

Full Length Research Paper

Dental Anxiety among Sudanese Patients

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Despite advances in dentistry, anxiety about dental treatment and the fear of pain remains widespread among patients and is a significant barrier to dental treatment. This study would therefore provide information so as to minimize levels of anxiety and aid in planning stress-free treatment. The cross sectional study utilizing a self-reported questionnaire based on Modified Corah's Dental Anxiety Scale (MDAS) framed in Arabic (local language) was performed on 500 patients (aged 8-90 years). All questionnaires were returned (response rate - 100%). The prevalence of anxiety was seen mostly higher in the <20-year age group by (68.8%). Anxiety was also seen to be significantly higher in females (71.2%) than in males. Patients anxious about dental procedures are often more difficult to treat. Anxious patients should be identified and managed appropriately by behavioral/pharmacological measures.

Keywords: Dental fear, anxiety, and phobia, dental feeling

INTRODUCTION

Dental fear, anxiety, and phobia have consistently been reported as widespread problems that persist despite the technological advances that have made dentistry less painful and less uncomfortable.

By definition, anxiety is described as a vague, unpleasant feeling accompanied by the premonition that something undesirable is about to happen. It is a reaction to a perceived danger that is unknown to the individual. On the other hand, fear is a biological response to a specific threat, and is a reaction to a known danger or threat. Phobia, which shares features with both anxiety

and fear, involves an avoidance response and is associated with a debilitating loss of function (Rubin et al., 1988; Chadwick, 2002). It is well documented that dental fear has a significant impact on dental care utilization behaviors (Locker, 2003; Hagglin et al., 2000; Skaret et al., 2000) The consequences of dental fear on oral health outcomes have been reported in many studies. In general, dental fear is associated with the oral health status, poorer oral health related quality of life (McGrath and Bedi, 2004), and compromised psychosocial health, such as lower self-esteem and lower morale (Locker, 2003).

Dentally anxious patients take longer to treat and often fail to keep their appointments (Locker, 2003) mid elder women Severely fearful patients as well as patients not

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seeking dental care before have significantly poorer oral status (Locker and Liddell, 1992; Hakeberg et al., 1993) Furthermore, acute conditions and treatments make both patient and dentist subject to more stress and significantly less satisfied with the dental care performed (Locker and Liddell, 1991) McGrath and Bedi (Dixon et al., 1999) reported that people with the poorest oral health related quality of life were most commonly found among those with high levels of dental anxiety. Schuller et al (Schuller et al., 2003) indicated that compared with persons with low dental fear, persons with high dental fear had a higher number of decayed tooth surfaces, decayed teeth, and missing teeth but a lower number of filled and sound teeth (Hagglin et al., 1996) Similarly, Hagglin et al (Hagglin et al., 1996) noted that high dental anxiety was associated with a high number of missing teeth.

As dental anxiety can be quite common amongst patients, it has been widely studied all over the world. Possible factors related to dental anxiety that have been studied include age (Kleinknecht et al., 1973; Locker et al., 1991), gender (Bernstein et al., 1979), objects and situations (Gale, 1972) etc. Many scales have been developed to measure dental anxiety, including the Corah Dental Anxiety Scale (Corah, 1969), Dental Fear Survey (Kleinknecht and Bernstein, 1978) and Dental Belief Survey (Smith et al., 1984). All of these scales have been adopted and tested for many years in dental and psychological research.

To help patients reduce their dental anxiety, many treatment modalities have been suggested, these included 1) behavior modification including systemic desensitization, extinction, positive and negative reinforcement, biofeedback, 2) hypnosis and 3) use of various relevant pharmaceutical agents such as intravenous sedation and inhalation sedation. The aim of the present study was to assess the levels of dental anxiety in patients visiting a Khartoum Teaching Hospital in Khartoum, Sudan.

Our study revealed that anxiety was at its highest level in secondary school students with (94.5%) according to education, (68.8%) in participants under the age of 20 according to age, while according to occupation the highest level of anxiety was detected in professional individuals by 60%, and females scored higher dental anxiety level (71.2%) than males according to gender.

Background of the study

Self-report measures of dental fear are commonly used to permit quick assessment of the degree of dental fear experienced by patients. Since there can be cultural differences in various anxiety disorders, including dental

fear (Good and Kleinman, 1985), it is important to develop measures appropriate for different cultural groups.

Objectives

Aims and Objectives

- * To compare the levels of anxiety among the two genders.
- * To compare the levels of anxiety among different age groups.
- *To compare the levels of anxiety among different occupation groups.
- *To compare the level of anxiety among different levels of education.
- * To establish a comfortable patient–dentist relationship which helps in framing out a better treatment plan.

The assessment of anxiety is important for two reasons

- *To provide evidence based research into the psychological constraint which has been showed to predicted dental avoidance.
- *To assist the dentist in the management of anxious patients successfully and efficiently.

METHODOLOGY AND ANALYSIS

The intended target group for this survey was patients (aged < 20 - >80 years) seeking treatment in the Khartoum Teaching Hospital. A patient-oriented questionnaire was structured to assess patient's anxiety levels before dental treatment. This cross-sectional study utilized questions modified from Corah's Dental Anxiety Scale (Locker and Liddell, 1991), termed as Modified Corah's Dental Anxiety Scale (MDAS) which was framed in English and Arabic (local language), (appendix 1).

Participants were allowed to choose from five responses (scored 1 to 5), ranging from 'relaxed' to 'very anxious'. Participants were also asked about their previous visit and the complaint for which they had visited the institute. The final score was analyzed as 5-9 mild anxiety, 10-15 moderate anxiety, 16-18 high anxiety and 19-25 severe anxiety (phobia).

The data (input into Microsoft Excel software) was checked and errors were corrected before data analysis. The data were analyzed using SPSS 11.5. Initially described by descriptive statistics, the comparison between the two genders, age education and occupation, done by **Chi-Square Tests**.

Analysis

GENDER

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid MALE	237	47.4	47.4	47.4
FEMALE	263	52.6	52.6	100.0
Total	500	100.0	100.0	

LEVEL OF EDUCATION

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid ILLITERATE	2	.4	.4	.4
BASIC	45	9.0	9.0	9.4
SECONDARY	127	25.4	25.4	34.8
UNIVERSITY	301	60.2	60.2	95.0
POST GRADUATE	25	5.0	5.0	100.0
Total	500	100.0	100.0	

OCCUPATION

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid EMPLOYEE	133	26.6	26.6	26.6
LABOURER	69	13.8	13.8	40.4
PROFESSIONAL	10	2.0	2.0	42.4
STUDENT	210	42.0	42.0	84.4
HOUSE WIFE	76	15.2	15.2	99.6
OTHER	2	.4	.4	100.0
Total	500	100.0	100.0	

AGE GROUPS

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid <=20	125	25.0	25.0	25.0
21-40	295	59.0	59.0	84.0
41-60	74	14.8	14.8	98.8
61-80	5	1.0	1.0	99.8
> 80	1	.2	.2	100.0
Total	500	100.0	100.0	

RESULTS

Out of 500 total questionnaires distributed, the majority of the patients were males 237 (47.4%) and the rest 263 (52.6%) were females (Table 1). Most of the participants amongst the five age groups were in the 21-40-year age group (59%), followed by <20-year age group (25%), and the least were in the 'above 80 years' age group (0.20%)

(Table 2). In relation to occupation, most of the participations came from students (42%), followed by employers (26.60%), and the least were from participants with various occupations (0.40%) (Table 3). As for the level of education, majority of the participants were university students (60.20%), followed by secondary school students (25.40%), the least were illiterate (0.40%) (Table 4).

Table 1. Comparison between males and females with respect to their anxiety scores:-If you went to your dentist for treatment tomorrow, how would you feel?

	GENDER		Total
	MALE	FEMALE	
Not Anxious	31.20%	23.6%	27.2%
Slightly Anxious	27.80%	34.2%	31.2%
Fairly Anxious	35.0%	25.5%	30.0%
Very Anxious	2.1%	5.7%	4.0%
Extremely anxious	3.8%	11.0%	7.6%
Total	100.0%	100.0%	100.0%

If you were sitting in the waiting room (waiting for treatment), how would you feel?

	GENDER		Total
	MALE	FEMALE	
Not Anxious	19.40%	22.4%	21.0%
Slightly Anxious	35.4%	30.4%	32.8%
Fairly Anxious	33.3%	17.1%	24.8%
Very Anxious	3.4%	11.8%	7.8%
Extremely anxious	8.4%	18.3%	13.6%
Total	100.0%	100.0%	100.0%

If you were about to have a tooth drilled, how would you feel?

	GENDER		Total
	MALE	FEMALE	
Not Anxious	22.8%	21.7%	22.2%
Slightly Anxious	36.7%	22.4%	29.2%
Fairly Anxious	16.00%	8.0%	11.8%
Very Anxious	9.7%	18.3%	14.2%
Extremely anxious	14.8%	29.7%	22.60%
Total	100.0%	100.0%	100.0%

If you were about to have you teeth scaled and polished, how would you feel?

	GENDER		Total
	MALE	FEMALE	
Not Anxious	17.30%	14.8%	16.0%
Slightly Anxious	32.1%	36.1%	34.2%
Fairly Anxious	42.20%	35.4%	38.6%
Very Anxious	3.0%	7.6%	5.4%
Extremely anxious	5.5%	6.1%	5.8%
Total	100.0%	100.0%	100.0%

If you were about to have an oral anaesthetic injection in your gum, above an upper back tooth, how would you feel?

	GENDER		Total
	MALE	FEMALE	
Not Anxious	20.3%	20.2%	20.2%
Slightly Anxious	25.7%	20.5%	23.0%
Fairly Anxious	13.5%	5.3%	9.2%
Very Anxious	19.4%	27.8%	23.8%
Extremely anxious	21.1%	26.2%	23.80%
Total	100.0%	100.0%	100.0%

Table 2. Comparison between age groups:-
If you went to your dentist for treatment tomorrow, how would you feels?

	AGE GROUPS					Total
	<=20	21-40	41-60	61-80	> 80	
Not Anxious	26.4%	26.4%	31.1%	40.0%	.0%	27.2%
Slightly Anxious	27.2%	33.9%	28.4%	20.0%	.0%	31.2%
Fairly Anxious	34.4%	27.1%	32.4%	40.0%	100.0%	30.0%
Very Anxious	4.0%	3.7%	5.4%	.0%	.0%	4.0%
Extremely anxious	8.0%	8.8%	2.7%	.0%	.0%	7.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were sitting in the waiting room (waiting for treatment), how would you feel?

	AGE GROUPS					Total
	<=20	21-40	41-60	61-80	> 80	
Not Anxious	15.2%	22.0%	27.0%	20.0%	.0%	21.0%
Slightly Anxious	34.4%	33.6%	25.7%	60.0%	.0%	32.8%
Fairly Anxious	22.4%	24.1%	31.1%	20.0%	100.0%	24.8%
Very Anxious	10.4%	6.4%	9.5%	.0%	.0%	7.8%
Extremely anxious	17.6%	13.9%	6.8%	.0%	.0%	13.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have a tooth drilled, how would you feel?

	AGE GROUPS					Total
	<=20	21-40	41-60	61-80	> 80	
Not Anxious	27.2%	20.3%	23.0%	.0%	.0%	22.2%
Slightly Anxious	25.6%	29.5%	32.4%	60.0%	.0%	29.2%
Fairly Anxious	7.2%	12.9%	13.5%	20.0%	100.0%	11.8%
Very Anxious	17.6%	13.6%	10.8%	20.0%	.0%	14.2%
Extremely anxious	22.4%	23.7%	20.3%	.0%	.0%	22.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have your teeth scaled and polished, how would you feel?

	AGE GROUPS					Total
	<=20	21-40	41-60	61-80	> 80	
Not Anxious	16.0%	17.3%	12.2%	.0%	.0%	16.0%
Slightly Anxious	32.8%	32.5%	41.9%	60.0%	.0%	34.2%
Fairly Anxious	36.8%	40.3%	35.1%	20.0%	100.0%	38.6%
Very Anxious	9.6%	3.7%	5.4%	.0%	.0%	5.4%
Extremely anxious	4.8%	6.1%	5.4%	20.0%	.0%	5.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100

If you were about to have a local anaesthetic injection in your gum, above an upper back tooth, how would you feel?

	AGE GROUPS					Total
	<=20	21-40	41-60	61-80	> 80	
Not Anxious	20.0%	20.0%	20.3%	40.0%	.0%	20.2%
Slightly Anxious	18.4%	24.1%	27.0%	20.0%	.0%	23.0%
Fairly Anxious	6.4%	8.1%	16.2%	20.0%	100.0%	9.2%
Very Anxious	29.6%	23.4%	16.2%	20.0%	.0%	23.8%
Extremely anxious	25.6%	24.4%	20.3%	.0%	.0%	23.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Tables 3. Comparison according to occupation:-

If you went to your dentist for treatment tomorrow, how would you feel?

	OCCUPATION						Total
	EMPLOYEE	LABOURER	PROFESSIONAL	STUDENT	HOUSE WIFE	OTHER	
Not Anxious	30.1%	36.2%	10.0%	26.2%	19.7%	.0%	27.2%
Slightly Anxious	27.8%	24.6%	40.0%	32.9%	36.8%	50.0%	31.2%
Fairly Anxious	32.3%	34.8%	40.0%	28.6%	23.7%	50.0%	30.0%
Very Anxious	5.3%	1.4%	10.0%	3.3%	5.3%	.0%	4.0%
Extremely anxious	4.5%	2.9%	.0%	9.0%	14.5%	.0%	7.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were sitting in the waiting room (waiting for treatment), how would you feel?

	OCCUPATION						Total
	EMPLOYEE	LABOURER	PROFESSIONAL	STUDENT	HOUSE WIFE	OTHER	
Not Anxious	24.1%	21.7%	20.0%	19.5%	19.7%	.0%	21.0%
Slightly Anxious	30.1%	37.7%	30.0%	33.8%	31.6%	.0%	32.8%
Fairly Anxious	29.3%	33.3%	40.0%	21.0%	17.1%	50.0%	24.8%
Very Anxious	6.8%	1.4%	10.0%	8.6%	11.8%	50.0%	7.8%
Extremely anxious	9.8%	5.8%	.0%	17.1%	19.7%	.0%	13.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have a tooth drilled, how would you feel?

	OCCUPATION						Total
	EMPLOYEE	LABOURER	PROFESSIONAL	STUDENT	HOUSE WIFE	OTHER	
Not Anxious	24.1%	26.1%	10.0%	22.4%	17.1%	.0%	22.2%
Slightly Anxious	31.6%	30.4%	30.0%	27.1%	28.9%	50.0%	29.2%
Fairly Anxious	12.8%	27.5%	10.0%	7.1%	7.9%	50.0%	11.8%
Very Anxious	16.5%	7.2%	10.0%	14.8%	15.8%	.0%	14.2%
Extremely anxious	15.0%	8.7%	40.0%	28.6%	30.3%	.0%	22.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have your teeth scaled and polished, how would you feel?

	OCCUPATION						Total
	EMPLOYEE	LABOURER	PROFESSIONAL	STUDENT	HOUSE WIFE	OTHER	
Not Anxious	17.3%	21.7%	10.0%	13.8%	15.8%	.0%	16.0%
Slightly Anxious	27.1%	33.3%	40.0%	36.2%	40.8%	50.0%	34.2%
Fairly Anxious	45.1%	39.1%	40.0%	37.6%	30.3%	.0%	38.6%
Very Anxious	6.8%	1.4%	10.0%	6.2%	3.9%	.0%	5.4%
Extremely anxious	3.8%	4.3%	.0%	6.2%	9.2%	50.0%	5.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have a local anaesthetic injection in your gum, above an upper back tooth, how would you feel?

	OCCUPATION						Total
	EMPLOYEE	LABOURER	PROFESSIONAL	STUDENT	HOUSE WIFE	OTHER	
Not Anxious	18.0%	27.5%	10.0%	19.0%	21.1%	50.0%	20.2%
Slightly Anxious	27.1%	21.7%	30.0%	20.0%	23.7%	50.0%	23.0%
Fairly Anxious	9.8%	15.9%	20.0%	8.1%	3.9%	.0%	9.2%
Very Anxious	22.6%	18.8%	20.0%	26.2%	25.0%	.0%	23.8%
Extremely anxious	22.6%	15.9%	20.0%	26.7%	26.3%	.0%	23.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4. comparison according to education:-
If you went to your dentist for treatment tomorrow, how would you feel?

	LEVEL OF EDUCATION					Total
	ILLITERATE	BASIC	SECONDARY	UNIVERSITY	POST GRADUATE	
Not Anxious	50.0%	31.1%	22.8%	27.9%	32.0%	27.2%
Slightly Anxious	.0%	35.6%	25.2%	34.2%	20.0%	31.2%
Fairly Anxious	50.0%	28.9%	37.0%	26.9%	32.0%	30.0%
Very Anxious	.0%	2.2%	3.1%	4.0%	12.0%	4.0%
Extremely anxious	.0%	2.2%	11.8%	7.0%	4.0%	7.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were sitting in the waiting room (waiting for treatment), how would you feel?

	LEVEL OF EDUCATION					Total
	ILLITERATE	BASIC	SECONDARY	UNIVERSITY	POST GRADUATE	
Not Anxious	.0%	22.2%	17.3%	22.6%	20.0%	21.0%
Slightly Anxious	.0%	31.1%	32.3%	33.6%	32.0%	32.8%
Fairly Anxious	100.0%	24.4%	28.3%	22.6%	28.0%	24.8%
Very Anxious	.0%	11.1%	7.9%	7.0%	12.0%	7.8%
Extremely anxious	.0%	11.1%	14.2%	14.3%	8.0%	13.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have a tooth drilled, how would you feel?

	LEVEL OF EDUCATION					Total
	ILLITERATE	BASIC	SECONDARY	UNIVERSITY	POST GRADUAT	
Not Anxious	.0%	26.7%	20.5%	22.3%	24.0%	22.2%
Slightly Anxious	50.0%	31.1%	29.1%	28.2%	36.0%	29.2%
Fairly Anxious	50.0%	22.2%	11.8%	10.0%	12.0%	11
Very Anxious	.0%	8.9%	12.6%	15.9%	12.0%	14.2
Extremely anxious	.0%	11.1%	26.0%	23.6%	16.0%	22.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have your teeth scaled and polished, how would you feel?

	LEVEL OF EDUCATION					Total
	ILLITERATE	BASIC	SECONDARY	UNIVERSITY	POST GRADUATE	
Not Anxious	.0%	22.2%	18.9%	13.3%	24.0%	16.0%
Slightly Anxious	0.00%	40.0%	32.3%	35.5%	20.0%	34.2%
Fairly Anxious	100.0%	33.3%	32.3%	40.5%	52.0%	38.6%
Very Anxious	.0%	.0%	7.1%	6.0%	.0%	5.4%
Extremely anxious	0.00%	4.4%	9.4%	4.7%	4.0%	5.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

If you were about to have a local anaesthetic injection in your gum, above an upper back tooth, how would you feel?

	LEVEL OF EDUCATION					Total
	ILLITERATE	BASIC	SECONDARY	UNIVERSITY	POST GRADUATE	
Not Anxious	50.0%	26.7%	24.4%	17.9%	12.0%	20.2%
Slightly Anxious	50.0%	15.6%	20.5%	23.9%	36.0%	23.0%
Fairly Anxious	.0%	15.6%	10.2%	7.6%	12.0%	9.2%
Very Anxious	.0%	20.0%	26.0%	23.6%	24.0%	23.8%
Extremely anxious	0.00%	22.2%	18.9%	26.9%	16.0%	23.80%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.00%

CONCLUSION

Through this study it's revealed that it is possible to identify the dentally fearful patients either through the use of questionnaires or by taking of a psychological history at the first visit. These individuals need to be treated in ways to minimize the risk of aggravation of dental anxiety.

Our study revealed that anxiety was at its highest level in secondary school students with (94.5%) according to education, (68.8%) in participants under the age of 20 according to age, while according to occupation the highest level of anxiety was detected in professional individuals by (60%), and females scored higher dental anxiety level (71.2%) than males according to gender.

The fear and anxiety of an individual could affect the patient-dentist relationship and the dental treatment plan; Therefore, before starting up with the dental treatment, patients anxiety and fear levels should be assessed and a proper counseling should be given in the initial visit itself. The findings of this study can assist in understanding the extent of this problem and subsequently appropriate measures can be undertaken to overcome this obstacle in future.

DISCUSSION

Despite the technological advances in dentistry, anxiety about dental treatment and the fear of pain associated with dentistry remains globally widespread and is considered a major barrier to dental treatment.

Overall, the mean of dental anxiety was quite higher in females {71.2%} than males {28.8%}. These findings are similar to the study that has been done by Marya, Grover, Jnaneshwar, and Pruthi at the Department of Public Health Dentistry, SudhaRustagi College of Dental Sciences and Research, Faridabad, India. Their study assumed that dental anxiety was also higher in females than males by a mean of {11.7%}. And the numbers in the study of Al Madi and Abdellatif which reports {54.4%} moderate anxiety and {29%} high anxiety. The possible reason for the high levels of anxiety in their study can be attributed to the fact that they have only studied dental anxiety levels in Saudi females, because schools are segregated by gender at age 6 in the Kingdom of Saudi Arabia.

The literature shows that women have a lower tolerance to pain and generally report higher levels of anxiety (Cesar et al., 2014; Schuurs et al., 1991). Similar results are obtained in the present study which reports a significant difference in the anxiety of males and females. This finding may be explained on the basis that women have higher levels of neuroticism (tendency to experience negative emotional states) than men and that anxiety is positively associated with neuroticism (Bedi et al., 1997; Neverlien, 1994).

The highest levels of dental anxiety according to age was found to be in {68.8%} of participants under the age of 20 and the lowest levels were in individuals above the age of 80. Showing significant inverse relationship of age and anxiety, i.e anxiety decreased with advancing age. This high anxiety rate of young patients has been reported in the literature (Cesar et al., 2014; Schwarz, 1990). These findings are similar to those of the west Indian study which also found that the highest numbers with dental anxiety were in the young age groups {<20 years and 20-30 years} followed by the age group 31-40 years, while the lowest levels were in the age group 51-60 years.

Explanations proposed as to why dental anxiety might decrease with age include the ability to cope with experiences or the phenomenon may be due to the ageing process itself characterized by a general decline in anxiety (Schwarz, 1990; De Moraes et al., 2002). A longitudinal analysis revealed that dental fear, like many other general and specific phobias, declines with age (Gatchel, 1989). It could be generally expected that previous experience of the patient would have been traumatic and it elevated the level of fear and anxiety in patients at subsequent dental visits (Al Shammary et al., 2002).

Solution

This study has valid applications as dental fear and anxiety are important clinical considerations and treatment success depends on patient compliance. Also, measuring anxiety indirectly measures psychological and social wellbeing. Procedures that elicit high fear should be avoided by the prevention of their occurrence. This can be achieved by education on oral hygiene instruction and motivation.

REFERENCES

- Al Shammary, Guile, El Backly, Lamborne (2002). An oral health survey of Saudi Arabia: Phase I (Riyadh), Saudi Med. J. 23(1):77-81.
- Bedi R, Sutcliffe P, Donnan PT, Barrett N, McConnachie J (1997). Dental caries experience and prevalence of children afraid of dental treatment. 128(5): 591-597.
- Bernstein DA, Kleinknecht RA, Alexander LD (1979). Antecedents of dental fear. J. Public Health Dent. 39: 113-124.
- Cesar J, de Moraes AB, Milgrom P, Kleinknecht RA (2014). Across validation of Brazilian version of the dental fear survey. Sci. World J. 725323 Published online 2014 Aug 11. doi: 10.1155/2014/725323.
- Chadwick BL (2002). Assessing the anxious patient. Dental Update. 29: 448-454.
- Corah NL (1969). Assessment of dental anxiety scale. J. Dent. Res. 48: 496-499.
- De Moraes ABA, Milgrom P, Tay KM, Costa SM (2002). Prevalence of dental fear in Brazilian high school students in São Paulo state. Saudi Dent. J. 14(2).
- Dixon GS, Thomson WM, Krueger E (1999). The west coast study. Itself reported dental health and the use of dental services. N Z Dent. J. 95:38-43.
- Gale E (1972). Fear of dental situation. J. Dent. Res. 51: 964-966.

- Gatchel RJ (1989). The prevalence of dental fear and avoidance: Expanded adult and recent adolescent surveys. *JADA*. 118: 591-593.
- Good BJ, Kleinman AM (1985). Culture and anxiety: cross-cultural evidence for the patterning of anxiety disorders. In *Anxiety and the Anxiety Disorders*. Edited by: Tuma AH, Maser J. Hillsdale NJ: Lawrence Earlbaum. pp. 297-323.
- Hagglin C, Berggren U, Hakeberg M, Ahlqvist M (1996). Dental anxiety among middle aged and elderly women in Sweden. A study of oral state, utilization of dental services and concomitant factors. *Gerodontology*. 13:25-34
- Hagglin C, Hakeberg M, Ahlqvist M, Sullivan M, Berggren U (2000). Factors associated with dental anxiety and attendance in middle aged and elderly women. *Community Dent. Oral Epidemiol.* 28:451-460
- Hakeberg M, Berggren U, Grondahl HG (1993). A radiographic study of dental health in adult patients with dental anxiety. *Community Dent. Oral Epidemiol.* 21:27-30.
- Kleinknecht RA, Bernstein DA (1978). Assessment of dental fear. *Behaviour Therapy*. 9: 626-634.
- Kleinknecht RA, Klepac RK, Alexander LD (1973). Origins and characteristics of fear of dentistry. *J. the Am. Dent. Assoc.* 86: 842-845.
- Locker D (2003). Psychosocial consequences of dental fear and anxiety. *Community Dent. Oral Epidemiol.* 31: 144-151.
- Locker D, Liddell A (1992). Clinical Correlates of dental anxiety among older adults. *Community Dent. Oral Epidemiol.* 20: 372-375.
- Locker D, Liddell A, Burman D (1991). Dental fear and anxiety in an older adult population. *Community Dent. Oral Epidemiol.* 19: 120-124.
- Locker D, Liddell AM (1991). Correlates of dental anxiety among older adults. *J. Dent. Res.* 70: 198-203
- McGrath C, Bedi R (2004). The association between dental anxiety and oral health related quality of life in Britain. *Community Dent. Oral Epidemiol.* 32: 67-72.
- Neverlien PO (1994). Dental Anxiety. Optimism-pessimism, and dental experience from childhood to adolescence. *Community Dent. Oral Epidemiol.* 22(4):263-268.
- Rubin JG, Slovin M, Krochak M (1988). The psychodynamics of dental anxiety and dental phobia. *Dent. Clin. North Am.* 32(4):647-656
- Schuller AA, Willumsen T, Holst D (2003). Are there differences in oral health and oral health behavior between individuals with high and low dental fear?. *Community Dent. Oral Epidemiol.* 31:116-121
- Schuurs AHB, Duivenvoorden HJ, Thoden van Velzen SK, Verhage F, Eijkman MAJ, Makkes PC (1991). Sociodemographic correlates of dental anxiety.
- Schwarz E (1990). Dental anxiety in young adult Danes under alternative dental care programs. *98 (5): 442-450*
- Skaret E, Raadal M, Kvale G, Berg E (2000). Factors related to missed and cancelled dental appointments among adolescents in Norway. *Eur. J. Oral Sci.* 108:175-183.
- Smith T, Weinstein P, Milgrom P, Getz T (1984). An evaluation of an institution-based dental fears clinic. *J. Dent. Res.* 63: 272-277.