



Anxiety and Sleep Quality are Affected in Students from Social Sciences

El Nivel de Ansiedad y la Calidad de Sueño Están Afectados en Estudiantes de Ciencias Sociales

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Abstract

Sleep quality in college students has been related to anxiety and depressive symptomatology. However, the available statistics have been focused on students from Health Sciences thus preventing to know whether the same problematic is observed in students from other Majors. We applied the scales DASS-21, PSQI, and EAT-26 to 80 Mexican undergraduate students enrolled to any of the first three semesters of Majors in Administration, Industrial Engineering, or Medicine. We report that the percentage of students with abnormal scores in anxiety (33.33%) and poor sleeping quality (71.43%) was higher in Administration students. By using a logistic regression model, we show that anxiety scores can be explained by stress level, poor sleep quality, depression scores, and by the Major of study. Our findings show that anxiety management is needed for students to alleviate other emotional afflictions and improve sleep quality, particularly for those of Social Sciences.

Keywords: Students, Depression, Eating Habits, Sleep, Youth

Resumen

La calidad del sueño en estudiantes universitarios ha sido relacionada con la ansiedad y síntomas depresivos. Sin embargo, las estadísticas disponibles muestran un sesgo hacia estudiantes de Ciencias de la Salud impidiendo

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así conocer si la problemática está presente en estudiantes de otras áreas. Se aplicaron las escalas DASS-21, PSQI y EAT-26 a 80 estudiantes mexicanos de licenciatura pertenecientes a los primeros tres semestres de las carreras en Administración, Ingeniería Industrial y Medicina. Se reportó que la proporción de estudiantes con puntajes anormales de ansiedad (33.33%) y con calidad pobre de sueño (71.43%) fue estadísticamente mayor en aquellos pertenecientes a la carrera de Administración. Usando un modelo logístico de regresión se encontró que los puntajes de ansiedad son explicados por el nivel de estrés, la calidad pobre de sueño, los puntajes de depresión y por la carrera de estudio. Los hallazgos muestran que el manejo de la ansiedad entre los estudiantes es necesario para aliviar otras afecciones emocionales y mejorar la calidad del sueño, especialmente en los estudiantes universitarios de las Ciencias Sociales.

Palabras Clave: Universitarios, Depresión, Hábitos Alimenticios, Sueño, Jóvenes

Around half of patients who suffer depression had their first depressive episode before the age of 20 (Burke et al., 1991). Similarly, anxiety disorders present around the age of 21 (Lijster et al., 2017). Due to this early emergence of mood disorders, college students represent a population at risk. In college students, the incidence of depression locates between 12 and 39.2%, the incidence of stress is around 20%, and anxiety presents in about 50% of them (Bayram & Bilgel, 2008; Eller et al., 2006; Gan et al., 2011; Manelic Rocha & Ortega-Soto, 1995; Rezaei et al., 2018; Riveros et al., 2007; Wong et al., 2006). Importantly, scores of depression, anxiety, stress, and eating disorders in students are known to be correlated (Gan et al., 2011; Rezaei et al., 2018).

Another important aspect that can affect students' performance is sleeping quality as one of its functions is to promote memory consolidation (Cairney et al., 2015; Wiesner et al., 2015). Furthermore, sleep abnormalities have been correlated with high levels of anxiety and depression (Afandi et al., 2013; Alvaro et al., 2013; Dinis & Bragança, 2018; Rezaei et al., 2018). A majority of the literature regarding students' sleep quality has been focused on students from Health Sciences (Medicine, Nursing, and Dentistry) finding that poor quality of sleeping varies from 1.5% to 67.6% of the community (Elagra et al., 2016; James et al., 2011; Lezcano et al., 2014; Nojomi et al., 2009; Rezaei et al., 2018; Rosales et al., 2007; Silva et al., 2016). Furthermore, from 17.3% to 36.6% of students of Health Sciences show abnormal somnolence levels during the day (Abdul-

ghani et al., 2012; Ez ElArab et al., 2014; Giri et al., 2013; Silva et al., 2016).

Besides the lack of statistics about sleep quality of students from Majors other than Health, it has not been clearly defined whether the level of anxiety, depression, and eating habits differs among students from other Majors. The work of Bayram and Bilgel (2008) shows that Turkish students from Social and Political Sciences have higher scores of anxiety as compared to those studying Basic Sciences, Engineering or Medicine. On the other hand, the work of Manelic Rocha and Ortega-Soto (1995) found that the level of depression in Mexican students from Social Sciences and Engineering was similar. Additionally, eating behaviors did not differ among students from Art, Science and Technical Majors (Gan et al., 2011).

The simultaneous assessment of depression, anxiety, and stress is of high relevance as these mood affections have been linked to substance abuse, suicide behavior, risky behavior, self-esteem problems, and low scholar achievements (Elias et al., 2011; Flisher & Katz, 2001; Maldonado et al., 2013; Nepon et al., 2010; Smith & Book, 2008).

We present statistics on the mental health, sleep quality, and eating habits of students from three different Majors (Administration, Industrial Engineering, or Medicine) from a small Professional School located in Hidalgo, Mexico. Participants shared a very similar environment (around 30 students per group, similar size and equipment inside the classrooms, same evaluation system, similar duration of cour-

ses per semester, and same academic regulations). We consider that this setting allows more confident interpretations to be made regarding whether mental health is differently affected according to the Major of study. We found that a higher percentage of Administration students showed abnormal anxiety scores compared to students from the other Majors and that they also had poorer sleeping habits as compared to Industrial Engineering students. Our logistic regression model shows that anxiety scores are impacted by the Major of study to a similar extent as poor sleep quality and depression.

Method

Design of the study

Two hundred twenty eight students of Administration, Industrial Engineering or Medicine enrolled at a public university from Hidalgo, Mexico were asked to participate in the study. The participants joined the study during the first three semesters of their undergraduate program. An electronic questionnaire elaborated by using Google Forms was applied within the first two months of the beginning of the semester. The electronic questionnaire included the Spanish version of the Depression, Anxiety, and Stress Scale-21 (DASS-21) (Gurrola Peña et al., 2006), the Pittsburgh Sleep Quality Index (PSQI) (Adorno-Nuñez et al., 2016), and the Eating Attitudes Test (EAT-26) (Constaín et al., 2017). Other general data as age, gender, and economic status were also recorded. A committee conformed by specialists in Psychology, Medicine, Biomedicine, and Engineering from Escuela Superior Tepeji del Río and Escuela Superior de Atotonilco de Tula reviewed and approved the electronic questionnaire. The students were informed that their answers were going to be used only for research purposes and that their identity would not be revealed at any stage of the investigation. The participants that agreed to participate gave informed consent by providing their name and email. The electronic questionnaire was sent to them afterwards and participants were allowed to submit their answers within the following two weeks. The application of the questionnaire was

performed following the ethical standards stated in the Helsinki Declaration of 1964, as revised in 2013 (Declaration of Helsinki, 1964).

Participants

Eighty students successfully completed the questionnaire (35% of retention), 36 men and 44 women (Table 1). The mean age of the participants was 19.61 years. The socioeconomic status of the participants located between medium-low, and medium. All the included participants declared not being under any medical treatment or to have any important clinical condition.

Table 1
Number of participants and age

Major	By Major	By Major and gender	Average age(years)
Administration	21	Male	8 19.63
		Female	13 20.23
Industrial Engineering	26	Male	19 20.05
		Female	7 18.43
Medicine	33	Male	9 19.89
		Female	24 19.17

Psychological instruments

The DASS-21 has been validated in the Mexican population (Gurrola Peña et al., 2006) and in other Spanish speaking communities (Antúnez & Vinet, 2012; Román et al., 2016). The DASS-21 composed by 21 items evaluates depression, anxiety, and stress symptoms over the previous week. The range of values for normal symptomatology for depression, anxiety, and stress were taken as 0-4, 0-3, and 0-7 respectively. Students with scores higher than the aforementioned ranges were categorized as abnormal for the respective variable.

The PSQI was previously validated in Spanish speakers (Adorno Nuñez et al., 2016; Huamaní et al., 2006; Jiménez-Genchi et al., 2008; Lezcano et

al., 2014); this scale evaluates the general quality of sleep during the last month. We used the PSQI Spanish scale reported by Grupo de Trabajo de la Guía de Práctica Clínica para el Manejo de Pacientes con Insomnio en Atención Primaria (2009). The total score is divided into 7 components and the sum of all the components constitutes the global PSQI; values of 5 or above indicate poor sleep quality. The number of real hours of sleep was calculated by subtracting the time it took them to fall asleep from the total hours they remained in bed, this value is a part of the PSQI.

The EAT-26 has been previously validated in Spanish speaking communities (Constaín et al., 2017; Rivas et al., 2010). This test is conformed by 26 items; scores of 20 or higher indicate concerns regarding body weight, body shape, and eating.

Statistical analysis

The Chi-square test was used to compare the proportion of students categorized as normal and abnormal in the different variables (Majors or Gender). The Shapiro-Wilk test was used to test whether the scores obtained in the different scales followed a Normal distribution. As we found that most of the groups did not follow a Normal distribution, we decided to use non-parametric statistics for the comparisons among groups. To compare among Majors, the Kruskal-Wallis rank sum test was applied followed when appropriate by the Dunn's test (Bonferroni correction for multiple comparisons). The Wilcoxon test was used to compare the scores between male and female students. We tested the correlation among Depression, Anxiety, Stress, PSQI, and EAT-26 scores by using a Pearson correlation test; the data from all the Majors was analyzed as one group. Multivariate logistic regression analysis was performed where anxiety scores were the predicted variable and Depression, Stress, PSQI, Major, and Gender were the predictor variables. The second model took PSQI as the predicted variable and Depression, Anxiety, Stress, and Gender as the predictors. Major was recoded as Administration=1 and Industrial Engineering and

Medicine=0. The R software version 3.5.1 was used for statistical analysis and for graph design (R Core Team, 2018).

Results

Depression, anxiety, and stress among students from different majors

We found that the age of the students did not differ among Majors ($H(2) = 2.46, p = .29$), or between genders ($H(1) = 0.77, p = .38$) (Table 1). The proportion of students with abnormal scores of depression, and stress symptomatology did not differ among Majors (Depression: $X^2 (2, N = 80) = 3.19, p = .20$; Stress: $X^2 (4, N = 80) = 5.37, p = .068$). However, abnormal anxiety symptomatology was more frequently observed in Administration students ($X^2 (2, N = 80) = 9.54, p = .008$) (Table 2).

The scores of depression, anxiety, and stress did not differ among Majors (Depression: $H(2) = 3.06, p = .22$; Anxiety: $H(2) = 3.48, p = .18$; Stress: $H(2) = 3.10, p = .22$) (Figure 1).

Sleep quality and eating attitudes

The proportion of students with poor sleep quality was higher in Administration students ($X^2 (2, N = 80) = 7.80, p = .02$) (Table 2). Furthermore, the PSQI scores differed among Majors ($H(2) = 8.44, p = .015$) being higher in Administration students compared to Industrial Engineering students ($p = .014$) (Figure 1). When the hours of real sleep were compared among college Majors, we observed significant differences ($H(2) = 7.36, p = .025$). The number of hours of real sleep was shorter in Administration students compared to Industrial Engineering students ($p = .032$); there were no other significant differences (Figure 1).

The proportion of students with problematic eating attitudes did not vary among Majors ($X^2 (2, N = 80) = .17, p = .92$) (Table 2). There were neither differences in the EAT-26 scores among Majors ($H(2) = .69, p = .71$) (Figure 1).

Table 2
Percentage of students with normal and abnormal scores according to their Major

Variable	Category	Administration	Industrial Engineering	Medicine
Depression	Normal	80.95	96.15	81.82
	Abnormal	19.05	3.85	18.18
Anxiety	Normal	66.67	96.15	90.91
	Abnormal	33.33	3.85	9.09
Stress	Normal	71.43	96.15	81.82
	Abnormal	28.57	3.85	18.18
PSQI	Normal	28.57	69.23	54.55
	Poor	71.43	30.77	45.45
EAT-26	Normal	95.24	92.31	93.94
	Abnormal	4.76	7.69	6.06

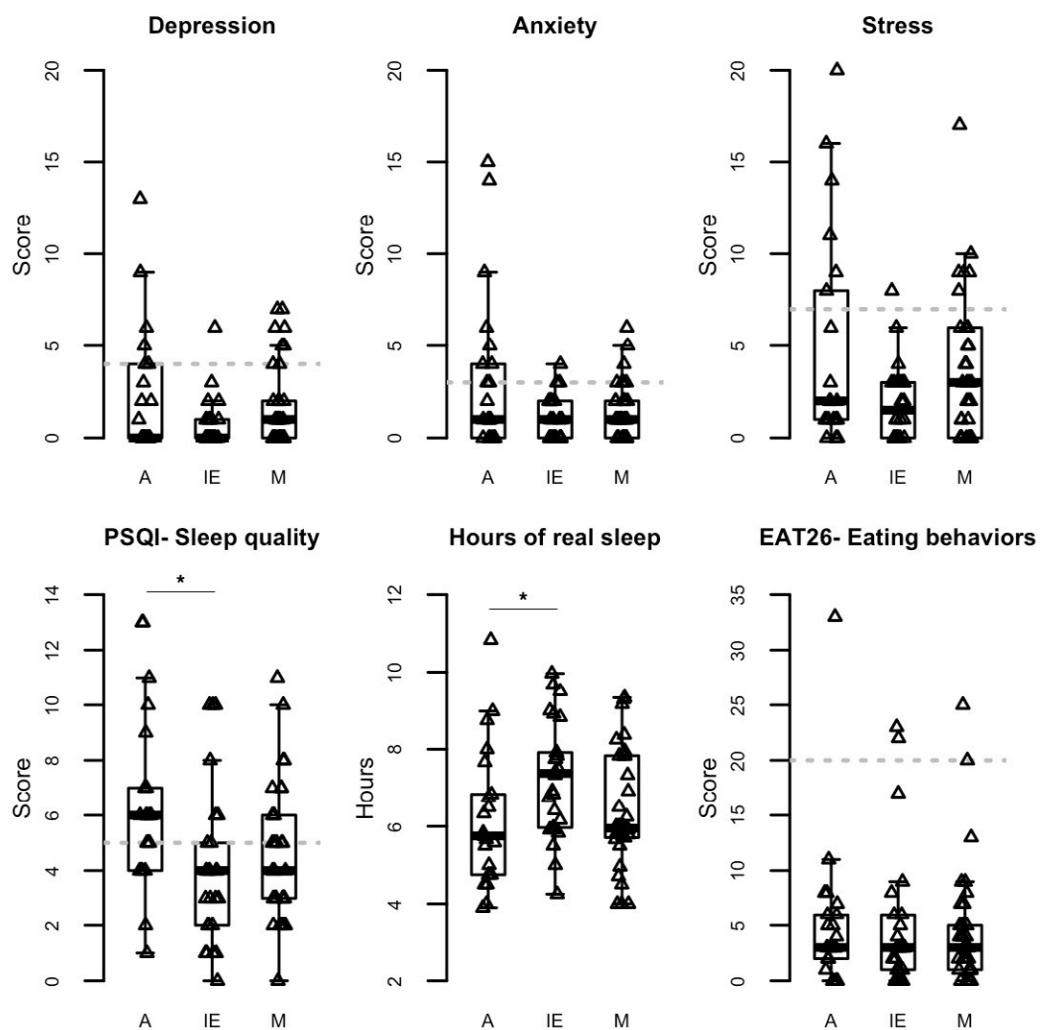


Figure 1. Boxplot of scores obtained in the DASS-21 (Depression, anxiety, and stress), PSQI, number of real hours of sleep, and EAT-26. A=Administration, IE=Industrial Engineering, M=Medicine. Each triangle represents the score from one participant. Values below the dotted gray line were considered normal. * p < 0.05.

Gender differences

The proportion of male and female students with abnormal scores in the DASS-21 was not different (Depression χ^2 (1, N = 80) = 0.90 p = .34; Anxiety χ^2 (1, N = 80) = .13, p = .72; Stress χ^2 (1, N = 80) = .68, p = .42) (Table 3). The scores obtained in the DASS-21 neither differed between genders (Depression p = .69; Anxiety p = .89, Stress p = .15).

The percentage of male and female students with abnormal sleeping habits did not show statistical differences (χ^2 (1, N = 80) = .52, p = .47) (Table 3). The scores obtained in the PSQI neither differed between genders (p = .64).

Similarly, the proportion of male and female students with abnormal scores in the EAT-26 was not statistically significant (χ^2 (1, N = 80) = .054, p = .82). The scores obtained in the EAT-26 scales neither differed between genders (p = .93).

Correlation analysis for Depression, Anxiety, Stress, PSQI, and EAT-26 scores

We next tested whether the scores of the different scales were correlated. We found a significant correlation among Depression, Anxiety, Stress, and PSQI scores (Table 4). EAT-26 scores were significantly correlated only with depression (Table 4).

Multivariate logistic regression analysis for anxiety and sleep quality

We wanted to identify which variables explained anxiety, as the proportion of students with abnormal scores was higher in Administration. We found

that stress levels were highly related to anxiety while depression, sleep, and Major of study were also statistically significant in the regression model but, with a lesser contribution. We also observed that the gender did not reach statistical significance in this regression model (Table 5. Model 1). A regression model was also tested for sleeping quality; anxiety was the only statistically significant variable related to sleep quality (Table 5. Model 2).

Discussion

Our study presents recent statistics about mental health in Mexican undergraduate students. Previous work showed that anxiety is observed in around 50% of the students, our study shows that in Mexican students the symptomatology is mild as only 13.75% of the students show abnormal anxiety. The percentage of students with abnormal anxiety increases when we divide the students according to their college Major: 33.33% of Administration students suffer from abnormal anxiety compared to 3.85% and 9.09% of Industrial Engineering and Medicine students, respectively. These results agree with those of Bayram & Bilgel (2008) that showed that Turkish students from Social and Political Sciences had higher scores of anxiety as compared to those studying Basic Sciences or Engineering. Altogether, students from Social Sciences might be at higher risk of developing anxiety disorders. Recent work has shown that relaxation techniques implemented in medical students improve their quality of life after a two-month intervention (Dehghan-Nayeri & Adib-Hajbaghery, 2011). This type of intervention needs to be tested in students from Social Sciences.

Previous work, using the Beck's Depression Inventory, showed that depressive symptoms occur

Table 3
Percentage of male and female students with normal and abnormal scores

Gender	Depression		Anxiety		Stress		PSQI		EAT-26	
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal	Normal	Poor	Normal	Abnormal
Male	91.60	8.34	83.33	16.67	88.89	11.11	58.33	41.67	91.67	8.33
Female	81.82	18.18	88.64	11.34	79.55	20.45	47.73	52.27	95.45	4.55

Table 4
Correlation analysis combining all the Majors

	Anxiety	Stress	PSQI	EAT-26
Depression	0.67*	0.68*	0.49*	0.37*
Anxiety	---	0.75*	0.58*	0.15(p=0.187)
Stress	---	---	0.47*	0.19(p=0.089)
PSQI	---	---	---	0.05(p=0.674)

Note: r values (Pearson) are reported. *p<0.01

in 11.8% of Mexican students (Manelic Rocha & Ortega-Soto, 1995); here, we report that using the DASS-21, abnormal depressive symptomatology is observed in 13.75% of the students. The percentage of the two works is similar and confirms that Mexican students have minor depressive affections. We did not find evidence in favor of a relationship of depressive symptomatology and the college Major similar to the findings of Bayram and Bilgel (2008) in Turkish students. We also found that 16.25% of Mexican students had abnormal stress scores; this percentage is similar to other works that show that 20% of students show abnormal stress levels. We neither found evidence about differences in stress scores among Majors. Overall, depression and stress levels in college students might be explained by factors not related to the academic environment (e.g. personal relationships, underlying psychological conditions) while anxiety could be a product of differences in the Major of study.

In terms of sleep quality, we found that 47.5% of all participants had poor sleeping habits. The highest proportion of students with poor sleeping habits was

observed in Administration students, 71.43%. The PSQI scores were higher and the number of hours of real sleep was shorter also in Administration students compared to Industrial Engineering students. Thus, Administration students have important sleeping problems that could be affecting their academic performance and their health status. The high use of social media in college students has been related to poorer sleep quality (Afandi et al., 2013); specifically, the risk is higher if social media is checked 30 min before going to bed (Levenson et al., 2016, 2017). It is important to notice that the high use of social media is related not only with sleep disturbances but also with depressive symptomatology (Lin et al., 2016). Thus, sleeping disturbances in youth related to social media use is an emerging problem that should be further studied. To better understand why the sleeping quality differed among Majors we need to test in a future study specific aspects of the academic programs such as number of hours that students devote to homework and the load, type (individual or group), and frequency of assignments.

We report that only 6.25 % of the Mexican students showed abnormal scores in the EAT-26. Our finding might reflect that Mexican students have little concerns about their eating habits. This result was unexpected as the Mexican inquiry ENSANUT 2016 reported that 36.3% of adolescents between 12-19 years are overweight or obese while in adults who are older than 20 years the prevalence grows up to 71.2% (Instituto Nacional de Salud Pública, 2016). The EAT-26 is focused on concerns about eating too much; the application of other scales that address the

Table 5
Multivariate logistic regression for anxiety and sleep (PSQI)

Model 1. Predicted variable: Anxiety			Model 2. Predicted variable: PSQI		
	Estimate	p-value		Estimate	p-value
Intercept	-1.132	0.2615	Intercept	7.588	7.75e-11
Depression	2.173	0.033	Depression	1.443	0.1533
Stress	5.474	5.75e-07	Anxiety	2.635	0.0102
PSQI	2.635	0.0102	Stress	-0.003	0.998
Major (Administration)	2.19	0.0317	Major (Administration)	1.36	0.1778
Gender (Female)	-1.756	0.0833	Gender (Female)	0.191	0.8489

type of food, eating schedules, and physical activity may be more appropriate to evaluate the Mexican student community (Ha et al., 2016; Roura et al., 2016). However, we found that eating habits were correlated with depression giving support to previous work done in students from Malaysia (Gan et al., 2011).

We did not find a significant relationship of gender to any of the studied variables. Our lack of gender differences in sleeping quality agrees with previous work that showed that PSQI scores do not differ between male and female students (Afandi et al., 2013; Rezaei et al., 2018). Eating habits in Malaysian students from different Majors are neither related with the gender similar to what we report in the present study (Gan et al., 2011). A previous work done in Mexican students showed that depression levels, evaluated with the Beck Depression inventory, did not differ between male and female students (Manelic Rocha & Ortega-Soto, 1995). However, other studies that used the DASS-42 or the Emotional State Questionnaire (EST-Q) reported a relationship of depression, anxiety, and stress with gender (Bayram & Bilgel, 2008; Eller et al., 2006; Wong et al., 2006). The aforementioned studies are difficult to be compared directly as they differ in the instrument that was applied, the college Majors included, and the sample size. Our study presents a limitation to assess strong conclusions about gender due to the small sample size used. This limitation becomes more accentuated when we divide the students by Major, as there are already differences in the proportion of male and female students that study each of the Majors. To rule out that the gender is not related to depression, anxiety, and depression scores in Mexican students, a future study with a higher sample size that includes students from several Majors is required.

Our study supports an interrelationship of depression, anxiety, stress, and sleeping quality. It is well established that people with mood disorders have a wide range of difficulties with sleep quality. Moreover, recent work suggests that poor sleep quality could be a risk factor of future onset of mood disorders and other psychiatric affections (Rumble et al., 2015). Our results suggest that the poor sleep quality

observed in Social Sciences students could put them at a higher risk of future onset of mood disorders compared to Medicine or Engineering students.

Finally, based in our regression analysis, anxiety appears to be a “hub” of emotional and health disturbance as it was tightly related to stress, poor sleep quality, depressive symptomatology, and the Major of study. A broader study including other Majors such as Psychology, Social Work or Political Sciences would give more support to our findings. Furthermore, it remains to be clarified whether particularities of the course (working load, teaching strategies), characteristics of the population (e.g. if they work, live by their own, marital status) or underlying mood affections in students from Social Sciences explain the increased anxiety and poor sleep habits. The contribution of Major of study to explain anxiety levels, with similar significance as depression, and sleeping quality, suggests that more attention should be paid to students from Social Sciences as they might be at higher risk of emotional affections.

Conclusion

Our work shows that a higher proportion of Administration students have abnormal anxiety scores and they have poorer sleep quality as compared to Industrial Engineering students thus supporting the hypothesis that the Major of study is related to mental health problems. It seems promissory that psychotherapies focused on anxiety management could alleviate abnormalities in other areas of students’ life. Furthermore, our findings revealed that mental health counseling and additional research studies are required in students from Social Sciences.

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Conflict of interests

The authors declare they have no conflict of interests

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References

Abdulghani, H. M., Alrowais, N. A., Bin-Saad, N. S., Al-Subaie, N. M., Haji, A. M. A., & Alhaqwi, A. I. (2012). Sleep disorder among medical students: Relationship to their academic performance. *Medical Teacher*, 34 Suppl 1, S37-41. <https://doi.org/10.3109/0142159X.2012.656749>

Adorno Nuñez, I. D. R., Gatti Pineda, L. D., Gómez Páez, L. L., Mereles Noguera, L. M., Segovia Abreu, J. M., Segovia Abreu, J. A., & Castillo, A. (2016). Calidad del sueño en estudiantes de medicina de la Universidad Católica de Asunción. *Ciencia e Investigación Medico Estudiantil Latinoamericana*, 21(1), 5-8.

Afandi, O., Hawi, H., Mohammed, L., Salim, F., Hameed, A. K., Shaikh, R. B., Al Sharbatti, S., & Khan, F. A. (2013). Sleep Quality Among University Students: Evaluating the Impact of Smoking, Social Media Use, and Energy Drink Consumption on Sleep Quality and Anxiety. *Inquiries Journal*, 5(06), 1-3.

Alvaro, P. K., Roberts, R. M., & Harris, J. K. (2013). A systematic review assessing bidirectionality between sleep disturbances, anxiety, and depression. *Sleep*, 36(7), 1059-1068. <https://doi.org/10.5665/sleep.2810>

Antúnez, Z., & Vinet, E. V. (2012). Escalas de depresión, ansiedad y Estrés (DASS – 21): Validación de la versión abreviada en estudiantes universitarios chilenos. *Terapia Psicológica*, 30(3), 49-55.

Bayram, N., & Bilgel, N. (2008). The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. *Social Psychiatry and Psychiatric Epidemiology*, 43(8), 667-672. <https://doi.org/10.1007/s00127-008-0345-x>

Burke, K. C., Burke, J. D., Rae, D. S., & Regier, D. A. (1991). Comparing age at onset of major depression and other psychiatric disorders by birth cohorts in five US community populations. *Archives of General Psychiatry*, 48(9), 789-795.

Cairney, S. A., Durrant, S. J., Power, R., & Lewis, P. A. (2015). Complementary roles of slow-wave sleep and rapid eye movement sleep in emotional memory consolidation. *Cerebral Cortex*, 25(6), 1565-1575. <https://doi.org/10.1093/cercor/bht349>

Constaín, G. A., Rodríguez-Gázquez, M. de los Á., Ramírez Jiménez, G. A., Gómez Vásquez, G. M., Mejía Cardona, L., & Cardona Vélez, J. (2017). Validez y utilidad diagnóstica de la escala Eating Attitudes Test-26 para la evaluación del riesgo de trastornos de la conducta alimentaria en población masculina de Medellín, Colombia. *Atención Primaria*, 49(4), 206-213. <https://doi.org/10.1016/j.aprim.2016.02.016>

Dehghan-nayeri, N., & Adib-Hajbaghery, M. (2011). Effects of progressive relaxation on anxiety and quality of life in female students: A non-randomized controlled trial. *Complementary Therapies in Medicine*, 19(4), 194-200. <https://doi.org/10.1016/j.ctim.2011.06.002>

Dinis, J., & Bragança, M. (2018). Quality of Sleep and Depression in College Students: A Systematic Review. *Sleep Science*, 11(4), 290-301. <https://doi.org/10.5935/1984-0063.20180045>

Elagra, M. I., Rayyan, M. R., Alnemer, O. A., Alshehri, M. S., Alsaaffar, N. S., Al-Habib, R. S., & Almosajen, Z. A. (2016). Sleep quality among dental students and its association with academic performance. *Journal of International Society of Preventive & Community Dentistry*, 6(4), 296-301. <https://doi.org/10.4103/2231-0762.186788>

Elias, H., Ping, W. S., & Abdullah, M. C. (2011). Stress and academic achievement among undergraduate students in Universiti Putra Malaysia. *Procedia - Social and Behavioral Sciences*, 29, 646-655. <https://doi.org/10.1016/j.sbspro.2011.11.288>

Eller, T., Aluoja, A., Vasar, V., & Veldi, M. (2006). Symptoms of anxiety and depression in Estonian medical students with sleep problems. *Depression and Anxiety*, 23(4), 250-256. <https://doi.org/10.1002/da.20166>

Ez ElArab, H., Rabie, M. A. M., & Ali, D. H. (2014). Sleep behavior and sleep problems among a medical student sample in relation to academic performance: A cross-sectional questionnaire-based study. *Middle East Current Psychiatry*, 21(2), 72-80. DOI: 10.1097/01.XME.0000444452.76469.05

Fleisher, W. P., & Katz, L. Y. (2001). Early onset major depressive disorder. *Paediatrics & Child Health*, 6(7), 444-448. DOI: 10.1093/pch/6.7.444

Gan, W. Y., Mohd Nasir, M. T., Zalilah, M. S., & Hazizi, A. S. (2011). Disordered eating behaviors, depression, anxiety and stress among Malaysian University students. *The College Student Journal*, 45(2), 296-309.

Giri, P., Baviskar, M., & Phalke, D. (2013). Study of sleep habits and sleep problems among medical students of Pravara Institute of Medical Sciences Loni, Western Maharashtra, India. *Annals of Medical and Health Sciences Research*, 3(1), 51–54. <https://doi.org/10.4103/2141-9248.109488>

Grupo de Trabajo de la Guía de Práctica Clínica para el Manejo de Pacientes con Insomnio en Atención Primaria. (2009). *Guía de Práctica Clínica para el Manejo de Pacientes con Insomnio en Atención Primaria. Plan de Calidad para el Sistema Nacional de Salud del Ministerio de Sanidad y Política Social*. Unidad de Evaluación de Tecnologías Sanitarias. Agencia Laín Entralgo.

Gurrola Peña, G. M., Balcázar Nava, P., Bonilla Muños, M. P., & Virseda Heras, J. A. (2006). Estructura factorial y consistencia interna de la escala de depresión ansiedad y estrés (DASS-21) en una muestra no clínica. *Psicología y Ciencia Social*, 8(002), 3–7.

Ha, S. A., Lee, S. Y., Kim, K. A., Seo, J. S., Sohn, C. M., Park, H. R., & Kim, K. W. (2016). Eating habits, physical activity, nutrition knowledge, and self-efficacy by obesity status in upper-grade elementary school students. *Nutrition Research and Practice*, 10(6), 597–605. <https://doi.org/10.4162/nrp.2016.10.6.597>

Huamaní, C., Reyes, A., Mayta-Tristán, P., Timana, R., Salazar, A., Sánchez, D., & Pérez, H. (2006). Calidad y parálisis del sueño en estudiantes de medicina. *Anales de La Facultad de Medicina*, 67(4), 339–344.

Instituto Nacional de Salud Pública. (2016). *Encuesta Nacional de Salud y Nutrición de Medio Camino*. México: Instituto Nacional de Salud Pública. ISBN: 978-607-511-160-5

James, B. O., Omoaregba, J. O., & Igberase, O. O. (2011). Prevalence and correlates of poor sleep quality among medical students at a Nigerian university. *Annals of Nigerian Medicine*, 5(1), 1–5. <https://doi.org/10.4103/0331-3131.84218>

Jiménez-Genchi, A., Monteverde-Maldonado, E., Nenclares-Portocarrero, A., Esquivel-Adame, G., & de la Vega-Pacheco, A. (2008). [Reliability and factorial analysis of the Spanish version of the Pittsburgh Sleep Quality Index among psychiatric patients]. *Gaceta Medica De Mexico*, 144(6), 491–496.

Levenson, J. C., Shensa, A., Sidani, J. E., Colditz, J. B., & Primack, B. A. (2016). The association between social media use and sleep disturbance among young adults. *Preventive Medicine*, 85, 36–41. <https://doi.org/10.1016/j.ypmed.2016.01.001>

Levenson, J. C., Shensa, A., Sidani, J. E., Colditz, J. B., & Primack, B. A. (2017). Social media use before bed and sleep disturbance among young adults in the United States: A nationally representative study. *Sleep*, 40(9), 1–7. <https://doi.org/10.1093/sleep/zsx113>

Lezcano, H., Vieto, Y., & Morán, J. (2014). Características del sueño y su calidad en estudiantes de Medicina de la Universidad de Panamá. *Rev Méd Cient*, 27(1), 3–11.

Lijster, J. M. de, Dierckx, B., Utens, E. M. W. J., Verhulst, F. C., Zieldorff, C., Dieleman, G. C., & Legerstee, J. S. (2017). The age of onset of anxiety disorders. *Canadian Journal of Psychiatry. Revue Canadienne De Psychiatrie*, 62(4), 237–246. <https://doi.org/10.1177/0706743716640757>

Lin, L. Y., Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., Hoffman, B. L., Giles, L. M., & Primack, B. A. (2016). Association between social media use and depression among U.S. young adults. *Depression and Anxiety*, 33(4), 323–331. <https://doi.org/10.1002/da.22466>

Maldonado, L., Huang, Y., Chen, R., Kasen, S., Cohen, P., & Chen, H. (2013). Impact of early adolescent anxiety disorders on self-esteem development from adolescence to young adulthood. *The Journal of Adolescent Health: Official Publication of the Society for Adolescent Medicine*, 53(2), 287–292. <https://doi.org/10.1016/j.jadohealth.2013.02.025>

Manelic Rocha, H., & Ortega-Soto, H. A. (1995). La depresión en los estudiantes universitarios de la Escuela Nacional de Estudios Profesionales, Plantel Aragón. *Salud Mental*, 18(2), 31–34.

Nepon, J., Belik, S.-L., Bolton, J., & Sareen, J. (2010). The relationship between anxiety disorders and suicide attempts: Findings from the National Epidemiologic survey on alcohol and related conditions. *Depression and Anxiety*, 27(9), 791–798. <https://doi.org/10.1002/da.20674>

Nojomí, M., Ghalhe Bandi, M. F., & Kaffashi, S. (2009). Sleep pattern in medical students and residents. *Archives of Iranian Medicine*, 12(6), 542–549.

R Core Team. (2018). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing.

Rezaei, M., Khormali, M., Akbarpour, S., Sadeghniat-Haghighi, K., & Shamsipour, M. (2018). Sleep quality and its association with psychological distress and sleep hygiene: A cross-sectional study among pre-clinical medical students. *Sleep Science*, 11(4), 274–280. <https://doi.org/10.5935/1984-0063.20180043>

Rivas, T., Bersabé, R., Jiménez, M., & Berrocal, C. (2010). The Eating Attitudes Test (EAT-26): Reliability and validity in Spanish female samples. *The Spanish Journal of Psychology*, 13(2), 1044–1056.

Riveros Q., M., Hernández V., H., & Rivera B., J. (2007). Niveles de depresión y ansiedad en estudiantes

universitarios de Lima Metropolitana. *Revista de Investigación En Psicología*, 10(1), 91–102. <https://doi.org/10.15381/rinvp.v10i1.3909>

Román, F., Santibáñez, P., & Vinet, E. V. (2016). Uso de las Escalas de Depresión Ansiedad Estrés (DASS-21) como Instrumento de Tamizaje en Jóvenes con Problemas Clínicos1. *Acta de Investigación Psicológica - Psychological Research Records*, 6(1), 2325–2336. [https://doi.org/10.1016/S2007-4719\(16\)30053-9](https://doi.org/10.1016/S2007-4719(16)30053-9)

Rosales, E., Egoavil, M., La Cruz, C., & Rey de Castro, J. (2007). Somnolencia y calidad del sueño en estudiantes de medicina de una universidad peruana. *Anales de La Facultad de Medicina*, 68(2), 150–158.

Roura, E., Milà-Villarroel, R., Lucía Pareja, S., & Adot Caballero, A. (2016). Assessment of eating habits and physical activity among Spanish adolescents. The “Cooking and active leisure” TAS program. *PLoS ONE*, 11(7), 1–21. <https://doi.org/10.1371/journal.pone.0159962>

Rumble, M. E., White, K. H., & Benca, R. M. (2015). Sleep Disturbances in Mood Disorders. *Psychiatric Clinics*, 38(4), 743–759. <https://doi.org/10.1016/j.psc.2015.07.006>

Silva, M., Chaves, C., Duarte, J., Amaral, O., & Ferreira, M. (2016). Sleep Quality Determinants among Nursing Students. *Procedia - Social and Behavioral Sciences*, 217, 999–1007. <https://doi.org/10.1016/j.sbspro.2016.02.090>

Smith, J. P., & Book, S. W. (2008). Anxiety and substance use disorders: A review. *The Psychiatric Times*, 25(10), 19–23.

Wiesner, C. D., Pulst, J., Krause, F., Elsner, M., Baving, L., Pedersen, A., Prehn-Kristensen, A., & Göder, R. (2015). The effect of selective REM-sleep deprivation on the consolidation and affective evaluation of emotional memories. *Neurobiology of Learning and Memory*, 122, 131–141. <https://doi.org/10.1016/j.nlm.2015.02.008>

Wong, J. G. W. S., Cheung, E. P. T., Chan, K. K. C., Ma, K. K. M., & Tang, S. W. (2006). Web-based survey of depression, anxiety and stress in first-year tertiary education students in Hong Kong. *The Australian and New Zealand Journal of Psychiatry*, 40(9), 777–782. <https://doi.org/10.1080/j.1440-1614.2006.01883.x>

Declaration of Helsinki, (1964). <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>