

## Anxiety and depression in students of third semester of “Facultad de Medicina y Nutrición de la UJED, Campus Durango”

### Ansiedad y depresión en Alumnos de Tercer Semestre de la Facultad de Medicina y Nutrición de la UJED, Campus Durango

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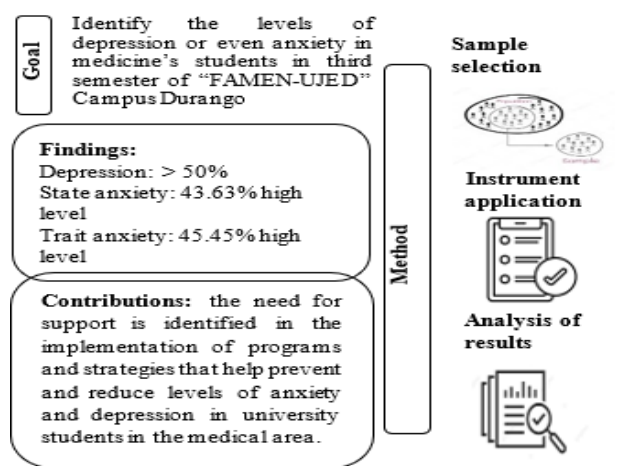


#### Abstract

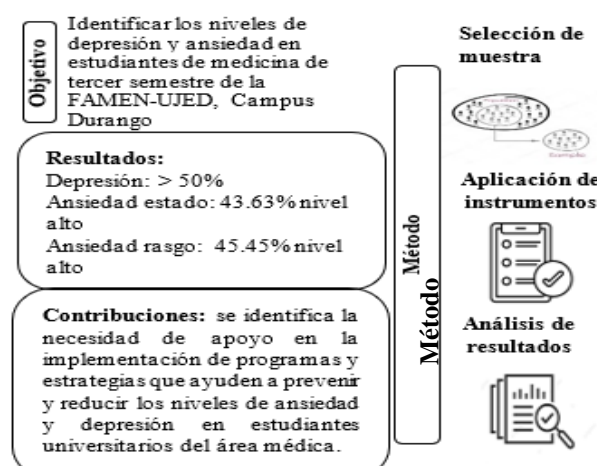
Mental health in university students can be a limitation or an ally to enhance professional and social skills. The evaluation of level's depression was realized by the Beck Depression Inventory (BDI). The anxiety was evaluated through of State-Trait Anxiety Inventory (STAI) with a total of 110 participants.

#### Resumen

La salud mental en estudiantes universitarios puede ser una limitante o una aliada para potenciar las competencias profesionales y sociales. La evaluación de los niveles de depresión se realizó mediante el Inventario de Depresión de Beck. La ansiedad fue evaluada mediante el Inventario de Ansiedad Estado-Rasgo a un total de 110 participantes.



#### Depression, Anxiety, University Students



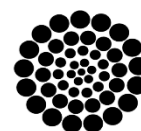
#### Depresión, Ansiedad, Estudiantes Universitarios

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## Introduction

Nowadays, psychosocial disabilities represent a serious public health problem that affects all sectors of society regardless of age, gender, socio-economic and cultural level, thus representing a high social cost. Global evidence shows that there is no health without mental health (H. Congreso del Estado de Durango, 2018).

The pressure and demands of studying a career can generate high levels of anxiety and depression in students, which can negatively affect their academic performance and emotional well-being (Londoño Arredondo et al., 2021).

Mental health is a phenomenon that can be determined by various factors, including social, environmental, biological and psychological factors, and conditions such as depression, anxiety, stress, dementia, etc. are often represented. These conditions can have serious consequences such as a decrease in people's development potential. In this sense, achieving good mental health in the population depends, to a large extent, on the implementation of public health actions (Sandoval De Escurdia and Richard Muñoz, 2005).

Depression and anxiety are mental health problems that affect a large number of people worldwide, including medical students. According to a recent study, medical students have a higher prevalence of depression and anxiety compared to other sectors of the population (Rotenstein et al., 2016), as the high levels of stress, academic pressure, lack of time to take care of themselves, long study hours and clinical practices to which they are exposed are some of the factors that contribute to the occurrence of these disorders (Dyrbye et al., 2006).

For Gutiérrez et al., (2010) it is of utmost importance to identify the prevalence of depression, anxiety or stress in students entering higher education, in order to know the state of mental health of such students, which may be affected by the demands, level of development and competences that may determine the possibility of success or failure in their learning process (Gutiérrez et al., 2010).

Currently, the mental health of university students is an issue of great relevance and concern for teachers, as it constitutes a limiting situation for achieving the enhancement of their professional, social and personal competences (Cuenca Robles et al., 2020).

In this research work, the current panorama of mental health in medical students will be presented, as well as the relevance of recognising and raising awareness about the importance of its care, so that they can identify the relevance of seeking help from a specialist in this area when necessary and thus gain access to intervention in a timely manner in case it is required.

Early interventions and appropriate treatment can prevent deterioration in mental health and improve students' well-being and performance.

## Rationale

First clinical encounters, usually occurring during the first semesters of medical school, trigger strong feelings and sensations in students, who are confronted with complex illnesses and/or confusing emotional states and, sometimes, feelings of guilt for using patients' conditions for their own learning (Segura Azuara et al., 2020).

High levels of stress as well as emotional morbidities can have negative personal and professional consequences for students, including social isolation, emotional exhaustion, undetected or untreated mental disorders that can lead to poorer prognosis, such as substance use and abuse and, in the worst cases, even suicidal behaviour (Cuttilan et al., 2016).

University students are a sector of society prone to a high risk of suffering from mental health problems due to curricular demands, thus significantly affecting all spheres of their lives, which is a product of the stress to which they are constantly exposed (Cardona et al., 2014).

Agudelo Vélez et al., (2008) report that, in the university population, one of the main reasons for consultation in psychological care is depression and anxiety (Agudelo Vélez et al., 2008).

For Gutiérrez Rodas et al, (2010) it is of utmost importance to identify the prevalence of depression, anxiety or stress in students entering higher education, in order to know the state of mental health of such students, since, due to the academic demands and difficulties in the learning process, accompanied by the pace of study, extended class schedules, teachers' demands, peer pressures, competition among classmates, variable eating schedules and changes in the sleep-wake cycle, can alter health conditions, including mental health (Gutiérrez Rodas et al. , 2010).

Regarding this issue, the Institute of Mental Health of the State of Durango (ISMED) announced at a press conference held in the framework of World Mental Health Day, that currently this problem has not been given the importance it deserves, neither in terms of budgets nor as a society, in addition, the difficulties faced by different public and private organisations is the lack of specialised places where patients with psychosocial disabilities can be given dignified treatment, requiring a short stay in hospital, so that they can continue their treatment on an outpatient basis (H. Congress of the State of Durango, 2018). For the aforementioned reasons, the present research on anxiety and depression in medical students is justified, in order to identify risk factors and, in this way, consider the feasibility of developing and implementing programmes as prevention and treatment strategies with the aim of promoting the mental health and well-being of university students, especially those who are trained in the medical field.

## Problem

The World Health Organization (WHO) in 2021 mentioned that, in school settings, including at university level, both anxiety and depressive disorders can significantly compromise school attendance, study and also the performance of professional, social, family and personal duties. This can have negative repercussions on students, as social withdrawal can exacerbate isolation and loneliness and, in the worst cases, depression can lead to suicide, which is of alarming concern to mental health professionals, as the fourth leading cause of death among 15-29 year olds is suicide (World Health Organization, 2021), figures that could continue to rise if an action plan is not implemented to help reduce or eradicate the problem.

According to the National Morbidity Yearbook 1984-2022, for the year 2022 in Mexico, depression was found to be number 19 of the 20 causes of national disease, where the general population aged 15 to 24 years gave a total of 26,450 people with this condition; of which, 19,329 correspond to the female sex, placing depression in women at number 18 of the 20 causes of disease, while the remaining 7,121 correspond to the male sex, in the latter, depression is not found within the 20 causes of disease (Government of Mexico, 2022).

Data provided by the Ministry of Health (SSA) through the epidemiological bulletin of the National Epidemiological Surveillance System showed that the state of Durango closed the year 2023 (week 52) with 4986 cases of depression, of which 1154 correspond to the male sex and 3832 to the female sex. Regarding the year 2024, updated figures for week 09 showed that there are a total of 804 cases of depression, of which 222 correspond to males and 582 to females (Secretaría de Salud, [SSA], 2023) and (SSA, 2024).

Regarding anxiety, in 2018 the Pan American Health Organization (PAHO) together with the World Health Organization (WHO) reported that, in most countries of the Region of the Americas, of which Mexico is part, anxiety disorders are the second most disabling mental disorder. In addition, mental disorders account for 23% of years lost to disability in low- to moderate-income countries, and are associated with lower life expectancy and higher mortality rates (Pan American Health Organization [PAHO] and WHO 2018).

These figures for mental disorders are highly relevant as the years go by, as failure to treat them immediately often has consequences that can extend into adulthood, and thus impair a person's physical and mental health, restricting their chances of living a full life in the future (WHO, 2021).

## Overall objective

To identify the levels of depression and anxiety in third-semester medical students of the Faculty of Medicine and Nutrition of the Universidad Juárez del Estado de Durango, Durango Campus.

## Theoretical framework

### Background

The State-Trait Anxiety Inventory (STAI) was applied to 268 medical students of the Pontificia Universidad Católica del Ecuador, Sede Ambato (PUCESA), enrolled in the periods August - December of the academic year 2022. The results showed that the levels of Anxiety-Rasgo and Anxiety-State presented moderate and severe levels in 86.2% and 77.4% of the sample respectively (Yáñez Yáñez, 2023).

In a study carried out using the Beck Anxiety Inventory (BAI) on 219 students from all semesters of the medical career at the Universidad del Norte de Barranquilla, in Colombia in the academic period 2022-10, resulted in an overall prevalence of anxiety symptoms of 70.8%, which corresponds to 155 people among all individuals in the study. Thus, the semester where the highest prevalence was found was the third semester, with 92.6%, followed by the fifth and sixth semesters with 82.6% and 78.9% respectively (Angarita Villegas et al., 2022).

On the other hand, in the national context, an investigation was carried out with 122 first-year medical-surgeon students at the Chimalhuacán Professional Academic Unit in the State of Mexico, with the aim of exploring their mental health, where levels of anxiety, depression and stress were studied, resulting in anxiety being the most prevalent condition, with 21.3% obtained through the Trait-State Anxiety Inventory, where 40.2% showed state anxiety and 44.3% had it as a range. Regarding depression, 9% showed intermittent depression, 5.7% moderate depression and 0.8% extreme depression (Arzate Salgado, 2020).

Likewise, in an investigation carried out with 274 students enrolled in fifth semester of the five degrees belonging to the Health Sciences (Medical Surgeon, Dental Surgeon, Nursing, Psychology and Nutrition) of the Universidad Juárez Autónoma de Tabasco, using data collection techniques and instruments such as direct observation, available information, as well as a questionnaire technique based on the Hamilton Anxiety Scale (HAS), it was found that 79.2% of the participants suffer from some type of anxiety, and 14.65% of the students suffer from a severe anxiety disorder.

In addition, it was found that the bachelor's degrees with the highest prevalence were Medical Surgeon and Nutrition with 88.85% (López-Wade and Viveros-Ojeda, 2018).

A study conducted in 2020 involving 177 students from all semesters of the Medical Surgeon degree at the Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM) campus Guadalajara, who were administered the Goldberg General Health Questionnaire, reported the results of this research, where it was found that 35.8% of students had symptoms of anxiety, and 8% had symptoms of depression. They also found that there is a significant difference between the academic years of the participants, with a higher percentage of cases in the fifth year of their degree (Ruvalcaba Pedroza et al., 2021)

Regarding depression, an investigation was conducted with the help of the Patient Health Questionnaire-9 (PHQ-9) to identify the prevalence of this condition in 63 students of the Bachelor of Medicine of the Benemérita Universidad Autónoma de Puebla (FMBUAP) where it was obtained that 95.23% of them reported at least one symptom in the last two weeks, in addition, 31.72% of these students could have a diagnosis of major depressive syndrome (Martínez-Martínez et al., 2016).

For his part, Fouilloux Morales (2002) conducted a study aimed at identifying probable cases of mental disorders in medical students in the first years of their studies. The results showed that 10.5% of the students suffered from some kind of mental disorder, within which decreased concentration, depressive mood and anxiety were the symptoms most frequently reported by students (Fouilloux Morales, 2002).

### Mental health

According to WHO (2013) mental health is a state of well-being in which the individual develops his or her abilities, can cope with the pressures of life and can also work productively, being able to make contributions to his or her community (WHO, 2013). It is also a fundamental human right, which allows us the ability to relate, to function in all areas and to thrive (WHO, 2022).



Mental disorders lead to considerable disability. They are clinical entities of long evolution, which generally begin in adolescence or early adulthood, and have remissions and recurrence that have a great impact on the personal, family and work functioning of the individual (Campo-Arias and Cassiani Miranda, 2008).

PAHO (2017) refers that common mental disorders refer to two categories: depressive disorders and anxiety disorders. They are diagnosable health conditions, and can be distinguished from feelings of sadness, stress or fear that any individual may occasionally experience in his or her life.

These disorders are highly prevalent in the population and often have an impact on the mood or feelings of the people who suffer from them, and their symptoms vary in intensity and duration (PAHO, 2017).

According to Martínez-Martínez et al., (2016), most mental disorders generally begin in the first decades of life, meaning that 50% of adults who have suffered from a mental disorder began to suffer from it before the age of 21, and when these disorders occur before the age of majority, the course of the illness tends to be more chronic and of longer duration (Martínez-Martínez et al., 2016).

### Mental health in university students

When talking about mental health in university students, it is well known that many of the authors who have dedicated themselves to research on this topic agree that between 10% and 25% of students require some kind of psychological-medical help, and that these figures tend to drop significantly in the case of more severe psychiatric disorders, which even cause students to drop out of their studies (Fouilloux Morales, 2002).

The education of medical students has been particularly characterised by a high level of demand, generating high levels of stress and a greater likelihood of suffering from psychological morbidities compared to the general population, such as anxiety and depression (Aktekin et al., 2001).

According to Borges (2016), some studies have pointed out that poor school performance tends to occur more frequently in students with depressive symptoms, associating depression with difficulties in concentration, social relations and reading and writing performance, even perceiving these tasks as a heavy burden (Borges, 2016).

### Anxiety

According to the SSA (2010), people who have suffered from anxiety experience it as an unpleasant, diffuse sensation, accompanied by physical discomfort such as retro sternal tightness, tachycardia and sweating. It is also characterised by excessive worry about events or activities such as work performance, with a prolongation of more than six months, and expressed in a series of symptoms such as: restlessness, impatience, easy fatigability, difficulty concentrating, muscle tension and sleep disturbances (SSA, 2010).

With regard to aetiology, anxiety disorders have a genetic variability that is estimated at between 30% and 50%, however, there are usually associated influencing factors that may be temperamental, social and/or environmental factors (Chacón Delgado et al., 2021).

The American Psychiatric Association (APA) in 2014, through the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), classifies anxiety disorders as follows:

Separation Anxiety Disorder: is an anxiety experienced by people who are faced with being away from their home or home, or the people to whom they are attached.

Selective mutism: one of the characteristics is that when the sufferer is faced with the situation of interacting socially they are not able to initiate dialogue or do not respond reciprocally when trying to talk to others. It is common for them to talk at home in the presence of their immediate family, but not outside this context.

Specific phobia: one of the essential characteristics of this disorder is a fear or anxiety of specific objects or situations.

Social anxiety disorder (social phobia): characterised by an intense or marked fear or anxiety of social situations or experiences, where the individual feels that they may be analysed by others.

Panic disorder: these are unexpected and recurrent panic attacks, with a panic attack being understood as a sudden sensation of intense fear or discomfort that occurs within minutes.

Agoraphobia: this is essentially characterised by an intense or marked fear or anxiety in the face of actual or anticipated exposure to a series of situations.

Generalised anxiety disorder is characterised by excessive anxiety and worry about a series of events or activities, the symptoms experienced are often disproportionate in intensity, duration and frequency to the actual impact of the anticipated event.

Substance/medication-induced anxiety disorder: prominent symptoms of panic or anxiety occur due to the effects of certain substances (drugs, medications, toxins, etc.).

Anxiety disorder due to another medical condition: occurs due to some organic conditions, endocrine diseases, cardiovascular disorders, respiratory diseases, among others, are an example.

Other specified anxiety disorder: refers to cases in which the characteristic symptoms of anxiety predominate and cause clinical distress or impairment in different areas of the individual's life, but do not meet the criteria of any of the above-mentioned disorders. It is used on occasions where the clinician communicates why the representation does not meet these criteria.

Other anxiety disorder not otherwise specified: refers to cases in which symptoms characteristic of anxiety predominate and cause clinical distress or impairment in different areas of the individual's life, but do not meet the criteria for any of the above-mentioned disorders. It is used on occasions where the clinician chooses not to communicate why the representation does not meet those criteria (American Psychiatric Association [APA], 2014).

## Depression

According to WHO (2001) depression is a mood disorder characterised primarily by the loss of an individual's ability to maintain interest and enjoyment (WHO, 2001).

Depression is also often accompanied by changes in sleep, appetite and psychomotor function, as well as a decline in cognitive functions such as attention, concentration and decision making; in addition to this, loss of self-confidence, feelings of worthlessness and guilt, hopelessness and recurrent thoughts of death with suicidal ideation, planning and/or acts or ideation (Beltrán et al., 2012).

According to the National Institute of Mental Health (NIH) in 2015, depression is not age-specific, i.e. it can occur at any age, but often begins in adolescence or early adulthood, i.e. approximately between 20 and 35 years of age (National Institute of Mental Health [NIH], 2015).

The APA (2014), through the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), releases the classification of depressive disorders, which are described below.

Disruptive state dysregulation disorder: the main feature of this disorder is chronic, severe and persistent irritability, with two relevant clinical manifestations, the first being frequent outbursts of anger and the second being a persistently irritable or chronically angry mood.

Major depressive disorder (includes major depressive episode): generally presenting symptoms are insomnia and fatigue, however, other depressive symptoms should be considered. The main feature is a period of time of at least two weeks where depressed mood or loss of interest in almost all activities of daily life is experienced. Persistent depressive disorder (dysthymia): the main feature is a depressed mood that occurs most of the day, most of the days and is experienced for at least two years (in children and adolescents at least one year). Premenstrual dysphoric disorder: the main features are the expression of affective lability, dysphoria and anxiety symptoms that usually recur during the premenstrual phase of the cycle and carry over to the onset of menstruation or shortly thereafter.

These symptoms may be accompanied by behavioural and physical symptoms.

Substance / medication - induced depressive disorder: the features of this disorder include the symptoms of major depressive disorder, however, these are associated with the use, injection or inhalation of a substance (e.g. drugs, psychotropic medication, etc.).

Depressive disorder due to another medical condition: the essential feature is a depressed mood or a significant decrease in interest in all or almost all activities over a significant and persistent period of time. This must be predominant in the clinical picture and thought to be related to physiological effects of another medical condition.

Other specified depressive disorder: symptoms characteristic of a depressive disorder that usually cause clinically representative distress, or impairment in social, occupational or other areas, but do not meet the criteria for any of the depressive disorders mentioned above, may predominate. In this case, the clinician chooses to report the specific reason why the criteria for a depressive disorder are not met.

Other unspecified depressive disorder: symptoms characteristic of a depressive disorder that typically cause clinically representative distress, or impairment in social, occupational or other areas, but do not meet the criteria for any of the depressive disorders already mentioned, may predominate. In this case, the clinician chooses not to report the specific reason for not meeting the criteria for a depressive disorder (APA, 2014).

### Beck Depression Inventory (Beck Depression Inventory; BDI-I)

The Beck Depression Inventory (BDI) was developed in the 1960s, with the aim of reflecting clinical consent on the symptoms that were then considered defining for depression (APA, 1980).

In Mexico, the BDI has been translated and its popularity has grown significantly in clinical practice, as well as in its use by psychologists or psychiatrists for research. Currently, it is one of the most widely used instruments to measure the severity of depressive symptoms (Jurado et al., 1998).

It is made up of 21 items, where in each item the respondent must choose from 4 the sentence with which he/she best identifies according to the last week and the day of answering the questionnaire. Each item is scored from 0 to 3 points according to the alternative chosen. The resulting total score ranges from 0 to 63 points. The cut-off scores proposed by Beck et al. (1988) to discriminate between different degrees of depression are presented in the following table (table 1).

#### Box 1

**Table 1**

Levels of depression and their cut-off scores for the interpretation of the results of the Beck Inventory

Total scores	Level of depression
0-9	Normal
10-18	Leve
19-29	Moderada
30-63	Grave

Source: Beck et al. 1988

A study by Jurado et al. (1998) concluded that the Mexican version of the BDI meets the psychometric requirements for use as an instrument to assess depression, and its statistical figures demonstrate content, criterion and construct validity (Jurado et al., 1998).

### State-Trait Anxiety Inventory (STAI)

Consists of 40 items. Each subscale consists of a total of 20 items in a Likert-type response system with four response options taking into account intensity (0=almost never/not at all; 1=somewhat/sometimes; 2=quite often; 3=a lot/almost always).

For the response to the items corresponding to the anxiety-state subscale, the participant is instructed to read the sentences and then choose the answers with a score from 0 to 3 that best indicate "how he/she feels in the now, at this moment". For the response to the items of the anxiety-trait subscale, the participant is instructed to read the sentences and then choose the answers with a score from 0 to 3 that best indicates "how he/she feels in general, most of the time". In the two subscales, anxiety-state and anxiety-trait, one percentage is inverted, assessing well-being or absence of anxiety, while the rest of the items assess the presence of anxiety.

The resulting total score for each of the scales ranges from 0 to 60 points. The total score is obtained by summing the items, taking into account the inversion of the items that are positively worded (Spielberg et al., 1982).

The scores for the interpretation by categories for the university population, both for men and women, can be seen in the table below (table 2).

## Box 2

**Table 2**

STAI scores by category for university students (male and female)

University students	Males		Women	
	A/E	A/R	A/E	A/R
High	27-60	26-40	29-60	31-60
Medium	10-26	12-25	11-28	14-30
Low	0-9	0-11	0-10	0-13

Source: Spielberg et al., 1982

The questionnaire shows good internal consistency in the Spanish adaptation, with scores between 0.9 and 0.93 for state-anxiety and between 0.84 and 0.87 for trait-anxiety (Spielberger et al., 1982).

## Research methodology

For the analysis of the present research, a quantitative methodology was used, of an exploratory type, with a non-experimental design, descriptive in scope and cross-sectional, with a descriptive statistical analysis. A non-probabilistic convenience sample was used, selected with 90% reliability. For the statistical analysis of the results of the quantitative variables of the sample studied, measures of central tendency (mean, mode, median) and dispersion (standard deviation) were used. For the qualitative variables (sex, marital status and occupation), frequencies and proportions were used (Hernández Sampieri et al., 2014).

## Participants

The study universe was 541 male and female students in the third semesters of the Bachelor's Degree in Medicine at the Faculty of Medicine and Nutrition (FAMEN) of the Universidad Juárez del Estado de Durango (UJED), Durango Campus, enrolled in semesters A2019, B2020, A2020 and B2021, of which 110 students (men and women), located in a range of 18 to 34 years of age, agreed to participate.

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## Instruments

Three instruments were used for this study:

- 1) Clinical interview: instrument applied individually through which the personal and sociodemographic data of the participants (sex, age, marital status, occupation, among others) were obtained.
- 2) Beck Depression Inventory (BDI): the adapted version of the BDI-I for the Mexican population by Jurado et al. (1998) was used. This inventory evaluates the presence of symptoms of depression such as: sadness, crying, loss of pleasure, feelings of failure and guilt, thoughts or desires of suicide, pessimism, among others. The instrument is easy to administer and takes approximately 10 to 15 minutes (Jurado et al., 1998).
- 3) State-Trait Anxiety Inventory (STAI): we used the State-Trait Anxiety Inventory questionnaire created by Spielberger et al. It is a self-report instrument whose purpose is to assess two concepts of anxiety: anxiety as a state (transient emotional condition), whose time reference is "right now, at this moment"; and anxiety as a trait (relatively stable anxious propensity), whose time reference is "in general, most of the time" (Spielberger et al., 1982).

## Procedure

In the first instance, the idea of carrying out this research was presented to the directors of the Faculty of Medicine and Nutrition (FAMEN) of the Universidad Juárez del Estado de Durango (UJED), located in the city of Victoria de Durango, with the aim of obtaining their consent for the application of the evaluation instruments to students who agreed to participate in the study.

In coordination with the academic heads, the type of students to whom the study would be directed was determined, with those enrolled in the third semesters (A2019, B2020, A2020 and B2021) of the medical degree course being the ones chosen.



A total of 541 students were invited to participate, 110 of whom agreed to take part. The appropriate time and place for the surveys were determined. The times of maximum student attendance were taken into account in accordance with the school's own dynamics. When the population agreed to participate voluntarily in the research, the objective of the study was explained to them, guaranteeing the confidentiality of their personal data. Interested students were given the informed consent form to return signed by them.

Afterwards, the assessment instruments (clinical interview, BDI and STAI) were distributed respectively to the participants, who were given clear and precise instructions for their self-application. The development period of the present project started in August 2019 and ended in February 2021.

It is worth mentioning that in the process of applying the evaluation instruments, the students were accompanied in person by the researchers until February 2020, and subsequently, due to the SARS-CoV-2 virus pandemic, it was not possible to continue with the in-person accompaniment due to the health contingency, so from March 2020 it was decided to send the evaluation materials via email to the participants who remained pending, all of this with their respective instructions and through virtual accompaniment when required.

### Inclusion criteria

- 1) To be a student in the third semesters A2019, B2020, A2020 and B2021 of the FAMEN-UJED, Durango Campus, with current enrolment.
- 2) Individuals of both sexes.
- 3) To have signed the letter of informed consent.

### Elimination criteria

- 1) Students who handed in their evaluation incomplete.
- 2) Students who gave apocryphal information.

## Results

The sample consisted of a total of 110 students, belonging to the third semester of the medical degree course at FAMEN-UJED, Durango Campus, enrolled during semesters A2019, B2020, A2020 and B2021; of which 76 (69.09%) were female and 34 (30.90%) were male, whose frequencies and age proportions can be seen in the following table (table 3).

### Box 3

**Table 3**

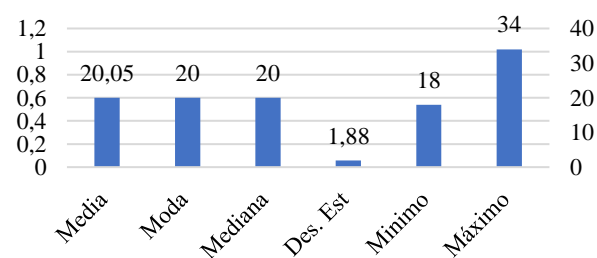
Frequencies and proportions according to sex and age of the sample studied.

Variables	Levels	Quantity in number	Quantity in percent
Sex	Female	76	69.09%
	Male	34	30.90%
Age	18	4	3.63%
	19	41	37.27%
	20	44	40.0%
	21	11	10.0%
	22	4	3.63%
	23	2	1.81%
	24	1	0.90%
	26	2	1.81%
	34	1	0.90%

Source: own elaboration

The analysis of the age of the participants using measures of central tendency and dispersion showed a minimum of 18 and a maximum of 34 years of age, a mean of 20.05, a median of 20, a mode of 20 and a standard deviation of 1.88 (graph 1).

### Box 4



**Graph 1**

Measures of central tendency and dispersion of participants' ages

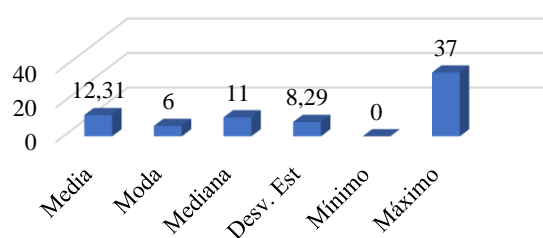
Source: own elaboration

On the other hand, the results regarding the frequencies and proportions according to the marital status of the sample studied showed that 109 participants (99.09%) are single, and only 1 (0.09) is married.

Similarly, the results regarding occupation showed that 107 participants (97.27%) only study, while only 3 (2.72%) study and work.

According to the results obtained from the total assessment score of the 110 students through the BDI-I, an analysis of measures of central tendency and dispersion was carried out, from which a mean of 12.31 was obtained, the median was 11, the mode was 6, and the standard deviation was 8.29, as well as a minimum of 0 and a maximum of 37 (graph 2).

### Box 5



### Graph 2

Measures of central tendency and dispersion of the total score obtained through the BDI Source: own elaboration

From the results obtained taking into account the cut-off scores for the interpretation of the results proposed in the BDI-I, we obtained that 45 students (40.90%) are not depressed, while 35 students (31.81%) are reported to be mildly depressed, 25 students (22.75%) are moderately depressed and 5 students (4.54%) are severely depressed (table 5).

### Box 6

#### Table 5

Results taking into account proposed cut-off scores in the BDI

Ranking	Number of pupils	Percentage of pupils
Normal	45	40.90%
Leve	35	31.81%
Moderate	25	22.72%
Severe	5	4.54%

Source: own elaboration

On the other hand, taking into account the cut-off scores for the interpretation of the results proposed in the STAI, with respect to anxiety as a state, it was obtained that 48 (43.63%) students have a high level of anxiety, 53 (48.18%) students have a medium level and 9 (8.18%) students have a low level of anxiety (table 6).

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### Box 7

#### Table 6

Results of the anxiety-state subscale taking into account the cut-off scores proposed in the STAI

Anxiety-state		
Ranking	Number of pupils	Percentage of pupils
High	48	43.63%
Medium	53	38.18%
Under	9	8.18%

Source: own elaboration

Regarding the level of anxiety as a trait, and according to the cut-off scores proposed in the STAI, 50 (45.45%) students are at a high level, 49 (44.54%) students are at a medium level and 11 (10.0%) students have a low level of anxiety (table 7).

### Box 8

#### Table 7

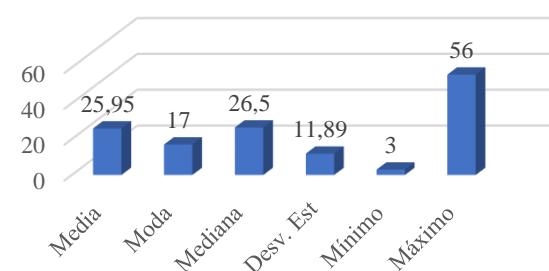
Results of the anxiety-trait subscale taking into account the cut-off scores proposed in the STAI

Trait anxiety		
Ranking	Number of pupils	Percentage of pupils
High	50	45.45%
Medium	49	44.54%
Under	11	10.0%

Source: own elaboration

According to the results obtained from the total score of the evaluation of the 110 students by means of the STAI, an analysis of measures of central tendency and dispersion was carried out, where anxiety as a state presented a mean of 25.95, the mode of 17, the median of 26.5 and the standard deviation of 11.89, as well as the minimum score was 3 and the maximum score was 56 (graph 3).

### Box 9



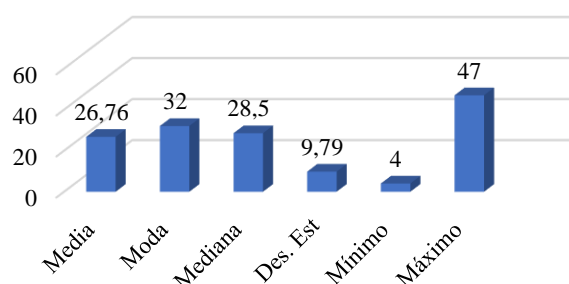
### Graph 3

Measures of central tendency and dispersion of the total score obtained by means of the STAI, in the anxiety-state scale

Source: own elaboration

For its part, anxiety as a trait in the total score resulted in a mean of 26.76, the mode was 32, the median was 28.5 and the standard deviation was 9.79, in addition, the minimum score was 4 and the maximum score was 47 (Figure 4).

### Box 10



**Graph 4**

Measures of central tendency and dispersion of the total score obtained by means of the STAI, in the anxiety-trait subscale

*Source: own elaboration*

### Conclusion

After the statistical analysis of the data collected through the evaluations to determine the level of depression in medical students at FAMEN-UJED, Durango Campus, it can be concluded that more than half of the students evaluated in this study (65 students) corresponding to 59.07% of the sample have this condition, while 40.90% of the sample (45 students) did not report any level of depression.

These results are similar to those obtained in the study conducted in 2011 in university students in the area of Health Sciences at a public university in Colombia, where it was found that more than half of the sample studied (52%) suffer from some degree of depression (Ferrel Ortega et al., 2011).

In addition, the results obtained in the present research showed figures above those obtained in the study conducted on students of the Bachelor of Medicine of the Benemérita Universidad Autónoma de Puebla (FMBUAP) by Martínez-Martínez et al. in 2016, where the results showed that 31.72% could have a major depressive syndrome (Martínez-Martínez et al., 2016).

On the other hand, the results obtained regarding anxiety as a state and anxiety as a trait, are similar to those obtained in a study conducted by Arzate Salgado in 2020 to medical students at the Autonomous University of the State of Mexico, where he reports that these students presented an incidence percentage of 40.2% as a state and 44.3% as a trait (Arzate Salgado, 2020), similar to those obtained in the present research work.

Regarding the international comparison, in a study conducted with medical students at the Pontificia Universidad Católica de Ecuador, Sede Ambato (PUCESA), the results differ, since in this research conducted by Yañez Yañez in the year 2023 the participants showed moderate and severe levels in the anxiety-trait and anxiety-state dimensions in 86.2% and 77.4% respectively; these figures are higher than those obtained in the evaluation of medical students at FAMEN-UJED.

Similarly, according to the results concerning the number of students with some level of anxiety, it is noticeable that a large percentage of participants have high levels of anxiety, both state and trait, the latter being where the largest number of medical students are found.

These results differ from a study conducted by Reyes Carmona et al. (2017) on students from the Faculty of Medicine of the National Autonomous University of Mexico, as their results showed that anxiety as a trait was present in a lower percentage (Reyes Carmona et al., 2017).

It is worth mentioning that after an exhaustive search of the literature indicating studies on depression and anxiety in medical students in the third semester of their degree, no studies were found that investigated this specific type of population.

However, the results obtained in this study have been compared with those obtained in research conducted on medical students in general, regardless of the semester studied, which shows the need to conduct studies on these problems in the first semesters of the medical career.

## Article

For all of the above reasons, it is important that both medical school authorities and governmental institutions support university students in the area of mental health, especially those studying medicine, since due to the demands of their careers, they are the ones who require the implementation of measures that cover the prevention, detection and management of these problems, ensuring them early, constant and specialised attention.

### Declarations

### Conflict of interest

We declare that we have no conflict of interest

### Author's contribution

The contributions of each researcher to this research were as follows:

*Salas-González, Cecilia:* contributed with the idea of the project, as well as in the application of the evaluation instruments, data collection and background. She also supported the writing of the article.

*Ríos-Valles, José Alejandro:* contributed to the application of the instruments, as well as to the analysis of the data, definition of the methodology and systematisation of the results.

*Pérez-González, Ivonne:* contributed to data analysis, systematisation of results, as well as to the writing of the article.

### Availability of data and materials

The data obtained in this research is fully available.

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### Abbreviations

APA	American Psychological Association
BAI	Beck Anxiety Inventory
DSM	Diagnostic and Statistical Manual of Mental Disorders
FAMEN	Facultad de Medicina y Nutrición
FMBUAP	Facultad de Medicina de la Benemérita Universidad Autónoma de Puebla
HAS	Hamilton Anxiety Scale
ISMED	Instituto de Salud Mental del Estado de Durango
ITESM	Instituto Tecnológico y de Estudios Superiores de Monterrey
NIH	National Institutes of Health
OMS	World Health Organisation
OPS:	Pan American Health Organization
PHQ-9	Patient Health Questionnaire-9
PUCESA	Pontificia Universidad Católica del Ecuador, Sede Ambato
SARS-CoV-2	Severe Acute Respiratory Syndrome Coronavirus 2
SSA	Ministry of Health
STAI	State-Trait Anxiety Inventory
UJED	Universidad Juárez del Estado de Durango

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