

Risk Factors, Self-perceived Stress, and Clinical Training among Dentistry Students in Peru: A Cross-sectional Study

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ABSTRACT

Introduction: This is a cross-sectional research on the impact of academic stress to which Peruvian students of dentistry are exposed and the various risk factors that affect academic performance and clinical and preclinical training.

Aim: The aim of this study is to determine the association of the perceptions of stress and the risk factors in students who take preclinical and clinical courses of a Peruvian private university.

Materials and methods: This cross-sectional study evaluated 222 students of the School of Dental Medicine at the Universidad Privada de Ciencias Aplicadas (UPC). To measure stress levels, we used the Dental Environment Stress (DES) questionnaire that was previously validated in Spanish. Data, such as age, sex, and year of study, were collected in a file made for this study. The students belonged to the 1st and the 5th year of study and authorized their participation through informed consent. In the data analysis, the odds ratio and the Chi-square test were used.

Results: We found that clinical students have 2.96 times higher risk of having stress than preclinical students. Within these categories, in the preclinical level, the first-year students show the higher stress levels (68.2% in moderately stressful and very stressful 15.1%), while in the clinical level, the third-year students had a higher stress level (80.9% in moderately stressful and 19% in very stressful). Our data show no association between sex and stress levels of the students ($p = 0.508$).

Conclusion: Clinical students show more stress level with 2.96 times higher risk for stress compared to preclinical students. In the preclinical level, the first-year students showed a higher stress level, while in the clinical level, third-year students had a higher stress level. Our data show no association between sex and stress levels of students.

Clinical significance: The impact of stress on dentistry students significantly influences their performance at the time of performing dental treatment protocols. This research shows the direct relationship that exists between these variables.

Keywords: Clinical training, Dental student, Peruvian university, Self-perceived stress.

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INTRODUCTION

For a long time, dentistry has been a demanding profession that generates much physical and mental strain on the professional. On many occasions, it has been observed that some students begin to experience stress when they begin the clinical practices of the Dental School, because at this time, they begin to perform their practices in real patients, in addition to receiving theoretical content, laboratory practices, and simulation dental.^{1,2}

University teachers seek to train health professionals who are ethical and competent to practice general dentistry at a level commensurate with the expectations of the society and in the best possible way. Undergraduate dental education uses pedagogical procedures on specific competences, in such a way that it facilitates the student to obtain the necessary academic, clinical, and interpersonal skills within the curriculum of the professional career.¹

Stress is described as a general mechanism of the body to adapt to all the influences, changes, demands, and tensions that could be exposed by the person, being common in all these processes the way the body tries to adapt, where sometimes the welfare of the person is endangered and can have a detrimental effect on academic performance. Teachers must monitor the level of stress that could be generated in students in relation to the academic subject, take measures to reduce the generating factors, and promote students to generate management tools to control stress situations that arise in their future profession. It has been shown in

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many studies that physical and mental illness, boredom at work, professional burnout, and a potential inhibitor in the performance of work are the most important causes of some diseases like stress.^{3,4}

For this reason, dentistry schools should make every effort to balance the demands of academic and clinical training to obtain quality in the work of students. This challenge has led to considerable interest in identifying sources of stress for students in dental education programs. These signals are easily detectable in daily activities by a set of psychic or organic signs that produce alarm states that induce the individual to the so-called struggle or fleeing that end in adaptation or exhaustion that can contribute to general or specific stress disorders.^{5–11}

Therefore, the objective of this study was to examine the prevalence of stress among dentistry students in Peru, to identify

the triggers that are risk factors, and to investigate the perceived impact of stress on their daily activities and mood during their training as future professionals.

MATERIALS AND METHODS

This cross-sectional study included all the students enrolled, who attended classes in the School of Dentistry of the Peruvian University of Applied Sciences (UPC), in Peru. The dental school follows a 5-year curriculum. Therefore, this research evaluated 222 officially enrolled students. The Dental Environment Stress (DES) questionnaire was created by Garbee et al.⁹ and validated in Spanish by Fonseca et al.¹¹ was used in this investigation. The sample was calculated using the proportions' comparison formula, establishing a significance level of 0.05 and a test power of 0.80; in addition, the subjects were evaluated by means of a simple random sampling. The study was approved by the Ethics and Research Committee of the Faculty of Health Sciences of the UPC with the approval code PI071-2013. Finally, it is worth mentioning that the elaboration and execution of this research followed the guidelines established by the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) (the reporting of observational studies in epidemiology) guidelines, thus guaranteeing the methodological and statistical rigor of the results obtained.

A letter of authorization was presented to the academic director of the professional career, to carry out the data collection of the students from the 1st to the 10th cycle. The students of the dental school from the 1st to 5th year of the UPC in their different venues were evaluated. Before the selection of the probabilistic sampling and after the call, the informed consent was voluntarily granted to each one of the participants. Underage students received an informed consent form before completing the questionnaire.

The dental clinic of the UPC was the main venue to collect the data and conduct the questionnaire to students from the 5th to the 10th cycle who took clinical courses. Subsequently, the Campus Villa of the UPC was visited to evaluate the students from the 1st to the 4th cycle who had preclinical courses and who had the authorization of their parents.

The survey was evaluated according to the instrument called "DES" and some data were added, such as age, sex, workload, and year of study. The questionnaire had 30 questions to mark according to how they felt in various situations related to the academic life they have during their dental career. The categories to be chosen were "non-stressful," "slightly stressful," "moderately stressful," "very stressful," and "not relevant" in case the statement is not consistent with their life situation. The survey took a maximum of 10 minutes and was conducted during class hours to ensure that all students were present. Finally, the surveys were classified and transferred to a database created for the corresponding statistical analysis.

The analysis of the data was performed using Stata® statistical software 12.0. For the univariate analysis, we proceeded to obtain the descriptive statistics (frequency and prevalence) of the qualitative variables of the study, recorded in a frequency table. Normal distribution was determined by using the Kolmogorov-Smirnov test. For the bivariate analysis, the Chi-squared test, odds ratio, was used to determine the risk factors associated with the stress level, and the Mann-Whitney U test to compare the variables.

RESULTS

In the descriptive statistical analysis of the variables year and gender, it was found that the preclinical students were 52.7% and the clinical students were 47.3%. It was also found that the percentage of the male gender was 33.3% and that of the female was 66.7% (Table 1).

Regarding gender, no difference was found statistically except in question 25 (work while studying), where it was observed that the female gender had a higher stress index with an average of 2.01 ± 1.21 than the male gender with an average of 1.56 ± 1.44 (Table 2).

An analysis was made to associate the stress level of the students with the year of study, observing that the year with the highest level of stress was the fourth-year students with 27% of the total number of students that year, followed by the third-year students with a percentage of 19 of all students of that year. For the purposes of the study, the years of clinical and preclinical studies were categorized, observing that clinical students have a higher level of stress (18%) than students who do not have clinical subjects (16.2%). In addition, we can observe that there is a statistically significant association with stress and the year of study ($p = 0.001$) (Table 3).

In addition, a degree of association was established between the main stress variable and the year of study of the students of the School of Dentistry. It was found that the clinical students present 2.96 times higher risk than the preclinical students (Table 4).

DISCUSSION

The present study used the questionnaire "DES", which was created by Garbee et al.⁹ and validated to Spanish by Fonseca et al.¹¹ which determines the degree of stress of the students who follow the career of dentistry. This instrument was used in several investigations that evaluated the level of stress,¹¹⁻¹⁹ which was the general objective of the present investigation.

Stress was defined as a situation or thought that makes one feel frustrated, angry, or anxious; it can be measured by several instruments. One of them, the one most used at the moment for research studies, is DES. This questionnaire has the advantages of presenting direct questions with direct answers (because the response scale has only five options), it takes only a few minutes to answer and has been used in many investigations. We evaluated 74 (33%) students of the male gender and 148 (67%) of the female gender of the School of Dentistry of the UPC. In several studies, it has been observed that the female gender prevailed in the dental population during the last years. Thus, in studies, such as those of Acharya,⁷ Polychronopoulou,⁸ Muirhead,¹⁵ Gorter,¹⁷ and Abu-Ghazale,¹⁹ the majority of students are female, showing a situation consistent with the present study. However, there are studies, such as that of Tangade,²⁰ which presented a sample made up of 304 students, where 60% was represented by the male gender. From the present study, it was possible to determine the average age of the students of the School, finding a value of 21.10 ± 4.30 in the male gender and 19.61 ± 2.26 in the female gender. This was

Table 1: Distribution of the gender and year of study of the students of the School of Dentistry

Variable	Group	Frequency	(%)	Total (%)
Academic Level	Pre-clinic	117	52.7	100
	Clinic	105	47.3	
Gender	Male	74	33.33	100
	Female	14	66.67	

Table 2: Comparison of the degree of stress of dental students according to gender

Questions	Female	Male	p value
1: Amount of work in class	2.68 ± 0.85	2.5 ± 0.93	0.291
2: Difficulty of working in class	2.54 ± 0.81	2.24 ± 0.90	0.323
3: Competition for the notes	3 ± 0.99	2.95 ± 1.01	0.609
4: Patients who arrive late or do not make their appointments	0.75 ± 1.51	3.18 ± 1.52	0.145
5: Exams or notes	3.15 ± 1.02	3 ± 0.92	0.181
6: Atmosphere created by the clinical teaching staff	0.53 ± 1.07	2.52 ± 1.03	0.232
7: Difficulty learning precision manual skills	0.48 ± 1.03	2.08 ± 0.97	0.069
8: Difficulty in learning clinical procedures	0.56 ± 1.18	2.08 ± 0.93	0.110
9: Lack of adequate clinical staff in the clinic	0.23 ± 0.48	1.91 ± 0.93	0.166
10: Lack of security to be a successful dentistry student	2.14 ± 1.07	1.85 ± 1	0.128
11: Lack of self-confidence to be a successful dentist	2.06 ± 1.03	1.82 ± 0.98	0.106
12: Lack of time between seminars, laboratories or clinic	0.58 ± 1.23	3.02 ± 1.15	0.201
13: Provisions of the faculty	2.17 ± 1.13	3.04 ± 0.99	0.429
14: Lack of home atmosphere in the accommodation area	0	0	-
15: Compliance with graduation requirements	2.24 ± 1.50	3.37 ± 0.94	0.126
16: Lack of input in the decision-making process of the faculty	2.23 ± 1.16	2.83 ± 1	0.276
17: Insecurity relative to the professional future	2.36 ± 1.12	2.58 ± 0.95	0.310
18: Financial responsibilities	2.27 ± 1.32	2.5 ± 1.30	0.091
19: Lack of time to perform the assigned tasks of the faculty	2.85 ± 1.01	2.97 ± 1.04	0.981
20: Inconsistency of feedback about their work among different instructors	2.07 ± 1.12	1.98 ± 1.19	0.320
21: Assistance and success in dental issues	1.91 ± 1.06	2.91 ± 1.01	0.893
22: Lack of communication or cooperation of patients	0.64 ± 1.32	2.41 ± 1.36	0.265
23: Lack of time to relax	2.57 ± 1.13	3.13 ± 1.01	0.780
24: Fear of not passing the course or year	2.97 ± 1.16	3.43 ± 0.90	0.363
25: Work while studying	2.01 ± 1.21	1.56 ± 1.44	0.007
26: Neglecting personal life	2.34 ± 1.19	2.16 ± 1.14	0.323
27: Fear of dealing with patients with contagious diseases	0.62 ± 1.24	2.94 ± 0.88	0.165
28: Delay in receiving notes	2.51 ± 1.09	1.75 ± 0.82	0.750
29: Lack of self-evaluation and awareness of one's competencies	2.18 ± 1.03	2.24 ± 0.85	0.178
30: Cooperation of the dental laboratory	0.37 ± 0.78	2.95 ± 1.43	0.141

Mann-Whitney U test

Level of statistical significance ($p < 0.05$)

Table 3: Association of stress level with the year of study and academic level of the students of the School of Dentistry

Variables	Stress level				Total	p value*
	Not stressful	Slightly stressful	Moderately stressful	Very stressful		
First year	0 (0%)	11 (16.6%)	45 (68.2%)	10 (15.1%)	66 (100%)	0.001
Second year	0 (0%)	12 (23.5%)	30 (58.8%)	9 (17.6%)	51 (100%)	
Third year	0 (0%)	0 (0%)	34 (80.9%)	8 (19%)	42 (100%)	
Fourth year	0 (0%)	0 (0%)	27 (72.9%)	10 (27%)	27 (100%)	
Fifth year	1 (3.84%)	7 (26.9%)	17 (65.3%)	1 (3.84%)	26 (100%)	
Total	1	30	153	38	222	
Preclinic	0 (0%)	23 (19.6%)	75 (64.1%)	19 (16.2%)	117 (100%)	0.001
Clinic	1 (0.95%)	7 (6.6%)	78 (74.2%)	19 (18.0%)	105 (100%)	
Total	1	30	153	38	222	

*Chi-square test

Level of statistical significance ($p < 0.05$)

similar to other studies, such as Harikiran,¹ where it was observed that the mean age was 21.2 ± 0.7 , and in the Tangade study,²⁰ where the average age was 20.65 ± 2.07 .

The perception of stress was determined through DES in 222 students of the career. According to the average scores of the

questions in the questionnaire, it was observed that the highest average was obtained in question 24 (fear of not passing the course or the year), followed by question 5 (exams or notes), question 3 (competition for grades), question 19 (lack of time to complete the tasks assigned by the faculty), and question 23 (lack of time to

Table 4: Magnitude of association (OR) of the level of stress with the year of study of the students of the School of Dentistry

		Degree of stress		
		Not stressed	Stressed	p value
Year of study		OR	95% CI	
Preclinic (1st and 2nd year)		2.966	1.264–6.962	0.012
	Clinic (3rd, 4th, and 5th year)			

Level of statistical significance ($p < 0.05$)

relax) successively. These results were similar to the Fonseca study,¹¹ where question 24 generated greater stress followed by questions 5, 23, 19, and 4. The research carried out by Muirhead¹⁵ found that the items that generate a higher stress index were question 5 followed by questions 23 and 3. In Saxena's study,¹⁸ a similar situation was found, where question 27 presented a higher stress load followed by questions 5 and 24 in dentistry students in the city of Bhopal, India. Also, it could be observed in Sedky's study² that the items that generated the highest stress index were questions 19, 12, 1, and 5 successively.

These results may be due to the fact that the level of academic demand is quite high in the school, where the number of requirements to pass the clinical course is extensive, generating a lack of time to perform the assigned tasks (despite the students' ample hours), and lack of time to relax. Another possible cause may be due to the students' interest in reaching the maximum grade, in such a way that they compete among themselves to stand out in the group, which generates some stress because they fear not achieving this purpose. On the contrary, the students of the School of Dentistry of the UPC obtained the lowest average in questions 9 (lack of adequate clinical staff in the clinic) and questions 7 (difficulty to learn precision manual skills). This may be due to the close relationship between students and teachers and the small number of students per year of study, allowing the teaching to be more personalized. These results were discordant to the Muirhead study.¹⁵ This author presented that question 14 (lack of home atmosphere in the accommodation area) was the one with the lowest stress index, which cannot be compared with our study because our school does not have accommodation services. On the contrary, this author presented that questions 9 and 7 presented light or moderate stress in the students. There are numerous research studies that have evaluated these variables that mention the direct relationship that exists between them, directly affecting the capacity of the subjects evaluated.^{21–27}

Another important variable in the investigation was the year of study. For the purposes of the study, it was categorized into clinical (3rd, 4th, and 5th year) and preclinical (1st and 2nd year). This characteristic was also taken by other authors, such as Suha Abu-Ghazaleh,¹⁹ where he also categorized the 1st, 2nd, and 3rd year students as preclinical students and 4th and 5th year as clinical students. Also, Muirhead¹⁵ categorized the 1st and 2nd year students as preclinical and the 3rd and 4th year students as clinical, so it was convenient to use this variable as a general objective. This is discordant to other authors, such as Bedoya⁴ and Acharya,⁷ who take the categorization only for years of study.

In Peru, training in the professional career of dentistry lasts 10 academic years (5 years). The curriculum includes subjects of general culture, basic sciences, preclinical training, and clinical

training. This situation is quite similar in countries like Brazil and Colombia. On the contrary, in the United States, universities do not teach undergraduate programs in dentistry, people who plan to choose that career must meet certain prerequisites, among which some are taught by the American Dental Association (ADA), which include 8-hour courses in Biology, Physics, English, General Chemistry, and Organic Chemistry; and requirements by the Schools of Dentistry. It is not necessary to graduate in any of the sciences mentioned, but it is a prerequisite to have taken those courses and then apply for the Dentistry Admission Examination (DAE). Finally, they must complete 4 more years to achieve the professional degree, of which 2 years are devoted to the basic medical sciences and 2 years to acquire a clinical orientation.²⁸

In this study, it was found that the stress level of preclinical students (16.2% very stressful) was lower than that of the students who study clinical subjects (18% very stressful). The students with the highest level of stress were the fourth-year students with 27% of all students of that year, followed by the third-year students with a percentage of 19 of all students of that year. This may be due to the fact that the students begins to perform their clinical practices in real patients after the 3rd year, in addition to the number of hours per week increasing with the years of study. In the case of the fourth-year students, they have a higher workload compared to the rest of the students. These results were similar to the study of Suha Abu-Ghazaleh,¹⁹ where he showed that the level of stress increases over the years, determining that the 1st year had a lower level of stress and the 5th year he had higher levels of stress.

The gender variable was also used, in which it was categorized into feminine and masculine. This variable was also taken by various authors such as Harikiran,¹ Sedky,² Madhan,³ among others. In the present study, it was observed that female students (74.77%) have higher levels of stress than male students (25.22%). This may be because women are three times as vulnerable as men to low moods. There are studies that show that the rate of production of serotonin in the brain of men is 52% higher than in women. These results are similar to the studies conducted by Sedky² and Acharya,⁷ but it is discordant to the Polychronopoulou study,¹² where it shows statistically significant difference between the female and the male gender.

Finally, the most important limitation in this study was to survey the entire population of students of the School of Dentistry, because not all students carry all the courses they have to take in their academic cycle or were absent on the day of the survey. On the contrary, another limitation is the fact that the sample was mostly female students. Previous studies have found that female students of dental schools show higher levels of stress than male students.

CONCLUSION

A greater degree of stress was found in the students of the clinic than in the preclinical students. Among the preclinical students, the students who presented the highest degree of stress were the 1st year students, while within the group of the students of the clinic, the students who presented the highest degree of stress were the 3rd year students. In addition, it was observed that the students belonging to the clinical group have OR = 2.96, CI95% = 1.264–6.962 in comparison to the preclinical students. The Spanish version of the DES-30 questionnaire did well, but we need future studies. Dental school-wide strategies to prevent high levels of stress, as well as provision of counseling and interventions to students who need it, are necessary to maintain a positive academic environment.

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