

Dental anxiety among patients attending King Saud University, College of Dentistry

Riyadh F. Akeel,* BDS, MDS, PhD
Adel Abduljabbar,* PhD

المهدف من هذه الدراسة الأولية هو تحديد مدى تفشي ظاهرة الخوف من علاج الأسنان ولتقصي علاقة الخوف بالسلوك والمستوى العلمي. أخذت عينة تتألف من 164 مريضاً احتيروا بشكل عشوائي من عيادة الفحص من كلية طب الأسنان في الرياض. وتم وضع مقياس للخوف السني باستعمال بنود أعطيت إلى هؤلاء المشتركين. تم فحص البنود للتأكد من تناسقها ومن ثم أخضعت لتحليل الحقائق. تم استعمال طريقة الأنوفا لاختبار مدى تأثير الزيارات المتكررة والمستوى الثقافي. أظهر التحليل ثلاثة حقائق رئيسية للخوف السني. { الخوف من الأجهزة السنية والأدوات، ونقص الثقة بنوعية العلاج، والخوف من انتقال العدوى } نسبة المرضى الذين سجلوا رد فعل معتدل لهذه الحقائق كانوا 38% - 65.5% - 48% في هؤلاء الذين رد مرتفع كانوا 8.5% - 17.5% - 15% على التوالي. تكرار الزيارات والعمر لم تتعلق بأي من هذه الحقائق. المرضى ذوي الثقافة العالية كانوا قلقين من ناحية انتقال العدوى. الإناث أظهروا خوفاً أكبر من الذكور بالنسبة للأدوات والأجهزة مع ذلك من الصعب تعميم هذه النتائج الأولية على السكان إلا أنها مشاهدة للدراسات في البلاد الأخرى. وكان هناك تصرفات أخرى تدل بوضوح على أن سببها الخوف السني والتي تستحق دراسات أخرى.

The aims of this preliminary study were to determine the prevalence of dental anxiety among the dental school clinic patients in Riyadh and to explore the anxiety relationship with educational and behavioral characteristics. The study group consisted of 164 patients randomly selected from the screening clinic of the College of Dentistry. A scale of dental anxiety was developed using a list of items addressed to the respondents. The items were tested for internal consistency and then subjected to factor analysis. ANOVA was used to test the effect of the level of education and frequency of dental visits. The analysis yielded three main factors of dental anxiety, namely, fear of operatory equipment and instrument, lack of confidence in the treatment quality, and fear of cross infection. The percentages of patients who scored moderately on these factors were 38%, 65.5%, and 48%, respectively, while those who scored highly were 8.5%, 17.5%, and 15%, respectively. The frequency of visits and age did not relate to any of the factors. Patients with a higher education worried more about cross infection. Females showed more fear of instruments and equipment than males. Although it is not justified to generalize the findings, these preliminary results, however, indicated that the level of dental anxiety in this study group is comparable to those in other countries. Other aspects of behavioral characteristics, which deserve further studies, were apparent as a source of dental anxiety.

Introduction

Dental anxiety is considered one of the main reasons for avoidance of dental care and the resultant deteriorating oral health.¹ Patients with dental anxiety, in general, have a substantially deteriorated dental health compared to ordinary patients.²

The prevalence of dental anxiety ranged from 5-20% in various countries, which pose a significant management problem for the dental practitioner.³ Saudi Arabia is a fast developing country with a high rate of dental diseases.⁴ The need for dental health care in the Kingdom is increasing and is paralleled by an increasing number of public as well as private dental clinics. A nationwide oral health survey had been conducted and is proving helpful in the planning of oral health care for the population.⁴⁵

However, information about the prevalence of dental anxiety in Saudi Arabia has not been published. This information is needed to assist the designing of appropriate measures in the planning

phase of oral health care for Saudi citizens. The aim of this preliminary study was to develop a dental anxiety scale and to test it in a group of Saudi patients attending the clinics of the College of Dentistry, Riyadh. Some aspects of dental anxiety will be examined in relation to educational and behavioral characteristics.

Materials and Methods

The study sample comprised of 164 patients (aged 14-75) who were randomly selected from the screening clinic over a period of three months. Distribution of age and sex is illustrated in Table 1. The degree of dental anxiety was measured by a scale composed of a list of items addressed to the respondent. Some of the items addressed other attitudinal factors on the fear of cross infection and trust in the treatment outcome. The response pattern was quantified as follows: (4) Always, (3) Sometimes, (2) Rarely, and (1) Never. The questionnaire included other information on age, sex, educational level and frequency of dental visits. In its initial form, the scale consisted of 38 items which had been tested for the internal consistency of these items.

Received 30 August 1999, Revised 19 Dec. 1999,
Accepted 26 March 2000

* Assistant Professor, Department of Prosthetic Dentistry,
College of Dentistry; *Associate Professor,
Department of Psychology, College of Education
King Saud University, Riyadh, KSA

Address reprint requests:
Dr. Riyadh F. Akeel
PO Box 60169, Riyadh 11545 KSA

Table 1. Distribution of age (years) and sex.

	Male	Female
Mean Age	32	30
SD	12	9
N	105	59

Data analysis - Internal consistency was tested using Spearman's rank-order correlation between the items and the total score of the scale. Items with significant correlation were subjected to factor analysis using the Principal Component method and Varimax rotation.⁶ Items with loading above 0.3 were included in the factors. Cronbach's alpha was calculated as a measure of reliability of the factor variables. Simple sums of relevant variables were used for constructing the factor score. The effect of frequency of visits and level of education on the factors' score was tested using one way ANOVA. The average score of items in the first three factors were calculated for each patient (factor score divided by the number of items). An average score above two indicated a dentally anxious individual while a score above three indicated a highly dentally anxious individual.

Results

Approximately 51% (n=84) of all participants had a university degree or higher, 27% (n=44) had a high school diploma and 20% (n=33) had only an intermediate school diploma or lower. Five subjects left this item blank. Most of the participants (69%) indicated that they visited the dentist only when they were in pain. Five percent of the sample stated that it was their first visit and 6% could not remember when they last visited their dentists. Only 19% stated that they visited the dentist regularly. Two participants left this item blank.

Table 2 shows the correlation coefficients and the statistical significance between each item and the total score of the scale. A total of 15 items were excluded because they did not show significant correlation with the total score of the scale. The significant correlation coefficients ranged between 0.32 and 0.81. The twenty-three items of the dentist phobia scale are listed in Table 3 with the percentage distribution of responses. The internal response rate was moderate to high and varied between the items, which is indicated by the numbers (n) in the table.

Table 2. Spearman's rank order correlation between each item and the total score of the scale.

Item No.	1	2	3	4	5	6	7	8
Correlation	0.44*	0.38*	0.79**	0.32*	0.80*	0.34*	0.26	0.17
Item No.	9	10	11	12	13	14	15	16
Correlation	0.24	0.49**	0.33*	0.49**	0.22	0.76*	0.29	0.05
Item No.	17	18	19	20	21	22	23	24
Correlation	0.43*	0.29	0.29	0.77**	0.26	0.80**	0.21	0.30
Item No.	25	26	27	28	29	30	31	32
Correlation	0.30	0.50**	0.67**	0.66*	0.81*	0.31	0.75*	0.45**
Item No.	33	34	35	36	37	38		
Correlation	0.31	0.80**	0.43**	0.09	0.79*	0.74*		

* < 0.05 ** < 0.01

The factor analysis results yielded five factors. Table 4 shows these factors and their item loading.

First factor: Approximately 60% of the scale items obtained loading above the 0.30 loading criterion on this factor which appear to be a general factor of dental operator and equipment. Therefore, this factor was named "Fear of operator equipment and instruments". The highest loading on this factor were 0.84, 0.82 and 0.79 for items on the dental drill, injection and electrical equipment respectively. The items had an alpha of 0.93. Sixty-three subjects (38%) and 14 subjects (8.5%) achieved an average score above two and three, respectively, on this factor.

Second factor: Five items obtained loading above the 0.30 loading criterion. All loading reflect the level of confidence in the dentist. Therefore, this factor was named "lack of confidence in the treatment quality". The items had an alpha of 0.54. One hundred and nine subjects (65.5%) and 29 subjects (17.5%) achieved an average score above two and three, respectively, on this factor.

Third factor: This factor scored on 4 items concerning the worry about the hygiene and fear of contracting diseases. Therefore, this factor was named "Fear of cross infection". Alpha was 0.69. Eighty subjects (48%) and 25 subjects (15%) achieved an average score above two and three, respectively, on this factor.

Fourth factor: The highest loading on this factor (0.69) was feeling of nausea during dental

Table 3. Percent distribution of dental anxiety items (m= number of respondents).

Item	Always	Sometimes	Rarely	Never	n
	(4)	(3)	(2)	(1)	
1.1 am afraid the dentist may cause more harm than good.	9.6	32.1	21.8	36.5	156
2.1 wish I can judge the quality of treatment.	51.7	30.6	4.8	12.9	147
3.1 feel worried when I think of going to the dentist.	14.0	28.0	14.6	43.4	164
4.1 am afraid of catching some infections at the dentist's clinic.	12.0	23.3	20.0	44.7	150
5.1 become irritated when the dentist uses electrical equipments.	14.3	31.1	14.2	40.4	161
6.1 am not sure about the sanitary of tools at dental clinics.	10.1	24.7	21.5	43.7	158
10. I feel like asking the dentist whether tools are sterilized.	19.6	19.6	11.8	49.0	153
11. More strict rules should be applied when dentists make mistakes.	64.9	19.4	5.3	10.4	134
12.1 have little confidence in dentists.	3.9	20.8	25.3	50.0	154
14.1 cannot tolerate pain when I go to the dentist.	28.4	27.1	23.9	20.6	155
17.1 feel nauseous during dental treatment.	2.0	26.2	20.8	51.0	149
20.1 cannot tolerate the noise of drilling in my teeth.	27.3	24.7	24.0	24.0	154
22. The way dental equipments look is not assuring.	11.8	13.2	19.1	55.9	152
26.1 hate to see my tooth bleeding when treated by the dentist.	29.7	21.3	17.4	31.6	155
27.1 don't think I can tolerate an operation in my jaw or teeth.	34.4	20.8	10.4	34.4	125
28. The taste of dental medications is very irritating.	15.4	23.8	23.8	37.0	143
29.1 shiver when the dentist tells me he will give an injection in my jaw.	27.0	28.3	19.7	25.0	152
31.1 don't know how people tolerate dental treatment.	12.7	15.5	30.0	41.8	110
32.1 tolerate pain rather than going to the dentist.	9.9	15.7	15.8	58.6	152
34.1 can tolerate any surgery except dental surgery.	9.7	16.9	12.1	61.3	124
35.1 pray to come out safely from the dental clinic.	60.5	7.5	8.2	23.8	147
37.1 am scared of pain when the dentist uses the drill.	31.2	35.1	15.2	18.5	151
38. The appearance of the dentist's chair and equipments are scary.	9.0	11.5	16.0	63.5	156

Table 4. Principal components factor analysis of items concerning dental anxiety.

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Communality
1.1 am afraid the dentist may cause more harm than good.	0.20	0.44	0.20	0.18	0.02	0.76
2. I wish I can judge the quality of treatment.	0.13	0.83	0.10	-0.07	-0.01	0.73
3.1 feel worried when I think of going to the dentist.	0.69	0.26	0.12	0.20	0.21	0.64
4.1 am afraid of catching some infections at the dentist's clinic.	-0.05	0.03	0.81	0.41	-0.04	0.83
5.1 become irritated when the dentist uses electrical equipment.	0.79	0.22	-0.01	0.14	0.05	0.69
6.1 am not sure about the sanitary of tools at dental clinics.	0.02	0.09	0.91	-0.01	0.04	0.84
10.1 feel like asking the dentist whether tools are sterilized.	0.35	0.29	0.61	-0.18	0.08	0.70
11. More strict rules should be applied when dentists make mistakes.	0.15	0.51	0.36	0.06	-0.29	0.63
12.1 have little confidence in dentists.	0.15	0.56	0.27	0.39	0.19	0.63
14.1 cannot tolerate pain when I go to the dentist.	0.58	0.29	0.13	0.18	0.18	0.75
17.1 feel nauseous during dental treatment.	0.28	0.21	0.14	0.69	-0.10	0.62
20.1 cannot tolerate the noise of drilling in my teeth.	0.72	0.29	-0.04	0.32	-0.03	0.71
22. The way dental equipment look is not assuring.	0.71	0.15	0.13	0.06	0.23	0.71
26.1 hate to see my tooth bleeding when treated by the dentist.	0.65	0.18	0.07	-0.28	-0.14	0.56
27.1 don't think I can tolerate an operation in my jaw or teeth.	0.71	-0.12	0.02	0.47	0.05	0.73
28. The taste of dental medications is very irritating.	0.67	0.07	0.16	-0.12	-0.22	0.56
29.1 shiver when the dentist tells me he will give an injection in my jaw.	0.82	0.02	0.11	0.07	0.12	0.71
31.1 don't know how people tolerate dental treatment.	0.64	0.09	0.16	0.40	0.30	0.78
32.1 can tolerate pain rather than going to the dentist.	0.23	0.14	0.07	-0.04	0.86	0.83
34.1 can tolerate any surgery except dental surgery.	0.77	0.02	0.11	0.17	0.20	0.67
35.1 pray to come out safely from the dental clinic.	0.23	0.58	-0.05	0.30	0.28	0.56
37.1 am scared of pain when the dentist uses the drill.	0.84	0.21	-0.10	0.13	0.04	0.78
38. The appearance of the dentist's chair and equipment are scary.	0.76	0.12	-0.08	0.09	0.14	0.83
Eigen value	8.86	2.50	1.37	1.28	1.22	

treatment while all other loadings were marginal.

Fifth factor: Only one item obtained significant loading (0.86) about tolerating pain rather than going to the dentist.

Table 5 shows the Pearson correlation coefficients between age and the first three factors. No significant relationship was found. Females obtained a significantly higher score on factor 1 than males (Table 6). No sex difference was found in factors two and three. Analysis of variance showed that the frequency of visits has no significant effect on the factor scores. The effect of the level of education, however, was significant on factor three scores.

Table 5. Pearson's correlation coefficients table of age and the first three factors.

	Age	Factor 1	Factor 2	Factor 3
Age	1.000	-.079	.207	.111
	(166)	(165)	(165)	(164)
	P=.	.309	P= .782	P=.157
Factor 1	-.0797	1.000	.477	.221
	(165)	(165)	(165)	(164)
	P= .309	P=.	P=.000	P=.005
Factor 2	.0217	.477	1.000	.561
	(165)	(165)	(165)	(164)
	P= .782	P=.000	P=.	P=.000
Factor3	.111	.221	.561	1.000
	(164)	(164)	(164)	(164)
	P=.157	P=.005	P=.000	P=.

Table 6. Mean and standard deviation of factors' score for males and females.

	Factor 1	Factor 2	Factor 3
Whole sample	26.1 ±10.4	12.0±4.0	8.5±3.5
Male	24.6± 9.6	11.8± 3.9	8.4± 3.4
Female	29.3 ± 10.6	12.6± 4.0	8.7± 3.6
T value	-2.93	-1.19	-0.59
Significance	0.004	0.23	0.55

Discussion

This study, to our knowledge, is the first study in Saudi Arabia, which examined the prevalence of dental anxiety although the patients are not representatives of the whole population of the city

of Riyadh. However, information from this random sample from the Dental School, Riyadh, would be valuable since this is the largest center in Riyadh offering dental service to the public. In the light of results of the internal consistency and the reliability, it can be said that the scale is a valid and reliable instrument to test dental anxiety. However, three separate scales were developed according to the results of the first three factors. Factor 4 being a mixture of the first three factors and factor 5 being only one item were excluded from the analysis.

General fear from dental equipment and instruments were found in 38% of the sample but only 8.5% reported high fear. These results are within the range reported by previous studies.^{2,7,8,11}

This study also revealed other characteristics of dental anxiety that was generally not reported in the literature. Almost half the sample (48%) was afraid of cross infection of which only 15% were very afraid. It was observed that people with a higher level of education were more likely to report fear from cross infection. Educated people usually have more awareness of the risk of cross infection in the dental clinic than the uneducated. Lack of confidence in the treatment quality was noticed in two thirds of the sample. Seventeen per cent of the sample were very anxious about the treatment results. This finding could be explained by the fact that those patients were aware that they would be treated mainly by students. No age difference was found in any of the first three factors, which is different from other studies in other nations^{8,12} but agrees with others.^{10,13} Females were more anxious than males about dental instruments and equipment. This sex difference in dental anxiety had been reported in several studies.^{2,8,10,14,15}

Although the avoidance of the dentist is a well-known finding associated with severe dental anxiety, this study did not show a correlation between the frequency of visits to the dentist and the severity of dental anxiety. Low level of dental awareness and motivation among the general population in a developing country could be an explanation. More than two thirds of the subjects visited the dentist only when they had pain. The percentage is close to the 81% reported earlier⁴ but much higher than the 8.4% found among university employees.¹¹ This suggests that more efforts should be made to improve dental health awareness and regular dental check-ups among the population.

A high number of broken dental appointments

in the College of Dentistry, Riyadh had already been reported.¹⁶ The increase of broken appointments by dental school patients was positively correlated with high dental anxiety.¹⁷ It can be presumed that dental anxiety may be partly responsible for more broken appointments and the consequent interruption of a student's dental education in the college.

This study supports the need for dental student education on the management of dental fear and anxiety in patients, an action already being taken by some dental schools. Due to the small sample studied, the result of this study cannot be generalized to the population. Future studies with a larger and varied sample size are needed to confirm these results. Other anxiety scales could also be compared with the present one.

References

- Gatchel RJ, Robertson C, Ingersoll B, Walker C and Bowman L. The prevalence of dental fear and avoidance: A recent survey study. *J Am Dent Assoc* 1983;107:609-10.
- Hakeberg M, Berggren U and Carlsson SG. Prevalence of dental anxiety in an adult population in a major urban area in Sweden. *Community Dent Oral Epidemiol* 1992; 20:97-101.
- Ter Horst G and DE Wit CA. Review of behavioral research in dentistry 1987-1992: Dental anxiety, dentist-patient relationship, compliance and attendance. *Int Dent J*1993; 43:265-78.
- Al-Shammery A, Guile E, El-Backly M and Lamborne A. An oral health survey of Saudi Arabia: Phase I (Riyadh). General Directorate of research grants programs - King Abdul-Aziz city for Science and Technology - Riyadh. 1991.
- Al-Shammery A, Guile E, El-Backly M and Lamborne A. An oral health survey of Saudi Arabia: Phase II (National). General Directorate of research grants programs - King Abdul-Aziz City for Science and Technology - Riyadh. 1999.
- Kim JO and Mueller CW. Factor analysis. Statistical methods and practical issues. Beverly Hills, CA: SAGE University Papers, 1978; vol. 14.
- Gatchel RG. The prevalence of dental fear and avoidance: Expanded adult and recent adolescent surveys. *J Am Dent Assoc* 1989; 118:591-3.
- Milgrom P, Fiset L, Melnick S and Weinstein P. The prevalence and practice management consequences of dental fear in a major US city. *J Am Dent Assoc* 1988; 116: 641-7.
- Stouthard MEA and Hoogstraten J. Prevalence of dental anxiety in the Netherlands. *Community Dent Oral Epidemiol* 1990; 18:139-42.
- Moore R, Birn H, Kirkegaard E, Brodsgaard I and Scheutz F. Prevalence and characteristics of dental anxiety in Danish adults. *Community Dent Oral Epidemiol* 1993; 21:292-6.
- Kaakko T, Milgrom P, Coldwell SE, Getz T, Weinstein P and Ramsay DS. Dental fear among university employees: Implications for dental education. *J Dent Educ* 1998; 62:415-20.
- Locker D and Liddell AM. Correlates of dental anxiety among older adults. *J Dent Res* 1991; 70:198-203.
- Kunzelmann KH and Dunninger P. Dental fear and pain: Effect on patient's perception of the dentist. *Community Dent Oral Epidemiol* 1990; 18:264-6.
- Ragnarsson E. Dental fear and anxiety in an adult Icelandic population. *Acta Odontol Scand* 1998; 56: 100-4.
- Skaret E, Raadal M, Berg E and Kvale G. Dental anxiety among 18 years olds in Norway. Prevalence and related factors. *Eur J Oral Sci* 1998; 106:835-43.
- Al Yahya AS and Al Shammery AS. Broken dental appointments: A comparison between dental students and dentists at King Saud University. *Egypt Dent J* 1989; 35: 245-59.
- Stewart JE, Marcus M, Christenson PD and Lin WL. Comprehensive treatment among dental school patients with high and low dental anxiety. *J Dent Educ* 1994; 58: 697-700.