








# Stress and minor mental disorders in undergraduate dental students: a cross-sectional study

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This study aimed to analyze the occurrence of stress and minor mental disorders (MMD) among dental students. Participants included students in the pre-clinical stage (N=123) and clinical stage (N=169) of the dental program. Data collection was carried out using sociodemographic data, Dental Environmental Stress (DES) and Self-Reporting Questionnaire (SRQ-20) to evaluate the minor mental disorders (DMM). Analysis was conducted using the Mann-Whitney test, Fisher's exact test, and logistic regression with a significance level of 5%. The overall mean for stressors was 2.7, indicating a range between "Mildly Stressful" and "Moderately Stressful," with higher levels observed in the clinical stage (2.8) and among women (2.9). The main stressors were "Exams and grades" (pre-clinical - 3.7, clinical - 3.9; p=0.0314), "Fear of failing a subject or losing the year" (pre-clinical - 3.6, clinical - 3.7; p=0.7596), "Completing graduation requirements" (pre-clinical - 3.4, clinical - 3.6; p=0.1092), and "Lack of time for relaxation or leisure" (pre-clinical - 3.3, clinical - 3.6; p=0.0037). The overall prevalence of MMD was 78.5%, with higher rates observed in the clinical stage (82.2%) and among women (81.6%). Of the variables in the regression analysis, two remained significant: "Difficulties at work" (p=0.001) and "Loss of interest in things" (p=0.033). The environment experienced by the participants in this study presents stressors, with a high prevalence of suspected MMD among female students in both stages of the dental program.

**Keywords:** Occupational stress. Mental disorders. Students, dental.



## Introduction

Admission to the University constitutes a very significant transition process in the student's life. In this new stage, there is a need to adapt to a new university context full of novelties and challenges. This set of factors, called stressors, has a direct impact on the quality of life of individuals, which can alter psychological functioning and cause disorders that compromise the health and academic performance of students<sup>1-4</sup>.

Stress can be defined as the state caused by the perception of stimuli capable of generating emotional arousal that, by disturbing homeostasis, result in a process of adaptation, thus generating systemic manifestations and physiological and psychological disorders. The term stressor, in turn, defines the event or stimulus that will drive the stress<sup>1,2</sup>. The way the individual evaluates and deals with the stressful situation is related to some moderating agents, such as personality, social support, educational level, etc. When the body's ability to maintain homeostasis is overtaken by the stressor, then the diseases resulting from stress arise<sup>2</sup>.

In this context, we can say that students are exposed to several stressors within the academic environment, such as knowledge overload, personal and teacher charges, tests and grades, among others. Among dental students, stress can also arise due to laboratory and clinical training, which require, in addition to theoretical competencies, the development of manual and interpersonal skills with patients<sup>3</sup>. During this process, we can say that students are negatively affected by stress, which has numerous consequences for their academic performance and psychosocial well-being<sup>4</sup>.

Minor mental disorders (MMD) represent less severe and more frequent mental disorders. Symptoms include memory alterations, difficulty concentrating and making decisions, insomnia, irritability and fatigue, as well as somatic complaints (headache, lack of appetite, tremors, gastrointestinal symptoms, among others)<sup>5</sup>. These symptoms can impact relationships, quality of life and compromise performance in daily activities, in addition to being substrates for the development of more severe disorders<sup>6</sup>.

It is estimated that 15 to 25% of university students present some psychic disorder during their academic training, as it constitutes a phase of great changes in the subject's life<sup>7</sup>. In Brazil, the prevalence rates of minor mental disorders in academics ranged from 25%<sup>8</sup> to 58%<sup>9</sup>.

According to the report Fonaprace<sup>10</sup>, in a sample of 939,604 students from IFES (Federal Institutions of Higher Education), 79.8% of the students reported experiencing emotional difficulties in the last twelve months. The emotional difficulty most reported by the students was anxiety (58.36%) followed by discouragement/unwillingness to do things, with a frequency of 44.72%. Of the total students surveyed, 30.45% reported having already sought psychological care.

Students in the health area, when compared to students in other areas, are more vulnerable to psychological problems due to the demands to which they are submitted<sup>11,12</sup>. Cherchiar et al.<sup>8</sup> investigated the mental health of students from different courses. The total prevalence of MMR in this population was 25%, with nursing students being

the most affected (34%). Facundes and Ludermir<sup>13</sup> conducted a similar study, proving that there is a higher incidence of these disorders in students in the health area, with a general rate of 34.1%, with a predominance among medical students (42.6%). In another study<sup>14</sup> with medical, dental and nursing students, they found a general prevalence for the same disorders of 33.7%.

Since the university environment has numerous stressors capable of causing important changes in the body, including putting at risk the mental health of students, the present study proposed to identify the occurrence of stress and minor mental disorders in students of the Undergraduate Course in Dentistry in a certain college in Brazil.

## Material and Method

### Study design and sample selection

It was a descriptive, cross-sectional and exploratory study. The sample design in this study was non-probabilistic. The sample was composed of students enrolled in the Undergraduate Course in Dentistry of the School of Dentistry of Araraquara – UNESP in the Pre-Clinical phase (N = 123) (belonging to the 1st to the 4th semester), who attend pre-clinical disciplines of a theoretical and practical nature (laboratory), but do not yet have specific clinical and academic activities enrolled in the Clinical Stage (N = 169) (belonging to the 5th to the 10th semester, they take courses more focused on learning clinical practice and patient care, in an increasing degree of technical-scientific complexity. The study was approved by the Human Research Ethics Committee of the Universidade Estadual Paulista (UNESP) of the Faculdade de Odontologia de Araraquara (registration number CAAE: 16161419.0.0000.5416)

### Data collection

Socio-demographic data:

Used to obtain data related to the student's profile. This questionnaire was developed by Sangiorgio et al.<sup>15</sup> and adapted by the authors of the present study, reducing the number of questions.

### Dental Environmental Stress (DES)

Used to identify and quantify specific stressors in dental students. This questionnaire was translated and validated into Portuguese by Sangiorgio et al.<sup>15</sup>, with the name of Stress in the Dental Environment (OAS). Composed of 36 items answered by the following scale: 0 (not applicable), 1 (non-stressful), 2 (slightly stressful), 3 (moderately stressful) and 4 (very stressful). The items are divided into domains for a better analysis of the data, namely: "Academic Performance", "University Relationship", "Responsibility with patients", "Professional Difficulties" and "Personal and Institutional Factors".

### Self-Reporting Questionnaire (SRQ-20)

Used to identify the presence of anxious, depressive and psychosomatic symptoms. This instrument was developed with the objective of evaluating minor mental disorders (DMM) in populations. It is intended for the detection of symptoms, that is, it

suggests a level of suspicion (presence/absence) of some mental disorder, but does not discriminate a specific diagnosis; thus, it assesses whether there is any disorder, but does not offer a diagnosis of the type of existing disorder. Because of this screening character, it is very suitable for population studies, being very useful for a first classification of possible cases and non-cases. This instrument was translated into Portuguese by Busnello et al.<sup>16</sup> and is recommended by the World Health Organization to screen for psychiatric disorders in primary health care centers. The questionnaire consists of 20 questions with “yes” or “no” answers, four questions about physical symptoms and 16 about psychoemotional disorders. Each “yes” answer is assigned one point, resulting in a final score ranging from 0 to 20 points. When analyzing the SRQ-20, different cutoff points were used for each sex. Men with a score  $\leq 5$  and women with a score  $\leq 7$  were classified as “not suspected of MMD” and men with a score  $\geq 6$  and women with a score  $\geq 8$  were classified as “suspected of MMD”.

The questionnaires were prepared in “Google Forms” and made available through a link to be answered online. To prevent people who are strangers to the study sample from having access to the questionnaire, each student received in their institutional e-mail the link to access the questionnaire, being the exclusive access through the link sent to each participant.

## Data analysis

The collected data were entered into spreadsheets and evaluated using the SPSS version 17.0 program, and the results were expressed in tables with the frequency distribution in absolute and percentage numbers. After obtaining the prevalence of stress and minor mental disorders, tests of association between the dependent variables and the independent variables were performed using the chi-square test with a significance level of 5% and logistic regression.

## Results

### Socio-demographic data

The participating students were mostly women (74.7%), single (98.6%) and were, on average, 21.5 years old. The majority (44.7%) live with other people, 31.1% live alone, 19.1% live with their parents or relatives and 5.1% live in other types of individual/collective housing, and no participant reported living with a spouse and/or children.

Among the participants of this study, 72.9% declared having moved to another city to attend university, 15.1% already lived in Araraquara and 12% claimed to have changed state. Most of the students declared to be in the same entrance class (90.4%) and not to have any failure (87.0%).

### Dental Environmental Stress (DES)

The overall mean of the stressors among the participants was 2.7 (standard deviation 1.3), being located between Mild Stressful and Moderately Stressful.

The mean among the stressors was higher among the students of the clinical stage, with a mean of 2.9 (standard deviation 1.2). The preclinical stage presented a mean

slightly below this value, with 2.4 (standard deviation 1.4), values also considered between Mild Stressful and Moderately Stressful.

Table 1 shows the means of the stressors according to the domains, with the division of the students into the preclinical and clinical stages.

**Table 1.** Mean and standard deviation of the level of stressors of the questionnaire “DES”, according to the Domains, in the pre-clinical and clinical stages of the students of the Dentistry Course.

Domains/Stressor Factor	Steps/Level/Standard Deviation		p
	Preclinical	Clinic	
<b>Academic Performance</b>			
Amount of work required in the classroom	3.0 (0.9)	2.9 (0.9)	0.4196
Difficulties in the classroom	2.8 (0.9)	2.9 (1.0)	0.0960
Exams and grades	3.7 (0.6)	3.9 (0.5)	0.0314*
Environment created by the faculty	2.7 (1.0)	3.6 (0.5)	<0.0001*
Receive criticism of the work done	2.3 (1.2)	2.7 (1.0)	0.0056*
Lack of time to relax or for leisure	3.3 (0.9)	3.6 (0.7)	0.0037*
Complete the requirements for graduation	3.4 (0.9)	3.6 (0.8)	0.1092
Reconciling personal life with college routines	3.4 (0.7)	3.5 (0.8)	0.1072
Fear of failing a discipline	3.6 (0.9)	3.7 (0.7)	0.7596
Lack of time to do the required jobs	3.3 (0.8)	3.4 (0.8)	0.0628
<b>University Relationship</b>			
Competitiveness by grade	3.1 (1.2)	2.8 (1.3)	0.0283*
Interactions with people of the opposite sex	1.5 (0.9)	1.5 (1.0)	0.8925
Amount of academic dishonesty	1.9 (1.3)	2.1 (1.3)	0.0984
Lack of family atmosphere during college	1.7 (1.4)	1.9 (1.5)	0.5047
Discriminatory attitudes towards female students	2.2 (1.4)	2.6 (1.4)	0.0511
Conflict with the family over the future of the profession	1.5 (1.1)	1.7 (1.3)	0.1829
Discrimination due to social status or ethnic group	1.7 (1.5)	1.9 (1.5)	0.3070
Discriminatory attitudes towards homosexual dental students	1.9 (1.6)	2.3 (1.7)	0.0640
<b>Responsibility to patients</b>			
Lack of cooperation of patients in the care they must take at home	0.9 (1.2)	2.6 (0.8)	<0.0001*
Responsibility for the care of the patient's health in an integral way	1.3 (1.4)	2.7 (1.0)	<0.0001*
Delay or lack of patients in appointments	0.9 (1.2)	2.5 (1.0)	<0.0001*
Perform treatments in patients with mouths without proper hygiene	1.0 (1.3)	2.2 (1.0)	<0.0001*
<b>Professional Difficulties</b>			
Difficulty learning clinical procedures	1.9 (1.5)	3.0 (1.0)	<0.0001*
Difficulty learning manual skills in the preclinical stage	1.8 (1.5)	3.0 (1.0)	<0.0001*
Lack of confidence in being a successful dental student	3.2 (1.0)	3.4 (0.9)	0.0607

Continue

Continuation			
Lack of self-confidence in being a successful dentist	3.2 (1.0)	3.5 (0.8)	0.0045*
Insecurity about the professional future	3.4 (0.9)	3.7 (0.7)	0.0039*
Fear of being unable to recover in studies	3.5 (0.9)	3.5 (0.9)	0.7979
Personal and Institutional Factors			
Rules and regulations of the dental school	2.0 (1.0)	2.4 (1.0)	0.0001*
Differences between college expectations and reality	2.7 (1.1)	3.2 (0.9)	0.0001*
Lack of participation in college decision-making processes	2.3 (1.1)	2.8 (1.0)	0.0003*
Financial responsibilities	3.2 (1.0)	3.5 (0.8)	<0.0001*
Consider joining another workspace	1.7 (1.3)	2.1 (1.6)	0.0160*
Difficulties in making marital commitments due to dental school	1.4 (1.5)	1.4 (1.5)	0.9686
Personal physical health	2.9 (1.0)	3.2 (1.0)	0.0044*
Incompatibility between evaluations of work between different teachers	2.6 (1.3)	3.4 (0.9)	<0.0001*

\*Statistically significant, Mann Whitney test,  $p < 0.05$

In the "Academic performance" domain, the highest averages among the stressors in the preclinical and clinical stages, respectively, were: "Tests and grades" (3.7 and 3.9), "Fear of failing a subject or losing the year" (3.6 and 3.7), "Completing the requirements for graduation" (3.4 and 3.6), "Lack of time to relax or for leisure" (3.3 and 3.6), whereas levels between 3 and 4 are categorized as moderately and very stressful. It is noted that the greatest difference between the preclinical and clinical means was in the factor "Environment created by the faculty" (2.7 and 3.6), that is, from slightly to moderately stressful.

In the "University Relationship" domain, the factor "Competitiveness by grade" stands out, where the average in the students of the pre-clinical stage was 3.1 and in the clinical stage of 2.8, being located at the level Mild and Moderately Stressful, and this being the only factor with statistically significant difference. The lowest average of the group was 1.5 for both stages in the factor "Interactions with people of the opposite sex".

In the domain "Responsibilities with patients", all questions presented a statistically significant difference, ranging from non-stressful to moderately stressful, with higher mean values in the clinical stage. In descending order (pre-clinical and clinical respectively) we have: "Responsibility for the health care of the patient in an integral way" (1.3 and 2.7), "Lack of cooperation of patients in the care they should take at home" (0.9 and 2.6), "Delay or lack of patients in consultations" (0.9 and 2.5), "Perform treatments in patients with mouths without adequate hygiene" (1.0 and 2.2). This is due to the difference in experiences found by the two groups, since the preclinical stage has little or no contact with patients, while the clinical stage deals with them more frequently in their routine in college.

The fourth domain "Professional difficulties", covers issues of self-confidence of the student, both about their expectations and possible frustrations in the profession

and in graduation. The highest averages were the following factors: "Insecurity about the professional future" (3.4 pre-clinical and 3.7 clinical) and "Fear of being unable to recover if I fall behind in studies" (3.5 for both groups), categorized as Moderately Stressful. All factors were statistically significant, except for "Lack of confidence in being a successful dental student." Two factors stand out for the difference in mean in the populations, they are: "Difficulty in learning clinical procedures" (1.9 and 3.0) ( $p < 0.0001$ ) "Difficulty in learning precision manual skills required in preclinical and laboratory work" (1.8 and 3.0) ( $p < 0.0001$ )

In the last domain, "Personal and Institutional Factors" it is observed that, once again, the mean values of the clinical stage are higher than the values of the preclinical stage and all presented statistically significant difference, except for a single question ("Difficulties in assuming marital commitments (living together, engagement, marriage) due to the dentistry course"). The most prominent factor was "Financial Responsibilities" with an average of 3.2 preclinical and 3.5 clinical, categorized as Moderately Stressful.

An analysis of stressors in relation to gender was also performed, with the same domains. The mean of the female gender was the highest with 2.8 (standard deviation 1.3), while the male gender obtained a mean of 2.4 (standard deviation 1.4), values considered between Mild Stressful and Moderately Stressful.

The mean values of the questions related to stressors, according to gender, are shown in Table 2.

**Table 2.** Mean and standard deviation of the level of stressors of the questionnaire "DES", according to the Domains, in the female and male gender of the students of the Dentistry Course. Araraquara, 2019.

Domains/Stressor Factor	Gender/Level/Standard Deviation		p
	Feminine	Masculine	
<b>Academic Performance</b>			
Amount of work required in the classroom	3.0 (0.9)	2.7 (0.8)	0.0047*
Difficulties in the classroom	2.9 (0.9)	2.6 (1.0)	0.0349*
Exams and grades	3.8 (0.4)	3.6 (0.7)	0.0696
Environment created by the faculty	3.2 (0.9)	2.6 (1.0)	0.0001*
Receive criticism of the work done	2.7 (1.0)	2.1 (1.0)	0.0004*
Lack of time to relax or for leisure	3.6 (0.8)	3.4 (0.9)	0.1058
Complete the requirements for graduation	3.6 (0.8)	3.3 (1.0)	0.0350*
Reconciling personal life with college routines	3.6 (0.7)	3.2 (0.9)	<0.0001*
Fear of failing a discipline	3.7 (0.7)	3.4 (1.0)	0.1397
Lack of time to do the required jobs	3.5 (0.8)	3.1 (0.8)	0.0043*
<b>University Relationship</b>			
Competitiveness by grade	3.0 (1.2)	2.7 (1.4)	0.0697
Interactions with people of the opposite sex	1.6 (1.0)	1.2 (0.9)	0.0069*

Continue

Continuation			
Amount of academic dishonesty	2.0 (1.3)	2.0 (1.5)	0.9149
Lack of family atmosphere during college	1.9 (1.5)	1.4 (1.2)	0.0112*
Discriminatory attitudes towards female students	2.7 (1.2)	1.7 (1.7)	<0.0001*
Conflict with the family over the future of the profession	1.6 (1.2)	1.5 (1.2)	0.3960
Discrimination due to social status or ethnic group	1.7 (1.5)	1.9 (1.6)	0.5798
Discriminatory attitudes towards homosexual dental students	2.3 (1.6)	1.7 (1.6)	0.0200*
Responsibility to patients			
Lack of cooperation of patients in the care they must take at home	2.0 (1.3)	1.7 (1.4)	0.1500
Responsibility for the care of the patient's health in an integral way	2.3 (1.4)	1.7 (1.3)	0.0039*
Delay or lack of patients in appointments	1.9 (1.3)	1.7 (1.3)	0.2463
Perform treatments in patients with mouths without proper hygiene	1.8 (1.3)	1.5 (1.3)	0.0523
Professional Difficulties			
Difficulty learning clinical procedures	2.7 (1.4)	2.1 (1.2)	0.0003*
Difficulty learning manual skills in the preclinical stage	2.7 (1.4)	1.9 (1.3)	<0.0001*
Lack of confidence in being a successful dental student	3.4 (0.9)	3.0 (1.0)	0.0006*
Lack of self-confidence in being a successful dentist	3.5 (0.9)	2.9 (1.0)	<0.0001*
Insecurity about the professional future	3.7 (0.7)	3.2 (1.0)	0.0012*
Fear of being unable to recover in studies	3.6 (0.8)	3.2 (1.0)	0.0097*
Personal and Institutional Factors			
Rules and regulations of the dental school	2.3 (1.0)	1.9 (0.9)	0.0056*
Differences between college expectations and reality	3.1 (0.9)	2.5 (1.1)	0.0002*
Lack of participation in college decision-making processes	2.7 (1.1)	2.3 (1.2)	0.0127*
Financial responsibilities	3.5 (0.8)	2.9 (1.0)	<0.0001*
Consider joining another workspace	2.0 (1.5)	1.6 (1.4)	0.0290*
Difficulties in making marital commitments due to dental school	1.5 (1.5)	1.2 (1.4)	0.1821
Personal physical health	3.2 (1.0)	2.8 (1.0)	0.0030*
Incompatibility between evaluations of work between different teachers	3.1 (1.1)	2.8 (1.3)	0.0611

\*Statistically significant, Mann Whitney test,  $p < 0.05$ .

In the "Academic Performance" domain, all stressful factors presented higher averages in the female gender, with the factor "Exams and grades" standing out with the highest averages in each group (female=3.8 and male=3.6). Thus, a statistical difference is observed in most factors, listed in ascending order of significance: "Meeting graduation requirements (Grades/Clinical production/Internship)" ( $p=0.0350$ ), "Difficulties in the classroom" ( $p=0.0349$ ), "Amount of work required in the classroom" ( $p=0.0047$ ), "Lack of time to complete school assignments" ( $p=0.0043$ ), "Receiving criticism for work done" ( $p=0.0004$ ), "Environment created by faculty members" ( $p=0.0001$ ), and "Balancing personal life with college

routines" ( $p < 0.0001$ ). In this domain, all values are considered between Mildly Stressful and Moderately Stressful.

In the "University Relationships" domain, the highest averages were found in the factor "Competition for grades" (3.0 for females and 2.7 for males), ranging from Mildly Stressful to Moderately Stressful. Only one average from the male gender (1.9) was higher than that of the female gender (1.7) in the factor "Discrimination based on race, social status, or ethnic group." Regarding statistical differences, the factors in ascending order of significance were: "Discriminatory attitudes of the university community towards female dental students" ( $p < 0.0001$ ), "Discriminatory attitudes of the university community towards homosexual dental students" ( $p = 0.0200$ ), "Lack of a family atmosphere in student residences/fraternities during college" ( $p = 0.0112$ ), and "Interactions with individuals of the opposite sex" ( $p = 0.0069$ ).

In the "Responsibility towards Patients" domain, women demonstrated being more affected than men, particularly in the factor "Responsibility for comprehensive patient care" (2.3 for females and 1.7 for males), ranging from Not Stressful to Mildly Stressful. This was also the only factor with a statistically significant difference.

"Professional Difficulties," all the averages for the female gender were also higher than those for the male gender. Additionally, all the factors showed statistically significant differences, in increasing order: "Fear of being unable to recover if I fall behind in my studies" ( $p = 0.0097$ ), "Insecurity about the professional future" ( $p = 0.0012$ ), "Lack of confidence in being a successful dentistry student" ( $p = 0.0006$ ), "Difficulty in learning clinical procedures" ( $p = 0.0003$ ), "Difficulty in acquiring precise manual skills required in pre-clinical and laboratory work," and "Lack of self-confidence in being a successful dentist" ( $p < 0.0001$ ). In this domain, all the values are considered to be between non-stressful and moderately stressful.

"Personal and Institutional Factors," once again, all the averages for the female gender were higher than those for the male gender, with the highest being the factor "Financial responsibilities" (3.5 for females and 2.9 for males). Six out of the eight factors in this domain showed statistically significant differences, in increasing order: "Financial responsibilities" ( $p < 0.0001$ ), "Personal physical health" ( $p = 0.0030$ ), "Rules and regulations of the dental college" ( $p = 0.0056$ ), "Lack of participation in college decision-making processes" ( $p = 0.0127$ ), and "Considering entering another field of work" ( $p = 0.0290$ ). In this domain, all the values range from non-stressful to moderately stressful.

### Self-Reporting Questionnaire (SRQ-20)

Regarding mental health, 78.5% of the students obtained scores that classified them as "suspected of Mental Health Disorders" (Table 3). The study found a higher prevalence among Clinical stage students (82.2%), females (81.6%), those aged up to 21 years (81.2%), living with other people (83.2%), having relocated to a different city/state (78.9%), being in the same admission class (82.1%), and having experienced academic failure (78.9%). The only variable that showed statistical significance ( $p < 0.05$ ) for suspected mental disorders was female gender (81.6%).

**Table 3.** Distribution of the frequency of suspected cases of minor mental disorders (MMD) according to sociodemographic variables among students of the Dentistry Course.

Variables/Frequency	n	%	% MMD	p
Period				
Preclinical	123	42.1	73.2	0.0833
Clinic	169	57.9	82.2	
Age				
Up to 21 years	154	52.7	81.2	0.2031
22 or + years	138	47.3	74.6	
Gender				
Female	218	74.7	81.6	0.0325*
Male	74	25.3	68.9	
Housing condition				
With other people	121	42.8	83.2	0.4484
Other types	15	5.3	53.3	
Parents or relatives	56	19.8	76.8	
Alone	91	32.1	75.8	
Changed city/state				
No	44	15.1	72.7	0.4288
Yes	247	84.9	78.9	
Same class				
No	28	9.6	77.7	0.8101
Yes	265	90.4	82.1	
He was reproachful				
No	255	87.0	67.9	0.9999
Yes	38	13.0	78.9	

Legend: n= absolute number of participating students

\*p<0.05 - statistically significant. Fischer's exact test.

The frequency of minor mental disorders and their association with socio-demographic data can be found in Table 3.

The questions of the Self-Reporting Questionnaire (SRQ-20) were evaluated, and the frequencies of the answers according to the Preclinical and Clinical stages are shown in Table 4.

**Table 4.** Distribution of the frequency of the variables of the questionnaire “SRQ-20”, according to the division of students in the Preclinical and Clinical stages of the Dentistry Course.

Variables	Period								p
	Preclinical				Clinic				
	Yes		No		Yes		No		
	n	%	n	%	n	%	n	%	
Frequent headache	59	48.0	64	52.0	94	55.3	76	44.7	0.2370
Lack of appetite	28	22.7	95	77.2	39	22.9	131	77.1	1.0000
Difficulty sleeping	80	65.0	43	35.0	116	68.2	54	31.8	0.6155
Scares easily	56	45.5	67	54.5	91	53.5	79	46.5	0.1938
Feels nervous	111	90.2	12	9.80	156	91.8	14	8.20	0.6810
Tremors in the hand	47	38.2	76	61.8	68	40.0	102	60.0	0.8088
Poor digestion	48	39.0	75	61.0	75	44.1	95	55.9	0.4031
Difficulty thinking clearly	63	51.2	60	48.8	97	57.1	73	42.9	0.3431
Feel sadness lately	80	65.0	43	35.0	133	78.2	37	21.8	0.0165*
Cries more than usual	51	41.5	72	58.5	96	56.5	74	43.5	0.0130*
Difficulty in activities with satisfaction	85	69.1	38	30.8	137	80.6	33	19.4	0.0273*
Difficulty making decisions	82	66.7	41	33.3	119	70.0	51	30.0	0.6102
Difficulties in the service	42	34.2	81	65.8	98	58.0	71	42.0	<0.0001*
Unable to play a useful role	34	27.6	89	72.4	64	37.6	106	62.4	0.0800
Lost interest in things	62	50.4	61	49.6	116	68.2	54	31.8	0.0024*
Feels a useless person	48	39.0	75	61.0	65	38.2	105	61.8	0.9038
He had the idea to end his life	12	9.80	111	90.2	17	10.0	153	90.0	1.0000
Feels tired all the time	87	71.3	35	28.7	144	84.7	26	15.3	0.0083*
Gets tired easily	93	75.6	30	24.4	135	79.4	35	20.6	0.4776
Unpleasant sensations in the stomach	66	53.6	57	46.4	90	52.9	80	47.1	0.9062

Legend: n= absolute number of responses

\*p<0.05 - statistically significant. Fischer's exact test.

Of the 20 questions of the questionnaire, only 6 showed a statistically significant difference ( $p<0.05$ ) between the groups, namely: “Feel sad lately” ( $p=0.0165$ ), “Cry more than usual” ( $p=0.0130$ ), “Difficulty to perform activities with satisfaction” ( $p=0.0273$ ), “Difficulties in the service” ( $p<0.0001$ ), “Lost interest in things” ( $p=0.0024$ ) and “Feel tired all the time” ( $p=0.0083$ ).

In more than half of the questionnaire (14 questions) there was no statistical difference between the groups. In all these items, the students of the clinic always answered more yes than those of the pre-clinic, indicating that they were more affected.

Next, logistic regression analysis of the variables that presented statistical significance in the SRQ-20 was performed (Table 5).

**Table 5.** Regression analysis of the variables that presented statistical significance of the questionnaire “SRQ-20”, according to the division of students in the Preclinical and Clinical stages of the Dentistry Course. Araraquara, 2019.

Questionnaire variables “SRQ-20”	Model	
	$\beta$	P
Feels sad lately	0,115	0,165
Cries more than usual	0,076	0,277
Difficulty performing activities with satisfaction	0,017	0,851
Difficulties in the service	0,245	<0.0001*
Lost interest in things	0,168	0,033*
Feels tired all the time	0,117	0,210
Adjusted R <sup>2</sup>	0,073	
P	0,002	

\*p<0.05 - statistically significant. Logistic Regression.

Of the 6 variables placed in the regression, only 2 remained significant, being “Difficulties in the service” ( $p = <0,001$ ) and “Lost interest in things” ( $p = 0,033$ ). Both variables were higher in the students of the clinical stage, indicating that they are more affected.

## Discussion

The obtained data corroborate with studies found in the literature, especially regarding the high prevalence among females<sup>17-22</sup>. The overall average of stressors among the participants was 2.7, ranging between Mildly Stressful and Moderately Stressful. This value is higher when compared to other studies, such as the study by Uraz et al.<sup>18</sup>, which found an average of 2.5; Abu-Ghazaleh et al.<sup>20</sup> in Jordan reported 2.40, and Morse and Dravo<sup>22</sup> observed an overall average of 2.52. In this study, it was observed that the main stressors present in the academic environment are consistent with previous studies, including “Exams and grades,” “Fear of failing a subject or repeating the year,” and “Lack of time to relax or engage in leisure activities.” Therefore, it can be observed that this pattern is consistent in other dental universities in Brazil and other countries<sup>18-20,22</sup>.

Considering the academic stage in which the students were classified, the average of stressors was higher among participants in the Clinical stage, with an average stressor score of 2.9. This value is higher than that found in India (2.4)<sup>20</sup>, Florianópolis (2.61)<sup>19</sup>, and Jordan (2.7)<sup>18</sup>. The Pre-clinical stage showed a slightly lower average, with a score of 2.4, which is similar to a study conducted at a university in Florianópolis (2.42)<sup>19</sup>.

In the pre-clinical stage, the greatest concerns were “Exams and grades” (3.7), “Fear of failing a subject or losing the year” (3.6), and “Fear of being unable to catch up if I fall behind in my studies” (3.5). During this period, students are more concerned with issues related to the required theoretical work, grades, and evaluations.

In the clinical stage, a higher average stress level was observed compared to the pre-clinical stage, as well as a higher average for its main stressors. This is also observed in other studies<sup>17-19,21,23</sup>. In this particular stage, in addition to the concerns that afflict students regarding grades, exams, and failures, new factors related to clinical practice also arise.

For these students, the stressors continued to be "Exams and grades" (3.9) and "Fear of failing a subject or losing the year" (3.7), followed by "Completing graduation requirements" (3.6) and "Lack of time to relax or for leisure" (3.6), and in addition to these, we have "Insecurity about future professional prospects" (3.7). The increased stress in this stage can be explained by the pressure students feel to perform multiple clinical procedures in various dental specialties while also succeeding in theoretical subjects<sup>20</sup>.

Thus, we can highlight that some stressors remain and become more significant as the academic stages progress, such as "Exams and grades" and "Fear of failing a subject or losing the year". This can be explained by the characteristics of dental education, which gradually evolves, increasing the complexity and demands in theoretical, laboratory, and clinical fields. Furthermore, previous studies<sup>21,24</sup> have observed that anxiety about the future increases each year, reaching its peak in the final year of graduation, which can be explained by insecurity about entering the job market and the fear of unemployment after graduation.

We can observe factors with a statistically significant difference between stages, such as the question of "Environment created by the faculty", where the difference is quite high ( $p < 0.0001$ ). This finding is consistent with other studies, which assert that clinical-year students consider educational environment-related factors more stressful than pre-clinical students<sup>17,19,22</sup>. This fact can also be explained by greater interaction between students and faculty in the clinic, as well as the fear of feeling humiliated when criticized by a professor in front of a patient<sup>21</sup>.

Lastly, when evaluating the same domains in terms of gender, the average for females was higher (2.8) than for males (2.4). This result is consistent with findings by other authors<sup>18,25-27</sup> and differs from what was found by Kumar et al.<sup>17</sup>, whose study showed a significant difference in stress perception between genders, with a preference for males. Studies suggest that female dental students feel more pressure to succeed in a male-dominated profession, and they perceive the pressure and competition present in dental education as particularly stressful<sup>23,28,29</sup>.

The overall prevalence of mental health disorders (MHD) found in our population was 78.5%, which is considered very high compared to rates found in other studies, ranging from 25%<sup>8</sup> to 58%<sup>9</sup>. Many of these studies evaluated students from various fields of study, but even those that assessed the suspicion of MHD in dental students<sup>13,14</sup> found lower rates than those found in our study.

A high prevalence of MHD was observed in both the pre-clinical stage (73.2%) and the clinical stage (82.2%), although this data did not show a statistically significant association with disorders. This may be due to the difficulties encountered throughout the dental education, from the admission and adaptation phase to the academic real-

ity, to some characteristics of the teaching-learning process throughout the course, which can affect the emotional well-being of students<sup>13</sup>. Although this data does not correlate with the suspicion of MHD, it is important to emphasize that these are high and thus concerning rates.

One variable that showed a statistically significant correlation ( $p < 0.05$ ) with the suspicion of mental health disorders was being female (81.6%), which aligns with similar studies conducted by Costa et al.<sup>14</sup>, as well as previous studies<sup>30-34</sup> that reported similar results in female samples within the context of primary healthcare in Brazil. This finding is consistent with the literature, which states that women have a higher prevalence of mental health disorders, and temporomandibular disorders are the third most common health problem among women in developed countries and the fifth in non-developed countries<sup>14,34,35</sup>.

Thus, health courses present certain peculiarities in the educational process that negatively impact the physical and psychological health of students. Stressors include concerns about exams and grades, fear of failure, lack of time to relax, excessive workload, fear of making mistakes, proximity to pathological processes, and difficulty in learning clinical procedures<sup>14,35-38</sup>. Additionally, constant exposure to an inhospitable environment surrounded by disease processes and human suffering may predispose students to a higher risk of developing minor mental disorders as well as Burnout Syndrome<sup>39,40</sup>.

Socio-demographic variables did not demonstrate correlation with MHD, supporting the results of other studies<sup>9,13</sup>, and differing from a study<sup>40</sup> that reported age range as a significantly associated factor with MHD.

Nonetheless, Dentistry presents peculiarities in its profession, such as patient contact, financial factors, specific working postures, and working within the confined space of the oral cavity, which categorizes its professionals as a highly stressed group<sup>39</sup>. Literature indicates that the chronicity of this stress, along with factors such as lack of energy, feelings of exhaustion, job dissatisfaction, and emotional instability, can lead to the development of Burnout Syndrome. Moreover, it is possible for this syndrome to develop early, starting during the learning period of the profession<sup>40</sup>.

It can be concluded that the dental environment experienced by the participating students in this study presents stressors that contribute to high levels of stress among students. The main identified stressors were grades and evaluation methods, fear of failure, lack of time for relaxation and leisure, and they prevail among female students in the clinical stage. The high prevalence of suspected minor mental disorders in the female gender and in both the pre-clinical and clinical stages suggests that students are experiencing psychological distress.

## Data availability

The entire dataset supporting the results of this study is available upon request from the corresponding author.

## Conflict of interest

No potential conflict of interest relevant to this article was reported.

## Author Contributions

**Julia Tiemy Michigami and Isabela Antunes de Medeiros:** contributed to the development and writing of the project, execution of data collection, data tabulation, data analysis, and the writing and correction of the article. **Luis Eduardo Genaro:** contributed to the development of the project and the correction of the article. **Elaine Pereira da Silva Tagliaferro:** contributed to the development of the project and the correction of the article. **Silvio Rocha Corrêa da Silva:** execution of data collection and data analysis. **Aylton Valsecki Júnior:** contributed to the development of the project and the correction of the article. **Fernanda Lopez Rosell:** contributed to the development and writing of the project, supervision, data tabulation, data analysis, and the correction of the article. All authors actively revised and approved the final version of the manuscript.

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