

## The relationship between level of dental fear and anxiety and DMFT index in students of Rafsanjan University of Medical Sciences, Iran, during the 2010-2011 academic years

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### Abstract

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**Background:** The majority of individuals who visit the dentist are anxious. They are usually capable of controlling their anxiety. However, this fear sometimes creates great problems for the patient and dentist such as lack of visiting the dentist for treatment, incorrect diagnosis due to lack of appropriate communication between the patient and dentist, and finally, reduction of oral health level. The purpose of this study was to determine the level of dental fear and anxiety in students of Rafsanjan University of Medical Sciences, Rafsanjan, Iran, and its relationship with oral and dental health status in the 2010-2011 academic year.

**Materials and Methods:** This descriptive study was conducted using the Dental Anxiety Scale-Revised (DAS-R), Dental fear Scale (DFS), and the decayed, missing, and filled teeth (DMFT) index checklist. The study was performed on 300 students of Rafsanjan University of Medical Sciences, enrolled during 2005-2011. The participants were selected through stratified random sampling based on the population of each department (medicine, nursing and midwifery, dentistry, and paramedicine). The DMFT, DAS-R, and DFS scores along with other gathered data were analyzed using chi-square test in SPSS software.

**Results:** Among the participants, 82 individuals were medical students, 44 were dentistry students, 53 were nursing and midwifery students, and 121 were paramedical students. In addition, 173 subjects were women and 127 were men. Moreover, 49.3% of students had dental fear and 24.8% had dental anxiety. Among women, 32.4% had dental anxiety and 54.3% had dental fear, while among men, 14.2% had dental anxiety and 40.2% had dental fear.

**Conclusions:** According to the obtained results, variables such as sex, marital status, field of education, history of dental visit, painful previous treatments, and dental anxiety in the family had an effect on DAS-R and DFS scores. Moreover, there was a significant relationship between DMFT index and level of fear and anxiety; with the increasing of dental fear and anxiety, DMFT also increased.

**Keywords:** Anxiety, Fear, Dentistry, Student

### Introduction

The cost of treating oral and dental diseases is higher than that of cardiovascular diseases (CVDs), cancer, and osteoporosis in industrial countries. Oral and dental health promotion and preventive measures are undoubtedly better and more economical (1). The simplest criterion for diagnosing decayed, lost, and restored dental is DMFT index score which

has been determined by the World Health Organization (WHO). Generally, in epidemiologic studies, the use of a questionnaire and intraoral examination is a

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typical method of collecting diagnostic data and performing oral and dental health studies (2).

Investigations in different parts of the world show that the prevalence of dental anxiety in children and adults can vary from 5% to 20% (3). Although persons visiting dentists are typically anxious, they can overcome their anxiety. However, in some cases, fear of dentistry is the cause of great problems for the patient and dentist to an extent that anxiety has been recognized as a strong factor in avoiding treatment or visiting the dentist only in emergencies. Anxiety in patients is the cause of management issues, such as longer treatment duration, missed appointments, and patients' higher pain threshold, for the dentist. Therefore, managing patient's anxiety is one of the main factors of stress for dentists. Other problems that can be caused by severe anxiety are incorrect diagnosis, lack of suitable communication between the patient and dentist, difficulty in controlling the patient on the dental chair, and the need for more time to manage the patient's anxiety (4-6). In addition, occurrence of anxiety in patients and its recurrence during the examination of patients can affect the performance of dentists and decrease their self-confidence. Decrease in the dentist's self-confidence decreases his/her probability and level of success. Since the provision of effective dental services has a profound effect on the determination of health indexes of society, anxiety of patients and lack of seeking of dentistry treatment services may have an undesirable effect on society development indexes (7).

Different reasons have been provided for this problem and the most common is fear of pain which may be due to previous painful experiences of the patient or persons who are intimate with the patient (8). Injection of anesthetics and drilling of teeth are stimulants that cause anxiety. Tooth extraction and root therapy are the most fearful dental operations for patients; however, 37% of toothless individuals have expressed that they have

postponed their dental visits due to fear of dentistry (9).

Dental operations, unlike other medical operations, are usually performed while the patient is conscious. The dental syringe and drill are objects that create the highest amount of fear in patients. Another environmental factor is the small distance of the dentist and his/her assistant from the patient. Mental stimulants which affect the patient include perception of treatment, helplessness or lack of control during the treatment, and inserting of the hand into the patient's mouth. Perception of an undesirable and unavoidable event in the future is a strong stimulus for stress (9).

Fear differs from anxiety. Fear forms in response to apparent, external, and specific danger or with a nonintrusive origin; however, anxiety is formed in response to an unknown, internal, and vague threat and it accompanies conflict. The psychological difference between these two emotional reactions is in the acute nature of fear and chronic nature of anxiety (10). Many endodontic patients have heard fearful stories about root therapy which are usually related to the pain and undesirable experience of the illness itself and the treatment is less painful. One study on endodontic patients with completed treatment showed that 96% approved of root therapy in the future. Therefore, the cause of fear and anxiety of patients is the fear of an unspecified event and often due to scary stories that others recount. It is interesting that many patients hide this fear. Therefore, awareness about the prevalence and level of dental anxiety in patients can help researchers find its causative factors and reduce them (11).

People who fear dentistry may have suffered from a painful or damaging dental treatment or may have had a history of negative interaction with a dentist or his/her assistant. Both direct and indirect experiences are the cause of fear of dentistry. The effect of family and friends on adolescents or adults may create fear in them. Sometimes it has been observed that children fear the dentist's office even before seeing it. This subject is relevant to similar

dental experiences (such as seeing a medical room or emergency room) which is recognized as stimulus generalization (8, 12).

Moreover, students of medical fields during their years of education, especially later years in hospital departments, encounter stressful factors such as the environment of the department, needles, syringes, injection medication, treatment procedures, hospital facilities, and the dental unit. These stressful factors can have an effect on their fear and anxiety due to dental treatments (13). Therefore, the purpose of this study was to determine the relationship between dental fear and anxiety and oral and dental health status in students of Rafsanjan University of Medical Sciences, Rafsanjan, Iran.

### **Material and Methods**

This descriptive study was conducted on 300 students studying in different majors at Rafsanjan University of Medical Sciences in 2010-2011. The age range of the participants was 18-36 years with an average age of  $22.16 \pm 2.54$ . The subjects were selected through stratified random sampling from among all students of admission years of 2005-2011 and based on the population of each faculty (medicine, dentistry, nursery and midwifery, and paramedicine). Based on  $P = 10\%$ ,  $\alpha = 0.05$ , and  $d = 0.04$  (14), the sample size was calculated as 216 individuals, and for greater certainty, the sample size was considered as 300 individuals.

To collect data, 3 questionnaires were used; including a demographic characteristics questionnaire, the Dental Anxiety Scale-Revised (DAS-R), and the Dental Fear Scale (DFS). The questionnaires were distributed among the students in the departments and study classes and were collected after completion by the students. DMFT checklist index is a tool which is widely used for measuring DMFT index which indicates the oral and dental health status of an individual. After drying the teeth, the DMFT index of each participant was determined via intraoral

examination by a trained individual under artificial light of a torch, which was held by a colleague, using a mirror and periodontal probe, and through visual inspection of caries, fillings, and lost teeth. The validity of this questionnaire has been verified in different studies (13).

**Demographic characteristics questionnaire:** This questionnaire includes demographic information including sex, marital status, field of education, year of university admission, history of visiting a dentist, history of physical [based on the classification of the American Society of Anesthesiologists (ASA)] (15) and mental illness (visiting a psychologist, drug consumption, hospitalization in a psychology department or history of receiving student counseling services), painful or undesirable treatments in previous dental appointments, and anxiety from dental treatments in family and friends.

**Dental Anxiety Scale-Revised:** One of the tools widely studied and used for measuring dental anxiety is the DAS-R. The goal of this questionnaire is the investigation of patients' views of the danger and threat level of dental treatment. This questionnaire is made up of 4 items with 5 options each and their score ranges from 1 to 5. Scores of 1 and 5, respectively, represent the calmest and most anxious states. Therefore, the total score of the DAS-R ranges between 4 and 20; scores of below 9, 9-12, 13-14, and 15-20 represent low anxiety, moderate anxiety, high anxiety, and severe anxiety, respectively.

**Dental Fear Scale:** The 20-item DFS was used in this study to evaluate the level of fear in an individual. The DFS is classified into avoidance of dental treatment (2 questions), physical symptoms due to anxiety (5 questions), and anxiety caused by dental stimulant (13 questions). The questions of the DFS were related to topics such as the patient's feeling about the following day's treatment, avoiding dental examinations or canceling of dentist appointments due to fear, and anxiety due to arranging an appointment, approaching the clinic, sitting in the waiting

room, sitting on the dental chair, the smell of the dentist's office, the entrance of the dentist, seeing the anesthesia needle, feeling the needle injection, and seeing, hearing, and feeling the vibration of the drill, muscle contraction, increased breathing rate, sweating, feeling nauseated, and increased heart rate during dental treatments. Data are adjusted based on a Likert scale from 1 to 5, and therefore, a total score of less than 23, 23-33, and more than 34 shows low, moderate, and severe DFS, respectively.

Data were coded after collection, entered into the computer, and were analyzed using chi-square test in SPSS software (version 15, SPSS Inc., Chicago, IL, USA).

## Results

In this study, 300 students of Rafsanjan

University of Medical Sciences were studied. The age of the participants ranged between 18 and 36 years with an average age of  $22.16 \pm 2.54$  years.

Among the subjects, 82 (27.33%) were medical students, 44 (14.67%) were dentistry students, 53 (17.67%) were nursing and midwifery students, and 121 (40.33%) were paramedical students. Moreover, 173 subjects (57.67%) were women and 127 (42.33%) were men. Among the participants, 275 (91.70%) individuals were single and 25 (8.30%) were married. In this study, women showed more fear and anxiety toward treatment. In the DAS, 17.9% of women had severe anxiety, while 7.9% of men showed severe anxiety, and in the DFS, 40.2% of men had severe fear, while 54.3% of women expressed severe fear.

**Table 1:** Frequency distribution of studied subjects based on level of fear due to treatment and demographic characteristics

Demographic characteristic	DFS frequency	Level of fear				Result of chi-square test
		Low N (%)	Moderate N (%)	Severe N (%)	Total N (%)	
Gender	Male	52 (40.9)	24 (18.9)	51 (40.2)	127 (100)	P < 0.0001
	Female	32 (18.5)	47 (27.2)	94 (54.3)	173 (100)	
	Total	84 (28.0)	71 (23.7)	145 (48.3)	300 (100)	
Field of study	Medicine	25 (30.5)	18 (22.0)	39 (47.5)	82 (100)	P < 0.0001
	Dentistry	18 (41.0)	11 (25.0)	15 (34.0)	44 (100)	
	Nursing and midwifery	11 (20.8)	23 (43.4)	19 (35.8)	53 (100)	
	Paramedicine	23 (19.0)	23 (19.0)	75 (62.0)	121 (100)	
	Total	77 (25.7)	75 (25.0)	148 (49.3)	300 (100)	
Marital status	Single	79 (28.7)	66 (24.0)	130 (47.3)	275 (100)	P = 0.4620
	Married	5 (20.0)	5 (20.0)	15 (60.0)	25 (100)	
	Total	84 (28.0)	71 (23.7)	145 (48.3)	300 (100)	
History of physical illness	Yes	0 (0)	0 (0)	3 (100)	3 (100)	P = 0.1980
	No	84 (28.3)	71 (23.9)	142 (47.8)	127 (100)	
	Total	84 (28.0)	71 (23.7)	145 (48.3)	300 (100)	
History of mental illness	Yes	2 (25.0)	1 (12.5)	5 (62.5)	8 (100)	P = 0.6700
	No	82 (28.2)	70 (23.7)	140 (48.1)	292 (100)	
	Total	84 (16.8)	71 (25.0)	145 (58.2)	300 (100)	
History of dental anxiety in the family	Yes	30 (18.3)	23 (14.0)	111 (67.7)	164 (100)	P < 0.0001
	No	54 (39.7)	48 (35.3)	34 (25.0)	136 (100)	
	Total	84 (28.0)	71 (23.7)	145 (48.3)	300 (100)	
History of painful treatment	Yes	15 (17.8)	13 (15.5)	56 (66.7)	84 (100)	P = 0.0010
	No	69 (31.9)	58 (26.9)	89 (41.2)	216 (100)	
	Total	84 (28.0)	71 (23.7)	145 (48.3)	300 (100)	
Dental visits	Regular	8 (40.0)	7 (35.0)	5 (25.0)	20 (100)	P = 0.0020
	Sometimes	11 (14.9)	26 (35.1)	37 (50.0)	74 (100)	
	During a problem	65 (31.6)	38 (18.4)	103 (50.0)	206 (100)	
	Total	84 (28.0)	71 (23.7)	145 (43.8)	300 (100)	

DFS: Dental Fear Scale

Regarding the level of anxiety due to treatment, no difference was observed between married and single individuals ( $P = 0.835$ ). In the DFS, a higher level of fear was observed in married individuals; however, this relationship was not statistically significant ( $P = 0.462$ ). There was relationship between the field of education of the individuals and anxiety due to treatment. Students of paramedicine had the highest level of anxiety (21.6% showed severe DAS) and the students of dentistry had the lowest level of anxiety (4.5% showed severe DAS). Furthermore, 9.8% and 11.3 of medical and nursing and midwifery students, respectively, had severe DAS. This relationship was also found in the DFS; paramedical students had the highest level of fear of treatment (62% had severe DFS) and dentistry students had the lowest level of fear of treatment (34% had severe DFS). Moreover, 35.8% and 47.5 of students of nursing and midwifery and medicine had severe DFS, respectively. There was no relationship between year of

university admission of individuals and fear and anxiety due to treatment and there was no statistically significant difference between them. Most of the patients (68.6%) expressed that they only visit the dentist when a problem occurs and only 6.6% had regular dental visits. It was shown that dental visits influence the fear of treatment; 25% of individuals who had regular dental visits had severe DFS, while 50% of those who visited only when a problem occurred had severe DFS. This relationship was not found for DAS. Furthermore, 54.6% of individuals stated that there is a person in their family or friends who has dental fear or anxiety. Between this variable and anxiety due to treatment a relationship existed. The level of anxiety in individuals who had an acquaintance with anxiety and those who did not was 18.9% and 7.4%, respectively. This relationship also existed in the fear of treatment, and the level of fear among these individuals was 67.7% and 25%, respectively (Table 1).

**Table 2:** Frequency Distribution of studied subjects based on level of anxiety due to treatment and demographic characteristics

Demographic characteristic	DAS frequency	Level of anxiety					Result of chi-square test
		Low N (%)	Moderate N (%)	High N (%)	Severe N (%)	Total N (%)	
Gender	Male	92 (72.4)	17 (13.4)	8 (6.3)	10 (7.9)	127 (100)	P = 0.004
	Female	102 (59.0)	15 (8.7)	25 (14.5)	31 (17.9)	173 (100)	
	Total	194 (64.7)	32 (10.7)	33 (11.0)	41 (13.7)	300 (100)	
Field of study	Medicine	55 (67.0)	16 (19.5)	3 (3.7)	8 (9.8)	82 (100)	P = 0.001
	Dentistry	35 (79.5)	4 (9.0)	3 (7.0)	2 (4.5)	44 (100)	
	Nursing and midwifery	38 (71.7)	3 (5.7)	6 (11.3)	6 (11.3)	53 (100)	
	Paramedicine	63 (52.0)	13 (10.7)	19 (15.7)	26 (21.6)	121 (100)	
	Total	194 (64.6)	32 (10.6)	33 (11.0)	41 (13.8)	300 (100)	
Marital status	Single	178 (64.7)	30 (10.9)	29 (1.0)	38 (13.8)	275 (100)	P = 0.835
	Married	16 (64.0)	2 (8.0)	4 (16.0)	3 (12.0)	25 (100)	
	Total	194 (64.7)	32 (10.7)	33 (11.0)	41 (13.7)	300 (100)	
History of physical illness	Yes	3 (100)	0 (0)	0 (0)	0 (0)	3 (100)	P = 0.647
	No	191 (64.3)	32 (10.8)	33 (11.0)	41 (13.8)	297 (100)	
	Total	194 (64.7)	32 (10.7)	33 (11.0)	41 (13.7)	300 (100)	
History of mental illness	Yes	8 (100)	0 (0)	0 (0)	0 (0)	8 (100)	P = 0.213
	No	186 (63.7)	32 (11.0)	33 (11.3)	41 (14.0)	292 (100)	
	Total	194 (64.7)	32 (10.7)	33 (11.0)	41 (13.7)	300 (100)	
History of dental anxiety in the family	Yes	85 (51.8)	24 (14.6)	24 (14.6)	31 (18.9)	164 (100)	P < 0.0001
	No	109 (80.1)	8 (5.9)	9 (6.6)	10 (7.4)	136 (100)	
	Total	194 (64.7)	32 (10.7)	33 (11.0)	41 (13.7)	300 (100)	
History of painful treatment	Yes	47 (57.3)	11 (13.4)	11 (13.4)	13 (15.9)	82 (100)	P = 0.434
	No	147 (67.4)	21 (9.6)	22 (10.1)	28 (12.8)	218 (100)	
	Total	194 (67.4)	32 (10.7)	33 (11.0)	41 (13.7)	300 (100)	
Dental visits	Regular	8 (40.0)	7 (35.0)	0 (0)	5 (25.0)	20 (100)	P = 0.002
	Sometimes	11 (14.9)	26 (35.1)	0 (0)	37 (50.0)	74 (100)	
	During a problem	65 (31.6)	38 (18.4)	0 (0)	103 (50.0)	206 (100)	
	Total	84 (28.0)	71 (23.7)	0 (0)	145 (43.8)	300 (100)	

DFS: Dental Fear Scale

In addition, 2.6% of individuals had a history of psychological disease and 1% had a history of physical illness. Between these two variables and anxiety and fear of treatment no relationship was observed. Presence or lack of presence of physical and psychological illnesses had no effect on anxiety and fear due to treatment. About 27.3% of subjects had experienced painful or undesirable treatment in the previous dental visits which had a direct relationship with level of anxiety due to treatment. Severe anxiety was observed in 15.9% of subjects with a past undesirable experience and 12.8% of participants without such an experience (Table 2). The Spearman test showed no significant difference between scores of DMFT, DFS, FT, MT, DT, and DFS, DMFT and DAS-R, and FT, MT, DT, and DAS-R ( $P < 0.0001$ ).

### Discussion

Controlling anxiety and fear during dental treatments is one of the most important factors and the first factor of success. Approximately 50% of people in Western societies are concerned about dental visits and 10% of individuals are extremely afraid of it. Dealing with the fear and anxiety of patients is a primary concern in dentistry and has caused a reduction in follow-up, sometimes lack of visits for dental treatments, and a decrease in the level of oral and dental health of patients (10).

With the increasing of level of fear and anxiety from dental treatments, the level of dental and oral health decreases and a significant relationship exists between fear and anxiety levels and DMFT index. This result is in agreement with the study of Liran et al. (1). Liran et al. found that with the increasing of fear and anxiety levels, the oral and dental health status of people worsens (1). Moreover, the results of the study by Taani et al. showed that fear of dental treatment and value of DMFT index have a significant relationship with each other (16). Women showed more anxiety compared to men regarding dental

treatment. This finding is in agreement with previous studies such as the study by Saatchi et al. (17). Saatchi et al. reported that women had more anxiety, but they found no relationship between age and level of education, and anxiety. Participants who had regular visits to the dentist and had no undesirable previous treatment history experienced lower level of anxiety.

In the present study, no relationship was found between anxiety due to treatment and marital status. Nevertheless, the study by Berggren et al. showed that single people showed severe anxiety (18). This difference between the studies may be due to the similar number of single and married subjects in the study by Berggren et al. and the much higher number (almost all) of single subjects in the present study.

The field of education of the participants had a relationship with anxiety and fear due to treatment; paramedical students experienced the highest level of fear and anxiety and dentistry students the least amount of fear and anxiety due to treatment. Moreover, students of nursing and midwifery and medicine, respectively, showed higher level of fear and anxiety compared to dentistry students. This finding is in agreement with the result of the study by Yaghouti Khorasani et al. who reported lower fear and anxiety in dentistry students compared to students in other fields (19). However, the study by Ghasempour et al. showed that anxiety and fear due to treatment was not influenced by field of study (13). They reported needle injection as the most prevalent factor for fear. In their study, dental anxiety and fear among students was not prevalent and not affected by the field of study and history of visiting the dentist's office, but gender and academic term had an effect on DFS and DAS scores (13).

No relationship was found between year of university admission and anxiety and fear due to treatment in the present study. Nevertheless, in the study by Ghasempour et al., more recently admitted students had higher DAS and DFS scores (13).

People with regular dental visits showed less fear of treatment compared to people who visited when a problem occurred. This result was in agreement with that of the studies by Saatchi et al. (17) and Akhavan et al. (7). However, in the study by Ghasempour et al., this variable had no effect on anxiety and fear due to treatment (13).

Presence of fear or anxiety in family members and acquaintances also had a relationship with anxiety and fear due to treatment. This result was in accordance with the results of studies by Akhavan et al. (7) and Olak et al. (20).

History of mental and physical illness had no relationship with anxiety and fear of treatment. Akhavan et al. also found no relationship between these two variables, and DAS and DFS scores (7).

People who had had painful or undesirable treatment experiences in previous dental visits had a higher dental anxiety score. This result is in agreement with that of the studies by Akhavan et al. (7), Olak et al. (20), and Oostrink (21, 22).

### Conclusion

Based on the results obtained from this study, fear and anxiety are prevalent among dentistry students. A significant relationship was observed between DMFT index and the level of fear and anxiety; increase in the level of dental fear and anxiety caused an increase in DMFT.

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