



DENTAL FEAR AND ANXIETY AMONG STUDENTS, INTERNS, ASSISTANTS AND PATIENTS IN KING SAUD UNIVERSITY DENTAL COLLEGE IN RIYADH, SAUDI ARABIA

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ABSTRACT

Objectives: To evaluate dental fear and anxiety among students, interns, assistants and patients in the dental college and clinics in King Saud University in Riyadh, Saudi Arabia.

Material and Methods: A specifically designed cross-sectional questionnaire was distributed to male and female dental students, interns, assistants and patients. The questionnaire supplied was both in Arabic and English languages to suit the participants, for ease of analysis. The question format used were (yes or no) type of questions.

Results: Among the participants, 38.35 % were males and 61.65% were females. Bad experience in childhood and fear from dental treatment and dentist was highly significant $p=0.000$ and 0.002 respectively. Similarly fear from dental treatment and dentists in the past and present $p=0.000$. The dental students had high scores in cancelling appointments for fear from dental treatment $p=0.008$ and increased breathing ($p=0.020$) dental assistants had significant levels in remembering a bad experience that happened in their childhood during dental treatment ($p=0.038$), patients had high significant levels for increased breathing ($p=0.044$), hand sweating ($p=0.009$), on seeing the dental clinic ($p=0.003$) and while in the waiting room ($p=0.034$). While patients specifically reported significantly higher levels of fear from general dental treatment procedures $p=0.022$

Conclusion: Dental fear and anxiety was experienced by all categories but with varying levels. Some categories revealed higher percentages for questions related to fear while others for anxiety. Dental fear and anxiety was more prevalent among patients and female students.

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INTRODUCTION

Dental fear or anxiety may be described as a subjective state of feeling of reaction to a known source of danger which lies in the conscious (Rubin *et al.*, 1998). Dental anxiety is viewed as a fear originating in childhood which persists into later life. However studies that have addressed this issue did not support this point of view (Kruger *et al.*, 1998). It has been found that fear of pain is a primary source of anxiety and a major obstacle to seeking dental care (Klepac and Hauge, 1982; Woolgrave and Cumberbatch, 1986). Avoidance of dental treatment due to anxiety is very common and appears to be strongly associated with extreme deterioration of oral and dental health (Gatchel *et al.*, 1983; Cohen, 1985) affecting quality of life (McGrath and Bedi, 2004). A large number of patients only seek a dentist when they have a toothache. Some individuals experience fear due to certain stimuli involved in dental treatment. The sight of a needle, feeling of the injection and noise of the drill and

other dental instruments trigger emotional sensations of discomfort (Serra-Negra *et al.*, 2012), when fearful patients do appear for dental treatment, they may pose special treatment considerations for the practitioner, often resulting in pain and the need to undergo more invasive treatment when patients do come to the dentist (Milgrom *et al.*, 1995).

Dental anxiety refers to patients' specific response towards dental situation-associated stress (Roy-Byrne *et al.*, 1994) and henceforth is considered among the most stressful situations a dentist might face. Patients with high levels of dental anxiety are reported to experience high levels of psychological distress, suffer strong negative social consequences and in some cases, can be psychologically handicapped (McGrath and Bedi, 2004). Dental anxiety is a recognized problem for both patients and dental health providers.

Many scales were developed in order to assess dental anxiety. The two most frequently used adult questionnaire measures of dental fear and anxiety are the Dental Anxiety Scale (DAS) (Corah, 1969) and the Dental Fear Survey (DFS) (Kleinknecht and Bernstein, 1978): Both were originally developed in

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English. The original DAS is a 4-item questionnaire, asking individuals to rate their anxiety as they imagine approaching four dental situations, such as sitting in the waiting room anticipating dental treatment.

The Modified Dental Anxiety Scale (MDAS)(Humphris *et al.*, 1995) was developed to improve the psychometrics and content validity of the original DAS by adding an extra question to the item about receiving dental injections and invites respondents to rate from least to greatest level of their anxiety. The measure is simple, quick and easy to complete, reliable, with evidence for validity, and no instrumental effects meaning it does not cause increase in anxiety upon completion. (Humphris *et al.*, 2006; Coolidge *et al.*, 2008).

The original DFS contained 27 items (Kleinknecht and Bernstein, 1978), which the authors (Schuurs and Hoogstraten, 1993) later reduced to 20. The items assess a broader array of dental stimuli than the MDAS, such as seeing the drill, smelling the dental office, and the like. In addition, the respondent is asked to rate specific physiological responses to dental stimuli, such as muscle tension and increased breathing rates. Two items assess avoidance of dental appointments due to fear and one item asks for an overall rating of fear of dental work. The DFS has been found to be reliable and valid in samples of college students and dental patients (Schuurs and Hoogstraten, 1993; Coolidge *et al.*, 2008).

Nevertheless, studies of dental fear are very scarce from the Middle East countries (Al Omari and Al Omiri, 2009; Abu-Ghazaleh *et al.*, 2011). Few studies, to our knowledge, are related to the Saudi population (Taani, 2001). As a consequence, the following research was undertaken to evaluate dental fear and anxiety among students, interns, assistants and patients in the Dental College and clinics in King Saud University, King Khaled and Dental University' Hospitals in Riyadh, Saudi Arabia.

MATERIALS AND METHODS

Anxiety and fear were evaluated within the present study by using a self-administered cross sectional specifically designed questionnaire. The same questionnaire was distributed to the dental students, interns, assistants and patients from the male and female dental schools and clinics in King Saud University, King Khaled and Dental University Hospitals in Riyadh, Saudi Arabia. The study was approved and supported by the research center at the College of Dentistry (CDRC), King Saud University, Riyadh, KSA. (Research project #IR 0160).

Questions related to the dental fear and anxiety were slightly modified from the previous DFS (Kleinknecht and Bernstein, 1978) and MDAS (Humphris *et al.*, 1995) versions to suit our participants. The questionnaire was written in both Arabic and English languages according to the nationality of the volunteers and for ease of analysis. The question format used were (yes or no) type of questions. The self-constructed tailored questionnaire was divided into two parts to include the demographic data where the age, gender and academic level of participants were included followed by 14 (yes or no) question type as shown in Table-1.

The collected data was analyzed using the SPSS statistical package software version 20. Descriptive statistical analysis was carried out. The chi square test was used and proportion

test when needed. The level of statistical significant difference was set at $p \leq 0.05$.

Table 1 Questionnaire

1. Have you ever cancelled the appointment due to fear of dental treatment?
2. Do you remember a bad experience that took place when you were young during dental treatment?

Do you feel any of these symptoms when you visit the dentist?

3. Increased breathing?
4. Sweating hands?
5. Increased heart beat?
6. Have you ever suffered from fear of dental treatment or are you currently suffering from it?
7. Does the fear increase when you see the dental clinic?
8. Does the fear increase when you hear the sound of the drilling tool?
9. Does your fear increase while waiting for your turn in the waiting room?

Does your fear increase when the doctor put local anesthetic for you?

If the answer is **yes**, please answer the following two questions and if it is not then skip them

10. Is the shape of the needle the reason for your fear?
11. Is your fear related to the feeling of pain while the dentist is injecting the Anesthesia in the oral tissues?
12. Are you afraid when the doctor cleans your teeth and polishes them after scaling?
13. Are you afraid of the dental treatment procedures in general?
14. Are you generally afraid of dentists?

RESULTS

Among the 800 participants, the questionnaires were distributed and only 558 participants responded to all the questions and henceforth were included in the present study. The questionnaires with missing data were discarded. The questionnaires were collected on different days from the students, interns, dental assistants and patients from the dental clinics of both males and females' dental colleges, King Khaled and Dental University' Hospitals in King Saud University, Riyadh, Saudi Arabia.

Among the 558 questionnaires, 214(38.35 %) were males while 344(61.65%) were females including dental students, interns, assistants and patients. The frequency distribution of the males and females for all categories is shown in Figure-1.

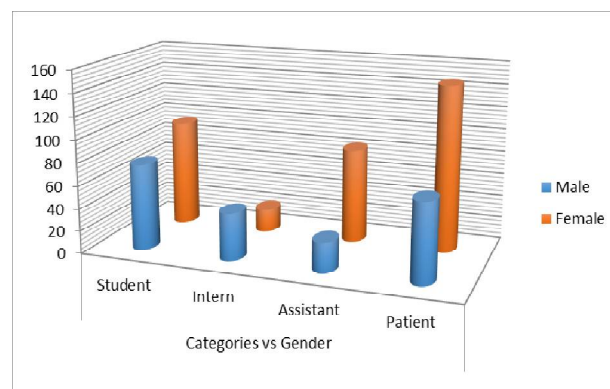


Figure 1 Frequency distribution of categories according to gender

The majority of participants were under 30 years of age and included both Saudi and non-Saudis, with their level of education varying from school graduates to university graduates as shown in Table-2.

Among the participants, 69.4% of them remembered the reason of their first dental visit. 42.8% recalled was due to

pain, while 26.5% said was for routine checkup, whereas 5.4% replied for orthodontic treatment and 8.2% marked for other reasons.

Table 2 Frequency distribution of the demographic data

Variables	Total	Male	Female
	Frequency (n)	n (%)	n (%)
Gender	558	214 (38.35 %)	344 (61.65%)
Age			
20 <	61	21 (34.43 %)	40 (65.57%)
21 - 30	331	151 (45.62%)	180 (54.38%)
31 - 40	66	11 (16.67%)	55 (83.33%)
41 - 50	73	16 (21.9%)	57 (78.1%)
51 >	24	15 (62.5%)	9 (37.5%)
Nationality			
Saudi	412	178 (43.20%)	234 (56.80%)
Non Saudi	144	35 (24.31%)	109 (75.69%)
Education			
School	95	28 (29.47%)	67 (72.63%)
University	456	183 (40.13%)	273 (59.87%)

n= number, % = percent

The participants were asked if they had any gender preference when it comes to dental treatment, the males responded they preferred to be treated by males and the females preferred females, only few had no gender preference as shown in Figure 2.

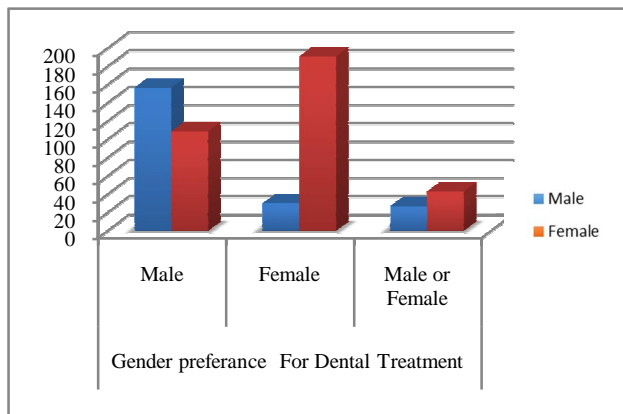


Figure 2 Frequency distribution for gender preference

The participants who answered (yes) to the 14 questions related to fear were tabulated in Table-3 according to gender and categories. The chi square was applied for the statistical analysis. The dental students had statistically high level of significance related to the question # 1 and # 3 which were related to cancelling an appointment for fear from dental treatment (p =0.008) and consequently increased

Table 3 Frequency distribution of individual 14 questions answered by (yes) according to Gender and categories

#	Student			Intern			Assistant			Patient		
	M %	F %	P value	M %	F %	P value	M %	F %	P value	M %	F %	P value
Q1	2.6	14	.008*	2.4	0	.667	7.7	13.3	.355	14.3	16.4	.424
Q2	25	20.2	.287	22	19	.534	44	22.9	.038*	27.1	23.2	.323
Q3	6.6	18.3	.020*	16.7	9.5	.363	23.1	25.3	.522	10.1	20.4	.044*
Q4	10.5	18.1	.121	11.9	9.5	.571	16	19.8	.463	5.9	18.7	.009*
Q5	13.2	22.8	.079	26.2	4.8	.38	34.6	31.7	.480	19.1	26.4	.163
Q6	19.7	26.1	.216	21.4	14.3	.376	15.4	9.6	.310	27.5	35	.177
Q7	5.3	11.8	.110	9.5	0	.188	.189	10			26.6	.003*
Q8	13.2	21.3	.119	11.9	23.8	.195	26.9	12.2	.073	33.3	40.7	.189
Q9	13.3	11.8	.474	16.7	14.3	.559	11.5	13.3	.560	7.2	17.4	.034*
Q10	18.4	12.8	.210	7.1	4.8	.593	16	19.3	.483	20.9	32.6	.056
Q11	15.8	22.3	.190	11.9	23.8	.195	23.1	16.9	.327	29	40	.079
Q12	7.9	3.2	.155	2.4	4.8	.559	3.8	2.4	.566	7.4	15.6	.070
Q13	9.2	18.1	.075	11.9	0	.121	11.5	3.7	.149	13	26.1	.022*
Q14	3.9	10.8	.085	2.4	0	.667	3.8	2.4	.566	7.2	12	.210

M = Male, F = Female, n = number, % = percent, p-value = probability value * chi-square test at 5 % level.

breathing (p = 0.020). While dental assistants had significantly high levels associated with question # 2 about remembering a bad experience that took place when they were young during dental treatment (p = 0.038). On the other hand, the patients had high significant levels for increased breathing (p=0.044), increased hand sweating (p=0.009), on seeing the dental clinic (p =0.003) and while in the waiting room (p=0.034).

The response of males were compared to that of females in regards to Question# 13 and # 14 which were mainly about fear from dental treatment and fear from dentist in general (Table-4).

Table 4 Correlation of fear from dentists and dental treatment among males and females

Variables	Male n (%)	Female n (%)	Male and Female P - value
Fear from dental treatment	24 (11.26%)	57 (16.81%)	.046*
Fear from dentist	10 (4.69%)	29 (8.57%)	.057

N=number, % = percent, p-value = probability value * chi-square test at 5 % level.

Female students appeared to be more fearful from the dental treatment (16.81%) rather than from the dentist (8.5%). While patients specifically reported significantly higher levels of fear from general dental treatment procedures where p =0.022.

The analysis revealed statistical significant differences between a bad experience in childhood and fear from dental treatment with p=0.000 and dentist p=0.002. A statistical significant correlation is also found between fear from dental treatment in the past and fear from dental treatment in the present as well as from dentists with p =0.000 for both. Additionally a highly significant difference was observed between increase in breathing and heart beat on hearing the sound of the drilling tool, waiting for their turn in the waiting room, seeing the shape of the needle and the feeling of pain while the dentist is injecting the anesthesia in the oral tissues with a p value 0.000. While correlating sweating hands with the shape of needle, the p value was 0.012.

DISCUSSION

Oral diseases are important public health concerns and their prevalence is increased by dental fear and anxiety. Assessment tools for the measurement of dental fear have been validated in different countries, and in different languages. The MDAS has been found to be reliable and valid in several samples from

England, Scotland, Wales, Ireland, Finland, Dubai, Brazil and Turkey as well as in a sample of Spanish speaking individuals in the United States. (Humphris and Peacock, 1993; Humphris *et al.*, 1995; Humphris *et al.*, 2000; Coolidge *et al.*, 2008)

The decision was made to construct a specifically tailored self-administered questionnaire slightly modified from the previous DFS (Kleinknecht and Bernstein, 1978) and MDAS (Humphris *et al.*, 1995) versions to suit our participants. The survey was yes or no type of questions for more accuracy in answering. The fear was measured according to the percentage of each question answered by yes. The individual items and the total dental anxiety were scored according to the study fields including male and female students, interns, assistants and patients, in accordance to the study carried out in Brazil where a similar percentage scale was used to determine the high and low levels of fear among dental students and patients (Serra-Negra *et al.*, 2012); where they calculated the high percentage of participants choosing yes for their 13 yes or no questions related to fear. They reported dental fear was present in both students and patients but was higher in patients who had previous experience of dental pain than dental students

Clinicians and researchers alike have the need for valid measures of dental fear. Questionnaires have several advantages over other methods of assessing fear. First, they are quick and inexpensive to administer and score. Second, they have high face validity, making them appropriate tasks for patients and research subjects to engage in (Newton and Buck, 2000; Armfield, 2010). Psychiatrists have noted that there may be cultural differences in the manifestation of various anxiety disorders along with dental fear. Humphris and his colleagues (2000) found cultural differences in the proportions of patients with high dental anxiety, as well as which dental stimuli were rated as the most feared. This indicates that it would be useful to study dental fear within each culture of interest, rather than extrapolate findings from other cultures.

Coolidge *et al.* (2008) stated that the Greek dentists have noticed fearful behavior in some of their patients but have not had a Greek version of a standard fear questionnaire to accurately assess fear. In addition, researchers have wished to study the effectiveness of fear-reduction techniques in Greek patients, but have likewise been unable to quantify change due to the lack of valid Greek fear measures.

Within the present study, dental fear and anxiety was found among all participants but with higher prevalence among female students and patients. Locker *et al.* (1996) has previously quoted that "dental anxiety was related to personality and psychological status". This might explain the presence of higher levels of anxiety among females as well as the patients in the present study in consistency with previous studies who reported statistically significant higher levels of dental anxiety among females; (Coolidge *et al.*, 2008; Abu-Ghazaleh *et al.*, 2011; Shaikh and Kamal, 2011). However, the clinical significance of this gender difference has been questioned by Al Omari and Al Omiri (2009) as well as Serra-Negra *et al.* (2012) who stated that no significant association was found between dental fear and gender. The reason for having higher numbers of female participants than male was mainly due to the fact that the female patients visit the emergency dental clinic far more often than the males. Overall female participants were far more anxious than males from

general dental treatments rather than from the dentist in consistency to previous reports (Humphris *et al.*, 1995; Al-Omari and Al Omiri, 2009).

Dental students had significantly higher scores in cancelling appointments due to fear of dental treatment when they themselves are patients, while female students and male dental interns have shown higher levels of anxiety for increased breathing specifically when visiting the dentist. Male dental interns have additionally reported that they are generally suffering from fear of dental treatment whereas the female dental interns have shown high anxiety levels and fear during drilling as well as feeling of pain during intraoral injection of the local anesthetic in consistency with the findings of Al Omari and Al Omiri (2009) who compared the dental anxiety between male and female dental, medical and engineering Jordanian university students by using the modified dental anxiety scale MDAS (Humphris *et al.*, 1995). They concluded that dental students had low anxiety than medical students and females had more anxiety than men and the most severe dental anxiety was related to drilling and intra oral injection of local anesthesia. The findings corroborate those investigated by Yoshida *et al.* (2009), Shaikh and Kamal (2011) and Shim *et al.* (2015) where they cited that dental fear and anxiety was more frequently seen in girls, and was related to dental pain.

Although dental assistants reported higher scores for having a previous bad experience in their childhood during dental treatment, a significant correlation existed among all participants having a bad experience and fear from dental treatment and dentists in general, and fear from dental treatment in the past and fear from dental treatment in the present as well as from dentists. Patients reported significantly higher levels of fear from general dental treatment procedures. Fear is primarily associated with learned negative behavior and the higher level of dental anxiety is attributed to the aggressive conditioning process which occurred during their childhood. Patients usually arrive with serious treatment needs and a greater chance of experiencing pain, which increases the chances of the patients becoming more anxious (Serra-Negra *et al.*, 2012). This is the vicious circle of fear that affects oral health. Anxiety is considered one of the most stressful situations for the dentist and it also affects the patient dentist relationship and diagnosis for dental problem.

Among the reported physiological responses to dental treatment, highly significant differences were observed among all groups with varying degrees between increased breathing and heart beat on hearing the sound of the drilling tool, waiting once turn in the waiting room, seeing the shape of the needle and the feeling of pain while the dentist is injecting the anesthesia in the oral tissues and sweating of hands when seeing the shape of the needle in accordance to previous studies (Taani, 2001).

Fear reactions or responses to stimuli vary considerably since each subject has a particular pattern of fear responses made to different stimuli within the dental treatment situation (Taani, 2001). Such variation in anxiety level may be related to differences in social and cultural influence as previously reported or due to the fact that prevention oriented recall visit are not common in Saudi Arabia. However, the comparison of our findings with previous reports was limited, due to fact that

very little information is available in the recent literature in Saudi Arabia.

Al Omari and Al Omiri (2009) concluded that good dental health education, good dentist patient relationship, regular visit to dental clinic and good communication with the patient will control the dental anxiety level where as irregular visits to the dental clinic may play a major role to increase the dental anxiety. Serra-Negra *et al.* (2012) added that dental staff should not only learn dental skills and techniques, they should also know how to cope with children, adults and elderly patients having dental fear and anxiety. Although dental students are leading stressful course and profession they are yet still exposed to better dental health education and knowledge and thus develop favorable dental behavior. Presence of suitable dental health education and knowledge seem to be capable, to some extent, of overruling the effect of stress and personality factors on dental anxiety among dental students in support to the earlier reports of Taani (2001).

CONCLUSION

Within the limitations, the present study on dental fear and anxiety was experienced by all categories but with varying levels. Some categories revealed higher percentages for questions related to fear while others for anxiety. Dental fear and anxiety was more prevalent among patients and female students. This may be due to lack of dental health education and communication between dentists and patients, which may in turn create difficulty to manipulate the patient and increase the dental profession stress level.

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Conflicts of interest

The authors declare there are no conflicts of interest.

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