

Assessment of Dental Anxiety and its Impact on Dental Health Behaviour among Medical Undergraduate Students of Gujarat, India.

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ABSTRACT

Background: AIM: Dental anxiety is one of the major factors influencing an individual's attitude and behavior towards dental health. Medical students bear the responsibility of creating dental health awareness in rural parts of India where availability of dentists is still a problem. This study assessed the prevalence of dental anxiety among medical undergraduate students and its impact on their dental health behavior. **Methods:** Total 196 students were included in this study out of which 81 were males and 115 were females. All the participants answered 3 multiple-choice questions regarding their dental health behavior and filled up Modified dental anxiety scale (MDAS) questionnaire. Collected data were subjected to statistical analysis and results were expressed as absolute numbers and percentages for males and females. Gender-wise comparison to their responses was also made using chi-square test. **Results:** On analyzing the data, it was observed that 85.7% subjects who had "poor" previous dental experience were dentally anxious. 81.8% subjects with MDAS score between 11 and 25 tended to postpone dental treatment. Irrespective of gender, anticipation to have local anaesthetic injection was related to the highest level of dental anxiety. 13% of females and 9.9% of male participants were found to be dentally phobic (MDA score ≥ 19). Mean MDA score was higher in female students (12.17 ± 4.24) as compared to their male counterparts (11.36 ± 3.51) but this difference was statistically not significant ($p > 0.05$). **Conclusion:** From the findings of this study, it can be concluded that dental anxiety is a significant problem among the Indian medical undergraduate students. As a result of this, these students tend to avoid regular visit to dentist which in turn might affect their dental health.

Keywords: Dental anxiety; medical students; dental health; modified dental anxiety scale.

INTRODUCTION

Anxiety is defined as an aversive emotional state anticipating a feared stimulus in the future; with or without the presence of an immediate physical threat.^[1] Dentally anxious individuals tend to avoid conventional dental care. Such individuals usually depend on home remedies, use of analgesics to alleviate pain and herbal preparations which claim to "cure" dental diseases which may result in deterioration of their dental health over a period of time.

Dental anxiety possesses a major problem for patients as well as clinician. Individuals with severe dental anxiety tend to avoid conventional dental

care which in turn has a negative impact on their overall health. A study among Swedish population demonstrated that individuals with severe dental fear had deteriorated dental status which was confirmed by mean DMFT (decayed, missing, filled teeth) score of 18.6 ± 5.6 and presence of root remnants in 57% of study subjects.^[2] There are a wide variety of factors which are associated with high dental anxiety. Moreover, severe dental anxiety also affects an individual's attitude towards dental health. Moore et al (1993) found that in Danish adults extreme dental anxiety was associated with fear of drilling, negative dentist contacts, general fear tendency, avoidance of treatment and increased oral symptoms.^[3] A case-control study among Serbian medical students established inappropriate oral hygiene, less frequent changes of a toothbrush and less frequent visits to the dentist are important risk factors for severe dental anxiety.^[4]

Various methods have been developed and utilized by clinicians and researchers for measuring dental anxiety. The most commonly used include the

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Corah's Dental Anxiety Scale (DAS),^[5] the Modified Dental Anxiety Scale (MDAS),^[6] the Kleinknecht's Dental Fear Survey,^[7] Stouhard's Dental Anxiety Inventory (DAI) and its shorter version (DAI-S).^[8,9] The Corah's DAS (CDAS) and the MDAS have been seen to be suitable for use in screening of populations and diagnosing patients with dental anxiety. The former has been used extensively in epidemiological and clinical studies and showed good psychometric properties. However, it does not have any reference to local anaesthesia (LA) injections which is a major focus of anxiety for many.^[10,11] Additionally, CDAS, unlike the MDAS, can provide meaningful measures only of extremely high or extremely low dental anxiety.^[12] Furthermore, MDAS has been used to measure dental anxiety without raising anxiety to respondents.^[13] To date, the MDAS has been considerably utilized worldwide, among participants in clinical and in community settings in different languages with acceptable psychometric properties.^[14-16]

Medical students are going to be the future medical professionals and being considered as role models by the society. Dental anxiety among this subpopulation will not only have impact on their attitude towards dental health but it might affect the health knowledge they are going to impart to general population. There are very few published studies evaluating prevalence of dental anxiety among medical students.^[4,17,18] A study among the Indian medical undergraduate students demonstrated the prevalence of severe dental anxiety to be alarmingly high (35.4%).^[17] In Jordan, medical students showed significantly higher MDA score (13.58 ± 4.41) as compared to their counterparts in engineering (13.27 ± 4.47) and dentistry (11.22 ± 4.47).^[18]

Therefore, this study was conducted to determine the prevalence of dental anxiety among the undergraduate medical students of GMERS Medical College & Hospital, Valsad, India. It was also aimed to assess the possible impact of dental anxiety on dental health behaviour of these students.

MATERIALS AND METHODS

This cross-sectional study was conducted at GMERS medical college and hospital, Valsad. Ethical approval was obtained from the institutional ethical committee. All the MBBS students irrespective of their batch who were willing to participate were included in the study. Students who refused to give consent and those undergoing psychiatric treatment were excluded from the study. On the day of data collection, total of 197 students were present. A power point presentation about the need of the study and description of the questions included in the study was made by

primary author. The students were also encouraged to raise doubts regarding any of the questions included in the questionnaire which were addressed appropriately. Out of 197, one student was undergoing psychiatric treatment for depression and hence was excluded from the study. Total of 196 students were included in the study and were asked to give written informed consent. These students were asked to fill a pretested, structured questionnaire in two parts. The first part of the questionnaire included 3 multiple-choice questions pertaining to their dental health behaviour such as duration of previous dental visit, previous dental experience and postponement of dental treatment due to anxiety. The second part of the questionnaire was modified dental anxiety scale.

Modified Dental Anxiety Scale (MDAS):

MDAS contains five multiple-choice questions dealing with the patient's subjective reaction to the dental situations mentioned below:

- anticipating visit to dental clinic;
- waiting in dentist's office for treatment;
- waiting in the dental chair for drilling of teeth;
- waiting in the dental chair for scaling of teeth;
- waiting in the dental chair for receiving local anaesthetic injection in upper back posterior teeth.

Answer to each question ranges from "not anxious" to "extremely anxious". Each question carries a possible minimum score of 1 and maximum score of 5. So the final MDAS score for each individual ranges from 5 to 25.

Interpretation of MDAS score was done as follow:

< 11 – Not anxious

≥11 – Dentally anxious

11-14 – Moderately anxious

15-18 – Highly anxious

≥19 – Extremely anxious

An MDA score of 19 and above indicates a strong likelihood of the individual being dentally phobic.^[12]

RESULTS

Total number of students enrolled in this study was 196 out of which 81 were males and 115 were females. Mean age of male students was 19.88 ± 1.68 and of female students was 19.32 ± 1.21 years. Table-1 compares dental health behaviour and different MDAS category. Data showed that 66.7% students who visited the dentist in past 12 months were not anxious whereas this frequency was significantly less in moderately anxious (25.6%), highly anxious (2.6%) and extremely anxious (5.1%). While enquiring upon the previous experience of dentist/dental treatment, 63% students admitted as having "good" experience were not anxious whereas 27.2%, 8.6% and 1.2% subjects were moderately anxious, highly anxious

and extremely anxious, respectively. This difference was highly significant ($p < 0.001$). Only 18.2% students who were not anxious postponed

dental treatment due to dental anxiety as compared to 54.5% subjects who were extremely anxious ($p < 0.001$).

Table 1: Comparison of dental behaviour among different MDAS category

	Not Anxious n (%)	Moderately anxious n (%)	Highly anxious n (%)	Extremely anxious n (%)	Chi square Value	P value
Last dental visit						
0-12 months	26 (66.7)	10 (25.6)	1 (2.6)	2 (5.1)	38.776	<0.001*
1-2 years	10 (41.7)	7 (29.2)	2 (8.3)	5 (20.8)		
2-5 years	11 (44)	9 (36)	1 (4)	4 (16)		
>5 years	14 (93.3)	0	1 (6.7)	0		
Never	28 (30.1)	33 (35.5)	20 (21.5)	12 (12.9)		
Previous dental experience					52.486	<0.001*
Good	51 (63)	22 (27.2)	7 (8.6)	1 (1.2)		
Average	12 (52.2)	5 (21.7)	1 (4.3)	5 (21.7)		
Poor	1 (14.3)	1 (14.3)	0	5 (71.4)		
Not Applicable	25 (29.4)	31 (36.5)	17 (20)	12 (14.1)		
Postponement of dental treatment due to anxiety					75.188	<0.001*
Yes	6 (18.2)	3 (9.1)	6 (18.2)	18 (54.5)		
No	83 (50.9)	56 (34.4)	19 (11.7)	5 (3.1)		

*p value <0.001 indicates highly statistical significance

Table 2: Comparison of dental behaviour between non-anxious & dentally anxious subjects.

	Not Anxious (MDAS <11) n (%)	Dentally Anxious (MDAS 11-25) n (%)	Total n (%)	Pearson square value	P value
Last dental visit				19.947	<0.001*
0-12 months	26 (66.7)	13 (33.7)	39 (19.9)		
1-2 years	10 (41.7)	14 (58.3)	24 (12.2)		
2-5 years	11 (44)	14 (56)	25 (12.8)		
>5 years	14 (93.3)	1 (6.7)	15 (7.7)		
Never	28 (30.1)	65 (69.9)	93 (47.4)		
Previous dental experience				22.004	<0.001*
Good	51 (63)	30 (37)	81 (41.3)		
Average	12 (52.2)	11 (47.8)	23 (11.7)		
Poor	1 (14.3)	6 (85.7)	7 (3.6)		
Not Applicable	25 (29.4)	60 (70.6)	85 (43.4)		
Postponement of dental treatment due to anxiety				11.866	0.001†
Yes	6 (18.2)	27 (81.8)	33 (16.8)		
No	83 (50.9)	80 (49.1)	163 (83.2)		

*p value <0.001 indicates highly statistical significance

†p value <0.05 indicates statistical significance

[Table 2] compares dental behaviour between non-anxious (MDA score <11) and dentally anxious (MDA score 11-25). Surprisingly 47.4% subjects had never visited dentist in which 69.9% subjects were dentally anxious whereas 30.1% subjects were non-anxious ($p < 0.001$). Significantly more number of subjects (85.7%) who had “poor” dental experience in the past was dentally anxious as compared to those who were not anxious (14.3%). Dentally anxious subjects (81.8%) showed significantly more tendency to postpone/avoid dental treatment when compared to non-anxious counterparts (18.2%) ($p = 0.001$).

[Table 3] summarizes the comparison of scores to individual item of MDA scale based on gender. To all the items female subjects showed greater anxiety score as compared to their male counterparts. Total MDAS score among males was

11.36±3.51 and females were 12.17±4.24. However, the difference was not statistically significant.

[Table 4] depicts the gender-wise comparison of different MDAS categories. In all the categories, more number of females were found to be anxious than male participants but the difference was statistically not significant ($p > 0.05$).

No statistical significant difference was observed between males and females in terms of anxiety levels to anticipated dentist’s visit, while sitting in waiting room and while waiting to get tooth drilled. Significantly more number of females (18.3%) were “very anxious” while waiting in dental chair for scaling and polishing of teeth as compared to male students (1.2%). 23.5% female participants were extremely anxious as against 13.6% of male participants ($p < 0.001$) [Table 5].

Table 3: Gender-wise comparison of individual item and total MDA scores.

Questionnaire item	Males (Mean±SD)	Females (Mean±SD)	P value (t-test)
Anticipating visit to dentist tomorrow	1.62 ± 0.799	1.70 ± 0.850	0.516
Waiting for your turn in the dentist's waiting room for treatment	1.88 ± 0.900	1.98 ± 0.991	0.445
Waiting in the dental chair for drilling of teeth	2.54 ± 1.001	2.76 ± 1.105	0.168
Waiting in the dental chair for scaling of teeth	2.02 ± 0.741	2.20 ± 1.094	0.212
Waiting in the dental chair to have local anaesthetic injection in gums	3.22 ± 1.037	3.53 ± 1.245	0.069
Total Score	11.36 ± 3.515	12.17 ± 4.249	0.162

Table 4: Gender-wise comparison of different categories based on MDAS.

Category	Males n (%)	Females n (%)	Total n (%)	Pearson chi square value	P value
Not anxious (MDAS<11)	41 (50.6)	48 (41.7)	89 (45.4)	1.657	0.646
Moderately Anxious (MDAS 11-14)	23 (28.4)	36 (31.3)	59 (30.1)		
Highly Anxious (MDAS 15-18)	9 (11.1)	16 (13.9)	25 (12.8)		
Extremely Anxious (MDAS ≥19)	8 (9.9)	15 (13)	23 (11.7)		

Table 5: Gender-wise comparison of individual item and total MDA scores

Questionnaire item	Males n (%)	Females n (%)	Pearson chi square value	P value
Anticipating visit to dentist tomorrow				
Not anxious	45 (55.6)	57 (49.6)	3.052	0.549
Slightly anxious	24 (29.6)	41 (35.7)		
Fairly anxious	10 (12.3)	14 (12.2)		
Very anxious	2 (2.5)	1 (0.9)		
Extremely anxious	0	2 (1.7)		
Waiting for your turn in the dentist's waiting room for treatment				
Not anxious	32 (39.5)	44 (38.3)	1.073	0.784
Slightly anxious	33 (40.7)	42 (36.5)		
Fairly anxious	10 (12.3)	16 (13.9)		
Very anxious	6 (7.4)	13 (11.3)		
Extremely anxious	0	0		
Waiting in the dental chair for drilling of teeth				
Not anxious	9 (11.1)	11 (9.6)	3.166	0.530
Slightly anxious	37 (45.7)	47 (40.9)		
Fairly anxious	20 (24.7)	23 (20)		
Very anxious	12 (14.8)	27 (23.5)		
Extremely anxious	3 (3.7)	7 (6.1)		
Waiting in the dental chair for scaling of teeth				
Not anxious	20 (24.7)	35 (30.4)	19.748	0.001†
Slightly anxious	40 (49.4)	45 (39.1)		
Fairly anxious	20 (24.7)	13 (11.3)		
Very anxious	1 (1.2)	21 (18.3)		
Extremely anxious	0	1 (0.9)		
Waiting in the dental chair to have local anaesthetic injection in gums				
Not anxious	3 (3.7)	10 (8.7)	21.303	<0.001*
Slightly anxious	16 (19.8)	17 (14.8)		
Fairly anxious	33 (40.7)	17 (14.8)		
Very anxious	18 (22.2)	44 (38.3)		
Extremely anxious	11 (13.6)	27 (23.5)		

*p value <0.001 indicates highly statistical significance

†p value <0.05 indicates statistical significance

Subjects who had “poor” dental experience in past had mean MDA score of 16.71 ± 5.05 which was significantly higher than those who had “average” (12.00 ± 4.47) or “good” experience (10.06 ± 2.94). Subjects with mean MDA score of 16.42 ± 4.45 tended to postpone the dental treatment whereas those with score of 10.90 ± 3.14 never postponed dental visit ($p < 0.001$) [Table 6].

Table 6: Comparison of dental behaviour and dental anxiety score.

Dental behaviour	Mean (SD) MDA Score	F value	P value
Last dental visit			
0-12 months	10.03 (2.92)	7.659	<0.001*
1-2 years	12.54 (4.63)		
2-5 years	11.68 (4.29)		
>5 years	8.53 (2.50)		
Never	12.98 (3.76)		
Previous dental experience			
Good	10.06 (2.94)	13.981	<0.001*
Average	12.00 (4.47)		
Poor	16.71 (5.05)		
Not Applicable	13.07 (3.83)		
Postponement of dental treatment due to dental anxiety			
Yes	16.42 (4.45)	72.470	<0.001*
No	10.90 (3.14)		

*p value <0.001 indicates highly statistical significance

DISCUSSION

This study assessed the prevalence of dental anxiety among medical undergraduate students and its impact on their dental health behaviour. The major finding of this study was that though females were found to be more anxious as compared to their male colleagues, the difference was not statistically significant. Females were significantly more anxious while waiting in dental chair for scaling and to have local anaesthetic injection as compared to male students. The study also found that students who had unpleasant dental experience in past were more likely to have higher anxiety score than those who had relatively pleasant dental experience. Also, subjects with higher mean anxiety scores had tendency to postpone dental treatment against those with lower anxiety scores. It is believed that frightening experience during dental treatment in the past may lead to development of dental anxiety in such individuals.^[19] Various authors have reported that people with previous traumatic or unpleasant dental experiences showed higher levels of dental fear and

anxiety.^[20,21] In present study, we found that 3.6% of subjects had “poor” experience with their dentists out of which 85.7% were dentally anxious. Such individuals’ had significantly higher MDA score than those with either “good” or “average” experience. This is in agreement with a study done by Jankovic et al (2014).^[4] This finding emphasizes the need for dentists to have a good verbal and non-verbal communication with anxious patients and make the dental treatment as pleasant as possible which could potentially reduce the dental anxiety in such individuals.

Mean MDA score of female participants was higher than that of male participants but this difference was not statistically significant. Since this is the first of its kind study evaluating dental anxiety level only in medical undergraduate students, we do not have other studies to substantiate this finding. However, a study assessing dental anxiety among medical, dental and nursing students in India reported the similar results among their participants from medical fraternity.^[17] This finding can be explained by the fact that women have high levels of neuroticism compared to man and that anxiety is positively associated with neuroticism.^[22]

On exploring the individual items of MDA scale, this study revealed that the students were more anxious when they are about to have local anaesthetic injection and to get their tooth drilled. This finding is in line with other studies carried out among medical and paramedical students of various countries.^[17,18,23] This could be attributed to “drill” and “injection needle” which are anticipated to be painful. Students were less fearful towards scaling and polishing probably because it is perceived as painless. Lowest mean MDA score was reported for dental appointment on next day. These findings are in accordance with other studies among university students.^[17,18]

Gender-wise comparison of different categories based on MDAS revealed that females were more anxious compared to their male counterparts but this difference was statistically non-significant ($p = 0.646$). Overall 54.6% of students were found to be dentally anxious (MDA score between 11 and 25) out of which 11.7% students were extremely anxious (MDA score ≥ 19). This is much lesser compared to a study among an Indian university students which found that 35.4% medical students had MDA score of 19 and above.^[17] Lower prevalence of dental anxiety in our study can be attributed to different socio-demographic factors of participants.

Dental anxiety might result in poor patient compliance and attitudes which in turn negatively impacts oral health and quality of life. Studies have shown that individuals with dental anxiety tend to avoid regular dental care.^[24] Present study found that 25.2% of subjects had postponed dental

treatment due to dental anxiety. This finding is in agreement with other studies which have reported that 15.5% adults in United States of America,^[25] 41% in Finland^[26] and 29% in Australia^[27] avoided regular dental care due to dental fear or anxiety. This finding highlights the fact that reducing anxiety regarding dental treatment in such dentally anxious individuals may motivate them to visit the dentist regularly.

Medical students, as a future medical professional, will play a vital role in imparting health education to general public. Lack of oral health knowledge among these students might result in fear and anxiety towards dental treatment. This may not only affect their attitude towards dental health but also affect their ability to motivate general population to maintain optimum dental health. Explaining importance of oral health and regular chair-side demonstration of various dental procedures can be of great help in reducing the fear of dentistry in these students.

Patients with high levels of dental anxiety are often more difficult to manage and increase the levels of dental profession-related stress.^[28] Therefore, if a clinician could assess the level of patient anxiety before commencing the dental treatment, it would be of great help in predicting the patient's attitude and behavior to dental treatment. This information can also be valuable in formulating strategies to reduce patient anxiety.

CONCLUSION

The results of this study suggest dental anxiety is quite prevalent among Indian medical undergraduate students. Previous negative experience during dental treatment can increase the dental anxiety which in turn may lead to avoidance of regular dental visits among these individuals. Therefore, it is important to impart dental health education to this subpopulation as a part of their curriculum in order to alleviate dental anxiety.

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