

# Dental Anxiety and Its Possible Effects on Caries Prevalence among a Group of Jordanian Adults

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## ABSTRACT

**Objective:** To evaluate the prevalence of dental anxiety and to assess its relationship with caries prevalence among Jordanian adults

**Methods:** A cross sectional study was conducted to choose a non-random convenient sample, consisting of 500 adult dentate patients, (265 males, 235 females) of age range between 19 and 55 years attending the diagnostic dental clinic at Marka Military Medical Center between November 2010 and January 2011. Data were collected through a questionnaire that was based on the Modified Dental Anxiety Scale. Patients were examined for dental caries prevalence using the decayed, missing and filled teeth (DMFT) index, according to World Health Organization guidelines.

**Results:** Only 44 patients (8.8%) had high dental anxiety scores ( $\geq 19$ , Modified Dental Anxiety Scale), while the remaining individuals (91.2%) showed moderate to low dental anxiety ( $\leq 18$ , Modified Dental Anxiety Scale). The mean Dental Anxiety score of the study sample was 10.61.

For males, it was 9.78 and for females it was 11.55, with statistical significant difference between both genders (p-value  $< 0.001$ , t- test). Regarding its relationship with age, the mean dental anxiety score was 11.06 for the younger age group and declined to 8.64 for older age groups. Statistical significant difference among different age groups was noticed (p- value = 0.001, ANOVA test). Dental needle was the most fearful stimulus in dental clinic for both genders, followed by tooth drilling. Individuals with high dental anxiety ( $\geq 19$ , Modified Dental Anxiety Scale) had a mean decayed value of 3.16 while individuals with low dental anxiety had a mean decayed value of 2.05. The difference between both groups was statistically significant (p-value = 0.001, ANOVA test). The differences between other components of DMFT index were not statistically significant.

**Conclusion:** Dental anxiety remains a significant problem for many patients of both gender and among different age groups of the examined Jordanian adults. Dental anxiety had negative effect on oral health status by increasing the prevalence of decayed teeth. Further studies should be carried out using larger random samples before generalizing this conclusion.

**Key words:** Age group, Caries prevalence, Dental anxiety, Gender, Modified Dental Anxiety Scale.

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### Introduction

Dental anxiety is described as a state of anxiety that occurs due to the dental treatment

procedures. It is a state of feeling or reaction to a known source of danger that lies in the subconscious.<sup>(1)</sup> Dental Anxiety is a multidimensional complex phenomenon, which

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is influenced by personality characteristics, negative childhood dental experiences, negative attitudes in the family,<sup>(2)</sup> perceptions of unsuccessful or painful previous dental treatment,<sup>(3)</sup> blood-injury fears,<sup>(4)</sup> fear of tissue damage and fear of pain.<sup>(5)</sup> Fear of pain and trauma were identified as the major contributor to dental fears.<sup>(3)</sup> Despite many improvements in dental instruments and behavioural management procedures, dental anxiety remains a significant challenge for both the dentists and their patients.<sup>(6)</sup> Dental anxiety can affect the dentist-patient relationship, and may lead to misdiagnosis.<sup>(7)</sup> In an old study by Agras *et al.*<sup>(8)</sup> the prevalence of dental fear or phobia was shown to be 198/1000, or as high as fear of flying and was ranked as fourth or fifth among 40 most commonly feared situations. Recent studies reported the prevalence of dental anxiety between 4% and 20% in many countries in the world.<sup>(9-11)</sup> Regarding consequences of dental anxiety, many researchers reported that dental anxiety and fear of pain may lead to avoidance of dental care. For examples, Taani D<sup>(12)</sup> reported that 13.3% of surveyed individuals reported fear from the dentist as the reason for irregular attendance to dental clinic. Locker D *et al.*<sup>(13)</sup> revealed that a majority of individuals with high dental fear had avoided necessary dental care. Regarding the relationship between the level of dental anxiety and caries prevalence among people, Eitner *et al.*<sup>(14)</sup> found that high dental anxiety was correlated to increased caries morbidity and DMFT scores. Schuller *et al.*<sup>(15)</sup> reported that persons with high dental fear, had higher numbers of decayed tooth surfaces, decayed teeth, and missing teeth, but lower numbers of filled and sound teeth, compared to persons with low dental fear. In Jordan, there are few studies regarding dental anxiety. Some of these studies were among schoolchildren,<sup>(16,17)</sup> and another study was among university students.<sup>(18)</sup> These studies were conducted in Irbid governorate, north of Jordan, and were among young age groups. In this study, we added a clinical examination part beside the dental anxiety questionnaire for each participant. The study took place in Amman. The aim of this study was to evaluate the prevalence of dental anxiety and to assess its relationship with caries prevalence, in a

sample of adult Jordanian patients attending the dental clinic at Marka Military Medical Center.

## Methods

### *Study population*

A cross sectional sample of 500 adult patients (265 males, 235 female) attending diagnostic dental clinic at Marka Military Medical Center between November 2010 and January 2011 was chosen. This center provides medical and dental services for a large group of population of the capital Amman. The age of the study sample ranged between 19-55 years. As this study includes only dentate individuals, patients seeking complete denture therapy were excluded from the study. The examiner informed the selected patients about the purpose and method of the study, and asked them to participate. Only those who consented to participate in the study were included.

### *Questionnaire*

The questionnaire was composed of two parts; the first part included information regarding patients name, age and gender. The second part of the questionnaire was based on the 5-item Modified Dental Anxiety Scale (MDAS) of Humphris G *et al.*<sup>(19)</sup> which contains improvements over the previous 4-item Corah Dental Anxiety Scale (DAS),<sup>(20)</sup> where an important item regarding local anesthetic injection was added. This Modified Dental Anxiety Scale is a brief, self-completed questionnaire that contains five multiple-choice questions related to dental anxiety. Each question has five possible answers, the answers for each item range from "not anxious" with a score of 1 to "extremely anxious" with a score of 5. The scores are summed together with a minimum score of 5, and a maximum of 25. The MDAS is a reliable, valid, has good psychometric properties, and require just 2-3 minutes to complete.<sup>(21-23)</sup> The MDAS has been validated in the United Kingdom and number of other countries. Arabic native translation is available and used in some studies.<sup>(18,22)</sup> A cut-off value of 19 and above is used in the MDAS to indicate high dentally anxious patients who may require special attention in the dental clinic.<sup>(19)</sup>

**Table I.** Means, Standard Deviations (SD) and percentages of dental anxiety by age group including patients with high dental anxiety (MDAS $\geq$ 19)

Age group (years)	N	%	Mean	SD	High dental anxiety, MDAS $\geq$ 19	
					N	%within age group
19-34	270	54.0	11.06	4.51	28	10.4
35-44	172	34.4	10.58	4.38	15	8.7
45-55	58	11.6	8.64	3.49	1	1.7
Total	500	100	10.61	4.41	44	8.8
P- Value (ANOVA)				0.001		

**Table II:** Means, Standard Deviations (SD) and percentages of dental anxiety by gender, including patients with high dental anxiety (MDAS $\geq$ 19).

Gender	N	%	Mean	SD	High dental anxiety, MDAS $\geq$ 19	
					N	%within gender
Males	265	53.0	9.78	4.18	17	6.4
Females	235	47.0	11.55	4.50	27	11.5
Total	500	100.0	10.61	4.41	44	8.8
P- Value (t-test)				<0.001		

**Table III:** Single item MDAS mean according to gender

Questionnaire item (MDAS)	Males	Females	p-value
If you went to your dentist for Treatment Tomorrow, how would you feel?	1.69	1.94	.004
If you were sitting in the Waiting Room, how would you feel?	1.83	2.05	.022
If you were about to have a Tooth Drilled, how would you feel?	2.32	2.67	.002
If you were about to have your Teeth Scaled And Polished, how would you feel?	1.52	1.89	.000
If you were about to have a Local Anaesthetic Injection in your gum, how would you feel?	2.45	2.99	.000
Total mean score according to gender.	9.78	11.55	.000

**Table IV:** Mean decayed, missing and filled permanent teeth by low and high dental anxiety

Variable	Low dental anxiety MDAS<19	High dental anxiety MDAS $\geq$ 19	P- value
Decayed (D)	2.05	3.16	.001
Missing (M)	1.42	1.32	.750
Filled (F)	3.34	2.82	.242
DMFT	6.80	7.30	.440

### Clinical examination

After the patients filled the questionnaire, one examiner evaluated dental caries status using the decayed (D), missing (M) and filled (F) teeth (DMFT) index, according to WHO guidelines<sup>(24)</sup> using plane mouth mirror and an explorer under good light. Dental radiographs were not included and third molars were excluded. Decayed teeth (D) were defined as the number of teeth with primary and secondary caries, missing teeth (M) were defined as number of missing teeth, irrespective of the reason, filled teeth (F) was defined as number of teeth filled, including all types of filling materials and crowns. The examiner recorded individual values of D, M, and F for each subject then the sum of these three

values gave the corresponding DMFT score, which is an indicator of dental disease and previous dental treatment experience until the examination day. All subjects were examined by one dentist. Ethical approval for the study was obtained from the ethical approval committee at the Royal Medical Services.

### Statistical analysis

Data were analyzed using the computerized Statistical Package for Social Sciences (SPSS) 15 for windows (SPSS Inc, Chicago, IL, USA). Means, standard deviations and frequency distributions were calculated. An Independent-Samples t-test was used to compare the means of two variables, while ANOVA test was used to

compare the means of multiple variables. The level of statistical significance was chosen at  $p < 0.05$ . Descriptive statistics were used as well.

## Results

The study population sample consisted of 500 adult subjects, 53% males and 47% females. Only 44 patients (8.8%) showed high dental anxiety ( $MDAS \geq 19$ ). Table I shows dental anxiety scores among different age groups. The age groups for the study population range between 19-55 years. The mean MDAS for the total subjects was 10.61. The highest MDAS was seen among the younger age group and the mean values for MDAS decline with age, with statistical significant difference between age groups ( $p$ -value = 0.001, ANOVA test). Regarding the association between dental anxiety and gender, dental anxiety was higher among females compared to males. Table II shows that 17 males (6.4%) and 27 females (11.5%) were high dental anxious patients ( $MDAS \geq 19$ ). The mean dental anxiety score for males was 9.78 and 11.55 for females. The difference was statistically significant ( $p$ -value  $< 0.001$ ,  $t$ -test). The most fearful stimulus in dental clinic for both gender was local anesthetic injection, followed by drilling of teeth (Table III). The least fearful situation for both genders was scaling and polishing. Individuals with high dental anxiety had a statistically significant higher number of decayed teeth ( $p$ -value = 0.001, ANOVA), however there were no statistically significant differences for missing (M), filled (F) teeth and total DMFT index scores between high and low dental anxiety groups (Table IV).

## Discussion

The results of this study show that prevalence of dental anxiety among the sample was 8.8%. This result is within the range between 5-20% reported from other countries such as Saudi Arabia (8.5%),<sup>(11)</sup> Netherlands (17.9%),<sup>(9)</sup> United Kingdom (11.6%),<sup>(23)</sup> USA (12.2%),<sup>(25,26)</sup> Australia (9.5%),<sup>(27)</sup> China (8.7%)<sup>(28)</sup> and Denmark (10.2%).<sup>(29)</sup> The prevalence of dental anxiety in this study was close to the lower range limits. This may be due to the fact that this study was carried out among patients attending a dental clinic. Since many individuals with extremely

high dental anxiety would not attend the dental clinic voluntarily, this may have resulted in an underestimation of the prevalence of dental anxiety. This study population does not reflect dental anxiety among all Jordanian adult population, and further studies that include more representative samples are required. The findings of this study are in agreement with many cross-sectional studies who reported that prevalence of dental anxiety decreases with age.<sup>(23,28,30)</sup> Hagglin *et al.*<sup>(31)</sup> in their longitudinal study which followed individuals from 1969 to 1996, explained this decrease as "a true age effect rather than a cohort effect, and dental fear, like many other general and specific phobias, decline with age". In addition, this observation may be explained by the fact that older subjects had more time for good dental experiences that would help to neutralize previous traumatic ones. On the other hand, few studies did not find significant association between dental anxiety and age.<sup>(32)</sup> This study revealed that females are significantly more dentally anxious than males. This result agrees with many studies that assessed dental anxiety between both genders and reported that prevalence of dental anxiety was higher in females than in males.<sup>(23,25,29,33,34)</sup> However, some studies failed to find significant difference in dental anxiety between gender.<sup>(26)</sup> The explanation for this gender difference may be due to actual differences in anxiety levels between both genders, a greater readiness among females to acknowledge feelings of anxiety, or lower ability to cope with dental situation, or may simply reveal gender differences in self-reporting dental anxiety with male's denial or may be a combination of multiple factors. According to the MDAS scores, the most common anxiety-producing stimulus in both gender was the needle injection. This is consistent with other studies.<sup>(3,18)</sup> Milogram *et al.*<sup>(35)</sup> in their study explained this problem as a four-dimension one. "Fear of pain, fear of local anesthetic solution, fear from acquired diseases and physical injury". Avoidance of necessary dental treatment<sup>(12,13)</sup> is said to be related to dental anxiety, furthermore, if anxious dental patients attend for emergency dental visit, they will likely avoid necessary follow up appointments to complete dental treatment properly.<sup>(14)</sup> This dental avoidance behavior will lead mostly to more extensive

development of carious lesions, which ultimately requires more invasive and painful treatment, that will augment the level of dental anxiety and the patient will enter what is called "vicious cycle"<sup>(36)</sup> of fear. The effect of dental anxiety on caries prevalence was discussed by many researchers, Eitner *et al.* Found that avoidance of dental treatment was highly correlated with anxiety scores and with increased caries morbidity.<sup>(14)</sup> Our study supports these findings, where we found that Individuals with high dental anxiety had a statistically significant higher number of decayed teeth (D), compared with low dental anxiety patients. Schuller A *et al.*<sup>(15)</sup> found that individuals with high dental fear, had a statistically significant higher number of decayed and missing teeth, but statistically significant lower number of filled teeth. There were no differences in DMFT between both groups. Our study supports their findings regarding differences in DMFT between both groups. Locker and Liddell <sup>(37)</sup> found that dentally anxious patients had significantly more missing and fewer filled teeth compared to low dental fear subjects. In general, dental anxiety had negative effect on utilization of dental services and oral health status. So breaking this "vicious cycle" is important to improve oral health status of those fearful individuals. This needs efforts from both the dentists and patients. On one hand, dentists' should have more understanding, patience, higher communication skills and behavioral management procedures. On the other hand, patients should recognize and control their fears from dental treatments, and improve dental utilization behaviors to improve their oral health status. If this approach fails, pharmacological means may be used to solve this problem.

## Conclusions

Dental anxiety remains a significant problem for many patients of both gender and for different age groups among Jordanian adults. Dental anxiety had negative effect on oral health status by increasing the prevalence of decayed teeth. In order to generalize the results of such studies among Jordanian adults, future studies should be carried out using larger random samples.

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