Dental Anxiety and Influencing Factors: A Cross-sectional Questionnaire-based Survey

Abstract
Background: Dental treatment still remains as one of the most anxious visits despite awareness between dentists and patients in building trusting relationships. The fear of dental treatment determines the frequency of treatment availed with long-term implications in oral health maintenance. Aim: This study aims to estimate prevalence, extent, and factors influencing dental anxiety in a sample of the adult population visiting a private dental hospital in Chennai, India. Materials and Methods: The study sample included 300 consecutive outpatients visiting a private dental hospital in Chennai. Any patient aged 18 and above was considered for the study. A structured custom-made questionnaire composed of ten questions was designed to assess the anxiety levels of dental patients. The level of the patient’s anxiety was assessed taking into account various factors that could influence their mental state. This included their age, gender, educational qualification, number/frequency of their dental visits, reason for their visit, past dental experiences, and nature of the dental procedure planned. Enquiries about the related time of anxiety manifestations as well as their preferred anxiety reducing protocols were done as part of the study. Statistics: The data analysis was performed using SPSS Version 11.5. Analysis initially was performed with Chi-square test for frequency and reason of visit, with the independent samples t-test used for assessing mean score differences along with Pearson’s correlation coefficient. Results: The study revealed that dental anxiety has a wide prevalence rate encompassing both genders. Distinctive predominance among females (65.2%) and professionals (66.9%) exhibiting a greater degree of anxiety was identified. Pain and extraction have been cited as duress and anxiety inciting procedures (72.6%). Conclusion: This survey has revealed that age, gender, level of education, and procedure along with visit frequency has a direct effect on the patient’s state of mind and anxiety.

Keywords: Dental Anxiety, dental fear, survey

Introduction
Dental anxiety is an emotion and a major complication that is prevalent worldwide and cannot be limited to a particular country or population. It is a stress that is created in response to dental treatment where the precipitating stimuli could range from a specific cause to something vague or could be for no particular reason.[1]

The quality of dental care and ultimately the quality of life can be improved by allaying the anxiety of the patient when a dental issue crops up. An apprehensive patient delays or misses his dental visit and shows a decreased degree of pain perception. This acts as a deterrent for both the dentist and the patient during treatment. To alleviate dental anxiety, varying dental anxiety management techniques have been utilized involving both pharmacological agents and allied techniques such as behavioral distraction. However, their usage requires special equipment, professional expertise, and knowledge that in turn need funds and time (Hmud and Walsh 2007; Pawlicki 1991). The practice among dentists to screen and evaluate the fear of the patient before dental treatment is not common, and so, this study aims to evaluate the dental anxiety and fear in patient and its significance with relation to their age, gender, education, past traumatic experiences, and frequency of dental visits. While several scales are found to evaluate dental anxiety, we found that a custom-made questionnaire taking into account the local population was more appropriate.

Materials and Methods
The study sample included 300 consecutive outpatients visiting a private dental hospital in Chennai. Any patient aged 18 and above...
was considered for the study. A structured custom-made questionnaire composed of ten questions was designed to assess the anxiety levels of dental patients [Annexure I]. The criterion for the study was formulated to make the study simple and clear. The sample was selected based on the exclusion and inclusion criteria. The study has been approved by the ethical board of clearance and was done with the consent and understanding of each subject.

**Exclusion criteria**

- Patients not willing to participate in the study
- Edentulous patients
- Medically compromised patients
- Patients with physical and mental disability
- Patients with a known history of psychiatric illness.

**Inclusion criteria**

- Patients above 18 years of age
- Willingness to participate in the survey
- Patients with the ability to understand, read, and fill questionnaires.

The eligible and willing participants received the structured questionnaire in a printed form after a brief explanation about the study and its purpose. Data were tabulated and analyzed using SPSS Version 11.5 (SPSS 11.5 for Windows®). Analysis initially was performed with Chi-square test for frequency and reason of visit, with the independent samples t-test used for assessing mean score differences along with Pearson’s correlation coefficient.

**Results**

Comparison and analysis between anxious and nonanxious groups among the study population \((n = 299)\) revealed that a total of 192 patients exhibited anxiety and fear. Although the sample population was comprised predominantly of male patients \((54.8\%)\) when compared to females \((45.2\%)\), a significantly higher percentage of females were detected to exhibit anxiety and fear \((65.2\%)\) [Graph 1a, \(P = 0.751\)].

The anxiety levels were more palpable within the \(\leq 40\) years of age group [Graph 1b, \(P = 0.227\)] with professionals \((66.9\%)\) showing more anxiety and fear than nonprofessionals \((61.3\%)\) [Graph 1c, \(P = 1.022\)].

Tabulation of three different response variations based on the visits of the patients [Table 1a-c] was done. Analysis of the number of visits to the dentist, the reason behind the visit, and their state of mind before a dental visit was observed. We found that out of the total sample size, \(72.2\%\) were patients who had visited more than thrice, and only \(7.7\%\) claimed to be first-time visitors. The anxiety levels in patients \((61.6\%)\) who have been visiting for more than three times were reduced when compared to those with three or lesser visiting frequency [Table 1a, \(P = 0.263\)]. Cosmetic reason was the most commonly cited reason for a dental visit and 24 patients \((72.7\%)\) out of them complained of being overly anxious [Table 1b]. On comparing the state of mind before the dental visit, it was observed that majority of the patients \((64.2\%)\) were anxious and fearful before the dental visit, with \(21.1\%\) of the study population

![Graph 1: Demographic data and anxiety](image)

**Graph 1**: Demographic data and anxiety (a) Influence of gender on anxiety. (b) Influence of age on anxiety. (c) Influence of education on anxiety (a - Gender, b - Age, and c - Education). *P-Statistical Significance, \((P \text{ value} \leq 0.05 \text{ means significant})\)
calm and relaxed. About 13% were neutral, and only 1.0% were happy and cheerful before their visit to the dentist [Table 1c, $P = 0.263$]. On analysis of the exact causes of dental fear and the procedure that induces anxiety [Table 2a-c], we found that while previous bad dental experiences (33.3%) were cited as the most common reason for the initial start of dental fear [Table 2a], pain was the most significant fear inducer in about 79.7% of the patients [Table 2b]. Extraction was found to be the procedure that created the most anxiety (46.4%) followed by the root canal treatment [Table 2c].

**Discussion**

An increasingly perceived problem encountered by the dental practitioner, in his practice, is the anxiety of the patient population regarding the dental procedure. Dental treatment still remains as one of the most anxious visits despite awareness among both the dentists and the patient in building trusting relationships. The fear of dental treatment determines the frequency of treatment availed and has a long-term implication in maintaining oral health.$^{[1]}$

The fear in an individual visiting a dentist is universal and can be seen in both children and adults. The estimated prevalence range of dental anxiety seems to vary from 3% to 43% with many factors such as age, gender, and culture playing a vital role of influence.$^{[2]}$ Studies report an increased prevalence of anxiety among the female gender and a general reduction in anxiety as age advances.$^{[3]}$ However, high reports as much as 43% have been seen in children which further emphasizes the fact that dental anxiety can have long-term effects and is not as easily assuaged.$^{[4]}$ Dental anxiety has been found to have a profound impact on daily living, influencing sleep, and social behavior patterns of the individual$^{[5]}$ with dental fear being implicated as its forerunner. This forms a vicious cycle of fear and anxiety and has been validated in many studies.$^{[4]}$ Dental fear results in a delayed dental visit which further compounds the dental problem leading to symptom-driven treatment culminating in further fear of dental treatment.

This study estimated the prevalence, extent, and factors influencing dental anxiety in a sample of adult population visiting a private dental hospital in Chennai, India. Association between visiting patterns, experience at the dental care center, and dental fear were elucidated through structured custom-made questionnaire composed of ten questions that were designed to assess the anxiety levels of dental patients.

Out of the 300 patients, one patient was excluded due to disinterest in participation in the survey. The remaining 299 patients were a mixed population with both male (54.8%) and female (45.2%) participants. This is similar to the distribution of sample population in studies...
Anxious and fearful group,
38 (19.8)
3 (1.6)
8 (4.2)
20 (10.4)

and hence, greater awareness of the procedure/visit. However, this observation was in contrast to the data projected by Erten et al.[11] and Appukuttan et al.,[12] where an increased literacy implied less anxiousness.

An increased frequency of dental visits (greater than three visits) seems to decrease the anxiety levels among patients. This is in agreement with many study results which reported an increased anxiousness among patients who have had no previous dental experience when compared to patients with regular or frequent dental attendance.[13,14] The reason could be a fear of the unknown procedure manifesting as anxiety.

Out of the patients exhibiting anxiety, those coming to the hospital with tooth pain tended to be overly anxious 72.6% followed by patients visiting the dentist for cosmetic reasons.

A previous unpleasant experience with the dentist or the dental procedure seems to play an important factor in instilling early seeds of anxiety within the patient’s mind, with the fear of pain cited as the most important reason for fear in more than 79.7% of the patients with increased anxiety levels. The procedure of extraction has been cited as the most traumatic or anxiety increasing procedure in this study which is similar to results got by Rodriguez Vázquez et al.[15]

Conclusion
For a satisfactory dental treatment and a good oral health status, the state of mind of the patient is very important and is influenced by many factors such as age and gender.[16]

Dental anxiety has an impact on behavior, health, physiology, cognition, and social factors. This in turn is manifested as fear, avoidance behavior, aggression, tension, and emotional instability affecting sleep, work, and relationships.[15]

Preoperative anxiety usually indicates accurately the level of postoperative pain and recovery. Methods targeting the four major sensory anxiety triggers such as sight (needles), smell (cut dentine), and sound (drills) along with sensations (vibrations) have been utilized to reduce dental fear. Pleasant odors with lavender orange and apple scents have shown to have some anxiolytic effect on the patients with profound effect during the wait for dental treatment.[17-20] With many new advents such as plasma torch toothbrush technique to alleviate dental fears[21,22] and other such innovations coming up, we can envision a fearless and anxiety free visit to the dentist in the future.

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Conflicts of interest
There are no conflicts of interest.
References

1. Saatchi M, Abtahi M, Mohammadi G, Mirdamadi M, Binandeh ES. The prevalence of dental anxiety and fear in patients referred to Isfahan Dental School, Iran. Dent Res J (Isfahan) 2015;12:248-53.

2. Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: A review of prevalence and concomitant psychological factors. Int J Paediatr Dent 2004;14:241-5.

3. Folayan MO, Idheen EE, Ojo OO. The modulating effect of culture on the expression of dental anxiety in children: A literature review. Int J Paediatr Dent 2004;14:241-5.

4. Armfield JM, Stewart JF, Spencer AJ. The vicious cycle of dental fear: Exploring the interplay between oral health, service utilization and dental fear. BMC Oral Health 2007;7:1.

5. Cohen SM, Fiske J, Newton JT. The impact of dental anxiety on daily living. Br Dent J 2000;189:385-90.

6. Astrom AN, Skaret E, Haugejorden O. Dental anxiety and dental attendance among 25-year-olds in Norway: Time trends from 1997 to 2007. BMC Oral Health 2011;11:10.

7. van Wijk A, Lindeboom JA, de Jongh A, Tuk JG, Hoogstraten J. Pain related to mandibular block injections and its relationship with anxiety and previous experiences with dental anaesthetics. Oral Surg Oral Med Oral Pathol Oral Radiol 2012;114 5 Suppl:S114-9.

8. Marya CM, Grover S, Jnaneswar A, Pruthi N. Dental anxiety among patients visiting a dental institute in Faridabad, India. West Indian Med J 2012;61:187-90.

9. Fuentes D, Gorenstein C, Hu LW. Dental anxiety and trait anxiety: An investigation of their relationship. Br Dent J 2009;206:E17.

10. Malvania EA, Ajithkrishnan CG. Prevalence and socio-demographic correlates of dental anxiety among a group of adult patients attending a dental institution in Vadodara city, Gujarat, India. Indian J Dent Res 2011;22:179-80.

11. Erten H, Akarslan ZZ, Bodrumlu E. Dental fear and anxiety levels of patients attending a dental clinic. Quintessence Int 2006;37:304-10.

12. Appukuttan D, Datchnamurthy M, Deborah SP, Hirudayaraj GJ, Tadepalli A, Victor DJ. Reliability and validity of the Tamil version of Modified Dental Anxiety Scale. J Oral Sci 2012;54:313-20.

13. Sohn W, Ismail AI. Regular dental visits and dental anxiety in an adult dentate population. J Am Dent Assoc 2005;136:58-66.

14. Ekanayake L, Dharmawardena D. Dental anxiety in patients seeking care at the University Dental Hospital in Sri Lanka. Community Dent Health 2003;20:112-6.

15. Rodríguez Vázquez LM, Rubiños López E, Varela Centelles A, Blanco Otero AI, Varela Otero F, Varela Centelles P. Stress amongst primary dental care patients. Med Oral Patol Oral Cir Bucal 2008;13:E253-6.

16. Locker D, Liddell A. Clinical correlates of dental anxiety among older adults. Community Dent Oral Epidemiol 1992;20:372-5.

17. Kritsidima M, Newton T, Asimakopoulou K. The effects of lavender scent on dental patient anxiety levels: A cluster randomised-controlled trial. Community Dent Oral Epidemiol 2010;38:83-7.

18. Lehrner J, Eckersberger C, Walla P, Pötsch G, Deecke L. Ambient odor of orange in a dental office reduces anxiety and improves mood in female patients. Physiol Behav 2000;71:83-6.

19. Lehrner J, Marwinski G, Lehr S, Johren P, Deecke L. Ambient odors of orange and lavender reduce anxiety and improve mood in a dental office. Physiol Behav 2005;86:92-5.

20. Toet A, Smeets MA, van Dijk E, Dijkstra D, van den Reijen L. Effects of pleasant ambient fragrances on dental fear: Comparing apples and oranges. Chemosens Percept 2010;3:182-9.

21. Kumar CH, Sarada P, Reddy CH, Reddy MS, Nagasailaja DS. Plasma torch toothbrush a new insight in fear free dentistry. J Clin Diagn Res 2014;8:ZE07-10.

22. Berggren U. Long-term management of the fearful adult patient using behavior modification and other modalities. J Dent Educ 2001;65:1357-68.
Annexure

Annexure 1: Dental Anxiety Assessment Questionnaire

Name: .................................................... Age: ..................Sex: .......

1. Number of visits to the dentist so far…
   a. 1 b. 2 c. 3 d. More than 3

2. Reason for the present dental visit
   a. Tooth pain b. Cosmetic reasons c. Regular checkup d. Any other reason

3. State of mind before dental visit
   a. Calm and relaxed b. Anxious and cheerful c. Neutral d. Cheerful and happy.
   If response is B for above question, please continue with the questionnaire

4. How would you grade your level of dental anxiety?
   a. Mild b. Moderate c. Severe d. Cannot say

5. Reason for fear of dental treatment
   a. Injection b. Fear of pain c. Sight of blood/doctors’ operatory d. Sound of drill and suction

6. How did the fear start?
   a. Unknown b. Bad previous experience c. Un-empathic dentist d. Information from others

7. Any physical manifestations of fear during dental treatment?
   a. Tremors b. Light headedness c. Sweating d. Palpitation

8. When do you feel that your fear is at peak?
   a. Previous night b. At the waiting lobby c. During treatment d. After the procedure

9. How would you prefer to control anxiety?
   a. Counselling by doctors b. Medication c. Conscious sedation/GA d. Meditation and alternative relaxation techniques

10. Which dental procedure causes the most anxiety?
    a. Scaling b. Filling c. Extraction d. Any other/RCT

This questionnaire intends to assess the anxiety level of dental patients. The personal details of the patient will be kept confidential and identity of patients will not be disclosed under any circumstances.