# Comparative study on depression and associated factors in first year students and Interns in the Faculty of Medicine

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**Original article**

## SUMMARY

The prevalence of depression in Medical Students (MS) is higher than in the general population and changes over time. It is not known whether the prevalence of depression is greater and the associated factors different between students that initiate the first and last academic years of Medical School.

### Objective

To compare the prevalence of depression and the associated factors in MS that start their academic courses in the first and last academic years.

### Methods

This is a cross-sectional, observational and analytical study. A total of 1871 MS participated; 1240 were in the initiation of the first academic year, and 631 in the initiation of the last academic year. Participants answered a written survey made up of a questionnaire about risk factors for depression, and assessed for current depression with the Patient Health Questionnaire-9 (PHQ-9).

### Results

The prevalence of depression (PHQ-9≥10) was significantly higher in last year MS compared to first year MS (5.7 *vs.* 3.5%). The percentage of MS with a personal history of depression was higher in the year compared to first year MS (12.1% *vs.* 7.1%), as was the mean for previous depressive episodes (3.2 *vs.* 1.6). The age of onset for depressive episodes was higher in the last year group.

### Conclusions

The prevalence of depression in MS starting the academic year is higher in the last year than at the beginning of the first year of the career, and could be attributed, among other factors, to a cumulative phenomenon resulting from the allostatic load that this academic process currently generates. A personal history of depression and other situational factors are associated to the presence of depression differently according to the academic year, and should be considered in future studies.

**Key words:** Depression, internship, first year, medical students.

## RESUMEN

La prevalencia de depresión en estudiantes de la Facultad de Medicina (EM) es mayor que en la población general y cambia a lo largo del tiempo. No se conoce si la prevalencia de depresión es mayor y los factores asociados son diferentes en estudiantes que inician el último y el primer año académico de la carrera de Medicina.

### Objetivo

Comparar la prevalencia de Depresión y los factores asociados en EM que inician el año académico en primer año y aquellos que realizan el año de internado.

### Método

Este es un estudio observacional, transversal y analítico. Participaron un total de 1871 EM: 1240 que iniciaban el primer año de la carrera y 631 que iniciaban el año de internado. Los alumnos contestaron una encuesta en papel compuesta por el *Cuestionario sobre Factores de riesgo para Depresión* y el *Cuestionario sobre la Salud del Paciente* (*PHQ-9*, por sus siglas en inglés) para evaluar la presencia actual de depresión.

### Resultados

La prevalencia de Depresión (PHQ-9≥10) resultó significativamente mayor en los estudiantes de internado comparados con los de primer año (5.7 *vs.* 3.5%). El porcentaje de alumnos con antecedente personal de depresión fue mayor en los alumnos de internado con respecto a los de primer año (12.1% *vs.* 7.1%), como lo fue el promedio de episodios depresivos previos (3.2 *vs.* 1.6). La edad de inicio del primer episodio depresivo fue significativamente mayor para los del quinto año.

### Conclusiones

La prevalencia de Depresión en EM que inician el año académico es mayor en la etapa final de la carrera y puede ser atribuible, entre otros factores, a un fenómeno acumulativo de carga alostática que actualmente genera este proceso educativo. Los antecedentes personales para depresión y los factores situacionales se asocian a la presencia de depresión de una forma diferente de acuerdo al año académico y deben de ser considerados en futuros estudios.

**Palabras clave:** Depresión, internado, primer año, estudiantes de la carrera de Medicina.

# INTRODUCTION

The high physical, intellectual, and emotional demands of medical courses cause an increase in the risk of developing some types of psychiatric illness in the mental health of students,[1,2] in particular Major Depressive Disorder (MDD).[3] In Mexico, medical students undergo a lengthy process of preparation of between six and seven years' duration, of which the internship makes up the fifth year of the course, and involves greater demands and clinical responsibility in comparison with their previous years of training. Some students indicate that in terms of stress, the demands increase over the course of their training[1,4] and can even be higher than those of other university courses.[5]

It has been estimated that the prevalence of MDD among doctors in training from various populations varies within a range between 2% and 35%.[3,6,7] In spite of this breadth, there is evidence that students of medicine experience depression at higher rates than young adults of the general population and that these rates could increase towards the final years of their academic training.[1] One study in the EU indicates that the proportion of students with depression scores over the 80th percentile assessed with the CES-D (*Center for Epidemiological Studies Depression Scale*) increases and persists over time, with 18% at the start of the course, 39% in the second year, and 31% in the fourth.[3] Furthermore, a study of 7357 medical students in Korea revealed that the prevalence of depression increased during the first year and reached its maximum peak in the second, followed by a gradual decrease in the final years; this same study also indicated that the prevalence of depressive episodes is higher in students of medicine than in their peers in the general population.[8] Another multi-centric study also carried out in the EU indicates prevalence of depression (assessed with a score higher than 21 on the CES-D) of 15% for the first year, 15% for the second year, and 7% for those who proceeded to the equivalent of the fifth year.[7] In Mexico, a study that used Beck's Depression Inventory did not note differences in the proportions of depressive manifestations among medical students in the first and fourth years.[9]

The information regarding whether the MS have greater prevalence of depression from the start of the course in comparison with their counterparts in the general population seems to be consistent. However, the information that maintains that the students who are about to finish their academic training have a higher prevalence of depression with respect to the start of their course is still controversial.[10] The allostatic load is a commonly-used risk measurement based on the hypothesis that recurrent exposure to environmental demands, such as stress, generates a progressive alteration in the regulation of multiple physiological systems necessary in the process of a person's adaptation to their environment.[11]

Due to the many factors related to the intense demands involved in completing the activities corresponding to each

academic year, it is not known if the prevalence of depression in a state of "rest" (before the start of the academic activities) at the end of the course is greater than at the start as a possible indicator that depression is an accumulative phenomenon. The aim of this study is to compare the prevalence of probable cases with depression and associated factors in two populations of MS starting their courses: one in the first year and the other as interns. Our hypothesis is that the prevalence of depression will be greater at the start of the final year of the course than in the first year, and that the associated factors will behave in a different way according to academic year.

# MATERIAL AND METHODS

## Participants

An observational, transversal, and analytical study was carried out, in which a total of 1871 medical students participated: 1240 that were staring the first year of their course, and 631 that were starting their intern year. The age of the first group was 18.2 years (SD±1.9) and that of the intern group was 22.9 years (SD±1.5), 37.9% were male and 62.1% were female.

## Procedure

The study was approved by the Research and Ethics Committee [in Spanish: *Comisión de Investigación y Ética*] of the UNAM Faculty of Medicine. The students were assessed as a group in a Faculty auditorium one week before the start of the courses; the interns after an information meeting in December 2010, and the first years during the course of their general medical examination in August 2011. All participants signed a consent form which preserved anonymity unless they wished to be contacted; those who wished to identify themselves provided their e-mail address or telephone number and these were used to give feedback on their results, guaranteeing confidential use of their information. Furthermore, the whole population was offered care from the Program of the Mental Health Clinic in the Psychiatry and Mental Health Department of the UNAM. The students answered a paper survey made up from the *Inventory of Risk Factors for Depression* and the *Patient Health Questionnaire-9* (*PHQ-9*). A cut-off score of equal to or greater than 10 in the PHQ-9 was established to be considered as a case of probable depression. The maximum duration of assessment was 30 minutes.

## Instruments

*Inventory of Risk Factors for Depression*. The inventory was designed for this research and was made up of 14 questions that

inquire into various socio-demographic matters; personal history of abuse, depression, and suicidal intent; hereditary or familial history of mental illness; current presence of grief; and presence of abuse within and/or outside of school.

*Patient Health Questionaire-9*, (*PHQ-9*). An instrument derived from the Primary Care Evaluation of Mental Disorders (PRIME-MD). This is an interview, the nine reactives of which on the Likert scale are designed to establish the diagnosis of depression in accordance with the criteria of the DSM-IV. This instrument is short and self-completed, and upon assessing its clinometric properties, a sensitivity of 92% and specificity of 88% was observed for the diagnosis of Major Depressive Disorder.[12] Furthermore, this instrument has demonstrated similar characteristics in Spanish-speaking populations and its performance is adequate in different cultures.[13] The cut-off point to identify a positive case for a major depressive episode was established at a score of equal to or greater than ten.

## Data analysis

The statistical program PASW-18 was used (SPSS Inc. Chicago, IL). The capture of information was validated through descriptive analysis. The categorical variables of the socio-demographic and clinical characteristics were compared between the first and intern groups through chi2. The comparison of the PHQ-9 depression scores by marital status was performed using the Student's *t* test, while the correlation between age and depression score was made through the Pearson test. The correlation of perceived economic resources with depression scores was performed with the Spearman test.

## RESULTS

A sample of 1240 students starting the first year and 631 starting the intern year participated; figures that made up nearly all of the student population for each academic year. The average age was different between the groups: that of the first years was 18.2 years (SD±1.9) and that of the intern group was 22.9 years (SD±1.5). Age did not correlate with scores on the depression scale. No differences were observed in the proportion of males and females between the groups in either of the years studied (Table 1).

In terms of marital status among intern students, a greater proportion was observed of students who already lived with a partner (either married or cohabiting); furthermore, the internship year reported a lower percentage of students with restricted and/or scarce resources (Table 1).

The prevalence of cases with probable depression in accordance with the PQH-9 was significantly greater in intern students compared to first years (5.7 *vs.* 3.5%). Additionally, the percentage of students with a personal history of depression was greater among intern students than

those in the first year (12.1% *vs.* 7.1%); the average number of depressive episodes (1.6 for first years and 3.2 for fifth years), as well as the initial age for the first episode, was significantly greater among fifth years. First year students reported a significantly higher percentage of personal history of violence in childhood and adolescence compared with interns (9.9% *vs.* 5.4%), as well as higher percentages of family history of anxiety disorders (6.8% *vs.* 3.5%) (Table 2).

**Table 1.** Comparison of the socio-demographic characteristics of the first year and intern medical student groups

|  | First year | | Internship | |
|---|---|---|---|---|
|  | n | % | n | % |
| **Sex** | | | | |
| Male | 469 | (37.9) | 238 | (38.1) |
| Female | 769 | (62.1) | 386 | (61.9) |
| **Marital status** | | | | |
| Single | 1148 | (99.1) | 590 | (93.7) |
| Married/cohabiting | 11 | (0.9) | 40 | (6.3)* |
| **Perceived financial resources** | | | | |
| More than enough | 107 | (8.7) | 57 | (9.1) |
| Enough | 631 | (51.2) | 447 | (71.3) |
| Limited | 426 | (34.6) | 106 | (16.9) |
| Scarce | 68 | (5.5) | 17 | (2.7)* |
| **Cohabiting arrangement** | | | | |
| Familiar | 1123 | (91.6) | 570 | (90.8) |
| Tutor | 57 | (4.6) | 21 | (3.3) |
| Partner | 8 | (0.7) | 19 | (3.0) |
| Friends | 22 | (1.8) | 3 | (0.5) |
| Alone | 16 | (1.3) | 15 | (2.4)* |

\* p≤0.001

**Table 2.** Clinical characteristics of the study population

|  | First year | | Internship | |
|---|---|---|---|---|
|  | n | % | n | % |
| *Current depression* | 43.0 | (3.5) | 36.0 | (5.7)* |
| *Personal history* | | | | |
| Childhood abuse | 123.0 | (9.9)*** | 34.0 | (5.4) |
| Adolescent abuse | 98.0 | (8.0)** | 26.0 | (4.1) |
| Violence outside school | 37.0 | (3.0) | 13.0 | (2.1) |
| Violence within school | 11.0 | (0.9) | 5.0 | (0.8) |
| Depression | 107.0 | (8.6) | 74.0 | (11.8)* |
| Suicidal intent | 35.0 | (2.8) | 22.0 | (3.5) |
| Number of previous depressive episodes‡ | 1.6 | (7.7) | 3.2 | (3.8)** |
| Age of first depressive episode‡ | 14.3 | (3.2) | 18.0 | (4.1)*** |
| *Family history in first years* | | | | |
| Mental illness | 257.0 | (20.7) | 120.0 | (19.0) |
| Depression | 196.0 | (15.8) | 83.0 | (13.2) |
| Bipolar disorder | 28.0 | (2.3) | 9.0 | (1.4) |
| Schizophrenia | 32.0 | (2.6) | 15.0 | (2.4) |
| Anxiety | 84.0 | (6.8)** | 22.0 | (3.5) |
| Other | 21.0 | (1.7) | 10.0 | (1.6) |
| Suicide | 85.0 | (6.9) | 47.0 | (7.4) |

\* p≤0.05, \*\* p≤0.01, \*\*\* p≤0.001
‡ This data is presented on average and in standard deviation.

On comparison of the PHQ-9 scores among single and married/cohabiting students, it was found that the latter scored higher (t=-2.23, p=0.03), whereas if perceived economic resources scored as low, the depression score rose (rho= -0.10, p≤0.001).

Moreover, being female was only associated with the probable presence of actual depression in the first years (Table 3).

## DISCUSSION

The primary findings of this study are as follows: 1. The prevalence of probable depression is greater at the start of the final academic year than at the start of the first year, despite the first year group presenting more known risk factors for depression. 2. The intern students reported a greater number of previous depressive episodes, and 3. The prevalence of depression only differed by gender in the first year group.

In this study, the prevalence of cases compatible with Major Depressive Disorder at the start of the school year was greater among interns than first year students. In this respect, the studies have reported mixed results, given that while some indicate that the prevalence of depressive episodes reduces over the course of their studies,[7,8] others observe that it is greater in later years.[1] In student populations on medical courses such as those studied here, the highest rate of dropout occurs during the first two years,[14,15] and it could be that some students with depression abandon their studies, meaning that the fifth year students are the only ones who survived the previous years of preparation.

Among the intern students, a higher proportion of students was observed with a personal history of depression (double that of the first year), which is to say that there are already more students in the fifth year who have been depressed; however, these present a later start (18 years) compared to first years (14 years). Even if the depression that started before 18 years of age is less frequent than that which started in adult life (2% *vs.* 5%)[16] and a higher age increases the risk of depression, it is also certain that a higher level of education reduces the risk.[17] Furthermore, the fact that the

depressive episodes coincide with the start of the medical course raises speculation around whether that can be involved in its onset.

The findings suggest that for the fifth year, including in a state of "rest" – a week before the start of the academic year and before being newly subjected to the intense rhythms of work and responsibility involved in an intern year – a greater number of students present with a probable depressive episode and report having presented more episodes during the course of their medical studies. This is congruent with the findings reported in a study by Rosal in 1997,[3] who indicated that the first depressive episodes appear during the course of studies, and that those who had already suffered from them are susceptible to experiencing new episodes. Rosal also agrees with the concept of allostatic load as an accumulative phenomenon due to the "wear and tear" on the allostatic system throughout one's life, and which causes patterns of physiological response associated with "life challenges" (in this case, the medical course), which causes some students to cross a threshold where the load during the first years (eg, intellectual demand, personal sacrifice, responsibility, etc) contributes to an allostatic overload expressed in the form of depressive symptoms.[11,18]

Other factors associated with the presence of depression in this study include some which have previously been observed, such as being female, a difficult early family environment, and a previous history of depression.[3] In agreement with previous studies, there exists a greater predisposition among women to suffer from a depressive disorder;[3,19] however, in the present study, being female was only associated with depression in first year students, while in intern students – assessed during a state of "rest" – the prevalence of depression at the start of the year did not present differences between the genders. Among the possible explanations, it could be deduced that the state of "rest" during which the assessment was carried out could have impeded observation of the effect had by stress in favoring the greater appearance of depressive symptoms in women. In this sense, there is data such as the study carried out by Shah et al.,[2] in which the female medical students presented greater perceived stress in the first years of the course than their male counter-

**Table 3.** Association of sex and probable case of depression in first year and intern students

| Academic year | Sex | Case of probable current depression | | ORP | Confidence interval 95% | p |
|---|---|---|---|---|---|---|
| | | Negative | Positive | | | |
| First | Male | 461 (98.3) | 8 (1.7) | 1.0 | | |
| | Female | 734 (95.4) | 35 (4.6) | 2.7 | 1.3 - 6.0 | 0.008 |
| Intern | Male | 221 (92.9) | 17 (7.1) | 1.0 | | |
| | Female | 368 (95.3) | 18 (4.7) | 0.6 | 0.3 - 1.3 | 0.191 |
| Total population | Male | 682 (96.5) | 25 (3.5) | 1.0 | | |
| | Female | 1102 (95.4) | 53 (4.6) | 1.3 | 0.8 - 2.1 | 0.271 |

ORP= Odds Ratio for Prevalence.

parts. In a longitudinal study carried out on students of this course with measurements of depressive symptoms taken one or two months before starting and with three subsequent measurements at three, six, and 12 months during the internship, it was observed that the percentage of students depressed in accordance with the PHQ-9 scale during the base measurement dramatically increased during the internship from 3.9% to 26.6% in the 12 month measurement. One of the factors that was significantly associated with the possibility of increase in depressive symptoms was being female.

On the other hand, in accordance with some studies, the prevalence of depression increases with age in both sexes.[19] It has also been indicated that as the level of education increases, the prevalence of depression decreases;[19] this was not corroborated in the students studied here, in whose case the prevalence of depression was greater in the final academic year. Factors such as marital status and financial resources were related to the presence of depressive symptomatology, such that married or cohabiting students had higher scores in the depression scale and while financial resources were perceived as low, depression scores rose. The strengths of this study lie in its suitable sample size, given that access was available to the entire population of both years of medical students. Its design allowed for associations to be established between depression and other associated factors such as gender, marital status, and year of study, but due to its transversal nature, it did not allow for knowledge of the characteristics of students who had already dropped out.

The results led to a conclusion that the prevalence of cases of probable depression in MS that start the academic year is greater in the final stage of the course and can be attributable, among other factors, to an accumulative phenomenon of allostatic load currently generated by this academic process. The majority of the studies on the depressive phenomenon during a medical course have paid little attention to detailing the context in which the students find themselves at the time of assessment. The great heterogeneity of results suggests that the situational factors and stress levels that change with the dynamic of the course can influence the appearance of depressive symptoms and should be taken into account. In order to explain this phenomenon, it will be necessary to conduct some longitudinal research on the weight and interaction of risk factors for depression in students throughout the duration of their medical course.

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