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ORIGINAL ARTICALE

EVALUATING FACTORS CONTRIBUTING TO DENTAL ANXIETY IN ORTHODONTIC PATIENTS

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ABSTRACT

Background: Dental anxiety is one of the most common forms of psychological impairment obstructing oral health care, often causing necessary treatments to go unattended. Therefore, investigating the prevalence and associated determinants is important for effective intervention. It also assessed the prevalence of dental anxiety and its prospectors among patients in Baghdad, Iraq, for the planning of tailored patient care approaches.

Materials and Methods: A cross-sectional survey between October 2020 and June 2022 recruited 345 orthodontics patients who came to a private institution for dental care. According to the MDAS, patients scoring 11 or higher were determined to have clinically significant anxiety. A structured questionnaire was administered to collect demographic, psychological, and socioeconomic information. Statistical analysis was then performed using single and multifactor logistic regression to determine predictors significantly associated with dental anxiety, as advised by the statistician.

Results: The prevalence of dental anxiety was 17.23%. Significant predictors included being female, being more than 60 years old, having existing anxiety or depression, having an education level lower than secondary, having a poor sense of self-efficacy, suffering a physical disease, and having low social support ($P<0.05$). Multifactor regression reasoned and confirmed all these as strong contributors to the model, verifying the complexity of dental anxiety.

Conclusions: This study shows the high prevalence of dental anxiety and the intricate factors behind it, which require tailoring behavioral approaches in dentistry to factors of psychological and demographic origin.

Keywords: Dental anxiety; Modified Dental Anxiety Scale (MDAS); Orthodontic patients; Predictors; Personalized patient care

INTRODUCTION

Dental anxiety in orthodontics procedure, a common but multifaceted psychological condition, afflicts people of all ages, causing evasion of vital dental attention and, thus, a negative impact on oral health status [1,2]. Dental anxiety is not just an issue for the patient; it also creates problems for dentists in that anxious patients are usually more complicated and take longer to treat [3].

Several studies have identified different factors that contribute to dental anxiety, e.g., fear of pain, past negative experiences, socioeconomic status, and psychological factors like depression and anxiety [4-7]. Such patients usually undergo fainting states, palpitations, tremors, and other related symptoms and signs, which may be significantly damaging to the patient [8]. This orthodontics patient category forms a sizeable proportion of outpatient dental treatment patients and has, therefore, attracted many studies on dental anxiety among outpatients. Most of these studies focus on the result influences on dental anxiety in such patients but show common differences in the research aspect [9]. Outpatient orthodontics dental anxiety is commonly noted, and it causes more damage to treatment. It increases difficulty during the implementation of treatment and nursing measures and adversely affects the treatment outcome. Patients have also been forced to stay away from health institutions. Therefore, more attention is given in clinical practice to diagnosing, treating, and preventing dental anxiety patients [10- 12]. Townsend and Randall [13] elaborate on adolescent dental fear and the significance of nonpharmacologic behavior guidance while stressing individualized approaches for younger patients. Fell et al. [14] point out that a comprehensive overview of anxiety disorders reveals a key role for mind wandering in which such behavior may exacerbate dental anxiety. Lehrner et al. [15] show buffering factors such as ambient odors like orange in dental settings that would

help reduce anxiety; hence, it could be an easy, uncomplicated form to solve the issues. Khan et al. [16], as well as Hu et al. [17], principally address the consequences of trauma to facial and dental parts and report the association between such experiences with increased anxiety and depression. Ali et al. [18] analyze the self-reported anxiety of dental students, showing the difference in gender and education level, which can be further utilized in educational strategies.

Sukhabogi et al. [19] link psychological distress to oral health and consider their integrated nature. As for Çarıkçıoğlu [20], the effect of parental dental anxiety on their children is discussed concerning anxiety's intergenerational transfer and its effect on oral health-related quality of life. Sukumaran et.al [21], examined the broad impact of dental anxiety among adult New Zealanders and how much it affects oral health behaviors. Kassem et al. [22] describe the cultural diversity in Lebanon concerning the prevalence of dental anxiety, contributing factors to it, and exploring the overshadowing factors in the phenomenon. Lahti et al. [23] applied virtual reality-based relaxation therapies, which should highly advocate for developing non-pharmacological avenues in ameliorating the immediate post-dental intervention effectiveness on patient anxiety. Hence, the report introduces cognitive and non-cognitive factors contributing to dental anxiety's emergence and recommends a multifaceted approach to effectively addressing it. So far, there is a considerable lack of understanding of prevalence and determinants in particular populations, given their respective cultural contexts. Although studies on prevalence have been published on dental anxiety in many countries, there has been little that even includes the Middle East, especially Iraq, as a site for investigation.

In the present work, this research gap will be filled by exploring the prevalence and associated factors of orthodontics dental anxiety in patients who visit orthodontics dental clinics in Baghdad, Iraq. The study comprised 345 outpatients who attended the private clinic for dental treatment between October 2020 and June 2022. Other components measured dental anxiety levels alongside demographic data and conducted both uni- and multivariate analyses to identify significant predictors of dental anxiety. Therefore, it opened a new area of research around the specifics of the Iraqi social situation and the causes or contributions to dental anxiety, which could, thus, inform target measures to address it in dental patients.

1. MATERIALS AND METHODS

2.1 Data collection

Between October 2020 and June 2022, 345 orthodontics dental outpatients, 164 males and 181 females, visited the private dental clinic in Baghdad, Iraq. Patients must attain specific inclusion criteria when receiving treatment at the clinic, must be aged 14 and above, must fill the questionnaire alone or with family assistance, and must show interest in being devotedly and actively willing to cooperate in research activity. Exclusion from participation includes patients suffering from a history of mental illness, communication disorders, and those with incomplete clinical data.

2.2 Method

2.2.1 Analysis of Dental Anxiety

Dental anxiety was evaluated in this research with the Modified Dental Anxiety Scale (MDAS). It is an established, reputed instrument of global importance for measuring dental anxiety in orthodontics proceedures. It measures dental anxiety along four specific dimensions, and respondents rate each on a scale of 1 to 5, where 1 indicates "very low" anxiety and five marks "very high" anxiety. The present work sought to use cut-off scores above 11 in MDAS to indicate dental anxiety. Hereby, data that advance the recognition and classification of degrees of dental anxiety detected among the participants are of utmost importance for analysis and interpretation in the study.

2.2.2 General Information Collection

1. Structured questionnaires have been used to collect general orthodontics patient information: the structured questionnaires include a significant number of demographic and psychological factors concerning their:
2. Age: classified into below 60 years and 60 years and above categories.
3. Gender: classified as male or female.
4. Emotional State: The presence or absence of anxiety and depression were scored using a Zung scale, and on anxiety and depression
5. threshold scores of 50 (for anxiety) and 53 (for depression), anything below these threshold scores denoting absence.
6. Education Level: Orthodontics patients were grouped according to their educational backgrounds at junior high school and below and higher secondary technical education.
7. Marital Status: Married patients (having spouse) or unmarried patients (having no spouse).
8. Type of place of Residence: Urban or rural residents.
9. Patient base: Permanent or mobile residents.
10. Dental Treatment Construction: Patients who experienced dental treatment before (yes and no).
11. Income: Patients were divided into two categories according to their monthly income equal to or greater than 800 $/month and less than these categories.
12. Occupational Status: Patients were either classified as employed or non-employed.

13. General self-efficacy scores range from very high (31-40), high (21-30), low (11-20), and very low (below 11).
14. The Basic Disease Conditions: Patients were screened for comorbid disease conditions.
15. Social Support: Social support was measured using the Social Support Rating Scale. Patients were categorized based on their level of social support as high (30-40), medium (20-29), or low (<20).

2.2.3 Observation Indicators

Assessment of dental anxiety for orthodontics patients and its related determinants among the study cohort involves many research methods and indicators.

(a) Orthodontics Dental Anxiety Assessment: This is a crucial part of this study that includes carefully assessing all patients using an international measure called the Modified Dental Anxiety Scale (MDAS). The scale includes four main areas for measurement, each of which is used to mark score points on a 1-5 system, where 1 is mild and 5 is most severe. A total score of 11 points or above on the MDAS was the cut-off point for the diagnosis of the presence of dental anxiety, enabling a deeper understanding of patients' descriptive scores for levels of anxiety about dental procedures.

b) Univariate deficiencies: It has used simple univariate deficiencies for understanding the prevalence of dental anxiety and demands influencing factors, as well as for analyzing individual predictors and other factor potentials towards the occurrence of dental anxiety.

2.2.4 Statistical Processing

The analysis was done using SPSS 23.0 software statistical analysis. When presenting measurement data such as (x-±s), x is the mean, while s refers to the standard deviation. Count data were presented as percentages (%), ensuring clarity in data display.

2. RESULT AND DISCUSSION

The results of this study show that among 345 dental clinic orthodontics patients, 99 cases were dental anxiety, and the incidence rate of dental anxiety was 17.23%. The proportion of patients with dental anxiety who are ≥60 years old, female, anxious and depressed, have a junior high school education or below, have low or very low self-efficacy, have underlying diseases, and have moderate or low levels of social support are higher than those of patients without dental anxiety.

The difference is that there is statistical significance ($P<0.05$); see Table 1. It shows that there is still some room for prevention and control of dental anxiety, and effective control is urgently needed. Orthodontics Patients with dental anxiety are aged ≥60 years old, female, anxious and depressed, have junior high school education or below, have low and very low self-efficacy, have underlying diseases, and are moderate. The proportion of patients with lower social support levels was higher than that of patients without dental anxiety. Multifactor logistic regression analysis showed that age, gender, emotional state, education level, self-efficacy, underlying diseases, and social support levels all affected dental outpatient dental care. Influencing factors of anxiety. Therefore, the need for assessment and intervention of the above factors is believed to be high.

In-depth regression analyses using multifactor logistic regression to some of the indicators shown in Table 1, which were significantly different, for example, to transform them into an outcome variable categorized as "dental anxiety = 1" and "no dental anxiety=0."

The allocation of independent variables has been carefully outlined in Table 2 for clarity and transparency. Multifactorial logistic regression analysis also clarified which factors can affect oral outpatient dental anxiety. Such factors include age, sex, emotional state, level of education, self-efficacy, diseases present, and social support. Furthermore, this analysis has revealed from statistical reporting that the study found sufficient evidence to affirm that each of the mentioned factors does play a role in the presence of anxiety concerning dental treatment in the participants of the study. This can be concluded from a reported significant correlation ($P<0.05$). To have everything in view regarding the expected results and the breakdown of the variables used, refer to Table 3. The results reflect diverse kinds of interconnected factors that come into play upon the exhibition of dental anxiety among people undergoing oral outpatient visits and provide evidence for developing appropriate tailored interventions and support for patients.

Table 1. Univariate analysis of the occurrence of dental anxiety in dental clinic patients (%)

Dental Anxiety	Age		Gender		Emotional state		Education level	
	<60 year	≥60 year	Male	female	Anxiety and depression	No anxiety or depression	Junior high school and below	Technical secondary school and above
Have dental anxiety (n=99)	29.29	70.71	27.27	72.73	56.57	43.43	87.88	12.12
No dental anxiety (n=501)	59.68	40.32	58.28	41.72	4.59	95.41	69.06	30.94
χ2	30.802		31.926		195.320		14.572	
P	<0.001		<0.001		<0.001		<0.001	
	Form of residence		Dental treatment experience		Income		Place of residence	
Dental Anxiety	Permanent	Temporary	Have-none		≥800$/Month	<800$/Month	Town	Rural area
Have dental anxiety (n=99)	77.78	22.22	17.17	82.83	26.26	73.74	66.67	33.33
No dental anxiety (n=501)	83.03	16.97	11.98	88.02	32.73	67.27	66.47	33.53
χ2	1.559		1.995		1.345		0.001	
P	0.211		0.157		0.206		0.975	
	career status		self-efficacy		Basic disease conditions		degree of social support	
Dental Anxiety	On the job	Not employed	High and very high	Low and very low	Have	None	Higher	Medium and lower
Have dental anxiety (n=99)	69.70	30.30	20.20	79.80	40.40	59.60	36.36	63.64
No dental anxiety (n=501)	72.46	27.54	72.46	27.54	10.18	89.82	78.64	21.36
χ2	0.312		97.966		58.692		72.771	
P	0.576		<0.001		<0.001		<0.001	

Table 2. Assignment of Independent Variables

Factor	Assignment
Age	<60 years old=0; ≥60 years old=1
Gender	Male=0; Female=1
Emotional State	No anxiety and depression=0; anxiety and depression=1
Education level	Technical secondary school and above=0; Junior high school and below=1
Self-Efficacy	High and very high = 0; low and very low = 1
Basic Disease Conditions	None=0; Yes=1
Degree Of Social Support	High = 0; Medium and low = 1

Table 3. Multifactor Analysis of Dental Anxiety Among Dental Outpatients

Factor	β	SE	Waldχ2	OR	95%CI	P
Age	1.193	0.3221	12.352	3.06	1.389	<0.05
Gender	1.24	0.2791	18.028	3.203	1.423	<0.05
Emotional State	1.477	0.3601	15.555	4.039	1.805	<0.05
Education Level	1.062	0.2781	12.954	2.694	1.372	<0.05
Self-Efficacy State	1.421	0.3451	15.625	3.823	1.68	<0.05
Basic Disease Conditions	1.257	0.2911	17.018	3.257	1.43	<0.05
Degree Of Social Support	1.364	0.3301	15.672	3.616	1.576	<0.05

The analysis shows that older individuals with comorbid medical conditions usually find themselves at relatively lower levels of physical well-being. This status of health, therefore, results in relatively lower cognizance of the various treatment and examination types, even on lines of oral health. Consequently, higher tensions and uncertainties accompany their experiences with dental procedures. These states of mind significantly affect dental anxiety, leading to a higher prevalence of the condition 13-14. Research, too, identifies a gender difference where females possess a more fragile psychological disposition and a comparatively higher fear of medical treatment. Such high apprehension contributes to a much greater risk of developing dental anxiety 15.

The emotional reaction linked with this would often be expressed as dental anxiety and fear, thus emphasizing further the relationship between mental health and dental anxiety 16-17.

Understanding dental treatment is limited by such relatively low education levels, and dental misconceptions have been shared among less literate groups. Ignorance regarding what one fears usually gives one a very high susceptibility to developing dental anxiety 18. Besides, the amount of social support a person gets must weigh heavily on their psychological condition.

Patients with adequate but moderate social support levels suffer from alarmingly uncertain and even fearful confusion concerning the treatment they might undergo medically, as these emotional states are keys to triggering anxiety 19-20.

Those low in self-efficacy generally consider that treatment is not achievable; hence, they seem to have stronger fears related to the processes involved in treatment and what happens after it. These fears usually turn out to be reflected in dental anxiety 21. There is no doubt that these characteristics make it possible to see all kinds of patients requiring counseling and intervention related to these before the time of dental treatment. Further, the targeted interventions would go a long way in helping patients manage and control their dental anxiety, improving their overall experience with treatment and outcomes.

3. CONCLUSION

This research aimed to assess orthodontics dental anxiety and its factors among patients of a dental clinic, from which interesting insights can be drawn into the field of dental healthcare. However, the findings revealed a complicated interactive factors contributing to the intensity of dental anxiety among patients, thereby bringing out important issues to be considered by clinical practitioners and in further research.

The part of the analysis based on an established tool for assessment called the Modified Dental Anxiety Scale (MDAS) confirmed that dental anxiety is a real problem for patients. A significant number of the population studied showed signs of dental anxiety, according to the study, where the MDAS scores were then 11 and above. This indicates the urgency in the dental clinic setting.

Using different data collection and analysis methods, this research demonstrated that dental anxiety is multifactorial. Various demographic and psychological factors were found to be possible predictors of dental anxiety. These factors included age, sex, emotional state, level of education, marital status, place of living, housing condition, dental treatments, income, occupation status, self-efficacy, basic disease conditions, and social support. This confirms the need to consider personalized patient care based on an individual context and specific needs.

The robust results of this study have thus been made available to dental healthcare providers so that they can design specific interventions or strategies to prevent or address dental anxiety among patients. Understanding the determinants of dental anxiety permits healthcare workers to formulate a more supportive and patient-centered atmosphere, thereby improving the dental experience for patients with dental anxiety.

DECLARATIONS

Ethics approval and consent to participate

Not applicable.

Conflict interests

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REFERENCES

1.Ghasem Pour M, Haji Ahmadi M, Pourya Vali M. Dental experiments induced anxiety in 6-12 year old children and relative factors. J Babol Univ Med Sci 2004; 6 (5) :12-16

2.Khushboo Arif, Benazir Alam, Mohammad Imran Khan, Abhisheik Khare, Shitanshu Malhotra, Brijendra Singh. To assess the prevalence of dental anxiety among patients visiting a teaching dental hospital in Lucknow, India and their self-perceived treatment needs. Journal of Oral Biology and Craniofacial Research, Volume 12, Issue 6, 2022, Pages 798-801.

3.S. Aydinoglu, I. Arslan. Are anxiety and the presence of siblings risk factors for dental neglect and oral health status in children?. Archives de Pédiatrie, Volume 28, Issue 2, 2021, Pages 123-128.

4.Soha AlRatroot, Gadah Alotaibi, Fai AlBishi, Shahd Khan, Muhammad Ashraf Nazir. Dental Anxiety Amongst Pregnant Women: Relationship With Dental Attendance and Sociodemographic Factors. International Dental Journal, Volume 72, Issue 2, 2022, Pages 179-185.

5.Muhammad A. Nazir, Faisal Izhar, Ahmad Talal, Zaid B. Sohail, Abdul Majeed, Khalid Almas. A quantitative study of test anxiety and its influencing factors among medical and dental students. Journal of Taibah University Medical Sciences, Volume 16, Issue 2, 2021, Pages 253-259.

6.Grossman, S. The Surgical Dental Anxiety Scale (SDAS). British Dental Journal. Volume 237, 2024, pages 935–937.

7.Peric, R.; Tadin, A. Associations between Dental Anxiety Levels, Self-Reported Oral Health, Previous Unpleasant Dental Experiences, and Behavioural Reactions in Dental Settings: An Adult E-Survey. Medicina, Volume 60, Number 8, 2024, pages 1303.

8.Shahid M, Tadakamadla SK, Kroon J, Peres MA. Do dental anxiety and satisfaction with dental professionals modify the association between affordability and dental service use? A population-based longitudinal study of Australian adults. Journal of Public Health Dentistry. Volume 84, Issue 2, Pages136-146.

9.Soha AlRatroot, Gadah Alotaibi, Fai AlBishi, Shahd Khan, Muhammad Ashraf Nazir. Dental Anxiety Amongst Pregnant Women: Relationship With Dental Attendance and Sociodemographic Factors. International Dental Journal, Volume 72, Issue 2, 2022, Pages 179-185.

10 Anam M., Taha S. M., Shoaib A., Yusra N., Sarah H., Samina B. Anxiety, Depression and Stress in Dental Students and its Association with Sociodemographic Variables, Job Stress and the Academic Environment. Journal of Population Therapeutics and Clinical Pharmacology, Volume 31, Issue 9, 2024, pages 274-281.

11 P.V.A. Aditya, Madu Ghanashyam Prasad, Ambati Nagaradhakrishna, Nagothu Sleeva Raju, Duvvi Naveen Babu. Comparison of effectiveness of three distraction techniques to allay dental anxiety during inferior alveolar nerve block in children: A randomized controlled clinical trial. Heliyon, Volume 7, Issue 9, 2021, e08092.

12 Ilke Kupeli, Yakup Gülnahar. Comparing Different Music Genres in Decreasing Dental Anxiety in Young Adults Who Underwent Third Molar Surgery in Turkey: Randomized Controlled Trial. Journal of Oral and Maxillofacial Surgery, 78, 4, 2020, 546.e1-546.e7.

13 Janice A. Townsend, Cameron L. Randall. Adolescent Dental Fear and Anxiety: Background, Assessment, and Nonpharmacologic Behavior Guidance. Dental Clinics of North America, Volume 65, Issue 4, 2021, Pages 731-751.
14 Juergen Fell, Leila Chaieb, Christian Hoppe. Mind Wandering in Anxiety Disorders: A Status Report. Neuroscience & Biobehavioral Reviews, 2023, 105432.
15 J Lehrner, Christine Eckersberger, P Walla, G Pötsch, L Deecke. Ambient odor of orange in a dental office reduces anxiety and improves mood in female patients. Physiology & Behavior, Volume 71, Issues 1–2, 2000, Pages 83-86.
16 Fizza Khan, Satesh Kumar, Samiullah Dahri. Comment on: Anxiety and depression following facial and dental trauma – A prospective study. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology, 2023.
17 Weihsin Hu, Deval Mehta, Arpana Ludhwani, Taher Rupawala, Sandeep Thadani, Ramita Sood, Dhaval Prajapati, Henal Patel, Mohit Agrawal. Anxiety and depression following facial and dental trauma – A prospective study. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology, Volume 35, Issue 2, 2023, Pages 116-122.
18 Saqib Ali, Imran Farooq, Soban Q. Khan, Imran A. Moheet, Badr A. Al-Jandan, Khalifa S. Al-Khalifa. Self-reported anxiety of dental procedures among dental students and its relation to gender and level of education. Journal of Taibah University Medical Sciences, Volume 10, Issue 4, 2015, Pages 449-453.
19 Jagadeeswara Rao Sukhabogi, Dolar Doshi, Hangirga Sai Sandeep Kumar, Sanju Sundeep Bhargeva, Katukuri Sai Kumar. Relationship between psychological distress with self-rated oral health and dental caries status among dental patients, Clinical Epidemiology and Global Health, Volume 23, 2023, 101395.
20 Burak Çarıkçıoğlu. Impact of parental dental anxiety on the oral health-related quality of life of preschool children without negative dental experience. Archives de Pédiatrie, Volume 29, Issue 8, 2022, Pages 566-572.
21 Sukumaran, I., Taylor, S., & Thomson, W. M. (2021). The prevalence and impact of dental anxiety among adult New Zealanders. *International Dental Journal*, 71(2):122-126.
22 Kassem El Hajj, H., Fares, Y., & Abou-Abbas, L. (2021). Assessment of dental anxiety and dental phobia among adults in Lebanon. *BMC Oral Health*, 21, 48 (2021).
23 Lahti S, Suominen A, Freeman R, Lähteenoja T, Humphris G. (2020). Virtual reality relaxation to decrease dental anxiety: Immediate effect randomized clinical trial. *JDR Clinical & Translational Research*, 2020 Oct;5(4):312-318.