ORIGINAL ARTICLE

Evaluation of Dental Anxiety in Patients Undergoing Extraction of Teeth

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ABSTRACT

Background: Oral diseases significantly affect overall general health of an individual and is frequently less prioritized in developing countries like India. The most common problem faced by oral and maxillofacial surgeons is patients' fear and anxiety regarding the pain and discomfort associated with the treatment. Dental anxiety (DA) is a multidimensional and complex experience that interferes with dental care seeking behavior. The current study intended to measure self-reported DA, recognize factors that possibly influence DA, and appraise the dental visiting pattern based on their severity of DA among young adults in the Indian population.

Materials and Methods: A total of 1000 subjects aged 18–30 years participated and survey forms were administered in both English and Hindi languages. The modified DA scale (MDAS) was used for the assessment of DA. Subjects were patients visiting the outpatient clinics of the Department of Dentistry, Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh.

Results: DA was reported to be highest for the thought of receiving local anesthetic injection (Q5, mean score 2.79), followed by drilling of the tooth (Q3, mean score 2.72), sitting in the waiting room of the dental clinic (Q2, mean score 2.02), visiting the dentist (Q1, mean score 1.94), and finally the least anxiety provoking dental situation which was tooth cleaning and polishing among this study subjects (Q4, mean score 1.90). History regarding previous visit to dentist revealed that 50.8% never visited a dentist and they were more anxious ($P < 0.05$). Irregular visiting pattern was observed among those who visited a dentist previously with 47% of them visiting more than a year back. Furthermore, DA predicted dental non-attendance and avoidance behavior in this study group. Bad experience at the dentist office was associated with high anxiety scores ($P < 0.001$) and 3.34 times odds of avoiding dental visit. Those scoring ≥19 and 10–18 on MDAS were 4.8 and 2.36 times, respectively, more likely to avoid dental visit due to DA.

Conclusion: Thus, the study underscores the importance of identifying and alleviating DA among younger adults, thereby instilling a positive attitude toward dental visits which can improve their oral health condition.

Keywords: Dental anxiety scale, Dental anxiety, Dental attendance, Indian population, Modified Dental anxiety scale.

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INTRODUCTION

Oral diseases significantly affect overall general health of an individual and are frequently less prioritized in developing countries like India. The most common problem faced by oral and maxillofacial surgeons is patients fear and anxiety regarding the pain and discomfort associated with the treatment. Multiple factors influence dental service utilization, and among them, dental anxiety (DA) notably interferes with dental visits. DA and fear are both significant concerns faced by dental clinicians and dental auxiliaries. The prevalence of DA ranges from approximately 5% to 30% in the general population and inquests among young adults. DA is generally considered to have an origin in childhood and develops further as a result of aversive conditioning and family influences.[1-5] Thus, DA is a multidimensional and complex experience and the latter indicates individual personality traits such as susceptibility to generalized anxiety disorders, mood disorders, neuroticism, and self-consciousness. In the dental circumstances, DA can arise due to fear of pain, fear of unknown, fear of losing control, fear of bleeding, fear of gagging, fear of criticism, fear associated with needle, noise of dental instrument, and smell associated with practice. Coping mode and prior traumatic dental experience are also capable of giving rise to DA. Anxiety toward dental treatment is demonstrated to interfere with dental care seeking behavior. Anxious individuals eventually experience poorer oral health and request for treatment only in extremely painful or emergency situations, thus further intensifying DA. Treating these

individuals is difficult requiring longer treatment time, and they are less satisfied with their dentist and the treatment planned. Assessment of DA is extremely essential for patient management and several questionnaires are available for evaluation. Modified DA scale (MDAS), a modification of the original Corah's DA scale, is the most commonly used tool. It is brief, simple, easy to complete, reliable, and valid cross-culturally and can be used as a cost-effective instrument for population-based research.[6-10] The current study primarily intended to measure self-reported DA using validated Hindi and English MDAS questionnaire and, secondarily, to recognize factors that possibly influence DA and to appraise the dental visiting pattern based on their severity of DA among young adults, aged 18–30 years in Indian population.

MATERIALS AND METHODS

A total of 1000 subjects were participated in this study. The survey was completed using self-reported Hindi and English questionnaires from January 2017 to March 2017. Approval was obtained from the Institutional Ethical Committee of the Department of Dentistry, Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh. Survey forms were filled at the O.P.D. The study protocol was briefly explained and consent was obtained from those who agreed to participate. At the outset of the study, the subjects who refused to participate, NRI/immigrants, and subjects with acute dental pain or undergoing psychiatric therapy and suffering from generalized anxiety disorders were excluded from the study. The MDAS is a tool which comprises of five multiple choice questions dealing with the subjective assessment of DA. The self-reported survey form administered in the study included two segments: The first segment enquired on relevant demographic information of subjects such as age, gender, educational qualification, occupational status, income, details of previous dental experience, self-perceived oral health status, and postponement or avoidance of dental treatment due to anxiety, and the second segment included the MDAS tool dealing with the subjective reaction about going to a dentist, waiting in the dental clinic for treatment, awaiting drilling, scaling, and local anesthetic injections. The subjects were asked to choose the answer from Likert scale responses such as "not anxious, slightly anxious, fairly anxious, very anxious, or extremely anxious" scored from 1 to 5, respectively. The total score ranged from 5 to 25 with the lower scores indicating no anxiety and higher scores indicating extreme DA or dental phobia. The survey sheets were given and participants were briefed about filling the form; in case of any queries, the authors and study coordinators were available for clarification.

Statistical Analysis

The raw data were entered into Excel sheet and analysis was performed using IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp. The descriptive statistics were analyzed for all the variables evaluated in the study. The comparison of means between the subcategories within the variables either one-way ANOVA or independent *t*-test as applicable was done. The difference in mean scores was statistically significant when $P < 0.05$. Tukey's *post hoc* was done for pairwise comparisons when the test was statistically significant in one-way ANOVA. Binary logistic regression was carried to analyze which of the independent factors influenced the outcome, i.e., avoidance of dental visit due to DA and the magnitude of their potential influence to odds of the outcome. The Wald Chi-squared test was used to identify which of the independent variables in the regression model had a significant influence on the outcome following which only significant variables were retained and binary logistic regression was carried out.

RESULTS

Survey forms were collected from 1000 individuals. The mean age was 23 years (Standard deviation [SD] 3.2). Majority of the subjects fell within 18–30 age groups. Analysis of mean MDAS score based on specific age group showed that highest anxiety level was reported by subjects belonging to 19 years and the lowest anxiety level by those aged 28 years. Gender-wise grouping showed that 67% were men and 33% were women. Women were more anxious than men, and the difference in mean scores was statistically significant, $P < 0.001$. Based on the total MDAS score, subjects were categorized and it was noted that 5.9% of subjects were dental phobics scoring >19 on MDAS scale and majority of them, i.e., 69.9% were mild to moderately anxious about dental treatments. Observation of the mean scores for each of the five items of MDAS scale indicated that anxiety was reported to be highest for the thought of receiving local anesthetic injection (Q5, mean score 2.79), which was followed by drilling of the tooth (Q3, mean score 2.72), sitting in the waiting room of the dental clinic (Q2, mean score 2.02), visiting the dentist (Q1, mean score 1.94), and finally the least anxiety provoking dental situation which was tooth cleaning and polishing among this study subjects (Q4, mean score 1.90). The mean, median, and SD of each item in the scale are given in Table 1.

Further analysis of the responses to each item in MDAS revealed the following: On questioning "if you

**Table 1:** The item-wise response and mean of each item evaluated in MDAS

Variables	%	Mean	SD	Median
Q01 (*n*=1000)				
Not anxious	44.8	1.94	1.073	2.00
Slightly anxious	28.2			
Fairly anxious	19.5			
Very anxious	3.3			
Extremely anxious	4.2			
Q02 (*n*=1000)				
Not anxious	41.7	2.02	1.099	2.00
Slightly anxious	28.3			
Fairly anxious	20.4			
Very anxious	5.5			
Extremely anxious	4.1			
Q03 (*n*=1000)				
Not anxious	21.7	2.72	1.328	3.00
Slightly anxious	27.7			
Fairly anxious	21.7			
Very anxious	15.3			
Extremely anxious	13.7			
Q04 (*n*=1000)				
Not anxious	48.5	1.90	1.087	2.00
Slightly anxious	26.0			
Fairly anxious	16.1			
Very anxious	5.9			
Extremely anxious	3.4			
Q05 (*n*=1000)				
Not anxious	20.4	2.79	1.345	3.00
Slightly anxious	27.0			
Fairly anxious	20.8			
Very anxious	16.9			
Extremely anxious	14.9			
Total score	11.35	4.342		11.00

went to your dentist for treatment tomorrow, how you would feel?"44.8% of them felt they were not anxious of visiting a dentist, whereas only 4.2% were extremely anxious of visiting a dentist. When the subjects were asked "if you were sitting in the waiting room (waiting for treatment), how would you feel?" majority of them, i.e., 70% felt they would be not anxious or slightly anxious, whereas 4.1% felt that they would feel extremely anxious. Questioning the subjects regarding anxiety response before specific dental treatment situations revealed that the thought of getting their tooth drilled made 29% of them feel very anxious or extremely anxious, and 48.5% of the individuals felt that they would not be anxious to get their teeth cleaned and polished; nevertheless, a meager 3.4% felt that they would get extremely anxious. Among all the dental treatment situations evaluated using MDAS, it was observed that majority of subjects acknowledged that they were very or extremely anxious of getting local anesthetic injection in their gums, i.e., 31.8%. Individuals with degree or diploma had the highest mean anxiety score followed

by those who were not educated and the lowest score was seen among those with school education. One-way ANOVA showed statistically significant difference in mean scores between subjects based on their educational qualification (*P* < 0.05) and Tukey's *post hoc* for multiple comparisons showed the existence of statistically significant difference in anxiety levels between degree or diploma holders and those with school education (*P* < 0.05). Majority of the participants were students (73.4%); therefore, apparently, 78.5% did not have any income and were dependent on their family members financially. Furthermore, 17.7% of them were earning <10,000 rupees every month. Mean total score was lowest for those who were employed and highest among students; furthermore, ANOVA showed a statistically significant difference in anxiety levels based on employment status (*P* < 0.001). Tukey's *post hoc* showed a significant difference in anxiety scores between students and those employed (*P* < 0.001). On comparing anxiety scores based on income, participants earning >20,000 Rs./month had lower score, whereas those without income had higher score, this is as expected because the latter group comprised predominantly of students. Significant difference in anxiety levels was seen between subjects based on their income (*P* < 0.001). Respondents with good opinion on their oral health status had the lowest anxiety scores, and the difference in anxiety scores was statistically significant (*P* < 0.001).

Pattern of Dental Visit and DA Scores

History regarding the previous visit to dentist revealed that 50.8% never visited a dentist before. 90.5% of the individuals who visited a dentist before felt that it is a pleasant experience. It was observed that subjects who never visited a dentist previously were more anxious and significant difference in anxiety scores were seen between subjects based on their previous dental visits (*P* < 0.05). It was also noticed that awful or bad experience at the dentist office was associated with high anxiety scores, and significant difference was seen in anxiety scores between individuals based on their previous good or bad dental experience (*P* < 0.001). On questioning the subjects "whether they postponed their visit to dentist because of anxiety," majority of them, i.e., 81 % did not do so as shown in Graph 1. Apparently, respondents who postponed their dental visits had higher anxiety scores and significant difference was observed between the subjects based on this behavior (*P* < 0.001). Majority of subjects had visited the dentist previously, , 41.8% for scaling and 18% had visited for consultation regarding their dental problem. Furthermore, 17.5% and 13.8% of them had visited for restoration and
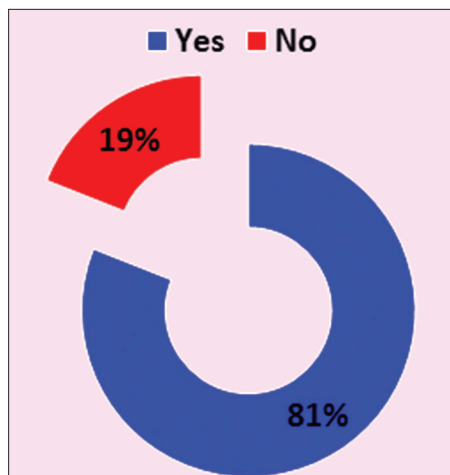
Graph 1: The item response of patient avoidance of visit to dentist

extraction of their teeth, respectively. 11 subjects had visited for pain and they reported the highest anxiety score, i.e., 14.91 among all the treatment procedures with lowest anxiety score reported by those visiting for prosthodontic purposes. ANOVA showed a statistically significant difference in anxiety scores based on the treatment undergone ($P < 0.05$), and Tukey's *post hoc* showed significant difference statistically between those undergone restorative, orthodontic, and scaling treatment when compared with those who had visited for pain complaints ($P < 0.05$).

Wald Chi-squared test showed that among, the variables evaluated, gender, self-perceived oral health, visit to dentist, previous dental experience, and self-reported total MDAS score significantly predicted the avoidance behavior of the subjects to visit a dentist due to DA. On observing the odds ratio, it was seen that subjects who had bad past dental experience were 3.34 times more likely to avoid dental visit due to anxiety. Subjects scoring ≥19 (dental phobics) and 10–18 (moderate-to-high DA) on MDAS were 4.8 and 2.36 times, respectively, more likely to avoid dental visit due to DA when compared with those scoring 5–8 (no or mild DA).

DISCUSSION

Schneider and colleagues explored a theoretical model of "psychological cycle" to explain dental attendance which included three stages. They suggested that past dental experiences influence anticipations for future dental visits, which, in turn, affect behavioral intentions to attend appointments. Their research on 311 psychology undergraduate students was consistent with their hypothesized model, proposing that recollections of past experiences influenced behavioral intentions to attend future appointments. The presence of extreme DA and poor perceived oral health ratings affected planning and attendance intentions with lower behavioral

intentions to attend appointments and explained for 20% of variance of participants' behavioral intentions. Remembrance or evaluation of past negative dental experience and pain resulted in avoidance behavior.[11,12] The younger population in the present study showed similar characteristic wherein subjects reporting previous bad dental experience (9.5%) and those reporting avoidance of dental visit due to DA (20.2%) had associated higher anxiety scores. Skaret *et al.*, Quetish, suggested that DA was the primary reason for avoidance of dental visits.[11-13] However, Eli Schwarz refuted such a notion and reported no such association between DA and dental visits.[14] The present study intended to identify the prevalence, severity, and factors influencing DA among young individuals in Indian population. The visiting pattern to the dentist and impact of anxiety on dental visits was also evaluated. Based on the above results, it was shown that 9% were not anxious, 85% were anxious, and 6% were dental phobics. Further, analysis of the statistics revealed that majority of them were mild to moderately anxious about dental treatment and a fair majority of them never visited a dentist for any purpose. Irregular visiting pattern was observed among those who visited a dentist previously with 47% of them visiting more than a year back. Furthermore, DA predicted dental non-attendance and avoidance behavior in this study group. Thus, the study underscores the importance of identifying and alleviating DA among younger adults, thereby instilling a positive attitude toward dental visits which can potentially ameliorate their overall oral health condition. Schwarz attributed the lower DA levels (mean MDAS score 7.26) among young adults in danes, to the positive influence of the child dental health services implemented in their country.[14] Majority of the respondents, in spite of being only mild to moderately anxious, never visited a dentist in this population possibly indicating the poor dental awareness, lack of active nationwide oral health awareness projects, influence of socioeconomic factors, individual personality traits, type of preoperative information, education level, gender, parental influence, personal dental experience, and due to multiple other factors. Thus, the present study in an unprecedented way showed the greater prevalence of dentally phobic (6%) and higher anxiety scores (11.35 ± 4.3) in this young adult Indian population (18–30 years). The strength of this research was the larger sample size which ensures an accurate population mean and smaller error and, second, the multicenter study design which enabled more patients to be recruited within a short period of time and allowed us to generalize the study findings to the population in question.

CONCLUSION

To the author's knowledge, the study is unexampled as there are no other available studies that have evaluated DA so explicitly in this age group, among the Indian population with multicenter recruitment. Thus, to conclude dental practitioners in addition to having comprehensive knowledge on various pharmacological and non-pharmacological approaches to manage DA, should also be highly watchful in recognizing anxious patients so that they can be appropriately managed, thereby enhancing patient satisfaction and better dentist–patient relationship.

REFERENCES

1. Buddiga V, Gupta VB, Aravind K, Reddy MV, Ramagoni NK, Ashwin D, *et al.* The comparison of oral health problems with other health problems in urban school children of 10-14 years: A group screening. J Int Oral Health 2014;6:77-80.
2. Gambhir RS, Gupta T. Need for oral health policy in India. Ann Med Health Sci Res 2016;6:50-5.
3. Schwarz E, Birn H. Dental anxiety in Danish and Chinese adults a cross-cultural perspective. Soc Sci Med 1995;41:123-30.
4. Thomson WM, Stewart JF, Carter KD, Spencer AJ. Dental anxiety among Australians. Int Dent J 1996;46:320-4.
5. Locker D, Poulton R, Thomson WM. Psychological disorders and dental anxiety in a young adult population. Community Dent Oral Epidemiol 2001;29:456-63.
6. Rachman S. The conditioning theory of fear-acquisition: A critical examination. Behav Res Ther 1977;15:375-87.
7. Goldberg LR. An alternative "description of personality": The big-five factor structure. J Pers Soc Psychol 1990;59:1216-29.
8. Appukuttan DP. Strategies to manage patients with dental anxiety and dental phobia: Literature review. Clin Cosmet Investig Dent 2016;8:35-50.
9. Appukuttan D, Subramanian S, Tadepalli A, Damodaran LK. Dental anxiety among adults: An epidemiological study in South India. N Am J Med Sci 2015;7:13-8.
10. Deogade SC, Suresan V. Psychometric assessment of anxiety with the modified dental anxiety scale among central Indian adults seeking oral health care to a dental school. Ind Psychiatry J 2016;25:202-9.
11. Corah NL. Development of a dental anxiety scale. J Dent Res 1969;48:596.
12. Skaret E, Berg E, Kvale G, Raadal M. Psychological characteristics of Norwegian adolescents reporting no likelihood of visiting a dentist in a situation with toothache. Int J Paediatr Dent 2007;17:430-8.
13. Quteish Taani DS. Dental anxiety and regularity of dental attendance in younger adults. J Oral Rehabil 2002;29:604-8.
14. Schwarz E. Dental anxiety in young adult Danes under alternative dental care programs. Scand J Dent Res 1990;98:442-50.