98 %
Married	4 %	2-6 %	Yes	3 %	2-5 %
Divorced	1 %	0.2-1.7 %			
Common-law union	2 %	1-4 %			
LIVE ALONE					
No	62 %	59-66 %			
Yes	38 %	34-41 %			

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

WORK HOURS (SHIFTS)		
8h	14 %	12-17 %
12h	18 %	15-22 %
24	18 %	15-21 %
25-32h	49 %	45-53 %
REST DURING SHIFTS		
No	70 %	66-73 %
Yes	30 %	27-34 %

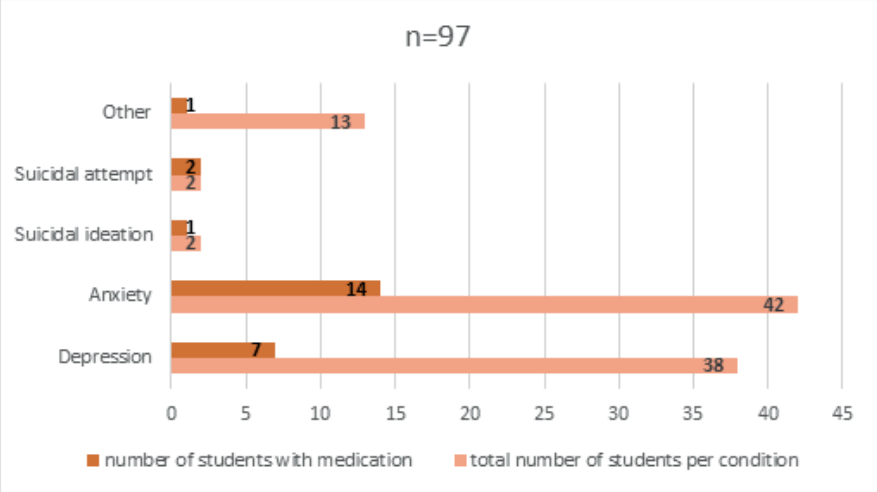
Table 2 shows that there are more students in the May cohorts (incoming and outgoing), and, regardless of the cohort, women are predominant. The majority of students are medical students, with mixed-race ethnicity being the most prevalent. A substantial minority of students with sexual orientations other than heterosexual are reported.

Work schedules exceeding 24 hours are reported, which corresponds to the majority of medical students, who work 24-hour shifts every 4 days. However, most report a lack of rest during their shifts and a regular sleep habit of less than 7 hours per day.

The prevalence of Anxiety and depression is reported to be 49% and 47 %, respectively. Within these figures, mild Anxiety (34 %) and mild depression (31 %) are predominant. Additionally, the majority of students do not present suicidal ideation (91 %) or suicide attempts (97 %).

The prevalence values for Anxiety and depression do not correlate with the reporting of these two pathologies before admission, in which 16% (n = 97), regardless of whether they were an incoming or outgoing cohort, reported having a diagnosis of any mental health disorder before their admission to the rotating internship.

Figure 1. Mental health disorder and medication



ISSN-impreso 1390-7581
ISSN-digital 2661-6742

Figure 1 shows the number of students who have mental health conditions before the start of the internship, and the number of students who require medication for each condition. Regarding the use of medication, this figure shows that most of the students have Anxiety, and 33.3 % (n = 14) of them had already taken medication, compared to students with depression, who were 18 % (n = 7).

The multivariate analyses, which consider the presence of Anxiety determined by GAD-7 scores, ranging from 5 to 21, are presented in Table 3. These values show an individual OR for each variable that showed an association $p<0.05$.

Table 3. OR for the presence of Anxiety

ANXIETY	Odds ratio	p-value	95 % CI	
INTERNSHIP MAJOR				
Medical Int.	1.89	0.001	1.31	2.72
SEXUAL ORIENTATION				
Heterosexual	0.31	0.046	0.10	0.98
SLEEP HOURS				
less than 7h	1.79	0.008	1.16	2.76
SLEEP HOURS (Ref.: 7h or over)				
4-6h	1.71	0.017	1.10	2.65
0-3h	2.34	0.005	1.29	4.23
COHORT				
Incoming cohort	0.78	0.131	0.57	1.08
Mental health disease before Intern.				
Yes	2.70	0.000	1.70	4.29
WORK HOURS				
24 or over	1.66	0.004	1.18	2.33
Work Hours				
12h	1.30	0.367	0.74	2.29
24	1.18	0.565	0.67	2.09
25-32h	2.30	0.001	1.42	3.74
DEPRESSION (PHQ-9)				
With Depression	27.05	0.000	17.60	41.59
PHQ-9 (levels)				
Mild Depression	18.08	0.000	11.52	28.38
Moderate Depression	72.00	0.000	21.58	240.23
Moderate-Severe Depression	166.91	0.000	22.37	1245.20
Severe Depression	-	-	-	-
SUICIDAL IDEATION				
Yes	9.94	0.000	4.19	23.57
SUICIDAL ATTEMPT				
Yes	6.57	0.003	1.91	22.53

Number of observations: 618
Intern.: Internship; CI: Confidence Interval; Ref.: Reference.

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

The ORs reported in Table 3 were assessed for the presence or absence of Anxiety using the GAD-7 as the dependent variable. The dichotomised independent variables were: medical interns versus nursing/nutrition interns; heterosexual versus homosexual/bisexual orientation; average hours of sleep (without the use of a validated instrument) less than 7 hours versus 7 hours or more; incoming cohort versus outgoing cohort; presence or absence of mental disorders before admission; work shifts longer than 24 hours versus 12/8 hour shifts; and presence of depression, suicidal ideation, and suicide attempt.

A Binary logistic regression was performed (dependent variable: presence or absence of Anxiety, as determined by the GAD-7), adjusted for all variables with p-values < 0.05, as shown in Table 3. Only 3 variables in the regression model showed an association with the presence of Anxiety, and the results are reported below:

The ORs report that medical interns had 3.48 times higher odds of having Anxiety compared to nurse and nutrition interns (95 % CI 1.35 – 8.93, p = 0.01); students with depression, according to the PHQ-9, independently of the level, had 25.34 times higher odds of having Anxiety (95 % CI 16.1 – 39.9, p = 0.000); and students with Suicidal Ideation had 4.25 times higher odds of having Anxiety (95 % CI 1.46 – 12.44, p = 0.008). The pseudo-R-square reported was 0.39.

The multivariate analyses, which consider the presence of depression defined as PHQ-9 scores of 5 or higher, are presented in Table 4. These values show each individual OR for each variable that showed an association p < 0.05.

Table 4. OR for the presence of depression

DEPRESSION	Odds ratio	p-value	95 % CI	
INTERNSHIP MAJOR				
Medical Int.	1.670	0.006	1.160	2.403
SLEEP HOURS				
less than 7h	2.363	0.000	1.506	3.706
SLEEP HOURS (Ref >=7h))				
4-6h	2.239	0.001	1.419	3.534
0-3h	3.153	0.000	1.720	5.781
COHORT				
Incoming cohort	0.639	0.006	0.465	0.877
MENTAL HEALTH DISEASE BEFORE INTERN.				
Yes	2.224	0.000	1.419	3.484

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

WORK HOURS				
24 or over	1.753	0.001	1.244	2.470
Work Hours				
12h	1.401	0.253	0.786	2.494
24	1.180	0.578	0.659	2.113
25-32h	2.632	0.000	1.605	4.317
ANXIETY (GAD-7)				
With Anxiety	27.055	0.000	17.599	41.591
GAD-7 (levels)				
Mild Anxiety	19.837	0.000	12.660	31.083
Moderate Anxiety	69.600	0.000	26.477	182.959
Severe Anxiety	168.000	0.000	22.298	1265.764
SUICIDAL IDEATION				
Yes	7.571	0.000	3.513	16.316
SUICIDAL ATTEMPT				
Yes	7.025	0.002	2.048	24.103

Intern.: Internship; CI: Confidence Interval; Ref.: Reference.

The results in Table 4 of the ORs individually report that being a medical intern, sleeping less than 7 hours, working more than 24 hours, and having Anxiety, having had a suicide attempt or suicidal ideation, are factors that increase the probability of having depression regardless of its severity. Their increase is considerable, from 60 % to 7 times the probability.

Based on the variables reported in Table 4, we performed a binary logistic regression, adjusting for all variables. The results are shown in Table 5.

Table 5. Binary Logistic Regression for the presence of depression

BINARY LOGISTIC REGRESSION				
DEPRESSION	**Odds ratio**	**p value**	**95 % CI**	
SLEEP HOURS				
less than 7	2.449	0.004	1.330	4.510
COHORT				
Incoming cohort	0.622	0.038	0.396	0.975
WORK HOURS				
24 or over	2.483	0.048	1.008	6.118
ANXIETY (GAD-7)				
With Anxiety	25.036	0.000	15.904	39.410
SUICIDAL IDEATION				
Yes	2.751	0.042	1.036	7.303
Pseudo R2 = 0.3916				

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This table shows that the binary logistic regression maintains the sleeping hours, work hours, Anxiety, and suicidal ideation as predisposing factors for depression, and being from an incoming cohort as a protective factor.

Table 6 summarizes the presence or absence of mental health disorders before the internship year, compared with the GAD-7 and PHQ-9 results for incoming and outgoing cohorts.

Table 6. Mental health disorders versus Anxiety and depression per incoming and outgoing cohorts

INCOMING COHORT (n=321)

		Anxiety (GAD-7)			**Depression (PHQ-9)**		
		Yes	**No**	**Total**	**Yes**	**No**	**Total**
Mental health disease before Inter.	**Yes**	26	16	42	23	19	42
	No	122	157	279	112	167	279
	Total	148	169	321	135	186	321
		p = 0.0276			**p = 0.0736**		
		n =122			n =112		
		n	**Suic. Id.**	**Suic. Att.**		**n**	**Suic. Id.**	**Suic. Att.**
	Mild A.	94	9	0	**Mild D.**	83	8	1
	Moderate A.	22	3	0	**Moderate D.**	16	2	0
	Severe A.	6	1	0	**Mod-Sev D.**	10	0	0
					Severe D.	3	2	0

OUTGOING COHORT (n = 297)

		Anxiety (GAD-7)			**Depression (PHQ-9)**		
		Yes	**No**	**Total**	**Yes**	**No**	**Total**
Mental health disease before Inter.	**Yes**	41	14	55	39	16	55
	No	114	128	242	119	123	242
	Total	155	142	297	158	139	297
		p = 0.0002			**p = 0.0035**		
		n=114			n=119		

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

	n	Suic. Id.	Suic. A		n	Suic. Id.	Suic. A
Mild A.	79	5	3	**Mild D.**	77	1	1
Moderate A.	22	2	1	**Moderate D.**	20	3	2
Severe A.	13	2	1	**Mod-Sev D.**	14	3	2
				Severe D.	8	1	0

The results in Table 6 report that in the incoming cohort, the p-value indicates differences between the prior diagnosis and the GAD-7 results, as 122 students who had never received a prior diagnosis of Anxiety actually did have it, and 9 even presented suicidal ideation. Regarding depression, while the p-value indicates no differences, a very high number of students (n =112) had depression according to the PHQ-9, who had not received a formal diagnosis before the internship, and within this group, 1 student had a prior suicide attempt.

For the outgoing cohort, the p-values report strong evidence of differences between the previous diagnosis and that reported with the questionnaires; there is even a greater number of students with suicide attempts and suicidal ideation.

DISCUSSION

Our results show a higher proportion of women in the health field (64 %), which aligns with global data, especially in fields like medicine, where the increase has ranged from 6 % to 60 % over the last 20 years.[17] Regarding the percentage difference in the number of students according to the cohort, historically, there is a higher number of interns in the May cohorts compared to the September cohorts.

The results of this study regarding depression and Anxiety show that between 47 and 49 out of every 100 students present these conditions. This is a cause for concern due to the working conditions to which students are subjected, which may pose a risk or exacerbate these conditions. Our results correspond with studies by Atienza B et al., which show a higher prevalence of depression and Anxiety in health students, mainly in women;[18] and by Pacheco J et al., and Macauley K et al., who report a prevalence between 30 %-40 % for depression and 51 % and 37.5 % for mild and moderate Anxiety.[19,20]

Although Table 2 shows low percentages of suicidal ideation and attempts (9 %, n = 56; and 3 %, n = 19, respectively), this is still a concerning percentage, given that these figures refer to individuals, students, and future healthcare professionals. One study by Pinzón et al. reports a prevalence of 15.7 % (n = 149) of suicidal ideation and 5 % (n = 47) of suicide attempts among medical students in Colombia. (21) Another study with the same population, conducted in Chile, showed that 19.1 % (n = 107) had a moderate risk of suicide, and 6.1 %

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ISSN-digital 2661-6742

(n = 34) had a high risk.[22] Although these two studies were not conducted among medical interns, they show high prevalence rates for suicide, highlighting the importance of having adequate screening tools and providing early interventions to prevent worse outcomes.

Figure 1 shows that less than half of students with a prior diagnosis of mental health conditions receive medication, except for those with suicidal ideation or attempts. Future research should analyze the impact of pharmacological therapies in this population. The hypothesis is whether receiving medication will decrease absenteeism among these students during their clinical rotations and how medication influences the quality of patient care, while considering its adverse effects. Two systematic reviews of clinical trials show that pharmacological therapy for these disorders, when combined with cognitive-behavioral therapy, follow-up phone calls, or other individualized therapies, reduces absenteeism and improves condition management.[23,24]

Logistic regression analyses show that being part of an incoming cohort represents a 38 % lower odds of having depression, which needs to be evaluated with longitudinal studies to determine how the intensity of depressive and anxious symptoms increases due to performing the rotating internship.

Poor sleep quality and shifts longer than 24 hours increase the odds of developing depression by 2.55 and 2.48 times, respectively; therefore, it is necessary to provide interventions for these factors immediately. Furthermore, a study reports that inmates with Anxiety are 25 times more likely to have depression; this reinforces the fact that these two pathologies are generally not isolated in patients, but rather occur together. This premise is further supported by a global prevalence meta-analysis that reports 19.2 % (95 % CI: 13.0–27.5 %) of depression and 16.5 % (95 % CI: 11.1–22.8 %) of Anxiety.[25]

All students, before entering the hospital as rotating interns, receive an official, mandatory psychological and/or psychiatric evaluation from university professionals, who issue mental health certificates to the teaching units of each hospital. However, when applying the tests in the study, there is no agreement, as shown in Table 6 (p-values less than 0.05). A large number of students, primarily from the incoming cohort, did not receive a formal diagnosis of Anxiety, but the questionnaires did detect the pathology (n = 122). While most presented mild Anxiety, nine interns exhibited suicidal ideation. Regarding depression, although there were no differences between the prior diagnosis and the questionnaire results, 112 students did not receive a prior diagnosis of depression, one of whom had already attempted suicide. The results worsen for the outgoing cohort, where there are even more cases of suicidal ideation and attempts.

There are many screening tools for these pathologies; the PHQ-9 questionnaire has a sensitivity and specificity of 85 %, compared to another classic tool such as the Beck Depression Inventory-II (BDI-II) with a sensitivity of 90 % and a specificity of 79 %; and regarding the GAD-7 questionnaire, a sensitivity of 81 % (95 % CI, 78 %-84 %), and a specificity of 78 % (95 % CI, 74 %-81 %).[9,26–28] Therefore, the tools used provide us with reliable results for identifying these pathologies.

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This study has limitations inherent to its proposed methodological design, including the inability to establish a causal relationship and the need to follow up participants to minimize confounding factors and reverse causality.[29] However, its strengths outweigh these limitations, as two types of cohorts—incoming and outgoing—were observed to reduce detection bias. An adequate sample of participants was obtained, resulting in good external validity and generalizability. Additionally, robust statistical tests were used, and the logistic regression model allowed for some control over confounding factors, resulting in considerable internal validity.

This study presents critical data on the mental health of health students, guiding authorities on areas requiring intervention to improve interns' health and ensure adequate patient care.

It would have been important to evaluate sleep quality and duration with validated instruments such as the Pittsburgh Sleep Quality Index (PSQI), which provides more objective results;[30] and, additionally, to evaluate possible concomitant effects, mainly insomnia, that may be isolated or part of the depressive/anxious disorder.

CONCLUSSIONS

Rotating health interns in Zone 3 hospitals exhibit a high prevalence of depression and anxiety, along with suicidal behaviours, reflecting a concerning mental health profile that tends to worsen throughout the internship period. Nearly half of the participants screened positive for depression and anxiety, while suicidal ideation and attempts, although less frequent, remain clinically significant. The population is predominantly female, single, economically dependent, and composed mainly of medical interns, with a high prevalence of sleep deprivation and extended work shifts. Strong associations were identified between depression and anxiety, as well as with reduced sleep duration, prolonged working hours, suicidal ideation, prior mental health history, and medical internship status.These findings highlight the need for longitudinal studies and targeted interventions. Implementing routine screening using PHQ-9 and GAD-7, limiting excessive work hours, promoting sleep-protective policies, and ensuring early referral pathways are essential to prevent adverse outcomes among health science interns.

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Credit authorship contribution statement

- Author 1: methodology, software, formal analyses, resources, data curation, visualization, conceptualisation, and investigation.
- Authors 2 and 3: collection and validation of data, and support in statistical analysis.
- Authors 4 and 5: discussion, review, writing-original draft, and writing - review and editing.

ISSN-impreso 1390-7581
ISSN-digital 2661-6742

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to this article.

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