Academic and sociodemographic predictors of anxiety and psychological well-being in Mexican medical students. A cross-sectional study

David Luna,^{1*} Diana Ivette Urquiza-Flores,² Rosa Paola Figuerola-Escoto,³ Carolina Carreño-Morales¹ and Fernando Meneses-González¹

¹Comisión Nacional de Arbitraje Médico, Office of Research Administration; ²Instituto Tecnológico y de Estudios Superiores de Monterrey, Campus Mexico City; ³Instituto Politécnico Nacional, Health Sciences Interdisciplinary Center, Santo Tomás Unit. Mexico City, Mexico

Abstract

Introduction: Medical students report higher levels of anxiety than students from other majors. Knowledge about their psychological well-being is scarce. **Objective:** To identify sociodemographic and academic factors that predict the level of anxiety and psychological well-being in Mexican medical students. **Method:** Cross-sectional study of Mexican medical students of first ($n = 59$), third ($n = 43$) and fifth semester ($n = 59$), who answered a sociodemographic questionnaire, Beck Anxiety Inventory, the Psychological Well-being Scale for adults and the Family Adaptability and Cohesion Evaluation Scale. **Results:** Females showed higher levels of anxiety ($p < 0.01$). Anxiety in males was similar in the different semesters ($p > 0.05$); women of third and fifth semesters were more anxious than those at first semester ($p < 0.01$). Anxiety and psychological well-being were negatively correlated ($p < 0.001$). The “Less anxiety, higher level of well-being” and “More anxiety, lower well-being” subgroups were characterized, and a logistic regression identified that being a woman ($OR = 4.70$) and not practicing any religion ($OR = 2.49$) are predictive factors of higher levels of anxiety. **Conclusions:** Female medical students constitute a population at risk for higher levels of anxiety and less psychological well-being, which compromises their learning, quality of life and future professional practice.

KEY WORDS: Mental health. Gender differences. Predictive factors. Medical students.

Predictores académicos y sociodemográficos de ansiedad y bienestar psicológico en estudiantes mexicanos de medicina. Estudio transversal

Resumen

Introducción: Estudiantes de medicina reportan mayor ansiedad que estudiantes de otras carreras. El conocimiento sobre su bienestar psicológico es escaso. **Objetivo:** Identificar factores sociodemográficos y académicos predictores del nivel de ansiedad y bienestar psicológico en estudiantes mexicanos de medicina. **Método:** Estudio transversal de estudiantes mexicanos de medicina de primer ($n = 59$), tercer ($n = 43$) y quinto semestre ($n = 59$), que contestaron un cuestionario sociodemográfico, la Escala de Ansiedad de Beck, la Escala de Bienestar Psicológico para Adultos y la Escala de Evaluación de la Cohesión y la Adaptabilidad Familiar. **Resultados:** Las mujeres presentaron mayor ansiedad ($p < 0.01$). La ansiedad en hombres fue similar en los distintos semestres ($p > 0.05$); las mujeres de tercer y quinto semestre fueron más ansiosas que las del primero ($p < 0.01$). Ansiedad y bienestar psicológico correlacionaron negativamente ($p < 0.001$). Se identificaron los

Correspondence:

*David Luna

E-mail: dluna@conamed.gob.mx

0016-3813/© 2019 Academia Nacional de Medicina de México, A.C.. Published by Permanyer. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Date of reception: 07-03-2019

Date of acceptance: 30-05-2019

DOI: 10.24875/GMM.M19000319

Gac Med Mex. 2020;156:38-44

Contents available at PubMed

www.gacetamedicademexico.com

subgrupos “Menor ansiedad, mayor bienestar” y “Mayor ansiedad, menor bienestar”, y una regresión logística identificó que ser mujer ($OR = 4.70$) y no profesar alguna religión ($OR = 2.49$) son factores predictores de mayor ansiedad. **Conclusiones:** Las estudiantes de medicina constituyen una población de riesgo para mayor ansiedad y menor bienestar psicológico, lo que compromete su aprendizaje, calidad de vida y futuro ejercicio profesional.

PALABRAS CLAVE: Salud mental. Diferencias entre sexos. Factores predictores. Estudiantes de medicina.

Introduction

Medical students show higher levels of stress and a prevalence of more severe psychopathologies in comparison with students of other majors and the general population.¹⁻³ Stress can cause anxiety disorders⁴ and comorbidity with different psychopathologies, including other anxiety disorders.⁵ Anxiety is a warning system that alerts the body about real or supposed threats.⁶ Its prevalence in medical students varies between countries,^{1,7-11} although some conditions are constant: the level of anxiety increases depending on the curricular development,² it is higher in females,¹¹ and its main sources include academic, psychosocial and economic issues.¹²

Stress in medical students negatively impacts their psychological well-being and potentiates the risk of psychopathologies.¹³ Psychological well-being is a positive affective state that favors optimal functioning in personal and social life, and allows individuals to perceive control of their life and surroundings.¹⁴⁻¹⁶ It is considered a critical aspect of medical training,¹¹ although its decrease has been reported over the course of studies in the medical area.¹⁷

More research has focused on the study of anxiety in medical students than on psychological well-being.¹⁸ This study identified sociodemographic and academic factors that predict the level of anxiety and psychological well-being in Mexican medical students.

Method

Cross-sectional study. Through convenience non-probabilistic sampling, medical students enrolled in first, third and fifth semester were recruited. The inclusion criteria were: attending an academic evaluation in November 2018, voluntarily participating in the study and completing four questionnaires. Out of 186 invited students, 10 refused to participate.

The sociodemographic and academic variables questionnaire, Beck Anxiety Inventory (BAI),¹⁹ the Psychological Well-being Scale for Adults (PWBS-A)¹⁶

and the Family Adaptability and Cohesion Evaluation Scale (FACES-III),²⁰ all validated in the Mexican population, were applied.²¹⁻²³

The BAI comprises 21 items organized in four factors: subjective anxiety, neurophysiological anxiety, autonomic anxiety and panic, which explain 56 % of the variance ($\alpha = 0.93$). The level of anxiety was considered according to the score: minimum, 0 to 5 points; mild, 6 to 15; moderate, 16 to 30; and severe, 31 to 63.²¹ The presence of anxiety was established with a score ≥ 6.7 .

The PWBS-A scale comprises 12 items organized in four factors: autonomy, projects, links and acceptance/control, which explain 60 % of the variance ($\alpha = 0.79$). The level of psychological well-being was considered average when total score was less than or equal to the 50th percentile, low if it was inferior to this value or high if it was higher than or equal to the 95th percentile.²⁴

The FACES-III scale comprises 20 items organized in two factors: cohesion and adaptability ($\alpha = 0.70$). Its interpretation according to the cohesion score indicated a disengaged (10 to 34 points), separated (34 to 40), connected (41 to 45) or enmeshed family (46 to 50). For adaptability, it indicated a rigid (10 to 19 points), structured (20 to 24), flexible (25 to 28) or chaotic family (29 to 50).

One researcher asked the students for their voluntary collaboration in the study, explained its objectives and clarified all doubts. Those who agreed to participate were given an informed consent form and the printed questionnaires.

Gender and semester differences regarding anxiety and psychological well-being were analyzed using one-factor, two-factor ANOVA and Tukey's post hoc test. To assess the association between variables, Pearson's product-moment correlation coefficient and chi-square test of independence were calculated. For the latter, with a significant result, Pearson's standardized residues were calculated as a post hoc test and Cramer's V as an indicator of the effect size. The strength of association between variables was interpreted as trivial with absolute values < 0.10 , as low

Table 1. Total prevalence, by gender, semester and level, of anxiety and psychological well-being in medical students

	n	%	n	%	n	%	χ^2	p	V
Anxiety									
	Total sample		Females		Males				
Minimal	47	29.2	21	18	26	59.1	28.81	0.001*	0.43
Mild	52	32.3	41	35	11	25			
Moderate	40	24.8	38	32.5	2	4.5			
Severe	22	13.7	17	14.5	5	11.4			
	Semester 1		Semester 3		Semester 5				
Minimal	25	42.4	11	25.6	11	18.6	11.26	0.04**	0.18
Mild	16	27.1	14	32.6	22	37.3			
Moderate	12	20.3	9	20.9	19	32.2			
Severe	6	10.2	9	20.9	7	11.9			
Well-being									
	Total sample		Females		Males				
Low	68	42.2	49	41.9	19	43.2	0.98	0.61*	0.07
Medium	70	43.5	53	45.3	17	38.6			
High	23	14.3	15	12.8	8	18.2			
	Semester 1		Semester 3		Semester 5				
Low	26	44.1	17	39.5	25	42.4	0.30	0.98**	0.04
Medium	25	42.4	20	46.5	25	42.4			
High	8	13.5	6	14	9	15.2			

*Comparison between genders. **Comparison between semesters.

Table 2. Anxiety and psychological well-being scores obtained by gender and by semester in the total sample, in males and in females

	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD		F	p
	Total sample	Females	Males			
Anxiety	15.10 $\pm$ 13.49	17.25 $\pm$ 13.07	9.36 $\pm$ 13.04		15.08*	0.001
Well-being	32.69 $\pm$ 2.65	32.66 $\pm$ 2.65	32.77 $\pm$ 2.70		0.28*	0.86
		Semester 1	Semester 3	Semester 5		
Anxiety	Total sample	11.71 $\pm$ 11.54	17.51 $\pm$ 16.18	16.74 $\pm$ 12.68	1.52**	0.22
	Females	12.26 $\pm$ 10.68	23.81 $\pm$ 16.14	18.47 $\pm$ 11.35	7.75**	0.001
	Males	9.76 $\pm$ 14.51	6.87 $\pm$ 9.47	11.66 $\pm$ 15.27	0.51**	0.59
Well-being	Total sample	32.74 $\pm$ 2.66	32.90 $\pm$ 2.30	32.49 $\pm$ 2.90	0.40**	0.66
	Females	32.86 $\pm$ 2.49	32.62 $\pm$ 2.40	32.47 $\pm$ 2.97	0.24**	0.78
	Males	32.30 $\pm$ 3.25	33.37 $\pm$ 2.12	32.53 $\pm$ 2.79	0.63**	0.53

SD = standard deviation. *Comparisons between genders. **Comparisons between semesters.

with 0.11 to 0.29, as medium with 0.30 to 0.49 and as high with ≥ 0.50 .²⁵

After the elimination of atypical multivariate values, a cluster analysis was carried out to create mutually exclusive subgroups with the anxiety and

psychological well-being data. A hierarchical technique with Euclidean squared distance and Ward's grouping method were used. The solution was validated by confirmatory cluster analysis²⁶ and the gamma, tau-b, tau-c, and Somers' d coefficients.²⁷ The

resulting subgroups were validated using a single-tailed t-test for independent groups, with Cohen's d as the effect size index (small, medium and large effect: $d \geq 0.20$, 0.50 , and 0.80 , respectively).²⁸

A logistic regression model considered belonging to the "More anxiety, lower level of well-being" subgroup as a response variable and sociodemographic and academic data as predictive variables. The model was

validated by assessing the null hypothesis (omnibus test) and its goodness of fit (Hosmer-Lemeshow). The correct percentage of case classification was calculated, as well as Nagelkerke's R^2 . Version 20 of the SPSS program was used.

This study was submitted to the Research Committee of the National Medical Arbitration Commission for approval.

Table 3. Student characteristics and sociodemographic, academic and familiar predictors according to their levels of anxiety and psychological well-being

	< A > B		> A < B		p*	d	OR	CI	p**
	Mean ± SD		Mean ± SD						
Total BAI	7.94 ± 5.55		33.15 ± 9.68		0.001	3.26			
Subjective anxiety	4.22 ± 3.31		14.20 ± 4.74		0.001	2.38			
Neurophysiological anxiety	2.16 ± 2.47		10.90 ± 4.86		0.001	2.38			
Autonomic anxiety	0.66 ± 1.02		4.29 ± 2.38		0.001	2.14			
Panic	0.89 ± 1.16		3.75 ± 2.07		0.001	1.75			
Total PWBS-A	33.09 ± 2.31		31.88 ± 2.85		0.007	0.43			
Autonomy	10.24 ± 1.59		9.68 ± 1.73		0.05	0.30			
Projects	11.54 ± 0.86		11.40 ± 0.89		0.38	0.13			
Links	5.69 ± 0.56		5.31 ± 0.95		0.002	0.49			
Acceptance/control	5.61 ± 0.75		5.47 ± 0.84		0.33	0.15			
Age	19.48 ± 1.12		19.79 ± 1.15		0.12	0.24	1.16	0.66-2.04	0.59
Grade-point average	89.93 ± 3.86		87.68 ± 3.61		0.001	0.53	0.86	0.76-0.97	0.01
Failed courses	0.05 ± 0.25		0.22 ± 0.60		0.01	0.40	1.36	0.40-4.53	0.61
	n	%	n	%	p**	V	OR	CI	p**
Gender									
Female	78	67.2	38	86.4	0.01	0.19	4.70	1.55-14.19	0.006
Male (R)	38	32.8	6	13.6					
Marital status									
Single	116	100	44	100	NA	NA			
Practices religion									
Yes (R)	76	65.5	21	47.7	0.04	0.16	2.49	1.05-5.88	0.03
No	40	34.5	23	52.3					
Works									
Yes (R)	5	4.3	3	6.8	0.51	0.05			
No	111	95.7	41	93.2			1.20	0.19-7.56	0.84
Maternal level of education									
Basic education or no data (R)	5	4.3	1	2.3	0.64	0.07			
High school education	25	21.6	12	27.3			1.72	0.11-25.22	0.69
Higher education	86	74.1	31	70.5			1.50	0.11-19.44	0.75

(Continued)

Table 3. Student characteristics and sociodemographic, academic and familiar predictors according to their levels of anxiety and psychological well-being (*Continued*)

	n	%	n	%	p**	V	OR	CI	p**
Paternal level of education									
Basic education or no data (R)	11	9.5	1	2.3	0.22	0.13			
High school education	10	8.6	6	13.6			11.32	0.71-178.35	0.08
Higher education	95	81.9	37	84.1			6.62	0.57-75.99	0.12
Medicine as option 1									
Yes (R)	107	92.2	41	93.2	0.84	0.01			
No	9	7.8	3	6.8			0.42	0.08-2.22	0.30
Semester									
First (R)	47	40.5	12	27.3	0.29	0.12			
Third	29	25	14	31.8			1.17	0.33-4.18	0.80
Fifth	40	34.5	18	40.9			0.65	0.10-4.11	0.65
Shift									
Morning	71	61.2	20	45.5	0.17	0.14	0.45	0.13-1.53	0.20
Evening	25	21.6	12	27.3			0.80	0.18-3.54	0.77
Mixed (R)	20	17.2	12	27.3					
Cohesion									
Disengaged (R)	18	15.5	7	15.9	0.28	0.15			
Separated	21	18.1	14	31.8			2.15	0.53-8.60	0.27
Connected	39	33.6	12	27.3			1.13	0.28-4.44	0.85
Enmeshed	38	32.8	11	25			0.91	0.22-3.75	0.90
Adaptability									
Rigid (R)	6	5.2	2	4.5	0.97	0.03			
Structured	16	13.8	7	15.9			0.72	0.06-8.75	0.79
Flexible	24	20.7	8	18.2			0.34	0.02-4.38	0.40
Chaotic	70	60.3	27	61.4			0.54	0.04-6.17	0.62

< A > B = less anxiety, higher level of psychological well-being; > A < B = more anxiety, lower level of psychological well-being; SD = standard deviation, NA = does not apply, R = reference variable. *t-test. ** χ^2 . ***Logistic regression.

Results

One-hundred and seventy-six medical students participated, but the data of 15 were eliminated for having answered the instruments only partially. The 161 retained students had an average age $\pm$ standard deviation of 19.57 ± 1.13 years, 117 (72.7 %) were females and 44 (27.3 %) were males; 59 were at first semester (36.6 %), 43 at third (26.7 %) and 59 at fifth semester (36.6 %); 91 were in the morning shift (56.5 %), 38 in the evening shift (23.6 %) and 32 had mixed hours (19.6 %). Grade-point average at current semester ranged from 78 to 98/100 (89.29 ± 3.91) and 12 participants (7.4 %) had between one and three failed

courses (0.09 ± 0.39). Medicine major was the first option for 148 students (91.9 %); all were single, 97 (60.2 %) practiced any religion and eight (5 %) reported having a job.

Anxiety of some level, from mild to severe, was experienced by 70.8 % of students, 82 % of females and 40.9 % of males. A high proportion of males did not exhibit anxiety (lowest level), while a considerably high proportion of females experienced it at a moderate level (Table 1). Regardless of gender, most first semester students did not show anxiety (lowest level) (Table 1). Average BAI score in males was lower than in females (Table 2), who also had higher scores at third and fifth semesters with regard to the first (Table 2). Low or

average level of psychological well-being was independent of gender or current semester (Table 1). There were no differences between genders or semesters in PWBS-A average score (Table 2). BAI and PWBS-A total scores showed a medium-intensity negative correlation ($r = -0.32$, $p < 0.001$).

Prior to the cluster analysis, one participant's data were eliminated because they were shown to be multivariate outliers. The hierarchical cluster analysis suggested a two-subgroup solution, which was validated by confirmatory analysis, by coefficients gamma = 1, tau-b = 0.95, tau-c = 0.74 and Somers' d coefficient = 0.95, and by t-tests. Table 3 shows the characteristics of the "less anxiety, higher level of well-being" ($n = 116$) and "more anxiety, lower level of well-being" subgroups ($n = 44$).

The logistic regression model identified belonging to the "more anxiety, lower level of well-being" subgroup, being a woman and not practicing any religion as risk factors. Grade-point average was a protective factor (Table 3). The model was significant ($\chi^2 = 34.95$, $p = 0.02$), had an adequate fit ($\chi^2 = 9.35$, $p = 0.31$), explained 28.4 % of the variance and correctly classified 74.4 % of cases.

Discussion

The main result of this study was that being a woman and not practicing a religion are predictors of higher levels of anxiety and lower levels of psychological well-being, with grade-point average being a protective factor.

The prevalence of anxiety is similar to that of other studies: 57, 73 and 79.7 %, ^{13,29,30} and it contrasts with national data that were obtained using the same instrument (BAI), but reported only 24.8 % of medical students with anxiety.⁹ This might be due to differences in the diagnostic criteria that were used. Consistently with other studies, females had a higher level of anxiety with regard to males.^{1,2,10,31-33} This asymmetry may be due to cultural, neurophysiological and evolutionary factors that make women more susceptible to anxiety.³⁴ A novel finding is that anxiety in males did not differ between semesters, while females in advanced semesters were more anxious. The slower recovery of hormonal response to stress in women³⁵ and the larger amount of academic stressors at advanced semesters may explain this result.

Gender equivalence in psychological well-being is consistent with data referred to in the literature.¹⁵ In males, maintaining the same level of psychological

well-being and anxiety between semesters indicates some independence between these variables.³⁶ In females, the anxiety increase did not decrease their psychological well-being. These data may suggest a protective role of anxiety that prevents psychological well-being decrease. In this regard, there are data indicating that anxiety promotes risk-aversion behavior,³⁷ which in the context of medical education might prevent impulsive decisions in health care that might compromise psychological well-being in female physicians. It is possible that, with higher levels of anxiety, female medical students better plan the behaviors and decisions to be adopted regarding the care of their patients' health, which would help to maintain their psychological well-being stable.

Consistent with the above, the reported strength of association between anxiety and psychological well-being indicates a certain degree of independence between these variables. This suggests that intervening in one of them will not necessarily intensely affect the other.

An important contribution of the study was the description of the profile of medical students with "less anxiety, higher levels of well-being" and "more anxiety, lower levels of well-being". The former included mostly males who practice a religion, with a higher grade-point average and fewer failed courses; the latter included mostly females who do not practice a religion, with lower grade point average and a larger number of failed courses. However, the logistic regression did not retain the number of failed courses as a predictor for belonging to the second profile. Practicing a religion can have a protective function against anxiety, which raises quality of life and academic performance and, consequently, the grade-point average. A similar association was previously suggested.³⁸

The difference between profiles lies mainly in the level of anxiety, the discrepancy of which in total and per BAI factor score showed a large effect size. Regarding the PWBS-A scale score, the equivalence in the "projects and acceptance/control" factors indicates that, in general, the assessed students have defined their goals and give meaning to their lives, while accepting themselves for who they are and perceiving control over their circumstances.¹⁶ However, the second profile showed less general well-being, less ability to independently make decisions (autonomy), and to establish empathic social relationships (links). The latter is important because, in the future, these students will have to establish empathic relationships with their patients, which has

been shown to favor the quality of health care.³⁹ In addition, there are data that demonstrate the protective effect of social support on the risk for developing anxiety disorders in females.⁴⁰

One limitation of this study was that the data were collected during a semi-annual evaluation. This may have introduced some bias in the levels of anxiety. However, the data obtained are consistent with the literature, which implies minimal influence of this event. Conducting cross-sectional and longitudinal studies to assess anxiety and psychological well-being at different times of the semester in order to verify their stability or trend is recommended.

Conclusions

Female medical students show more anxiety and lower levels of psychological well-being, which compromises their quality of life, their learning process and their future professional practice. Strategies for support and resilience are required for medical students in general and for female medical students in particular.⁴¹

Funding

Funded by the National Medical Arbitration Commission. This study is also part of the National Polytechnic Institute research project with registration number 20195546.

References

- Darby LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med*. 2006;81:354-373.
- Segura ANA, Eraña RIE, Luna-de-la-Garza MV, Castorena-Ibarr J, López CMV. Análisis de la ansiedad en los primeros encuentros clínicos: experiencias utilizando la simulación clínica en estudiantes de pregrado. *Educ Med*. 2019.
- Perales A, Sogi C, Morales R. Estudio comparativo de salud mental en estudiantes de medicina de dos universidades estatales peruanas. *An Fac Med*. 2003;64:239-246.
- Ko SM, Kua EH, Fones CS. Stress and the undergraduates. *Singapore Med J*. 1999;40:627-630.
- Wehrenberg M, Prinz SM. The anxious brain. EEUU: Norton; 2007.
- DSM-5. Manual diagnóstico y estadístico de los trastornos mentales. EEUU: American Psychiatric Publishing; 2013.
- De Oliveira TF, Fuganti-De Souza M, Pfützenreuterl G, Carriero LV, Traebertl E, Traebertl J. Prevalence of anxiety and depression among medical students of private university. *Rev Bras Educ Med*. 2015; 39:388-394.
- Santillán TTC, Hernández PMR, Bravo Y, Castro HA, Romero M. Prevalencia de síntomas de ansiedad en una muestra de estudiantes universitarios en una facultad de ciencias de la salud en México. *Tesis Psicol*. 2016;11:12-22.
- Sarkar S, Gupta R, Menon V. A systematic review of depression, anxiety, and stress among medical students in India. *J Mental Health Hum Behav*. 2017;22:88-96.
- Ogunsemi OO, Afe T, Odusan O, Oguntona SA, Adefuye BO, Oyelekan AAA. Psychological well-being of medical students in a state university, Nigeria. *Res J Health Sci*. 2013;1:90-98.
- Dunn LB, Iglewicz A, Moutier C. A conceptual model of medical student well-being: promoting resilience and preventing burnout. *Acad Psychiatry*. 2008;32:44-53.
- Castillo-Pimentá C, Chacón-De la Cruz T, Díaz-Véliz G. Ansiedad y fuentes de estrés académico en estudiantes de carreras de la salud. *Inv Ed Med*. 2016;5:230-237.
- Mosley TH, Perrin SG, Neral SM, Dubbert PM, Grothues CA, Pinto BM. Stress, coping and well-being among third-year medical students. *Acad Med*. 1994;69:765-767.
- Deci EL, Ryan RM. Hedonia, eudaimonia, and well-being: an introduction. *J Happiness Stud*. 2008;9:1-11.
- Udhayakumar P, Illango P. Psychological Wellbeing among college students. *J Soc Work Educ*. 2018;3:79-89.
- Casullo M. Evaluación del bienestar psicológico en Iberoamérica. Argentina: Paidós; 2002.
- Park CL, Adler NE. Coping style as a predictor of health and well-being across the first year of medical school. *Health Psychol*. 2003;22:627-631.
- Aboalshamat K, Hou XY, Strodl E. Psychological well-being status among medical and dental students in Makkah, Saudi Arabia: a cross-sectional study. *Med Teach*. 2015;37:S75-S81.
- Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. *J Consult Clin Psychol*. 1988;56:893-897.
- Olson DH. Circumplex model of marital and family systems: Assessing family functioning. En: Walsh F (editor). *Normal family processes*. EEUU: Guilford Press; 1993.
- Robles R, Varela R, Jurado S, Páez F. Versión mexicana del inventario de ansiedad de Beck: propiedades psicométricas. *Rev Mex Psicol*. 2011; 8:211-217.
- Luna D, Figuerola-Escoto RP, López-Cruz H. Propiedades psicométricas de la Escala de Bienestar Psicológico para Adultos (BIEPS-A) en universitarios mexicanos. Trabajo de investigación presentado en: 3er Congreso Internacional de Psicología. La psicología ante los desafíos de construir vertientes para el mejoramiento de la sociedad; 2019, Ciudad de México, México.
- Ponce-Rosas ER, Gómez-Clavelina FJ, Terán-Trillo M, Irigoyen-Coria AE, Landgrave-Ibáñez S. Validez de constructo del cuestionario FACES III en español (México). *Aten Primaria*. 2002;30:624-630.
- Páramo MA, Straniero CM, García CS, Torrecilla NM, Gómez EE. Bienestar psicológico, estilos de personalidad y objetivos de vida en estudiantes universitarios. *Pen Psicol*. 2012;10:7-21.
- Ellis PD. The essential guide to effect sizes: An introduction to statistical power, meta-analysis and the interpretation of research results. Reino Unido: Cambridge University Press; 2010.
- Fisher L, Ransom DC. An empirically derived typology of families: I. Relationships with adult health. *Fam Process*. 1995;34:161-182.
- Göktaş A, İsci Ö. A comparison of the most commonly used measures of association for doubly ordered square contingency tables via simulation. *Metodoloski Zvezki*. 2011;8:17-37.
- Aron A, Aron E. Estadística para psicólogos. Argentina: Prentice Hall; 2002.
- Inam SN, Saqib A, Alam E. Prevalence of anxiety and depression among medical students of private university. *J Pak Med Assoc*. 2003;53:44-47.
- Aboalshamat K, Jawhari A, Alotibi S, Alzahrani K, Al-Mohimeed H, Alzahrani M, et al. Relationship of self-esteem with depression, anxiety, and stress among dental and medical students in Jeddah, Saudi Arabia. *JIMD*. 2017;4:61-68.
- Sánchez-Marín C, Chichón-Peralta J, Leon-Jimenez F, Alipazaga-Pérez P. Trastornos mentales en estudiantes de medicina humana en tres universidades de Lambayeque, Perú. *Rev Neuropsiquiatr*. 2016; 79:197-206.
- Reyes-Carmona C, Monterrosas-Rojas AM, Navarrete-Martínez A, Acosta-Martínez EP, Torruco-García U. Ansiedad de los estudiantes de una facultad de medicina mexicana, antes de iniciar el internado. *Inv Ed Med*. 2017;6:42-46.
- Guerrero-López JB, Heinze-Martin G, Ortiz-De León S, Cortés-Morelos J, Barragán-Pérez V, Flores-Ramos M. Factores que predicen depresión en estudiantes de medicina. *Gac Med Mex*. 2013;149:598-604.
- Hines M. Brain gender. EEUU: Oxford; 2005.
- Olf M, Langeland W, Draijer N, Gersons BP. Gender differences in posttraumatic stress disorder. *Psychol Bull*. 2007;133:183-204.
- Sandoval BS, Dörner PA, Véliz BA. Bienestar psicológico en estudiantes de carreras de la salud. *Inv Ed Med*. 2017;24:260-266.
- Kirsch M, Windmann S. The role of anxiety in decision-making. *Rev Psychol*. 2009;16:19-28.
- Ashouri FP, Rasekhi SA. Review on Medical Students Mental Health Problems and Proposed Solutions. *IEJM*. 2015;4:23-31.
- Kim SS, Kaplowitz S, Johnston MV. The effects of physician empathy on patient satisfaction and compliance. *Eval Health Prof*. 2004;27:237-251.
- Kendler KS, Myers J, Prescott CA. Sex differences in the relationship between social support and risk for major depression: a longitudinal study of opposite-sex twin pairs. *Am J Psychiatry*. 2005;162:250-256.
- Hamza MA, Abdulaziz AA, Ebrahim S, Gominda GP, Eiad AA. Stress and its effects on medical students: a cross-sectional study at a college of medicine in Saudi Arabia. *J Health Popul Nutr*. 2011;29:516-522.