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Original article

## Anxiety and temporomandibular disorders in dental students

Anxiety and temporomandibular disorders in stomatology students

Anxiety and temporomandibular dysfunction in dentistry students

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### SUMMARY

**Introduction:** Oral and psychological health is an important element for overall health, well-being, and quality of life. This research can serve as a starting point for developing new occupational health research or actions, such as the prevention, diagnosis, and treatment of temporomandibular disorders, focusing on reducing anxiety levels in the population.

**Aim:** To determine the association between anxiety and temporomandibular disorders in dental students.

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**Methods:** An observational epidemiological study of the cross-sectional analytical type was carried out to determine the association between anxiety and temporomandibular disorders in Stomatology students of the clinical cycle belonging to the University Clinic of Stomatological Specialties between May 2020 and May 2022. The universe was made up of 37 students from the aforementioned center, distributed in the three final years of the career belonging to the clinical cycle of the career (3rd, 4th and 5th years).

**Results:** in the relationship between sex and temporomandibular disorders the female sex predominated with 51.35%. The year of study with the highest prevalence of temporomandibular disorders was the third year of the degree with 27.03%. In the case of minimal to moderate anxiety, the female sex was more representative with 35.14% and the fifth year of the degree with 16.67%. Minimal or moderate anxiety was the one that had the greatest relationship with temporomandibular disorders with 32.43%.

**Conclusions:** A statistical association was determined between the degree of anxiety and temporomandibular disorders.

**Keywords:** Temporomandibular disorder; Anxiety; Students.

## ABSTRACT

**Introduction:** It is very common to diagnose temporomandibular dysfunctions in university youths that are subjected to stressful situations that unchain anxiety. This investigation can be good as starting point for the development of new investigations or actions of occupational health, as the prevention, diagnosis and treatment of these affections being focused on reducing levels of anxiety in the population.

**Objective:** to determine the association between the anxiety and the temporomandibular dysfunctions in stomatology students.

**Method:** he/she was carried out an observational epidemic investigation of the traverse analytical type, to determine association between the anxiety and the temporomandibular dysfunctions in students of stomatology of clinical cycle belonging to

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the University Clinic of Stomatological Specialties between May of the 2020 and May of the 2022. The universe was constituted by 37 students of the one referred center, distributed in the three terminal years of the career belonging to the clinical cycle of the career (3rd, 4th and 5th years).

**Results:** in the relationship between the sex and the temporomandibular dysfunctions the feminine sex prevailed with 51.35 %. The year of study where most prevalence had the temporomandibular dysfunctions was in the third year of the career with 27.03 %. In the anxiety of minimum to moderate the feminine sex was more representative with 35.14 % and the fifth year of the career with 16.67 %. The minimum or moderate anxiety the one that more relationship had with the temporomandibular dysfunctions with 32.43 % was.

**Conclusions:** statistical association was determined between the degree of anxiety and the temporomandibular dysfunctions.

**Keywords:** Temporomandibular disorder; Anxiety; Students.

## SUMMARY

**Introduction:** Oral and psychological health is an important element for general health, well-being and quality of life. This research can serve as a starting point for the development of new research or occupational health actions, such as the prevention, diagnosis and treatment of temporomandibular dysfunctions, with a focus on reducing two levels of anxiety in the population.

**Aim:** determine the association between anxiety and temporomandibular dysfunction in dentistry students.

**Methods:** An observational epidemiological research of a transversal analytical type was carried out to determine an association between anxiety and temporomandibular dysfunction in Stomatology students of the clinical cycle belonging to the University Clinic of Stomatological Specialties between May 2020 and May 2022. The universe was constituted by 37 students from the aforementioned center, distributed over the three

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final years of the career belonging to the clinical cycle of the career (3rd, 4th and 5th years).

**Results:** The relationship between sex and temporomandibular dysfunction, or female sex predominated with 51.35%. The year of study with the highest prevalence of temporomandibular dysfunction was the third year of the course with 27.03%. Minimum to moderate anxiety, the female sex was more representative with 35.14% and the fifth year of the course with 16.67%. Minimal or moderate anxiety was the most related to temporomandibular dysfunctions with 32.43%.

**Conclusões:** A statistical association was determined between the degree of anxiety and temporomandibular dysfunctions.

**Keywords:** Temporomandibular dysfunction; Anxiety; Students.

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## Introduction

Psychology and dentistry are disciplines with numerous points of view and interests in common, given that individual behavior can affect the health of the stomatognathic system as an important risk factor. Psychological states influence health. Feelings and emotions can have positive or negative effects on well-being. (1)

In recent years, an increasingly important role has been attributed to the biopsychosocial model, enunciated by Engel, (2) which introduces a different way of understanding the health-disease process, admitting that there are biological, social and psychological factors involved, both with regard to a stage of health, as well as in the different levels of disease.

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Among the psychological factors studied in relation to temporomandibular disorders (TMD), one of the most associated is anxiety and there is considerable controversy on this subject, since the question arises as to whether anxiety is the cause of the dysfunction or the result of such a chronic condition. (3)

Patients with temporomandibular disorders have been shown to be more anxious than unaffected individuals. Psychological factors are known to play a role in the etiology and persistence of TMD. Over the years, several studies have linked anxiety with temporomandibular disorders. Several authors have found variables associated with anxiety due to TMD. (4)

It is becoming increasingly common to diagnose TMD in university students subjected to stressful situations that trigger anxiety. The Bayamo University Dental Clinic is a teaching center that trains future professionals in the field of dentistry, and these public health problems are not foreign to the clinical cycle students of this program. Exposure to various risk factors that cause anxiety could also be affected by the onset of TMD, considering that the somatization of any mental disorder affects the physical state.

This motivated the authors to conduct research linking anxiety to temporomandibular disorders in this population. This research will serve as a starting point for developing new research or occupational health initiatives, focusing on the prevention, diagnosis, and treatment of these conditions and reducing anxiety levels in the study population.

## Methods

An observational, cross-sectional, analytical epidemiological study was conducted to determine the association between anxiety and temporomandibular disorders in clinical cycle stomatology students attending the University Clinic of Stomatological Specialties between May 2020 and May 2022.

The sample consisted of 37 students from the aforementioned center, distributed across the three final years of the program. No sample was used because the study population

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was evaluable. Students with a history of temporomandibular joint trauma, students undergoing treatment for TMD, students who did not complete the data collection form and/or the anxiety and temporomandibular disorder tests, and students who did not agree to participate in the research were excluded.

The variables used were: temporomandibular disorder, degree of anxiety, sex and year of study.

For data collection in the present study, two instruments were used: the FONSECA questionnaire, to determine the presence and degree of severity of temporomandibular disorders, and the Zung test, to evaluate the degree of anxiety in Stomatology students belonging to the 3rd, 4th and 5th years of the University Clinic of Stomatological Specialties.

Once the information was collected, it was calculated from a database and created in a Microsoft Excel electronic spreadsheet. The data was tabulated and reflected in simple two-by-two contingency tables, without strata.

For data processing, the professional statistical programs EPIDAT version 3.0 and version 4.2, the Statistical Package for the Social Sciences SPSS 15 for Windows, as well as an epidemiological spreadsheet created in Microsoft Excel were used.

ForIn the processing of the information, absolute and relative frequencies (percentages) were used to quantitatively analyze the results. Univariate analysis was used as inferential statistics, calculating the chi-square test, the probability value (p-value), and the odds ratio (OR) to establish the association between the student developing TMD and the presence of anxiety, with a 95% confidence level. Univariate analysis was used to determine the association between the variables considered in the study and to establish the risk posed by each variable independently. Inferential statistics were used to determine the possible causal association between the study variables and the p-value, which indicated a statistical association if  $p < 0.05$ .

## Results

The relationship between sex and temporomandibular disorders was expressed in Table 1, where females predominated in the study, with 28 students representing 75.68% of the total, establishing a 3:1 ratio with respect to males. The statistical significance was  $p = 0.5013$ .

**Table 1.** Prevalence of TTM by sex.

| Sex    | Prevalence of<br>temporomandibular<br>disorder                     |       |     |       | Total |       |
|--------|--------------------------------------------------------------------|-------|-----|-------|-------|-------|
|        | Yeah                                                               |       | No  |       |       |       |
|        | No.                                                                | %     | No. | %     | No.   | %     |
| Male   | 5                                                                  | 13.51 | 4   | 10.81 | 9     | 24.32 |
| Female | 19                                                                 | 51.35 | 9   | 24.32 | 28    | 75.68 |
| Total  | 24                                                                 | 64.86 | 13  | 35.14 | 37    | 100   |
|        | Chi-square: 0.4522 p-value: 0.5013 OR:<br>0.5921 (0.1275 – 0.7494) |       |     |       |       |       |

Table 2 analyzes the distribution of temporomandibular disorders by year of study, referring to the 3rd, 4th, and 5th years of the program. The percentages were 10 (27.03%), 5 (13.51%), and 9 (24.32%). 35.14% of all students did not have temporomandibular disorders. The p value was 0.4064.

**Table 2.** Prevalence of TTM by year of study.

| Year of study | Prevalence of temporomandibular disorder |       |     |      | Total |       |
|---------------|------------------------------------------|-------|-----|------|-------|-------|
|               | Yeah                                     |       | No  |      |       |       |
|               | No.                                      | %     | No. | %    | No.   | %     |
| 3rd           | 10                                       | 27.03 | 3   | 8.11 | 13    | 35.14 |

|                                           |    |       |    |       |    |       |
|-------------------------------------------|----|-------|----|-------|----|-------|
| 4th                                       | 5  | 13.51 | 5  | 13.51 | 10 | 27.03 |
| 5th                                       | 9  | 24.32 | 5  | 13.51 | 14 | 37.84 |
| <b>Total</b>                              | 24 | 64.86 | 13 | 35.14 | 37 | 100   |
| <b>Chi-square: 1.8010 p-value: 0.4064</b> |    |       |    |       |    |       |

When studying anxiety levels by sex, Table 3 shows that females were the most common, representing 37 students (77.78%). Of these, 12 (32.43%) and 13 (35.14%) had no anxiety and minimal to moderate anxiety, respectively. It was observed that being female increased the risk of developing the disease, with a statistically non-significant effect ( $p=0.2460$ ) among the variables studied.

**Table 3.** Degree of anxiety by sex.

| Degree of anxiety                         | Male |       | Female |       | Total |       |
|-------------------------------------------|------|-------|--------|-------|-------|-------|
|                                           | No.  | %     | No.    | %     | No.   | %     |
| Absence of anxiety                        | 3    | 8.11  | 12     | 32.43 | 15    | 40.54 |
| Minimal to moderate anxiety               | 3    | 8.11  | 13     | 35.14 | 16    | 43.24 |
| Marked to severe anxiety                  | 2    | 5.41  | 3      | 8.11  | 5     | 13.51 |
| Anxiety at its highest level              | 1    | 2.70  | 0      | 0     | 1     | 2.70  |
| <b>Total</b>                              | 9    | 22.22 | 28     | 77.78 | 37    | 100   |
| <b>Chi-square: 4.2010 p-value: 0.2460</b> |      |       |        |       |       |       |

When analyzing the degree of anxiety according to school level, it is observed that 5th-year students presented the highest percentage of anxiety at 37.84%, with 10.81% and 2.70% having marked to severe anxiety and maximum anxiety, respectively. Third-year students reached 18.92% with no anxiety, and fourth-year students obtained 16.22% with minimal to moderate anxiety. Interpreting the statistical analysis with  $p = 0.2460$ , we reject the probability that any student presents anxiety. (Table 4)

**Table 4.** Degree of anxiety according to year of study.

| Degree of anxiety                  | Year of study |       |     |       |     |       | Total |       |
|------------------------------------|---------------|-------|-----|-------|-----|-------|-------|-------|
|                                    | 3rd           |       | 4th |       | 5th |       |       |       |
|                                    | No.           | %     | No. | %     | No. | %     | No.   | %     |
| Absence of anxiety                 | 7             | 18.92 | 5   | 13.51 | 3   | 8.11  | 15    | 40.54 |
| Minimal to moderate anxiety        | 5             | 13.51 | 5   | 13.51 | 6   | 16.22 | 16    | 43.24 |
| Marked to severe anxiety           | 1             | 2.70  | 0   | 0     | 4   | 10.81 | 5     | 13.51 |
| Anxiety at its highest level       | 0             | 0.00  | 0   | 0     | 1   | 2.70  | 1     | 2.70  |
| Total                              | 13            | 35.14 | 10  | 27.03 | 14  | 37.84 | 37    | 100   |
| Chi-square: 7.8938 p-value: 0.2460 |               |       |     |       |     |       |       |       |

The degree of anxiety in relation to the prevalence of temporomandibular disorders was analyzed in Table 5. Minimal to moderate anxiety was present in 16 students, representing 43.24% of the total, and of these, 12 (32.43%) presented some type of temporomandibular disorder. The absence of anxiety seconded this result, with 40.54% of the total. Only 6 students presented temporomandibular disorders. Overall, 21 students with TMD (59.45%) presented at least some degree of anxiety, 18 (48.64%). The p value: 0.0452 lower than the 0.05 confidence interval, demonstrating a statistical association.

**Table 5.** Prevalence of TTM according to degree of anxiety.

| Degree of anxiety           | Prevalence of temporomandibular disorder |       |     |       | Total |       |
|-----------------------------|------------------------------------------|-------|-----|-------|-------|-------|
|                             | Yeah                                     |       | No  |       |       |       |
|                             | No.                                      | %     | No. | %     | No.   | %     |
| Absence of anxiety          | 6                                        | 16.22 | 9   | 24.32 | 15    | 40.54 |
| Minimal to moderate anxiety | 12                                       | 32.43 | 4   | 10.81 | 16    | 43.24 |

|                                           |    |       |    |       |    |       |
|-------------------------------------------|----|-------|----|-------|----|-------|
| Marked to severe anxiety                  | 5  | 13.51 | 0  | 0     | 4  | 13.51 |
| Anxiety at its highest level              | 1  | 2.70  | 0  | 0     | 1  | 2.70  |
| <b>Total</b>                              | 24 | 64.86 | 13 | 35.14 | 37 | 100   |
| <b>Chi-square: 8.0404 p-value: 0.0452</b> |    |       |    |       |    |       |

## Discussion

Obtained Romero Quispe C, (5) similar results, 23 female students predominated with 53.50%. The statistical association value did not establish dependence between the variable sex and temporomandibular disorder.

The study carried out by Gállego-Royo A and collaborators, (6) showed that the sex that predominated in relation to the prevalence of TTM was the male sex with 52.2%, thus not coinciding with the author's study. In the authors' opinion, the result was determined because the majority of students participating in the study were female, with 64.86% of the female student population.

The TTM distributed by the years of study were studied by Caraballo Villalón LB and collaborators,(7) The year that prevailed was the fifth year with a prevalence of 55.80%, obtained a p value: 0.0024, a strong statistical association was demonstrated between the two variables studied, not matched with the results obtained in this study, the value obtained was p: 0.4064. The null hypothesis cannot be rejected and the dependence between the 2 variables in question cannot be determined.

In the study of Pinheiro Filho EB and collaborators,<sup>(8)</sup> conducted with Stomatology students, no statistical association was found between years of study and temporomandibular disorders, in contrast to the results obtained in this study.

In the authors' opinion, the results are due to the multifactorial nature of the disease, since it is not limited to specific years or any specific age. The disorders generally begin to

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appear from the second decade of life onwards, but can manifest at any stage of life without a defined age pattern.

Romero Quispe C,<sup>(5)</sup> In their research, they highlighted that the most common result in both sexes was the absence of anxiety, at 58.20%, which is not consistent with the study in question. However, minimal to moderate anxiety was the most prevalent in women, a result similar to that of this study, representing 35.14% of the total. The results yielded a p-value of 0.2460, higher than the expected confidence interval of 0.05; therefore, no statistical association was evident between the level of anxiety and sex.

Obtained Caraballo Villalón LB and collaborators,<sup>(7)</sup> in his study that there was no relationship of dependence between the variables degree of anxiety and sex. This author graphed that 54.1% (n=20) of male students and 45.9% (n=17) of female students do not present anxiety. Finally, the female gender predominated with 80% (n=4) of students with moderate anxiety, a notable difference over the 20% (n=1) of the male gender.

In the authors' opinion, the prevalence of minimal to moderate anxiety in women is due to their exposure to other biological, social, and cultural factors that tend to elevate anxiety levels. Medical and psychosocial research supports the fact that women are subject to stress due to being victims of rape, abuse, marginalization, and gender discrimination. Regarding biological factors, women's hormonal processes throughout their lives also trigger levels of anxiety that men do not experience. However, since no statistical association has been found, further research is needed to investigate this topic.

In the study of Chauca Bajaña L and collaborators,<sup>(9)</sup> Minimal to moderate anxiety was the most prevalent among students. The fifth year of the program was the most significant result, with 51.14%. The p-value of 0.5000 obtained in their research showed no statistical association, meaning no association was found between the two variables.

According to the authors, anxiety levels in the final year of the program were due to the academic pressure experienced by students in their final years when facing final exams. However, overall, almost 60% of the program's students experienced some degree of anxiety, which may be due to the demands and rigor of professional internships and

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various social factors, such as family and interpersonal relationships, that impact an individual's mental health.

Subjects with a high degree of anxiety perceive a wider range of situations as threatening and are more predisposed to suffer more frequently or with greater intensity; they are perceived as intensely annoying; therefore, if a person cannot avoid the stress that causes it, they will put into action the necessary coping skills to face the threatening situation and initiate a defensive process to reduce the irritating emotional state and, to the extent that the defense mechanisms are successful, the circumstances will be seen as less threatening and a reduction in anxiety will occur. (9)

Despite these findings, no statistical association was established between the two variables. It is believed that this is because anxiety in young university students often appear at different stages of their student life, especially in the final years of their studies, but it is not a personality trait. The same student may be anxious at a given time, and then decrease their anxiety levels after overcoming the stressful situation, making it difficult to establish a relationship between these two variables.

The prevalence variables of TTM according to the degree of anxiety were studied by Guachambosa-Quintana AE and Flores-Fiallos JS; (10) León Valencia WA and collaborators,<sup>(11)</sup> and Roque Huanca EO and collaborators,<sup>(12)</sup> those that showed statistical association between both variables.

In the aforementioned studies, the population studied was much larger than the research conducted by the authors of this study. However, Caraballo Villalón LB and collaborators,<sup>(7)</sup> It did not demonstrate dependence of the variables and the null hypothesis was not ruled out.

Therefore, university studies, especially in dentistry, are recognized as a period of risk for the development of fatigue, emotional detachment, and dehumanization, which can be associated with mental health problems, including anxiety.

In the opinion of the authors, it is concluded that the result obtained in the study establishes correspondence between anxiety as an etiological factor causing TMD.

Research shows that anxiety levels trigger sustained stress and manage to stimulate the hypothalamic-pituitary-adrenal (HPA) axis system and through complex neuronal pathways and stimulate the gamma-efferent system that makes muscle spindles more sensitive and as a general result there is an increase in muscle tone and muscle activity causing some type of TMD over time.

## Conclusions

A statistical association was found between anxiety levels and temporomandibular disorders. The prevalence of temporomandibular disorders was predominant in females, at 75.68%, and was higher among third-year students, at 27.03%. No statistical association was found between anxiety levels and the gender and years of study of the students who participated in the study.

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### **Conflict of interest**

The authors declare that there are no conflicts of interest for the publication of the article.

### **Authorship contribution**

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I, Rosa María Gómez Berenguer, on behalf of all the co-authors, declare the veracity of the content of the article.