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Original Article

Anxiety and Depression Identified in University Students in the Health-care Field with the Goldberg Scale

Ansiedad y depresión identificados con la Escala de Golberg en estudiantes universitarios del área de la salud

Ansiedade e depressão identificadas com a Escala Goldberg em estudantes universitários da área de saúde

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ABSTRACT:

Introducción. University programs in the health-care field are challenging and their routines are exhausting. Therefore, they create stress and a potential negative psychological impacts on students. This study's objective was to determine the prevalence and factors associated with anxiety and depression in students in the health-care field. **Methodology:** A cross-sectional study applied to Medical, Nursing and Pharmaceutical Chemistry students from a Colombian university, who anonymously and voluntarily completed a form with sociodemographic data and the

Goldberg Anxiety and Depression Scale. Logistic regression was performed: anxiety or depression (dependent variables) and sociodemographic characteristics (independent variables); $p < 0.05$, statistically significant. **Results** Six hundred and ninety-seven young adults participated, whose ages ranged between 20.3±1.7. Forty-three point six percent studied Medicine, 26.2% Pharmaceutical Chemistry and 30.1% Nursing. Anxiety was identified in 49.8% (95% confidence interval:46.0-53.4) and depression in 80.3% (95% confidence interval:77.2-83.1). Studying Medicine, Nursing, being female, overweight and underweight, having previously had a psychological or psychiatric consultation, taking permanent medication and suffering from a chronic disease are all associated with a higher presence of anxiety. Being from a rural area was associated with greater depression. **Discussion.** The findings show a high prevalence of symptoms of anxiety and depression in the group of university students in the health-care field. Even though the scale that was used does not perform diagnoses, it does suggest the existence of pathological manifestations. Psychosocial factors were associated, especially in juvenile environments. Similar situations have been indicated by various authors. **Conclusion.** Anxiety was identified in half of the students and depression was identified in eight of every ten. Factors inherent to university life, customs, habits and recreational activities were significantly associated.

Keywords:
Anxiety; Depression; Student Health Services; Young adult; Mental Health.

RESUMEN

Introduction. Los programas universitarios del área de la salud son exigentes y la rutina es extenuante, por lo tanto, generan estrés y un potencial impacto psicológico negativo en los estudiantes. El objetivo de este estudio fue determinar la prevalencia y los factores asociados a la ansiedad y a la depresión en estudiantes del área de la salud. **Metodología.** Estudio de tipo transversal aplicado a estudiantes de Medicina, Enfermería y Química Farmacéutica de una universidad colombiana que diligenciaron anónima y voluntariamente un formulario con datos sociodemográficos y, a su vez, la Escala de Ansiedad y Depresión de Goldberg. Se realizó regresión logística: ansiedad o depresión (variable dependiente) y las características sociodemográficas (independientes); $p<0.05$, estadísticamente significativo. **Resultados.** Los participantes corresponden a 697 jóvenes, cuyas edades oscilan entre 20.3±1.7. El 43.6% estudiaba Medicina, el 26.2% Química Farmacéutica y el 30.1% Enfermería. Se identificó ansiedad en el 49.8% (intervalo de confianza 95%:46.0-53.4) y depresión en el 80.3% (intervalo de confianza 95%:77.2-83.1). Estudiar Medicina, Enfermería, ser de sexo femenino, padecer de sobrepeso e infrapeso, haber tenido consulta previa psicológica o psiquiátrica, tener medicación permanente y sufrir de alguna enfermedad crónica, se asocia a mayor presencia de ansiedad. Proceder de zonas rurales se asoció a mayor depresión. **Discusión.** Los hallazgos muestran alta prevalencia de síntomas de ansiedad y depresión en el grupo de jóvenes universitarios del área de la salud. Si bien la escala utilizada no hace diagnóstico, sí sugiere la existencia de manifestaciones patológicas. Factores psicosociales, sobre todo del entorno juvenil, estuvieron asociados. Situaciones similares han sido señaladas por diferentes autores. **Conclusiones.** Se identificó ansiedad en la mitad de los estudiantes y depresión en ocho de cada diez. Factores inherentes a la vida universitaria, costumbres, hábitos y actividades recreativas se asociaron significativamente.

Keywords:
Ansiedad; Depresión; Servicios de salud para estudiantes; Adulto joven; Salud Mental.

RESUMO

Introdução. Os programas universitários da área da saúde são exigentes e a rotina é extenuante, gerando estresse e um potencial impacto psicológico negativo nos estudantes. O objetivo deste estudo foi determinar a prevalência e os fatores associados à ansiedade e à depressão em estudantes da área de saúde. **Metodologia.** Trata-se de um estudo transversal aplicado a estudantes de Medicina, Enfermagem e Química Farmacêutica de uma universidade colombiana que preencheram, de forma anônima e voluntária, um formulário com dados sociodemográficos, assim como a Escala

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Goldberg de Ansiedade e Depressão. Foi realizada regressão logística: ansiedade ou depressão (variável dependente) e características sociodemográficas (independentes); p<0,05, estatisticamente significativo. **Resultados.** Os participantes foram 697 jovens, cujas idades variam entre os 20,3±1,7 anos. 43,6% estavam cursando Medicina, 26,2% Química Farmacêutica e 30,1% Enfermagem. Foi identificada ansiedade em 49,8% (IC 95%:46,0-53,4) e a depressão em 80,3% (IC 95%: 77,2-83,1). Estudar Medicina, Enfermagem, ser do sexo feminino, estar com sobrepeso e abaixo do peso, ter feito consulta psicológica ou psiquiátrica anterior, ter medicação permanente e sofrer de alguma doença crônica, são fatores que estão associados a uma maior presença de ansiedade. Vir de áreas rurais foi associado a uma maior depressão. **Discussão.** Os resultados mostram uma alta prevalência de sintomas de ansiedade e depressão no grupo de jovens universitários da área da saúde. Embora a escala utilizada não faça um diagnóstico, sugere a existência de manifestações patológicas. Fatores psicossociais, especialmente no ambiente juvenil, foram associados. Situações semelhantes têm sido apontadas por diferentes autores. **Conclusão.** A ansiedade foi identificada em metade dos estudantes e a depressão em oito de cada dez. Fatores inerentes à vida universitária, costumes, hábitos e atividades recreativas foram significativamente associadas.

Palavras-chave:
Ansiedade; Depressão; Serviço de Saúde do Estudante; Adulto jovem; Saúde Mental.

Introduction

The prevalence of mental disorders varies between 12 and 47% in different continents, and figures are rising (1). The World Health Organization (WHO) has indicated that mental disorders make up 10% of the world's morbidity and mortality load, and the global economy loses US $1 trillion every year in productivity due to depression and anxiety (2). Mental disorders generate disabilities and negatively impact biological and social environments. In addition, if they are not detected and treated in a timely manner, they lead to considerable health losses (1-3).

As is the case worldwide (2,4,5-7), anxiety and depression disorders in Colombia represent a significant load of diseases in men and women, identified in university students (8,9). The 2015 Colombian Mental Health Survey reported that half of adolescents presented at least one symptom of anxiety and all young adults at least one of depression. In turn, among middle-aged adults, nine out of every ten had symptoms of anxiety and all had some form of depression (8,9).

University studies generally coincide with late adolescence or youth. Various authors have indicated a high presence of psychiatric pathologies in these vital stages, mainly anxiety and depression, with figures above the general population's. Differences in the frequencies of anxiety and depression have been observed in terms of gender, with a higher presence among women (10-12).

The university environment, a new setting for youth, leads to new responsibilities, less time for leisure and recreation and the need to meet family expectations, along with the subsequent academic stress and potential psychosocial risks (13). Some stress factors for university students are presented below: academic tasks and a lack of time to complete them, which is defined as academic overload, tests or evaluations from professors and the excessive daily hours they must destine towards academia, among others (3,4). Students in the health-care field, due to determining factors inherent to said professions, especially because of the volume of knowledge to be acquired and the skills to develop in laboratory or clinical practices, may be more highly subject to these stressors. For this reason, more psychological alterations may be expected. It has been indicated that students may experience exhaustion, a reduced interest in their studies and self-criticism, as well as a loss of control managing the family environment and social disinvolvement. Students in the health-care field can have their mental health compromised without sufficient coping resources, recognizing their personal situation and support from a professor or institution (1,2,4,5,7).

On one hand, Uchida & Uchida have indicated that anxiety and depression are among Japanese students' risk factors for suicide and death (13). On the other hand, the Colombian media, especially the radio and television, periodically report cases of suicide by university students, some in the health-care field. It seems like this situation should not be present in young adults who, one way or another, are privileged enough to gain access to one of the few spots available in higher education. Information regarding anxiety and depression in the university population in the health-care field in the Colombian Caribbean is insufficient, and this is even the case on a national and Latin American level. Meanwhile, there is

extensive data available about young adults from other cultures or countries subject to different social conditions (1,4,5,6,7). Expanding information on anxiety and depression in Colombia is necessary, in addition to facing the issue with global data, visualizing it better, raising general society's awareness and providing suggestions to higher education institutions. This study's objective was to determine the prevalence of anxiety and depression in university students in the health-care field, as well as identify associated factors from a list of psychosocial situations.

Methodology

This was a cross-sectional study belonging to the University Collectives line of research and the Psychosocial Dynamics in University Students (DISEU) research project, both declared before Universidad de Cartagena, Colombia. This public Colombian Higher Education Institution offers four programs in the Health-care field (Medicine, Nursing, Pharmaceutical Chemistry and Dentistry), which are focused on a specific university campus. Three academic programs were selected in order to respond to the study's justification, and out of convenience. The fourth had no students available for internal reasons during field work. Students enrolled in the second academic period of 2018 in their second to tenth semester of the degrees in Medicine, Nursing and Pharmaceutical Chemistry participated in the study. First semester students were not included, considering they were in the stage of adapting to university life.

Participants were chosen randomly on the university campus by research group members, who performed the survey (they had been previously trained to that end). They entered classrooms and explained the study's scopes. They explained how many participants were needed by course and motivated students to participate anonymously and voluntarily. Interested students remained in the classroom and completed the forms with the freedom of time to do so. Upon completing the form, they were weighed (kg) with a digital scale and measured (cm) with a wall stadiometer. The only exclusion criteria was a failure to complete the form. Documents were preserved as follows: incorrectly completed and incomplete documents were numbered and stored in the "Discarded" folder. Correctly completed documents were numbered and stored in the "Study" folder. One same course may have been approached various times to meet the sample size, reason why students were prevented from participating repeatedly. Both folders were preserved in custody.

The following definitions were established according to the WHO's nutritional state classification: underweight (<18.50 kg/m^2), normal weight (18.50-24.99 kg/m^2), overweight (25.00-29.99 kg/m^2), and obesity (≥30.00 kg/m^2). With respect to age, the following was considered: adolescent (under twenty years of age) and adult (twenty or more). For education: basic (second to fifth semester) and advanced (sixth to tenth semester) level of education. Academic performance was classified as regular (a cumulative average of 3.5 or lower), good (3.6-4.0) and high (4.1 or higher). Attending religious events, movie theaters, shows, restaurants, night clubs, cultural events and sport events (at least once in the last month). Socioeconomic stratification was performed according to the DANE-Colombia's recommendations.

A three-section form was designed. The first section requested sociodemographic data and general social aspects from the young adults' daily lives. They were established through a brainstorm (age, gender, origin, marital status, number of children, religion, faculty, semester, academic average, work activity, coffee, energy drink or other stimulant consumption, monthly recreation at movie theaters, shows, cultural events, attendance to restaurants and sports, weekly hours of studying and sleep, as well as ethnicity, defined by self-identification and phenotypic characteristics). The second section asked about the students' mental health background (a previous psychological or psychiatric visit, chronic pathologies and permanent medication consumption). Finally, the third section was the Goldberg Anxiety and Depression Scale (GADS), which is an 18-item validated survey composed of two subscales. The first goes from one to nine and the second from ten to eighteen, and it is appropriate to apply in non-psychiatric consultations. Each item had two possible answers: yes (one point) and no (zero points). Each subscale's score ranges from 0-9. A score of four or more in the first subscale defines the presence of anxiety. Two or more on the second subscale identified depression. The higher the score, the higher the possibility is of presenting the mentioned alterations. The anxiety subscale has an 82% sensitivity and a positive predictive value of 0.56. The depression subscale has an 85% sensitivity and a positive predictive value of 0.85. The specificity observed for both subscales was 91% (14).

The sample size was estimated with the Netquest online calculator, with a 50% heterogeneity level, 4% margin of error and 99% reliability level, differentiated by faculty, academic semester and gender. An expected prevalence of anxiety or depression was not considered among the factors for calculating the sample size. The 2017 statistical report from Universidad de Cartagena indicated that 772 students were enrolled in Medicine that year, 289 in Pharmaceutical

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Chemistry and 468 in Nursing, for a total of 1,529 students in the health-care field. They were considered the study population. The sample size was 619 students: 264 in Medicine, 166 in Pharmaceutical Chemistry and 189 in Nursing. Ninety-three (15.0%) students were added, taking into account the indicated stratification, in order to foresee incomplete forms. 712 forms were used.

Statistical Analysis: the obtained information was tabulated in a Microsoft Excel© 2016 database. The analysis was performed with Epi-Info-7 (Centers for Disease Control and Prevention, Atlanta, U. S.A.). Continuous data was expressed in means with standard deviation, and categoricals were expressed in absolute numbers, percentages and 95% reliability intervals. The Cronbach's Alpha reliability statistic was calculated for each subscale, since they are evaluated separately. The above was a part of the construct's validation in Colombian university students (data not presented).

Unadjusted logistic regression was performed to estimate the association between anxiety and depression (dependent variables) with thirty sociodemographic and psychosocial factors: faculty or semester, academic performance or level, age group, gender, ethnicity, additional studies, marital status, having children, religion, place of origin, nutritional state, coffee and energy drink consumption, psychological or psychiatric consultations, attending movie theaters, night clubs, restaurants and cultural events, playing sports, work and extracurricular activities (independent variables). Association was expressed in OR (95% CI). In addition, Spearman's correlation coefficient was estimated between each GADS subscale's score with the quantitative variables: weekly hours of sleep and study, daily cups of coffee, body mass index, number of friends of the same and different gender, academic average, number of monthly attendance to cultural, sports or recreational events. The strength of correlation or interdependence was interpreted according to the guide for appropriately using the correlation coefficient in medical research (15): no correlation: 0.00; negligible: 0.01-0.29; low: 0.30-0.49; moderate: 0.50-0.69; high: 0.70-0.89; very high: 0.90-0.99; and perfect: 1.00. It could be positive or negative, with or without statistical significance. $P < 0.05$ was statistically significant.

Participation was anonymous and voluntary, signing to confirm informed consent before completing the form, in accordance with the Declaration of Helsinki. The scientific, technical and administrative regulations established in Resolution 8430 of 1993 of the Ministry of Health of the Republic of Colombia for health care research were taken into account, which allows considering the study as research with minimal risk (16). No biological samples were taken, and no intervention was performed other than measuring height and body weight. The research project was approved according to Resolution No. 05-2018 of February 5, 2018 of the Research Ethics Committee of Clínica Santa Cruz in Bocagrande, Cartagena, Colombia. In addition, the group had the institutional approval of Universidad de Cartagena's Vice-chancellor of Research.

Results

Of the 712 forms, 15 were "discarded" (six from Medicine, three from Pharmaceutical Chemistry, four from Nursing and two as uninformed studies). Six hundred and ninety-seven students were evaluated, which was 12.6% greater than the sample size. Of the entire sample, 276 (39.6%) were men and 421 (60.4%) were women. The average age was 20.3±1.7, and BMI was 22.7±2.9. Forty-three point six percent studied Medicine, while 26.2% and 30.1% studied Pharmaceutical Chemistry and Nursing, respectively. Most were in their third semester: 91 (13.0%) (95% CI:10.7-15.7), and the least were in their tenth semester: 67 (9.6%) (95% CI:7.6-12.0). No significant difference was observed in the distribution by semesters. Sociodemographic characteristics, psychosocial aspects, health-case habits and backgrounds are presented in table 1.

Table 1. Sociodemographic characteristics, psychosocial aspects, health-care habits and backgrounds

n = 697	
X±SD	
Age, years	20.3±1.7
Weight, kg	64.3±9.7
Number of children	0.07±0.3
Body mass index, kg/m2	22.7±2.9

Cumulative academic average	3.7±0.27
Number of cigarettes smoked daily in the last month	0.3±1.6
Number of daily cups of coffee in the last month	1.1±1.4
Number of energy drink bottles consumed daily in the last month	0.22±0.6
Total number of current friendships	25.6±23.9
Number of friends of the same gender	12.1±11.5
Number of friends of another gender	13.5±13.8
Number of times they attended movie theaters or various shows in the last month	0.7±0.4
Number of times they attended concerts, dances or night clubs in the last month	0.6±0.6
Number of times they performed sports in the last month	1.6±3.6
Number of times they attended restaurants in the last month	2.8±3.3
Number of times they participated in cultural events in the last month	0.1±0.3
Number of weekly hours of sleep in the last month	21.7±4.0
Number of weekly study hours in the last month	12.6±5.8
n (%) [95% CI]	
Adolescents	248 (35.5) [32.1-39.2]
Adults	449 (64.4) [60.7-67.8]
Male	276 (39.6) [36.0-43.2]
Female	421 (60.4) [56.7-63.9]
Mestizo	520 (74.6) [71.2-77.7]
Afro-descendant	149 (21.3) [18.4-24.5]
Indigenous	28 (4.0) [2.7-5.9]
Medical Student	304 (43.6) [39.9-47.3]
Pharmaceutical Chemistry Student	183 (26.2) [23.1-29.6]
Nursing Student	210 (30.1) [26.8-33.6]
Basic level of education	331 (47.4) [43.8-51.2]
Advanced level of education	366 (52.5) [48.8-56.1]
Regular academic performance	208 (29.8) [26.5-33.3]
Good academic performance	409 (58.6) [54.9-62.2]
High academic performance	80 (11.4) [9.3-14.0]
Twelve or more weekly study hours in the last month	362 (51.9) [48.2-55.6]
Previous technical studies	79 (11.3) [9.1-13.9]
Previous technological studies	29 (4.1) [2.9-5.9]

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Working for pay	39 (5.6) [4.1-7.5]
Single	640 (91.2) [89.5-93.6]
Having children	37 (5.3) [3.8-7.2]
Originally from an urban area	358 (51.3) [47.6-55.0]
Less than thirty weekly hours of sleep in the last month	666 (95.5) [93.7-96.8]
Lower-lower socioeconomic class	93 (13.3) [11.0-16.0]
Lower socioeconomic class	249 (35.7) [32.2-39.3]
Middle-lower socioeconomic class	237 (34.0) [30.5-37.6]
Middle socioeconomic class	94 (13.4) [11.1-16.2]
Upper-middle socioeconomic class	20 (2.8) [1.87-4.3]
Upper socioeconomic class	4 (0.5) [0.22-1.4]
Underweight	61 (8.7) [6.8-11.0]
Normal weight	483 (69.3) [65.7-72.6]
Overweight	146 (20.9) [18.0-24-1]
Obesity	7 (1.0) [0.4-2.0]
Never had a smoking habit	552 (79.2) [76.0-82.0]
Consuming stimulating substances to improve academic performance	11 (1.5) [0.8-2.8]
Currently being in a romantic relationship	149 (21.3) [18.4-24.5]
Having had sexual intercourse at least once in the last month	414 (59.4) [55.7-62.9]
Attending a religious event in the last month	464 (66.5) [62.9-69.9]
Attending movie theaters or various shows in the last month	499 (71.5) [68.1-74.8]
Attending cultural events (theater, presentations, books) in the last month	85 (12.2) [9.9-14.8]
Attending restaurants in the last month	478 (68.5) [65.0-71.9]
Attending concerts, dances or night clubs in the last month	340 (48.7) [45.0-52.4]
Practicing a sport in the last month	247 (35.4) [31.9-39.0]
Having extracurricular activities or courses	72 (10.3) [8.2-12.8]
Previous psychological consultations in the last year	76 (10.9) [8.80-13.44]
Previous psychological treatment in the last year	8 (1.1) [0.5-2.2]
Previous psychiatric consultation in the last year	12 (1.7) [0.9-2.9]
Previous psychiatric treatment in the last year	5 (0.7) [0.3-1.6]
Suffering from a chronic disease in the last two years	60 (8.6) [6.8-11.0]
Consuming permanent medication in the last two years	61 (8.7) [6.8-11.0]

Source: prepared by authors

Anxiety was identified in 347 (49.8%) (95% CI:46.0-53.4) of health-care students, 190 (62.5%) (95% CI:56.9-67.7) from Medicine, 108 (51.4%) (95% CI:44.4-58.3) from Nursing and 49 (26.7%) (95% CI:20.5-33.8) from Pharmaceutical Chemistry. Moreover, depression was defined in 560 (80.3%) (95% CI:77.2-83.1) of students in the health-care field, 245 (80.5%) (95% CI:75.7-84.6) from Medicine, 158 (75.2%) (95% CI:68.8-80.9) from Nursing and 157 (85.7%) (95% CI:79.8-90.5) from Pharmaceutical Chemistry.

Half the students stated to have at least one symptom of anxiety or depression. The most recognized symptoms of anxiety were tremors, tingling, sweating and diarrhea (65.8%), while the symptom reported most for depression was losing faith in themselves (66.1%). Affirmative answers to the items in the two subscales are presented in table 2. Cronbach's alpha, α, based on the elements defined for the anxiety subscale was 0.812, and 0.845 for depression.

Table 2. Presence of manifestations related to anxiety and depression, Goldberg Anxiety and Depression Scale (GADS)

n = 697		
		n (%) [95 % 95% CI]
1	Feeling very excited, nervous or tense	391 (56.1) [52.3-59.7]
2	Having been concerned about something	300 (43.0) [39.4-46.7]
3	Feeling irritable	399 (57.2) [53.5-60.8]
4	Having difficulties relaxing	403 (57.8) [54.1-51.4]
5	Sleeping badly or difficulties sleeping	390 (55.9) [52.2-59.6]
6	Experiencing head or neck aches	387 (55.5) [51.8-59.1]
7	Having the following symptoms: tremors, tingling, sweating or diarrhea	459 (65.8) [62.2-69.2]
8	Being concerned about their health	425 (60.9) [57.3-64.5]
9	Having difficulties falling asleep	404 (57.9) [54.2-61.5]
Anxiety (*)		347 (49.8) [46.0-53.4]
10	Feeling low energy	388 (55.6) [51.9-59.3]
11	Having lost interest for things	456 (65.4) [61.8-68.8]
12	Having lost confidence in themselves	461 (66.1) [62.5-69.5]
13	Feeling without hope	460 (66.0) [62.4-69.4]
14	Difficulties focusing	401 (57.5) [53.8-61.1]
15	Having lost weight due to a poor appetite	445 (63.8) [60.2-67.3]
16	Waking up too early	409 (58.6) [54.9-62.2]
17	Feeling sluggish	420 (60.2) [56.5-63.8]
18	Believing they have a tendency to feel worse in the morning	436 (62.5) [58.9-66.0]
Depression (**)		560 (80.3) [77.2-83.1]

(*) Cronbach's α: 0.812
(**) Cronbach's α: 0.845

Source: prepared by authors

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Various factors were associated with more or less anxiety. Studying Medicine or Nursing, with respect to Pharmaceutical Chemistry, was associated with more significant presence. The same applied to having a chronic disease, consuming permanent medication and having had a previous psychological or psychiatric consultation. It also applied to being female, overweight or underweight (the following OR was obtained for the latter nutritional state: 3.50 (95% CI:1.92-6.37)). On their part, the factors that were significantly associated with less anxiety were: attending religious events, night clubs or restaurants, practicing sports, being married or in a common law marriage, having children, having sexual activity, being an Afro-descendant and being from rural areas. On the other hand, only two factors were significantly associated with more depression: consuming energy drinks and having technical studies. In addition, studying in the faculty of Nursing, pursuing advanced studies, performing extracurricular activities and studying for twelve or more hours every week were associated with less presence of depression. The only variable that was significantly associated with an increase in both evaluated mental conditions was consuming energy drinks. The following OR was observed: 1.90 (95% CI: 1.26-2.86) for anxiety and OR: 2.64 (95% CI:1.38-5.08) for depression. Table 3 presents the estimated unadjusted associated values for the variables with statistical significance, both for anxiety and depression.

Table 3. Factors associated with anxiety and depression, unadjusted logistic regression

n = 697

	OR [95% CI]	p
Anxiety		
Having a background of psychiatric consultations	5.16 [1.12-23.73]	<0.05
Medical Student (with respect to Pharmaceutical Chemistry)	4.55 [3.05-6.80]	<0.05
Suffering from a chronic disease	3.66 [1.97-6.80]	<0.05
Underweight (with respect to normal weight)	3.50 [1.92-6.37]	<0.05
Nursing Student (with respect to Pharmaceutical Chemistry)	2.89 [1.89-4.42]	<0.001
Having a previous psychological consultation	2.56 [1.53-4.28]	<0.001
Permanently consuming medication	2.21 [1.26-3.85]	<0.001
Consuming energy drinks	1.90 [1.26-2.86]	<0.001
Overweight (with respect to normal weight)	1.59 [1.09-2.31]	<0.05
Female (with respect to male)	1.38 [1.01-1.87]	<0.05
Attendance to concerts, dances or night clubs	0.66 [0.49-0.90]	<0.001
Attendance to at least one religious event in the last month	0.66 [0.48-0.90]	<0.05
Being an Afro-descendant (with respect to mestizo)	0.63 [0.43-0.91]	<0.05
Attending restaurants	0.60 [0.43-0.83]	<0.05
Practicing sports	0.58 [0.43-0.80	<0.001
Being from rural areas	0.53 [0.39-0.72]	<0.001
Having children	0.46 [0.23-0.94]	<0.05
Having sexual intercourse in the last month	0.44 [0.33-0.61]	<0.001
Common law marriage (with respect to single)	0.19 [0.07-0.52]	<0.001
Married (with respect to single)	0.16 [0.05-0.48]	<0.001
Depression		

Consuming energy drinks	2.64 [1.38-5.08]	<0.05
Having technical studies (with respect to no other additional studies)	2.24 [1.01-4.95]	<0.05
Being from rural areas	1.47 [1.01-2.15]	<0.05
Twelve or more weekly hours studying in the last month	0.60 [0.45-0.98]	<0.05
A high level of education (with respect to basic)	0.57 [0.30-0.80]	<0.05
Nursing Student (with respect to Pharmaceutical Chemistry)	0.50 [0.29-0.84]	<0.05
Having extracurricular activities	0.47 [0.27-0.81]	<0.05

Source: prepared by authors

The number of energy drink bottles consumed every day was the only variable that was positively correlated with the anxiety and depression subscales' scores ($p < 0.05$). Various situations were negatively correlated with the anxiety subscale's score: total number of current friendships, amount of friendships with people of another and the same gender, total sports activities performed, attending night clubs, dances or restaurants in the last month, age and number of children. In turn, the number of weekly hours studying was negatively correlated with the depression subscale's score. The correlation coefficients that reached statistical significance are presented in table 4. However, the strength of the correlation in all evaluated situations was negligible according to the utilized interpretation parameters.

Table 4. Factors associated with depression and anxiety, Spearman's Correlation Coefficient

n = 697		
rho (95% CI)		p
Anxiety		
Daily bottles of energy drinks	0.120 (0.045 to 0.192)	<0.05
Cumulative academic average	0.075 (0.001 to 0.149)	<0.05
Total number of current friendships	- 0.232 (- 0.301 to - 0.161)	<0.05
Number of friends of the same gender	- 0.232 (- 0.301 to - 0.161)	<0.05
Number of friends of another gender	- 0.224 (- 0.293 to - 0.152)	<0.05
Number of sports activities performed	- 0.121 (- 0.194 to - 0.047)	<0.05
Number of times attending night clubs or dances	- 0.133 (- 0.206 to - 0.059)	<0.05
Number of times attending restaurants	- 0.095 (- 0.168 to - 0.021)	<0.05
Number of children	- 0.087 (- 0.160 to - 0.012)	<0.05
Age	- 0.075 (- 0.149 to - 0.001)	<0.05
Depression		
Daily bottles of energy drinks	0.100 (0.026 to 0.173)	<0.05
Number of cigarettes smoked daily	0.077 (0.002 to 0.151)	<0.05
Weekly studying hours	- 0.102 (- 0.175 to - 0.028)	<0.05

Source: prepared by authors

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Discussion

Anxiety is a feeling of apprehension, concern or fear, whose source is often unknown or vague to the individual (17). This disorder was present in half of the students in the health-care field and in 62.5% of those studying Medicine. Other authors have indicated a frequency of 76.2% (11) in students from various professions in a Colombian university, who were also evaluated with GADS. Figures reported on a global level vary greatly. Mahroon, *et al*. observed a 51.5% rate of anxiety in Medical students in Bahrein upon evaluating them with the Beck Anxiety Inventory (18). In addition, Milić, *et al*., in Croatia, observed that 54.5% of Medical and Nursing students experienced symptoms of anxiety (19). Even lower figures were reported in Medical students in China and Brazil, with 21.2% and 19.5%, respectively (20,21). The figure observed in Medical students in Ethiopia was close to 30%, upon evaluating them with The Hospital Anxiety and Depression Scale (17). Higher figures were also reported: Seventy-three percent in Medical students in Egypt (22) and 66.4% in Medical and Dentistry students in Saudi Arabia (23). The frequency of anxiety observed in students in the health-care field on a global level, and even in one same region or community, is different, especially since the tools used to establish measurement, sample size and considered variables are different. Academic and non-academic stress factors and an individual's socioeconomic, cultural, family and personal context also influence this figure (11,17,22,24). It is necessary for each geographical region, and possibly every higher education institution, to keep frequency of anxiety within the mental health indicators of their various programs' students.

No change in frequency of anxiety identification was observed by contrasting students' academic semesters, with respect to the second course. Neither did Brenneisen, *et al*. observed this (25). First semester students were not included in the study for the population being evaluated to be more homogeneous. It has been indicated that first semester students must adapt to the transition from school to university, being far from family, the need to interact in a new learning environment and new interpersonal relationships (1,17,22,23). It has also been mentioned that first-year Medical students have a higher probability of suffering from anxiety that those at more advanced levels. The following RR was found in Brazil: 3.79 (95% CI:1.56-9.20), $p = 0.003$ (21) and, in Ethiopia, AOR: 12.06 (95% CI:2.18-66.72), $p < 0.05$ (17).

Various authors have indicated that students who suffer from anxiety usually have low grades (22,26). The panorama is different in our study. Sixty-nine percent of evaluated students demonstrated good or high academic performance. Academic results were not observed to modify the frequency of anxiety. Academic programs were associated with a change in the frequency of anxiety. Studying Medicine was associated to anxiety four times more than studying Pharmaceutical Chemistry. In the same sense, Fawzy and Hamed (22) indicated that Medical students have more psychological disorders than students pursuing other degrees. They also mentioned that studying Medicine can be stressful due to academic (volume of information, extensive curriculum, many class hours, limitations to recreation, a high frequency or high level of complexity in tests and competitiveness between peers) and non-academic factors (family expectations and demands, financial reasons and a fear of future failure by failing to obtain the necessary skills to exercise their profession). Adhikari *et al*. made similar statements (27). The profiles of basic level health-care students should include the capacity to adapt to demanding learning environments and extensive practice sessions at advanced levels and an ease for interaction with laboratory environments or hospital equipment exposed to ever-changing diseases and death properly. The importance of sufficiently exploring the presence of anxiety, as a characteristic or state, in aspiring students or students in the health-care field has been highlighted in order to identifying circumstances with negative consequences, such as abandoning school, resorting to consuming various risky substances to improve academic performance, suffering of Burnout syndrome or even suicidal ideas. (1,18,27-29)

Moreover, it was observed that women were associated with more anxiety than men by 38%. Mahroon, *et al*. (18) reported that women who were Medical students had a higher risk of anxiety, OR: 2.49 (95% CI:1.37-4.55), $p < 0.01$. It has been indicated that some mental health disorders can be predominant in women due to sociocultural factors, especially the disposition to admitting anxious feelings (11,22). Furthermore, Picco, *et al*. (1) observed that women have a two-times higher probability than men of recognizing mental disorders, know symptoms more often and are more emotionally intuitive and competitive. These four assertions may possibly be arguments to attempt to explain more anxiety or concern over academic averages among women (22). The factors that predispose women to more frequent states of anxiety are generally: genetic predisposition, sexual hormones, endocrine reactivity in light of stress, higher bioavailability of some neurotransmitters and the coexistence of neuropsychological determinants (11,22).

Personal situations, such as nutritional state or marital status, have been identified as factors associated with a higher presence of anxiety, as identified in the study. It has been indicated that overweight or obese university students

can have a lower self-esteem, body dysmorphic disorder or dysmorphophobia, an incorrect perception of their general state of health, higher risk of perceived psychological stress and an elevated frequency of anxiety (30). We observed that being married, in a common-law marriage and even having children are associated with a lower presence of anxiety. Emotional support, companionship, understanding and stability offered by partners or family can favor students' adequate mental health (1). Moreover, a study on German university students found that being married or in a committed relationship serves as protection against emotional loneliness, defined as a deficiency of intimate and close relationships (31).

In an evaluation of Medical students from a Colombian university, it was observed that students used energy drinks to increase their tolerance to many hours of studying and reduce their sleep time in order to seek academic performance more suitably (32). In this study, 16.6% of students consumed at least a bottle of energy drink every day in the last month. In addition, we observed that consuming these beverages was associated with a two-time increase in the presence of anxiety. Coherently, the score on both subscales was significantly higher the more daily bottles students consumed. Richards & Smith have also indicated this fact, and they note that, ironically, said beverages are used to boost individuals' spirits. This belief is not scientifically founded, even though they contain high loads of caffeine (33). No association was observed between coffee consumption and anxiety. However, it has been reported that caffeine precipitates, increases or helps maintain anxiety, reason why suspending coffee consumption is suggested for people with anxious personalities or who are currently anxious (22).

It was identified that a background of attending psychological or psychiatric consultations, having chronic diseases or taking medication frequently were associated with the presence of anxiety. Moreover, it was found that taking medication generated a 2.69 times higher probability of presenting anxiety in Brazilian Medical students (21). A study performed on a large number of students from University of Belgrade indicated having found an association between somatic diseases and alterations to mental health, especially anxiety, while the recreational activities they explored were associated with less anxiety (34). Furthermore, our evaluation demonstrated that recreational and leisure activities favored a lower frequency of anxiety. There are extensive evaluations, such as the systematic review of Eime *et al*., who indicated that various studies have proposed participating in competitive or recreational sports, performing extracurricular activities, being a part of youth groups or volunteer work, working for pay, taking music classes or interacting in performing arts, as well as cultivating a spiritual or religious foundation, can positively influence generally healthy behavior patterns and lay the foundations for better personal development (35). With respect to spirituality, we observed that attending to religious events in the last month was associated by 40% with less frequency of anxiety in the studied group. Gonçalves, *et al*. had a similar observation in Medical and Nursing students (36). Religion is a system of beliefs and symbols shared by groups of people who encourage social and doctrinal conducts. Religions drive developing adaptive mechanisms for stressful situations, help face adversity, offer a purpose of life, increase satisfaction and personal well-being and protect mental health (36). Our findings, supported by various author's theories, allow suggesting that the academic curriculum to become a professional must involve recreational, relaxing and leisure activities, socialization between young adults, encouraging body, artistic, cognitive and sports expressions, among others, in order to reduce the impact of academic stressors and improve psychological and social health (34-36).

Depression is a public health issue characterized by feelings of sadness, a loss of energy, disdain for activities and interest, low self-esteem and low concentration (17,37). It was observed that 80.3% of the studied population suffered from depression, without differences in between their degrees. In Croatia, they indicated that Medical students had a higher presence of depression than Nursing students (19). Our figures are higher than those reported in students in the health-care field in Saudi Arabia, where depression was observed in 69.9% of students (23). It was also higher than the average indicated in the most extensive available systematic review, in which 167 cross-sectional and 16 longitudinal studies were included and 129,123 Medical students from 47 countries were evaluated. A crude prevalence of 27.2% was observed (95% CI: 24.7% to 29.9%), $I2 = 98.9\%$ for depressive symptoms or depression (29). It must be indicated that each geographic region has its own frequency of depression among university students in health-care, with wide ranges of frequency in studies performed in the same country or in different countries with similar sociocultural conditions (20,38,39). Various factors influence frequencies for these differences to be observed, especially those specific to research designs, evaluation instruments and the involved variables, as well as the presence of personal psychobiological factors, family upbringing patterns and social, environmental or cultural determinants, which can be elements of confusion or interdependence. However, and independent from the magnitude of the figures, Medical students are between two and five times more susceptible to experiencing depression than the general population of the United States, and only 15.7% of Medical students who have

episodes of depression resort to professional evaluations and therapy (29). Zeng, *et al*. indicate that the academic demands of professional health-care degrees generate pressure and stress and, therefore, a higher frequency of depression than other university programs (20). Higher education institutions must take this into account. In addition, they must understand that late adolescence is a phase of physical, psychological and cognitive changes that requires solid coping strategies from individuals to consolidate their identity, autonomy and personal success. On occasion, they do not exist (11). The existence of previous episodes of depression at a young age must be explored, since they are usually recurring and lead to more severe symptoms of depression and suicide attempts (23,36). Symptoms of depression come along with slow thinking, difficulty focusing, indecision, limited academic development, feelings of inadequacy, emotional exhaustion and social isolation (18). Identifying these situations, which are complicated to evaluate within a student body, can be an ambitious challenge with respect to mental health in a solid student well-being program.

In this study, belonging to the female gender was not observed to be associated with a higher presence of depression, unlike what other authors observed in Medical students (37). Furthermore, the score on the depression subscale increased by 10% in the measure daily bottles of energy drinks increased, and 7% as the number of cigarettes smoked daily increased. Being from rural areas was one of the three factors associated to a higher presence of depression. These interdependencies are well documented (32,33). Having extracurricular activities, attending advanced studies, studying for twelve or more hours every week in the last month and being a Nursing student with respect to Pharmaceutical Chemistry were associated with 50% less of a presence of depression. This has also been indicated in Medical students from another Colombian university (40).

The study's purpose is to contribute to making a very sensitive issue that is usually deliberately ignored more visible: anxiety and depression in students in the health-care field. The research presents information from students' own perceptions and from an academic framework, not a sanitary consultation, with a widely used validated scale that scores the presence of both situations. However, as is the case with all biomedical scales, it does not perform diagnoses. It simply identifies symptoms, manifestations or situations that can be related to anxiety and depression. A list of everyday psychological, social and demographic circumstances in university environments that were associated with the two explored mental health conditions was provided to educational and sanitary authorities. The study has limitations beyond its cross-sectional design, which delivers statistical, not causal, associations. The estimated figures are inherent to the evaluated group, and extrapolations must be made with care. Estimates and findings are not diagnostic, for which reason psychological or psychiatric exploration in clinical environments would be merited. The specific existence of biological, psychological, family or social conditions was not explored for each participant, which can influence estimates, especially financial insufficiency, unsatisfied basic needs, a lack of food, vulnerable conditions or subjection to domestic violence and coping patterns to handle everyday stressful situations. In this sense, additional studies are required in other groups of university students in the health-care field to continue exploring the issue.

Public and private higher education institution directors are recommended to strengthen and continuously supervise actions scheduled by student well-being offices. From these offices, mental health deterioration can be recognized and recreational activities, spiritual practices, extracurricular programs and occupational dynamics can be encouraged to recreationally enrich entertainment and play areas, since all are important elements to reduce anxiety and improve mental health (34,35,36,40). Professors are recommended to empower students to identify patterns of behavior, attitudes and performance that could suggest situations related to anxiety or depression in their students (2,4,12,18). Administrative professionals, and even other students, can be involved on mental health programs' oversight and prevention teams (40). Primary health-care professionals and, in general, all health-care professionals who provide health-care consultations to university students, must be concerned with identifying symptoms of mental disorders early. Using simple scales that are quick to complete, such as the one used in this study, in waiting rooms or consultations could be useful to identify young adults who merit being referred to other clinical spaces for specialized assessment, diagnosis and therapy, as well as performing interviews with specific and exploratory terms of mental well-being.

Conclusion

A high prevalence of anxiety and depression was observed in a group of students in the health-care field in a university in the Colombian Caribbean. Consuming energy drinks was the only variable from a large number of sociodemographic characteristics, psychosocial aspects, habits and health background that was associated with a higher presence of anxiety and depression. While having a background of psychiatric or psychological consultations, being a Medical or Nursing student, having a chronic disease, being under or overweight, consuming medication

permanently and being female were associated with more anxiety, recreational activities, such as sports, concerts, dances, attending night clubs and restaurants, having a partner and having children did the opposite. Attending advanced studies and performing extracurricular activities were associated with a lower frequency of depression. This study's findings allow indicating the magnitude of the problem. Sanitary and educational authorities recommend implementing programs that involve all university levels in identifying, intervening, preventing and rehabilitating the psychosocial settings that could encourage or aggravate anxiety and depression in students in the health-care field.

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Conflict of interest

There are no conflicts of interest to declare.

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