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Perceived stress in dental students of a private university in Acapulco, Mexico

Estrés percibido en estudiantes de Odontología de una universidad privada de Acapulco, México

Estresse percebido em estudantes de odontologia de uma universidade particular em Acapulco, México

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ABSTRACT

Stress is a common aspect of daily life, but its negative impact emerges when it disrupts normal daily functioning. It triggers physiological changes within the body's systems, influencing behavior and emotions. **Objective:** This study aims to assess the frequency of perceived stress among dental students attending a private institute in Acapulco, Guerrero, Mexico. **Material and methods:** A descriptive cross-sectional study was conducted in November 2020. The survey targeted seventy-one Dentistry students ranging from the first to seventh semester. The survey collected sociodemographic information and utilized the ten-item Perceived Stress Scale, developed by Cohen, which employs a Likert-type scale with five categorical values. The scores were analyzed using the R statistical program. Simple frequencies of variables were obtained, and Student's *t*-test was employed to compare students' stress levels. The odds ratio (OR), along with its 95 % confidence interval (CI 95%) using the Miettinen method, was calculated to quantify stress risk based on gender and semester. **Results:** Among the participants, 60 % (43/71) experienced high levels of stress. Specifically, female students accounted for a higher occurrence of stress at 70 % (30/43). The association of high stress was particularly prominent among students in the last semester (OR = 2.88; 95 % CI = 1.07-7.71). **Conclusion:** The findings suggest that a significant portion, at least six out of ten students, experience elevated stress levels. The study underscores the importance of dental educators identifying and addressing stressful situations among students, thereby facilitating the referral of cases in need of psychological support.

Keywords: psychological stress, dental students, dental schools.

RESUMEN

El estrés es una situación cotidiana normal, pero tiene repercusiones negativas cuando altera el funcionamiento diario en la vida humana. Implica cambios en los sistemas fisiológicos corporales del organismo, los cuales influyen en el comportamiento y los sentimientos. **Objetivo:** Estimar la frecuencia del estrés percibido en estudiantes de Odontología de un instituto privado de Acapulco, Guerrero, México. **Material y métodos:** Estudio transversal descriptivo realizado en noviembre de 2020. Se encuestaron a 71 estudiantes de primero a séptimo semestre de Odontología. El instrumento de medición obtuvo datos sociodemográficos y se utilizó la Escala de Estrés Percibido de diez ítems, propuesta por Cohen, la cual toma un escalamiento tipo Likert de cinco valores categoriales. Las

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puntuaciones fueron analizadas a través del programa estadístico de R, que obtuvo frecuencias simples de las variables, y se utilizó la prueba *t* de Student para comparar los niveles de estrés en los estudiantes. Fue estimada la razón de momios (RM) con su intervalo de confianza de Miettinen del 95 % (IC 95%) para cuantificar el nivel de riesgo del estrés, por género y semestre. **Resultados:** El 60 % (43/71) de los estudiantes presentó estrés alto. Respecto al sexo, las mujeres presentaron mayor ocurrencia del fenómeno con el 70 % (30/43). La fuerza de asociación del estrés alto se presentó en los estudiantes del último semestre (OR = 2,88; IC 95 % = 1,07-7,71). **Conclusión:** Al menos seis de cada diez estudiantes presentaron variaciones de estrés alto. Se sugiere que los educadores de odontología identifiquen las situaciones de estrés en los estudiantes con el fin de derivar los casos que requieren ayuda psicológica.

Palabras clave: estrés psicológico, estudiantes de Odontología, facultades de Odontología.

RESUMO

O estresse é uma ocorrência comum no cotidiano, mas suas implicações negativas surgem quando afeta o funcionamento diário das vidas humanas. Isso envolve alterações nos sistemas fisiológicos do corpo, influenciando comportamentos e sentimentos. **Objetivo:** Estimar a frequência do estresse percebido entre estudantes de odontologia de uma instituição privada em Acapulco, Guerrero, México. **Material e métodos:** Realizou-se um estudo descritivo de corte transversal em novembro de 2020. Um total de 71 estudantes de Odontologia, do primeiro ao sétimo semestre, foram incluídos na pesquisa. O instrumento de medição coletou informações sociodemográficas e empregou a Escala de Estresse Percebido de dez itens, proposta por Cohen, utilizando uma escala Likert de cinco categorias. As pontuações foram analisadas através do software estatístico R, gerando frequências simples das variáveis e aplicando o teste *t* de Student para comparar o nível de estresse entre os alunos. A Razão de Chances (RC) com um intervalo de confiança de Miettinen de 95% (IC 95%) foi calculada para quantificar o risco de estresse por gênero e semestre. **Resultados:** Dos estudantes, 60% (43/71) apresentaram alto nível de estresse. No que se refere ao gênero, as mulheres tiveram uma maior incidência, com 70% (30/43). Observou-se uma associação significativa de alto estresse entre os alunos do último semestre (RC = 2,88, IC 95% = 1,07-7,71). **Conclusão:** Pelo menos seis em cada dez estudantes demonstraram níveis elevados de estresse. Recomenda-se que os educadores de Odontologia identifiquem situações estressantes nos alunos para encaminhar os casos que possam requerer apoio psicológico.

Palavras chave: estresse psicológico, estudantes de Odontologia, escolas de Odontologia.

INTRODUCTION

The American Psychological Association (APA) defines stress as a normal everyday situation, but with negative repercussions when it alters daily functioning in human life (1). In people, it involves changes in the bodily physiological systems of the organism that influence behavior and feelings. It has the capacity to negatively affect life with physical conditions such as headaches, digestive problems, sleep disorders and emotional strains including confusion, anxiety and depression. Chronic untreated stress, or prolonged constant stress, leads to high blood pressure or a weakened immune system (2).

During medical biological sciences training, high levels of stress are perceived, due to academic challenges that increase the predisposition to states of tension (3, 4). The three most frequent symptoms of high stress levels in students are drowsiness or increased need for sleep, concentration problems and the inability to relax to be calm (5). Dentistry stands out as a discipline in which there are varying levels of stress. Globally, it is estimated that stress affects more than half of all students and professionals (6, 7). Dentists are even described as the profession with the highest level of suicidal thinking due to stress-induced conditions (8).

Dental training involves stressful academic situations that students must face and know how to manage (9-13). In dental students, stress manifests itself in the form of negative emotional alterations, anxiety, and depression that they perceive due to stressful events, the presence of which makes daily activities difficult (10, 14). They are subjected to

prolonged academic loads, which require them to develop activities all day long, attend classes and carry out practices that demand behaviors that will result in productive activities (15, 16).

It has been documented that stress levels in dental students increase during the last academic years, where high stress peaks in the fourth and fifth year, respectively (9, 11-13). Regarding biological variables, such as gender, it has been described that females have higher stress levels, however, there is no consensus on conclusive results (9, 11, 12, 14). Some factors that trigger moderate to severe levels of stress are lack of rest periods (11), the school environment (12), academic overload (15, 16), educational and economic concerns (13).

High stress in dental students has been shown to increase the risk of occupational accidents eightfold (17). It is important for dental students to schedule pending assignments and start working on them in advance. Affective relationships with friends and family help students to improve stress management (14, 15). The importance of knowing the stress that dental students have lies in taking actions that help educational programs to improve this situation.

In the city of Acapulco, belonging to the southern region of the state of Guerrero, Mexico, there is no evidence of the phenomenon of stress in dental students. That is why this research aims to report the situation of this event and to serve as a guide for future evidence. The objective was to estimate the frequency of perceived stress among university dental students from Acapulco, Guerrero, Mexico.

MATERIAL AND METHODS

A descriptive cross-sectional study was conducted among students in a private dental institute from Acapulco, Guerrero, Mexico, during november 2020. The measurements were taken on the study universe, which consisted of 76 enrolled students. Prior to sending the form, a pilot test was conducted on students from another educational program at the same institution.

The selection criteria included students legally enrolled in the institution and with an institutional e-mail account. To reduce selection bias, the criteria were to have previous knowledge of the course topic and the management of stress variations taught by an expert in the area, so four recursive students and one with a history of visiting the psycho-pedagogical department were excluded, respectively. A total of 71 students remained who met the inclusion criteria and were part of the current academic period.

An electronic survey with an opt-in/opt-out box was used to collect sociodemographic data, such as age, gender, and semester completed. The outcome variable was perceived stress during the last three months. A validated 10-item questionnaire of Cohen's Perceived Stress Scale (PSS-10) was used to measure stress among students (18), which has shown good internal consistency (Cronbach's alpha coefficient = 0.86) (19, 20). The questionnaire takes a Lickert-type scaling of five categorical values (from 0 to 4, where 0 = never, and 4 = always) and will allow the identification of the level of intensity of self-perceived stress in the students. The total score of the PSS-10 is obtained by inverting the scores of items 4, 5, 7 and 8 in the following sense: 0 = 4; 1 = 3; 2 = 2; 3 = 1, and 4 = 0, and the sum of the ten items gives results from 0-40.

To classify students with high or low stress, the Shapiro-Wilk test was used to verify that the data followed the normal distribution (21). The data followed the assumption of normality, so the cutoff point was set at the median of the data, which corresponded to a score of 24 (20). Scores of 24 or more were considered high stress and scores below 24 were low stress. The individual scores of the PSS-10 were analyzed with the statistical program R (22).

A univariate analysis describing simple frequencies of the variables of interest was performed. Likewise, a superiority test was applied with Student's *t*-test (23), to compare the level of stress among seventh semester students against the rest. To quantify the risk, an odds ratio (OR) with its 95 % Mietinnen´s confidence interval (CI 95 %) was obtained, dividing the stress level variable by gender and semester.

The research did not present any bioethical conflict, since it did not generate any risk to the health of the participants. The research protocol was approved by the Teaching Department of the Health Jurisdiction 07 from Acapulco, Guerrero, Mexico. The dental institute coordinator provided permission for the project and disseminated the survey through google forms (24), without revealing the objective, to avoid changes in attitude on the part of the students.

The institute obtained the Google Suite for Education, which links institutional emails with student tuition, and in turn, its privacy policies guarantee the

care of the information. The students responded to the survey freely and voluntarily, at independent times at home. They were told that their responses would be confidential and that only quantitative data would be taken from the project for dissemination. Although the form did not ask for any identifying information, after downloading the responses in Excel format, the data were coded, and the template was removed.

RESULTS

71 dental students were surveyed, of whom 68 % (48/71) were female and the rest were male. The age range ranged from 17 to 35 years, with a mean of 21.5 ± 3.7. Table 1 shows the distribution of students by semester and gender.

Table 1. Overall distribution of undergraduate dental students by semester and gender.

Semester of study	Females	Males	Total	%
	n	n		
1°	15	6	21	29 %
3°	6	1	7	10 %
5°	4	-	4	6 %
7°	23	16	39	55 %
Total	48	23	71	100 %

Recalling that in this research high level stress was scores of 24 or more, according to the PSS-10. The scale scores ranged from 8 to 36 points with a mean of 22.8 ± 6.8. Figure 1 shows the box-and-whisker plot to obtain the cut-off point at the value given by the median.

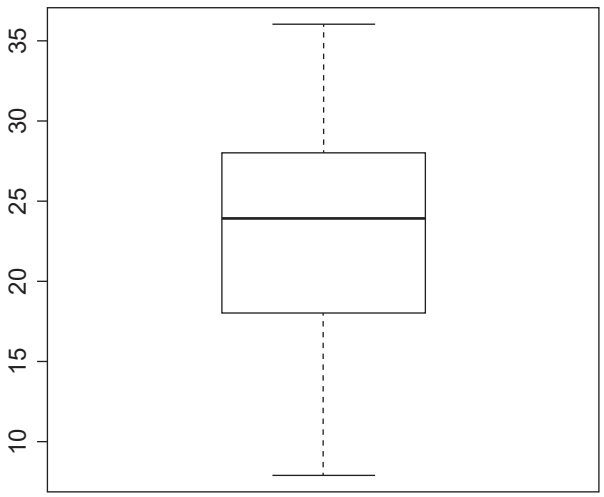

Figure 1. Dispersion of scores obtained of perceived stress levels among dental students.

The 60 % (43/71) of the students had high stress and the rest had low stress. Regarding gender, the proportion of high stress among females was 70 % (30/48) compared to males with 30 % (13/23). Table 2 shows the distribution of stress levels in dental students, by semester and gender.

Table 2. Perceived stress levels among dental students stratified by semester and gender.

Semester of study	Females				Males			
	High stress		Low stress		High stress		Low stress	
	n	%	n	%	n	%	n	%
1°	9	13 %	6	8 %	2	3 %	4	6 %
3°	2	3 %	4	6 %	1	1 %	-	-
5°	1	1 %	3	4 %	-	-	-	-
7°	18	26 %	5	7 %	10	14 %	6	8 %
Total	30	43 %	18	25 %	13	18 %	10	14 %

A comparison of means with Student's *t*-test was performed on the scores obtained in the PSS-10 among seventh semester students compared to the remaining semesters. There was a significant difference wich showed that the mean level of stress among seventh semester students is different from that of the other semesters ($p = 0.02$).

Contingency tables were performed to measure the risk of high stress by gender and semester. Table 3 shows the strength of the association with its Miettinen´s 95 % confidence interval, where seventh semester students have about three times the risk of perceiving high stress.

Table 3. Estimation of risk level among dental students, by gender and semester.

Factor	Category	High stress (≥ 24)		Low stress (< 24)		[a] OR	[b] CI 95 %
		n	(%)	n	(%)		
Gender	Females (ref)	30	42%	18	25%	1.28	0.46 - 3.52
	Males	13	18%	10	15%		
Semester of study	7° (ref)	28	39%	11	16%	2.88	1.07 – 7.71
	1°, 3°, 5°	15	21%	17	24%		

[a] OR: odds ratio.
[b] CI 95 %: confidence interval of 95 %.

DISCUSSION

A high stress frequency of 60 % was found among dental students of a private dental institute from Acapulco, Guerrero, Mexico. The scores obtained from the PSS-10 showed that females are the ones who manage higher stress figures. In terms of semester, dental students in their last semester have around three times the risk of having high stress.

This study, being of cross-sectional design, has limitations with respect to establishing the temporality criterion. Regarding the high stress level in the last year, it is possible that the variations are recent, since stress is a modifiable variable depending on the perceived situation. Therefore, it cannot be defined that the semester precedes the affect, since students in other semesters may also present variations. The study highlights the need to include stressors as possible stress-increasing factors.

It was not possible to ask about the social and academic situations that students go through; it is likely that these variables influence stress levels in the different semesters. A limitation of the PSS used in this study is that it does not yield data on academic overload and the stressors associated with it. There is a need for studies that specifically measure academic stress or Burnout syndrome in dental students.

The level of high stress reported in our study was similar that reported in other studies which state that the event is frequent in more than half of the students (9-13). Abu-Ghazaleh et al. (9), mention variations in stress from the first to the last year among Jordanian dental students; although, in their study they used other instruments for its measurement. Elani et al. (6), through a systematic review conclude that dental students experience stress during their training due to the demands of the profession.

Regarding gender, in this research it was females who had a higher level of stress, as in other studies (9, 11, 12, 14). A longitudinal study mentions that female students are more likely to have high stress, compared to men (9). In this study, the reason expressed was that for every two females with high stress, there is one male with the same condition.

As for academic semester, when comparing the scores obtained in final year students against the rest, we found that there is a higher level of stress. This had already been reported in other studies, which mention that during the fourth and fifth years there are high levels of the event (9, 11-13). This could be due to the number of clinical procedures requested in the various teaching departments, which increase the frequency of the phenomenon (15, 16). It should be noted that a difference of our study with respect to others is that we provide the level of risk that dental students must stress. Given the results found, we suggest involving factors associated with perceived levels of stress in future research.

An important fact to add is that this research was conducted during online classes due to the coronavirus type 2 causing severe acute respiratory syndrome (SARS-CoV-2) situation. Özdede & Sahin (25), commented that the concern among Turkish dental students increases with the pandemic situation. Kharma et al. (26), found that more than half of the students suffer from anxiety and stress due to concern about returning to face-to-face clases. A study conducted on Iraqi students mentions that high stress is frequent in first year females due to the pandemic situation (27). Perhaps, the pandemic situation in combination with

the academic overload of online classes and family experiences increase the level of stress in students.

The SARS-CoV-2 situation came to alter the mental health of people, including students (28). It is important to carry out studies to evaluate the stress caused by this situation in the future. Campo-Arias et al. (29), mention that it is necessary to perform emotional well-being measures in citizens with modified instruments of the PSS, specific to measure the situation given by the contingency.

It adds the importance of using an instrument that assesses the satisfaction of online classes, teacher development and stressors that may be involved in the situation of high stress level in students. In addition, there is an existing concern among clinical learning, which, because of the pandemic situation, is not taking place. It is possible that these concerns, in combination with the practical development that final year students will have in social service, will be characterized by a high level of stress.

Stress manifests itself with alterations whose presence hinders daily activities. Dental students are subjected to prolonged academic loads, which require the development of activities all day long, with a demand for productive activities (30). With the results obtained in this research, it will be necessary to develop follow-up studies that will make it possible to know the variations of stress in students from the first year of entry.

The universe of the dental surgeon educational program of a private teaching institute was studied; therefore, the results only reflect the stress situation among undergraduate dental students. Educational institutions in the public sector do not have the same characteristics as those in the private sector. However, the results can be used to evaluate the situation of the phenomenon in other private dental schools with similar study programs.

CONCLUSIONS

This research reported that at least six out of ten students perceive high variations of stress. In view of the results, we suggest the development of research that allows the monitoring of students from the beginning of their training, to identify high stress variations. We also suggest the identification of the social, academic and environmental factors involved in the phenomenon. Dental educators should identify stressful situations in students, to refer cases that require psychological support.

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