

Prevalence of dental anxiety in patients attending the dental service of two hospitals managed by the Ministry of Health of Peru.

Prevalencia de ansiedad dental en pacientes del servicio de odontología de dos hospitales del Ministerio de Salud del Perú.

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Receipt : 04/10/2019 **Revised:** 12/10/2020
Acceptance: 04/26/2021

Cite as: Espejo-Carrera R, Asmat-Abanto A, Carruitero MJ & Del Castillo-Huertas O.

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J Oral Res 2021; 10(2):1-9

Doi:[10.17126/joralres.2021.018](https://doi.org/10.17126/joralres.2021.018)

Abstract: Objective: To determine the level of dental anxiety in dental patients from two hospitals managed by the Ministry of Health of Peru, between August-September 2015. **Material and Methods:** Cross-sectional, comparative, and observational study, carried out between August and September 2015, including a total of 660 adult patients from the Dental Service of the Hospitals Regional Docente de Trujillo and Belén de Trujillo, Peru. A questionnaire based on the Modified Dental Anxiety Scale (MDAS) (Cronbach's Alpha=0.77) was applied to the participating subjects. Student's t test for independent groups and the Mann-Whitney U test were used for the analysis of the results, considering a significance level of 5%. **Results:** The mean total anxiety score for the population was 12.05 (SD=3.76). Females (mean=12.56) presented greater anxiety than males (mean=11.53) ($p<0.001$), young adults (Me=12.60) presented greater anxiety than subjects in mid-adulthood (Me=11.10) ($p<0.001$). No difference was found in terms of hospitals ($p=0.386$); 96.06% of the patients evaluated presented dental anxiety, 4.09% had extreme anxiety. **Conclusion:** The mean dental anxiety of the studied population coincides with the level of moderate anxiety. Females and young adults presented greater anxiety. No difference was found with respect to hospitals. Likewise, 96.06% of the evaluated patients presented dental anxiety, 4.09% had extreme anxiety.

Keywords: dental anxiety; prevalence; cross-sectional studies; anxiety disorders; surveys and questionnaires; Peru.

Resumen: Objetivo: Determinar la ansiedad dental en pacientes odontológicos de dos hospitales del Ministerio de Salud del Perú, agosto-septiembre, 2015. **Material y Métodos:** El presente estudio de corte transversal, comparativo y observacional, se desarrolló entre agosto y septiembre del 2015 e incluyó un total de 660 pacientes adultos del Servicio de Odontología de los hospitales Regional Docente de Trujillo y Belén de Trujillo. Se les aplicó un cuestionario basado en la Escala de Ansiedad Dental Modificada (Alfa de Cronbach=0.77). Para el análisis de resultados se empleó la prueba t de Student para grupos independientes y la prueba U de Mann-Whitney, considerando un nivel de significancia del 5%. **Resultados:** La puntuación media total de

ansiedad para la población fue de 12.05 (DE=3.76), el sexo femenino (Me=12.56) presentó mayor ansiedad que el masculino (Me=11.53) ($p<0.001$), la adultez joven (Me=12.60) presentó mayor ansiedad que la adultez media (Me=11.10) ($p<0.001$). No se encontró diferencia en cuanto a hospital ($p=0.386$). El 96.06% de los pacientes evaluados presentaron ansiedad dental, siendo el 4.09% de ansiedad extrema. **Conclusión:** La ansiedad dental media de la población estudiada coincide en el nivel de

ansiedad moderada. El sexo femenino y los adultos jóvenes presentaron mayor ansiedad. No se encontró diferencia con respecto a los hospitales. Asimismo, el 96.06% de los pacientes evaluados presentaron ansiedad dental, siendo el 4.09% de ansiedad extrema.

Palabra Clave: ansiedad al tratamiento odontológico; prevalencia; estudios transversales; trastornos de ansiedad; encuestas y cuestionarios; Perú.

INTRODUCTION.

Substantial scientific and technological advances have been made in the field of dentistry in recent years. However, there are still a significant number of patients suffering from anxiety related to dental treatment or dental anxiety.

In general terms, anxiety is a subjective state of persistent and disabling tension that occurs in response to a possible unknown potential threat.^{1,2} Anxiety disorders are measured using two concepts: state anxiety and trait anxiety. The first reflects transitory psychological and physiological reactions that occur in specific situations. The second, trait anxiety, is linked to personality and remains constant throughout the person's life.^{3,4}

In the dental setting, anxiety disorders are defined as an aversive physical and/or emotional response of anticipatory concern about a treatment or procedure.^{5,6}

According to some authors, the worldwide prevalence of dental anxiety in the adult population ranges between 3.8% and 25%.^{1,7-9} However, Rodríguez¹⁰ in her bibliographical review states that countries such as India, China, and Iran report percentages of anxiety between 46% and 74%; while Latin American countries such as Colombia and Mexico report a prevalence of 77.1% and 11.2% respectively.

The development of dental anxiety is associated with a predisposing temperament and personality, previous aversive experiences, feelings of extreme shame, and failure to communicate with the dentist.^{7,11,12} It is also associated with pain because it has a strong cognitive component. For this reason, anxious people may have exaggerated expectations and perceptions of pain.^{7,13}

Manifestations of dental anxiety are observed in behaviors that range from the absence of clinical signs

to the postponement, cancellation, or avoidance of dental treatment and appointments.^{1,2,6,7} Furthermore, if at any time these patients seek treatment, they only do so for symptomatic care and not for comprehensive treatment. In these situations, they probably require complicated and painful invasive procedures, usually expensive, which could discourage the patient from seeking care, worsening their anxiety.^{5,8,12,14} Therefore, they will have a greater deterioration of their oral health and a lower quality of life.^{4,8,12,14,15}

The Modified Dental Anxiety Scale (MDAS) assesses the subjective perception of anticipating an upcoming appointment with the dentist,^{2,16} its translation into Spanish has shown to have adequate validity and reliability.^{9,17,18}

It is necessary to have a situational diagnosis of the anxious state of dental patients as a starting point for the future planning of health strategies. These results should serve to justify the incorporation of methods of diagnosis and treatment of anxiety in dentistry. Consequently, the present study aimed to determine the prevalence of dental anxiety in adult patients of the Dental Service of the *Hospitals Regional Docente de Trujillo* and *Belén de Trujillo*, Peru, 2015.

MATERIALS AND METHODS.

The present study has a prospective, cross-sectional, and observational design. It was carried out at the dental services of the *Hospitals Regional Docente de Trujillo* and *Belén de Trujillo*, in the Department of La Libertad (Peru), between August and September 2015.

The sample consisted of 660 patients, 330 from each hospital, which was calculated using the formula for estimating averages when the population is finite, based on the average daily attendance observed in

the year prior to the study (estimated at 1920 patients for each hospital). For this calculation, a standard deviation of 3.41 of the item scores was considered, obtained through a pilot study, with a precision of 0.335, a confidence level of 97.5%, and a type I error of 5%. The sample was selected using the accidental non-probabilistic method.

Lucid and time-space oriented patients, aged between 20 and 65 years, treated at the Dental Service at the aforementioned hospitals, were included in the study. Patients who refused to participate in the study, those illiterate, those who were under psychiatric or psychological care, dental students, or dentists, and patients who were receiving dental care for the first time were excluded. The study was approved by the School of Human Medicine of the Universidad Privada Antenor Orrego and the Hospital Training Board, following the Declaration of Helsinki of the World Medical Association in its most recent version, and the General Health Law of Peru No 26842.

Each selected patient who was asked to participate in the study received information about the objective of the research. Upon accepting, they were given the informed consent form for reading and signing. Subsequently, the questionnaire was applied.

The instrument used was the Modified Dental Anxiety Scale (MDAS), whose validity was determined by the study of Coolidge *et al.*¹⁷ This scale is divided into two parts. The first part contains general information about the patient, and the second comprises 5 questions about aversive situations in dental treatment

in general. Each item on the MDAS presents a consistent response scheme that ranges from “no anxiety” to “extremely anxious” with scores from 1 to 5. The total score is obtained from the sum of these 5 items with a minimum range of 5 and a maximum range of 25. A score of 19 is considered as a cut-off point, an indicator of extreme dental anxiety that is equivalent to dental phobia.^{6,19,20}

The data obtained were processed using the statistical program Stata v. 14 (Stata Corp, Texas, USA). The descriptive statistical data of the quantitative variables were calculated, presenting the mean, standard deviation, and range in a uni- and bivariate analysis. In the case of qualitative variables, absolute and relative frequencies were calculated.

Dental anxiety was compared according to gender, stages of psychosocial development and hospital. Before comparing the observations, assumptions of normal distribution and homogeneity of variances were evaluated using the Shapiro-Wilk and Bartlett tests, respectively. Subsequently, the Student's t test was used for independent groups. Comparisons of data that did not meet these assumptions were performed with the Mann-Whitney U test. Statistical significance was considered at 5% ($p < 0.05$) in all cases.

RESULTS.

A total of 660 adult patients from the Dental Services of the *Hospitals Regional Docente de Trujillo* and *Belén de Trujillo* were evaluated, of which 300 (45.45%) were male and 360 (54.54%), female.

Table 1. Distribution of the sample by age, gender, stages of psychosocial development, and hospital, in adult patients treated at the Dental Service of the *Hospitals Regional Docente de Trujillo* and *Belén de Trujillo*. Trujillo, Peru, 2015.

	Groups	Total	Mean	Standard Deviation
Gender	Female	360	35.76	13.90
	Male	300	36.04	13.38
Stages of psychosocial development	Young adulthood (20-39 years)	418	26.84	6.00
	Middle adulthood (40-65 years)	242	51.52	7.75
Hospital	Belén	330	35.62	13.35
	Regional	330	36.15	13.96
Total		660	35.89	13.65

Their ages ranged from 20 to 65 years (Mean=35.89, SD=13.65), as indicated in Table 1. The MDAS scale proved to be reliable for the entire study sample (Cronbach's Alpha=0.773).

When evaluating dental anxiety scores in all the study patients, the mean anxiety score was 12.05 +/- 3.76. The lowest level of anxiety was observed when they thought about the possibility of needing to

Table 2. Dental anxiety in adult patients treated at the Dental Service of the Hospitals Regional Docente de Trujillo and Belén de Trujillo. Trujillo, Peru, 2015.

ITEM	N	Mean	SD	Min.	Max.
How would you feel if you had to go to see your dentist for a treatment tomorrow?	660	1.85	0.9	1	5
How would you feel if you were sitting in the waiting room (waiting for treatment)?	660	2.20	0.98	1	5
How would you feel if you were about to have a tooth drilled?	660	2.71	1.07	1	5
How would you feel if they were about to remove the tartar from your teeth and polish them?	660	2.44	1.10	1	5
How would you feel if you were about to be given an injection of local anesthetic into your gum, over one of the upper teeth at the back of your mouth?	660	2.85	1.13	1	5
Total	660	12.05	3.76	5	25

SD: Standard Deviation. Min: Minimum. Max: Maximum.

Table 3. Dental anxiety, by gender, in adult patients treated at the Dental Service of the Hospitals Regional Docente de Trujillo and Belén de Trujillo. Trujillo, Peru, 2015, (n = 660).

ITEM	Female					Male					p-value
	n	mean	SD	Min.	Max.	n	mean	SD	Min.	Max.	
How would you feel if you had to go to see your dentist for a treatment tomorrow?	360	1.95	0.97	1	5	300	1.73	0.79	1	5	0.006
How would you feel if you were sitting in the waiting room (waiting for treatment)?	360	2.25	0.99	1	5	300	2.13	0.97	1	5	0.092
How would you feel if you were about to have a tooth drilled?	360	2.83	1.04	1	5	300	2.57	1.09	1	5	<0.001
How would you feel if they were about to remove the tartar from your teeth and polish them?	360	2.49	1.13	1	5	300	2.37	1.05	1	5	0.196
How would you feel if you were about to be given an injection of local anesthetic into your gum, over one of the upper teeth at the back of your mouth?	360	2.95	1.17	1	5	300	2.73	1.07	1	5	0.006*
Total	360	12.56	3.97	5	25	300	11.53	3.51	5	25	<0.001

SD: Standard Deviation. Min: Minimum. Max: Maximum. Mann-Whitney U test; *: p-value, Student's t test for independent groups.

Table 4. Dental anxiety, according to stages of psychosocial development, in adult patients treated at the Dental Service of the *Hospitals Regional Docente de Trujillo and Belén de Trujillo*. Trujillo, Peru, 2015 (n = 660).

ITEM	Young adulthood					Middle Adulthood					p-value
	n	mean	SD	Min.	Max.	n	mean	SD	Min.	Max.	
How would you feel if you had to go to see your dentist for a treatment tomorrow?	418	1.91	0.95	1	5	242	1.76	0.80	1	5	0.098
How would you feel if you were sitting in the waiting room (waiting for treatment)?	418	2.28	1.03	1	5	242	2.05	0.88	1	5	0.010
How would you feel if you were about to have a tooth drilled?	418	2.84	1.13	1	5	242	2.49	0.90	1	5	<0.001*
How would you feel if they were about to remove the tartar from your teeth and polish them?	418	2.57	1.19	1	5	242	2.21	0.88	1	5	0.001
How would you feel if you were about to be given an injection of local anesthetic into your gum, over one of the upper teeth at the back of your mouth?	418	2.98	1.16	1	5	242	2.61	1.04	1	5	<0.001*
Total	418	12.6	3.95	5	25	242	11.1	3.22	5	22	<0.001

SD: Standard Deviation. Min: Minimum. Max: Maximum. Mann-Whitney U test; *: p-value, Student's t test for independent groups.

Table 5. Dental anxiety, according to hospital, in adult patients treated at the Dental Service of the *Hospitals Regional Docente de Trujillo and Belén de Trujillo*. Trujillo, Peru, 2015 (n = 660).

ITEM	Hospital Belén					Hospital Regional					p-value
	n	mean	SD	Min.	Max.	n	mean	SD	Min.	Max.	
How would you feel if you had to go to see your dentist for a treatment tomorrow?	330	1.86	0.92	1	5	330	1.85	0.89	1	5	0.946
How would you feel if you were sitting in the waiting room (waiting for treatment)?	330	2.18	0.97	1	5	330	2.22	1	1	5	0.891
How would you feel if you were about to have a tooth drilled?	330	2.68	1.06	1	5	330	2.75	1.07	1	5	0.292
How would you feel if they were about to remove the tartar from your teeth and polish them?	330	2.42	1.1	1	5	330	2.45	1.1	1	5	0.621
How would you feel if you were about to be given an injection of local anesthetic into your gum, over one of the upper teeth at the back of your mouth?	330	2.84	1.15	1	5	330	2.85	1.1	1	5	0.863*
Total	330	12.2	3.74	5	25	330	12.0	3.79	5	25	0.386

SD: Standard Deviation. Min: Minimum. Max: Maximum. Mann-Whitney U test; *: p-value, Student's t test for independent groups.

Table 6. Adult patients with anxiety, according to gender, stages of psychosocial development and hospital, treated at the Dental Service of the *Hospitals Regional Docente de Trujillo* and *Belén de Trujillo*. Trujillo, Peru, 2015.

Groups		Total	No anxiety (0 a 5)		Mild anxiety (6 a 10)		Moderate anxiety (11 a 18)		Extreme anxiety (19 a 25)		Total anxiety (6 a 25)	
			n	%	n	%	n	%	n	%	n	%
			Gender	Female	360	14	3.89	111	30.83	218	60.56	17
	Male	300	12	4.00	91	30.33	187	62.33	10	3.33	288	96.00
Stages of psychosocial development	Young adulthood (20-39 years)	418	16	3.82	128	30.55	256	61.10	19	4.53	403	96.18
	Middle adulthood (40-65 years)	242	10	4.15	74	30.71	149	61.83	8	3.32	231	95.85
Hospital	Belén	330	15	4.55	101	30.61	202	61.21	12	3.64	315	95.45
	Regional	330	11	3.33	101	30.61	203	61.52	15	4.55	319	96.67
Total		660	26	3.94	202	30.61	405	61.36	27	4.09	634	96.06

visit their dentist the next day (1.85 +/- 0.9 points). Likewise, they reported feeling greater anxiety at the idea that they were about to have a tooth drilled (2.71 +/- 1.07 points) or when they were going to receive an injection of local anesthesia in the gum (2.85 +/- 1.13 points), Table 2.

As can be seen in Table 3, females presented greater anxiety than males ($p < 0.001$). In the analysis by item, no statistically significant differences were found between genders regarding anxiety about sitting in the waiting room ($p = 0.092$), and whether they were about to have tartar removed from their teeth and have them polished ($p = 0.196$). In the other items, statistically significant differences could be found, with mean anxiety values being higher in females ($p < 0.05$).

According to stages of psychosocial development Table 4, it was found that young adults presented greater dental anxiety than mid-adults ($p < 0.001$). Likewise, in the analysis by item, young adults presented greater anxiety than those in middle adulthood in all items, except for the item related to being referred to a dental appointment for the next day ($p = 0.098$).

No statistically significant differences were found between the *Hospitals Regional Docente de Trujillo* and *Belén de Trujillo* ($p = 0.386$), Table 5. There were also no statistically significant differences between hospitals when performing the analysis by item ($p > 0.05$).

Finally, as reported in Table 6, it was found that 96.06% of the patients presented some degree of anxiety, 4.09% had extreme anxiety.

DISCUSSION.

Not only does dental anxiety affect people who suffer from it, but it can also be transferred from one generation to the next. Identifying the presence of anxiety is an important step towards improving the oral health of populations.¹²

In the present study, the mean dental anxiety value was similar to those reported by Appukuttan *et al.*,¹⁶ (India), Humphris *et al.*,²¹ (United Kingdom), and Kirova *et al.*,²² (Bulgaria). Likewise, the injection of local anesthetic in the gum and the drilling or perforation of the tooth recorded the highest anxiety values, in line with data reported by Caltabiano *et al.*,⁵ (Australia), and Appukuttan *et al.*¹⁶

Furthermore, Ferreira-Gaona *et al.*,²³ (Paraguay) also identify the injection of local anesthetic as the greatest generator of dental anxiety. These similarities may occur because procedures that involve the use of a dental turbine and injections are associated with pain, mainly in patients with anxiety.^{2,5}

However, the literature also mentions the possibility of reducing anxiety when becoming familiar with the procedures, in regular dental visits, and the personal

qualities of the dentist.^{5,11} It was found that female patients presented greater anxiety compared to males. This coincides with the studies carried out by Caltabiano *et al.*,⁵ White *et al.*,⁶ (United States), Scanduzzi *et al.*,⁹ (Brazil), and Prathima *et al.*,²⁴ (India).

This could be attributed to genetic, hormonal, emotional, and social factors, and the greater willingness of women to express and communicate their feelings.^{1,13,25} In the opinion of Rodríguez,¹⁰ being female as a variable should be considered as a predictive factor for dental anxiety.

On the other hand, the results found with respect to gender differ from those reported by Appukuttan *et al.*,¹⁶ (India), possibly due to cultural differences with female behavior in that country. Likewise, Cáceres-Alfaro *et al.*,²⁶ (Peru) found no differences, possibly because they studied a smaller sample (almost a fifth of the sample evaluated in this study), and because the study was specifically focused on two dental specialties, apart from the fact that they used another measurement scale.

According to the stages of psychosocial development, it was found that dental anxiety decreased with age. This agrees with the findings of Caltabiano *et al.*,⁵ Appukuttan *et al.*,¹⁶ and Prathima *et al.*²⁴ One likely explanation could be the increased exposure to dental care experiences over the years. In this regard, Appukuttan *et al.*,¹⁶ and Rodríguez¹⁰ believe that fears and phobias are decreasing due to brain deterioration caused by age and factors such as resignation or adaptation to unavoidable situations such as diseases and treatments, so that people eventually become more familiar with medical and dental procedures.

On the other hand, Cáceres-Alfaro *et al.*,²⁶ found no differences between the ages of the patients, possibly due to the smaller sample and the use of a different measurement instrument.

No differences were found according to hospital. This may be due to the fact that patients in both hospitals have similar cultural and socioeconomic characteristics. The hospitals in question are the most representative and with the highest level of healthcare provision. Both are managed by the Ministry of Health in the Department of La Libertad. In addition, they receive and treat patients referred from other health centers of the Department.

It is important to mention that almost all the patients evaluated presented anxiety in some of its levels.

This result differs from the values reported by Scanduzzi *et al.*,⁹ Kirova *et al.*,²² and Ferreira-Gaona *et al.*²³ Likewise, Rodríguez¹⁰ in her bibliographical review reports a low prevalence in Mexico. These differences are probably due to factors inherent to the Peruvian state health services, which could be conditioning the presence of anxiety. It is necessary to conduct additional studies to identify these associated factors.

The percentage of extreme anxiety was similar to that reported by White *et al.*,⁶ Appukuttan *et al.*,¹⁶ and Humphris *et al.*²¹ However, Kirova *et al.*,²² and Appukuttan *et al.*,²⁵ reported higher prevalence values. These differences may be due to the larger sample, in the case of the former; and in the case of the second, the research was not specifically directed to dental services, but it was applied to a very broad general population through household surveys.

It is important to report data corresponding to extreme anxiety, not only because of the repercussions on the deterioration of oral health and general well-being,^{8,14} but also, because it is very likely that these patients require special treatment and longer treatment times.^{19,27} According to White *et al.*,⁶ and Wang *et al.*,¹⁴ most of these patients are demanding with respect to the information and care provided to them.

To homogenize the behavior of the patients, in the present study, those who received dental care for the first time were excluded because they may not only be unaware of dental treatments but may also have prejudices in this regard that would increase their anxiety.^{28,29}

A limitation in this type of study is that some questionnaires could present a possible information bias, due to the probability that individuals underestimate or overestimate their answers.¹⁶ Another possible limitation is the reliability of the scale used since it was not rated as excellent. However, its *p*-value (higher than 0.70) confirmed the viability of its use in the present study.³⁰ In this sense, it is suggested to carry out subsequent studies in Spanish-speaking South American populations to evaluate in greater depth the psychometric properties of the questionnaire used.

Finally, the results of this study provide useful epidemiological information, allowing the generation of hypotheses for subsequent longitudinal observational or intervention studies. Likewise, they can guide clinicians to have a particular consideration about anxiety, to help them in making adequate therapeutic decisions.

CONCLUSION.

The mean dental anxiety score was 12.05, a *p*-value that corresponds to moderate anxiety. The drilling of the tooth and the injection of local anesthesia cause greater anxiety;

Females presented greater anxiety than males;

Young adults presented greater anxiety than patients in middle adulthood;

There was no difference in dental anxiety between patients from both hospitals;

96.06% of the evaluated patients presented dental anxiety, 4.09% had extreme anxiety.

Conflict of interests: The authors report having no conflicts of interest

Ethics approval: Not required.

Funding: Self-financed

Authors' contributions: All authors contributed to the study execution.

Acknowledgements: None.

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