



ORIGINAL ARTICLE

# Dental Procedures, Oral Practices, and Associated Anxiety: A Study on Late-teenagers

Rahul Bhola<sup>a</sup>, Reema Malhotra<sup>b,\*</sup>

<sup>a</sup>Department of Metallurgical & Materials Engineering, Colorado School of Mines, Golden, CO, USA.

<sup>b</sup>Department of Psychology, Faculty of Arts, University of Delhi, Delhi, India.

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scale

**Abstract**

**Objectives:** The study aims to determine the degree of anxiety pertaining to dental procedures and various oral hygiene practices among college teenagers.

**Methods:** Corah's Modified Dental Anxiety Scale was administered on a randomly chosen sample of 100 Indian college students (50 males and 50 females) of Delhi University, belonging to the age group of 17–20 years.

**Results:** Descriptive statistical computations revealed 12.14 years as the mean age of first dental visit, with moderately high levels of anxiety (60.75%) for various dental procedures among the Indian teenagers and 5% lying in the "phobic or extremely anxious" category. With merely 4.16% people going for regular consultations, general check-ups evoked 78.3% anxiety and having an injection or a tooth removed was perceived as the most threatening. The sample subgroup not using mouthwash and mouthspray, smokers, and alcohol drinkers with improper oral hygiene practices experienced much higher anxiety towards routine dental procedures.

**Conclusion:** The majority of the Indian youngsters had an evasive attitude of delaying dental treatment. The core problems lay in deficient health care knowledge, lack of patient-sensitive pedagogy to train dental professionals, inaccessibility of services, and a dismissive attitude towards medical help. The feelings of fear and anxiety prevalent among the Indian youth offer significant insights into causes and preventive measures for future research and practice. Methods of education and motivation could be developed to dissipate the anxiety amongst Indian teenagers that prevent routine dental visits and maintenance of adequate oral hygiene.

\*Corresponding author.

E-mails: [reema6@gmail.com](mailto:reema6@gmail.com), [bhola.reema@outlook.com](mailto:bhola.reema@outlook.com) (R. Malhotra).

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## 1. Introduction

Dental anxiety and fear are widespread amongst the patient population and pose a significant problem in their management. Anxiety is defined as an aversive emotional state anticipating a feared stimulus in the future [1], with or without the presence of an immediate physical threat. Although the terms fear, phobia, and anxiety are used interchangeably, they differ categorically. Dental phobia may be defined as the fear of treatment, characterized by the avoidance of dental treatments with high levels of associated dental anxiety [1,4]. According to American Psychological Association's Diagnostic and Statistical Manual IV [5], phobia is classified as an anxiety disorder covering symptoms such as a constant fear of a stimulus, avoidance of the feared object, and significant disruption in routine activities, limiting the functions of an individual due to exaggerated and unreasonable anxiety. Several researchers group dental phobias into situational and blood injection injury types of phobia [2,6,7]. Dental anxiety, by contrast, relates to the psychological and physiological variations of a nonpathological fear response to a dentist's appointment or treatment. The cancellation, avoidance, or postponement of dental visits is a common observation among anxious and vulnerable individuals [1–3,8].

Ekman et al [9] described fear as one of the six universal human emotions, often characterized by components [10] namely, psychological, physical, cognitive, and behavioral [11]. Past traumatic experiences [12] of dental visits creates a negative perception resulting in anxiety. Dental patients, in particular, are often moderately anxious at the beginning of a procedure and get more anxious, fearful, and depressed with time, complexity, and stage of treatment. Hence it becomes imperative for the clinician to not only control their anxiety, but also to reconstruct trust and positive relationships to facilitate a healthy curative procedure, as well as patient adherence [13].

Several researchers have concluded that dental anxiety varies in different social groups and tribes [14]. Age, sex, social status, and education level also significantly affect anxiety, with younger individuals and women showing higher levels of anxiousness [15–17]. The family environment, dentist experiences shared by others, and literacy level also affect anxiety to varying degrees. The role of culture is inextricable in oral practices. In the Indian population, for example, literacy level is low, social status is poor, general cleanliness is compromised, dental awareness is lagging, and consumption of tobacco is high [18–20]. Visiting a dentist is one of the rarest norm and it is routinely postponed until a serious symptom appears. These social realities pose newer challenges for a practicing dentist in retaining the consulting patient, in lieu of high doctor-patient ratios and social attitudes among the population at large. In such a scenario, attending to anxiety

among patients adds to the burden and effectiveness of the dental fraternity.

An extensive literature review revealed that several psychometric indexes have been developed to measure dental anxiety among patients [1]. Researchers vary in their methodological usage of a series of questionnaires, single question surveys, and descriptive interviews. Some commonly used scales have been tabulated in Table 1 [1], however, no single tool is complete enough to determine the holistic preview of an anxious patient. The dental anxiety scale, commonly referred to as the DAS index, developed by an American psychologist Norman Corah in 1968 [21,22], has been the most widely used. Its usage has been compared with other dental anxiety scales and is illustrated in Figure 1 based on the 2008 statistics [1]. The DAS index originally had a single question and was developed to measure the psychological stress in a dental situation [21], however, it was refined to four questions relating to the temporal and distal proximity related to a dental experience [22]. The Modified Dental Anxiety Scale/Index (MDAS) was developed by adding an additional question, related to local anesthetic injection, to the existing DAS inventory. The response options were further categorized into five subcategories, namely: not anxious, slightly anxious, fairly anxious, very anxious, and extremely anxious, to give the scale a quantitative approach. The literature indicates that DAS and MDAS constitute as research instruments in a majority of 31% research studies (as evident from Figure 1) and being fundamentally advanced, they are the most preferred tools by scientists all over the globe to measure fear and anxiety in a dental setting [1].

## 2. Materials and methods

### 2.1. Objective

The first objective was to determine the degree of anxiety among college students pertaining to dental procedures.

The second objective was to study the prevalence of dental anxiety based on several practices of oral hygiene.

### 2.2. Sample

The sample population consisted of 100 Indian college students (50 males and 50 females). All of the participants were undergraduates of Delhi University who belonged to the age group of 17–20 years and who came from the middle-class income group. A random sampling procedure was adopted, using a table of random numbers, to ensure that all individuals were evenly distributed, with 25 students each from courses of science, commerce, arts, and computers. Thus, a blind selection procedure added to the statistical soundness of the results.

**Table 1.** Dental anxiety scales and scale items (in 2008)[1].

Scales	Scale items	2008 usage (%)
<b>Adult dental anxiety scales</b>		
Corah's Dental Anxiety Scale (DAS)	4	23.5
Modified Dental Anxiety Scale (MDAS)	5	7.4
Kleinknecht's Dental Fear Survey (DFS)	20	12.3
Dental Fear Assessment Scale (DFAS)	31	0.0
Gatchel's 10-Point Fear Scale (FS)	1	0.0
Stouthard's Dental Anxiety Inventory (DAI)	36	0.0
Dental Anxiety Inventory-Short Version (DAI-S)	9	9.9
Gale's Ranking Questionnaire (RQ)	25	0.0
Photo Anxiety Questionnaire (PAQ)	10	0.0
Hierarchical Anxiety Questionnaire (HAQ)	11	1.2
Fear of Dental Plan (FDP) Questionnaire	18	1.2
Single-term measures	1	11.1
Other scales	vary	3.7
<b>General scales used to measure dental anxiety</b>		
Spielberger's State-Trait Anxiety Inventory (STAI-S)	10	6.2
Hospital Anxiety and Depression Scale-Anxiety Subscale (HADS)	7	3.7
<b>Child-specific dental anxiety scales</b>		
Children's Fear Survey Schedule-Dental Subscale (CFSS-DS)	15	13.6
Modified Child Dental Anxiety Scale (MCDAS)	8	0.0
Frankl Behaviour Rating Scale (FBRS)	1	2.5
Venham Picture Scale (VPS)	8	1.2
Facial Image Scale (FIS)	4	2.5
Morin's Adolescent's Fear of Dental Treatment Cognitive Inventory (AFDTCI)	23	0.0

### 2.3. Instrument

The current research study employed the questionnaire method to determine the anxiety levels of the individual. MDAS was chosen for its popularity, widespread usage, standardization, and layman-friendly language. MDAS consists of two subtests with five and six items in each [12,21,23]. The entire test was rated by the participants on a five-point Likert rating scale for their order of preference on the degree of discomfort experienced. Being a highly objective psychometric instrument, its test-retest reliability measures at 0.82 and internal consistency coefficient at 0.86 [22].

In addition, a self-constructed questionnaire was also used to gather information about frequency of dental visits, nature of symptoms, oral hygiene, and eating and drinking habits.

### 2.4. Procedure

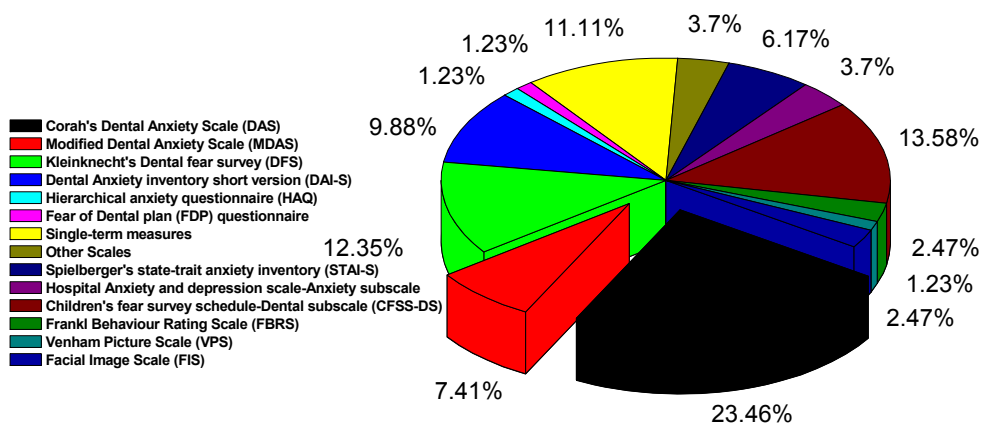
A blind selection procedure was used to randomly select 100 college students from various disciplines. After forming a rapport and ensuring that the participants understood the instructions clearly, MDAS was administered. It was made sure that individuals gave the first natural response and attempted all the questions spontaneously. After completion of the questionnaire, additional information was obtained about various dental practices by presenting the self-constructed questionnaire.

### 2.5. Analysis

Descriptive statistical analysis techniques were used with the help of SPSS version 16.0 (SPSS Inc., Chicago, IL, USA). This included the computation of means, standard deviations, and percentage frequencies for various variables involved. These included combined anxiety, age of 1<sup>st</sup> treatment, visits/year, degree of regularity, treatments taken, and habits such as brushing, tongue cleaning, mouthwash, mouthspray, floss, smoking, drinking alcohol, and food preference. In addition, cross-sectional item-wise means were also obtained to determine which dental procedure elicited the most anxiety. These results are depicted graphically using various bar diagrams.

## 3. Results

A visit to the dentist is often fraught with high levels of anxiety on behalf of the patient population. This intense discernible fear of anticipated dental procedures is often observed to rise as the complexity of treatment increases. Not only does it impact the resistant and evasive attitude among patients, but influences the dental fraternity by a constant mistrust, apprehension, and dropout rate, often witnessed by dentists. There were twofold objectives of the current study; to assess the degree of dental anxiety prevalent among Indian college students and to determine dental anxiety on the



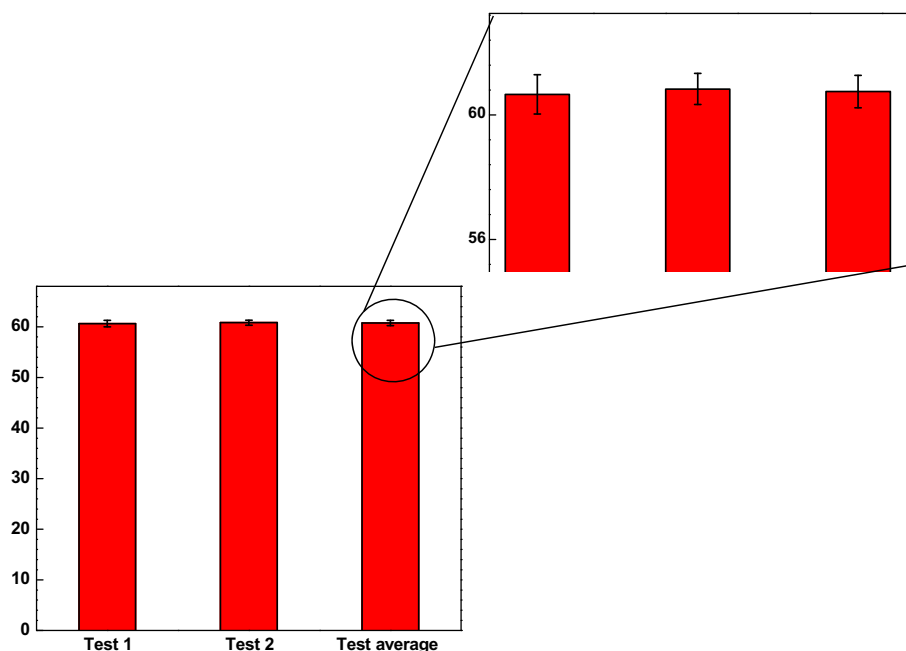
**Figure 1.** Dental anxiety scales and their reported usage (in percent) according to a 2008 survey. Note. Adapted from Table 1 percentage usage, credited to JM Armfield, [1].

basis of various factors related to oral hygiene. The MDAS questionnaire was chosen as the research instrument due to its wide usage and strong reliability. Being a brief self-report questionnaire, it was easily understood by and administered to a sample of 100 college students from Delhi University who were randomly selected from various disciplines. The scores of each participant were analyzed for combined means, item-wise averages and mean anxiety based on various social and oral measures.

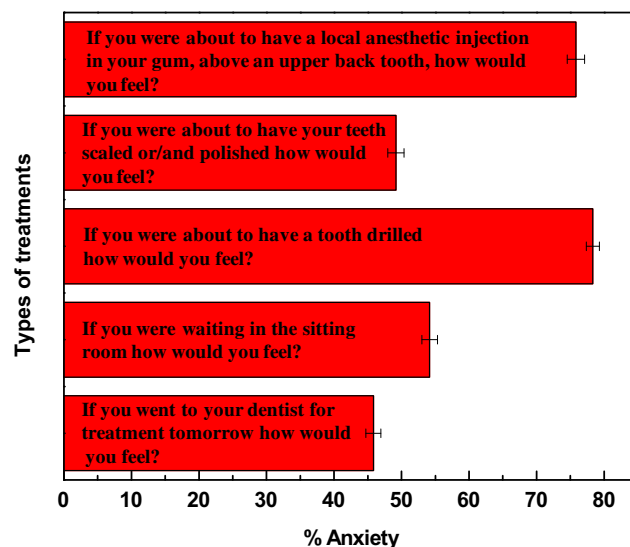
Results suggested that the mean percent anxiety for test one of the MDAS questionnaire was 60.66% and that for test two was 60.83%. With SD for all 100 participants as extremely low at 0.63 and 0.50, respectively, it can be said that both subtests reveal extremely close

estimations of the degree of anxiety and can be taken as truly consistent indicators of patients' reactions. The grand mean %, combined for both tests, was found to be 60.75%, with a negligible deviation score of 0.52, as shown in Figure 2. This suggests that most of the college students experienced a moderately high degree of anxiety, which Kunzelmann and Dünninger [8] found was invariably present in a dental setting.

Further, an item-wise analysis for both tests was done. On subtest one, Figure 3 reveals that "having a tooth drilled" evoked the highest level of anxiety, with a mean percent score of 78.3%, followed by "having a local anesthetic injection in the gum" (75.8% anxiety). As per Corah's classification of MDAS [22,23], any raw score >19 or about 76% may be classified in the severe



**Figure 2.** Mean percentage anxiety for two subtests of Modified Dental Anxiety Scale (MDAS).



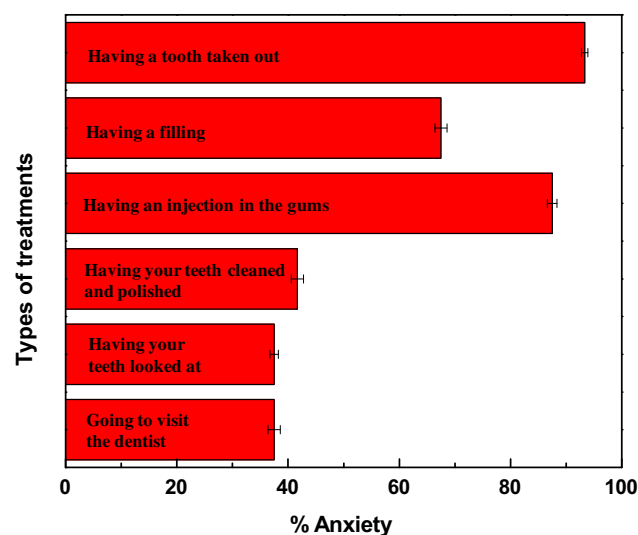
**Figure 3.** Item-wise anxiety scores on subtest one of Modified Dental Anxiety Scale (MDAS).

or phobic category, which as per our results, was experienced in drilling and injecting procedures. The remaining three items triggered the least anxiety, however, which also lay in the moderate category. These were “sitting in the waiting room for treatment”, “getting teeth scaled and polished” and “going to a dentist for a treatment tomorrow” with percent anxiety scores of 54.1%, 49.1%, and 45.8%, respectively.

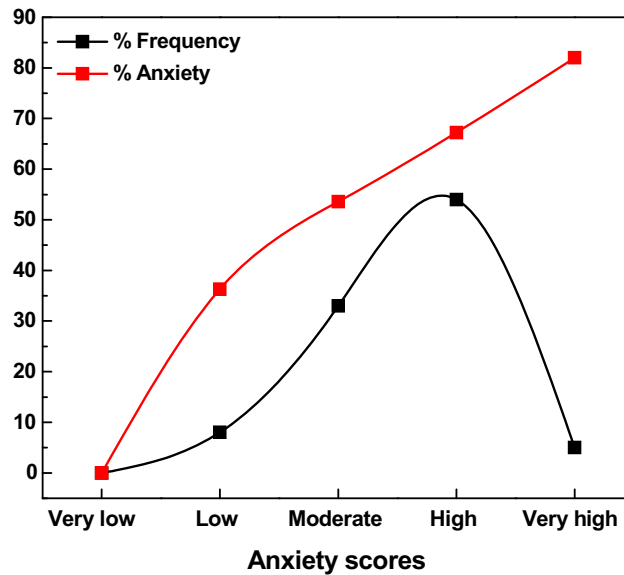
On subtest two, “having a tooth taken out” made the students extremely worried with a very high anxiety score of 93.3%. This was followed by having an injection in the gum that again elicited an anxiety of 87.5% as depicted in [Figure 4](#). “Having a filling” was also greatly worried about, with an anxiety score of 67.5%. Having one’s teeth “cleaned and polished” obtained scores in the “fairly worried” category with a moderate

score of 41.6%. The two items with the same least score of 37.5% were visiting a dentist and having one’s teeth looked at, suggesting that these situations produced only slight anxiety. The overlapping items from both tests were also averaged out to eliminate any discrepancies. Thus, the mean score for getting teeth polished was 45.35% and that for getting an injection was 81.65%. This suggests that despite minor variations, the respective qualitative categories of moderate and high anxiety scores remained the same.

A frequency classification of individuals based on the degree of anxiety reveals a negatively skewed curve, with most of the participants falling on the right side of the continuum, depicting higher anxiety values. [Figure 5](#) depicts that a majority of participants (54%) experienced high anxiety with a mean of 67.23%. This was followed



**Figure 4.** Item-wise anxiety scores on subtest 2 of MDAS.

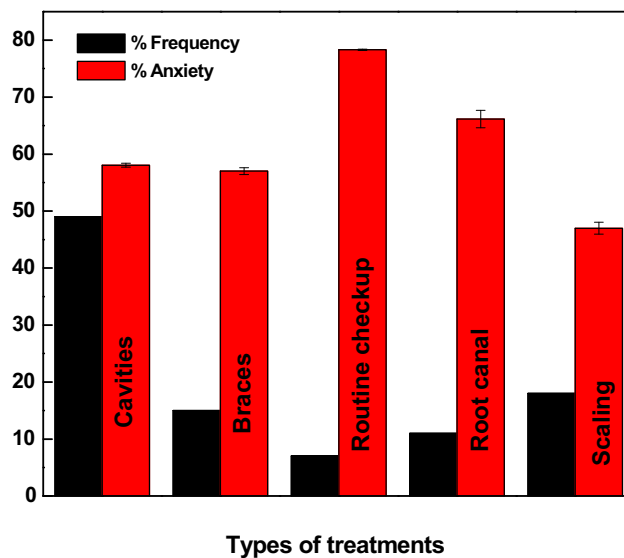


**Figure 5.** Frequency distribution of participants in different levels of anxiety.

by about 33% of participants with a moderate score of 53.6. About 8% of participants obtained a low mean score of 36.3, 5% experienced very high anxiety of 82%, and none of the participants experienced very low anxiety. This break-up is indicative of the fact that there is a tendency among late adolescents to feel highly apprehensive of dental procedures, nearly marginalizing on the phobic category. The very idea of visiting a dentist was, thus, a scary one as supported by several studies [24–28]. Agdal et al [26] also reported that as many as 75% of US adults experience anxiety of some form in relation to a dental experience.

Furthermore, these results are supported by statistical data reflecting the frequency of regular visits to the

dentist. The mean age of first visit among Indian youngsters was 12.14 years (range 7–16 years). This interesting observation suggests that Indian children do not visit a dentist in their 1<sup>st</sup> decade of life. According to the handbook of pediatric dentistry [29], the oral dentition of each individual involves eruption of first teeth at 4–8 months, exfoliation of the deciduous teeth at 6 years, and replacement by permanent dentition at 12–13 years. Oral health is prime to general health and the deciduous teeth are the benchmark to developing healthy and stable permanent teeth [29,30]. Deciduous teeth are considered functional trails, which guide the permanent teeth to develop into a stable occlusion relationship for healthy future oral health.



**Figure 6.** Percentage frequency and percentage anxiety based on types of treatment for which adolescents approached the dentist in the past.

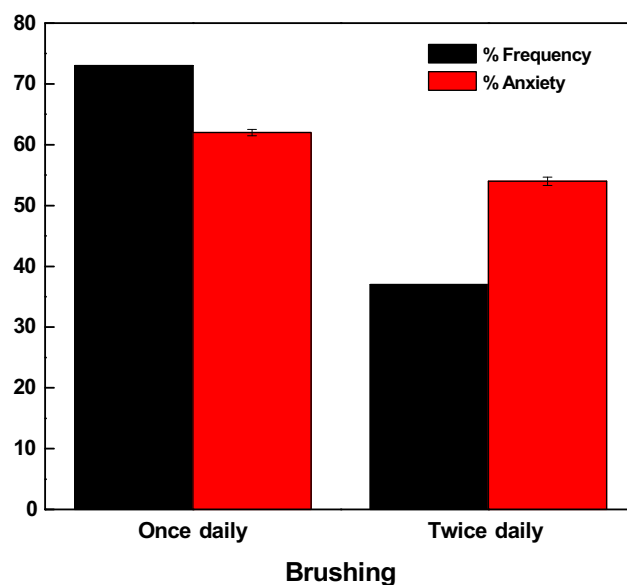


Figure 7. Dental anxiety as a measure of brushing habits of adolescents.

The age of first visit to a dentist (12.14 years) suggests the neglectful behavior of Indian parents and children towards dental health, who do not bother about oral care until the permanent teeth appear. This may be attributable to factors such as poor awareness, resources, medical facilities, literacy, and cleanliness. The average number of visits to a dentist was 2.46/year. This biannual frequency further adds to the fact that oral health and dental treatment is largely an ignored sphere of the Indian lifestyle and that periodic check-ups from a young age are not reinforced by the caretakers. Moreover, 95.84% of the student population admitted the fact that their doctor visits were highly irregular and were only on an “as-and-when” basis, whereas only 4.16% of

people were regular patients at a dental clinic. This dismal scenario supports how the nature of regularity and degree of anxiety were interdependent on each other. Although a higher anxiety reinforced fewer visits, this irregularity in seeing a dentist, in turn, added to the magnitude of their fears about what might be anticipated in a clinic.

Data was also obtained pertaining to the types of treatments that this adolescent population sought and is summarized in Figure 6. A majority of almost half of the students (49%) went for cavity-filling. Poor general hygiene may be a possible reason [30–33]. However, this procedure caused anxiety about 58.05% of the time. Such a high prevalence of carious dentition again

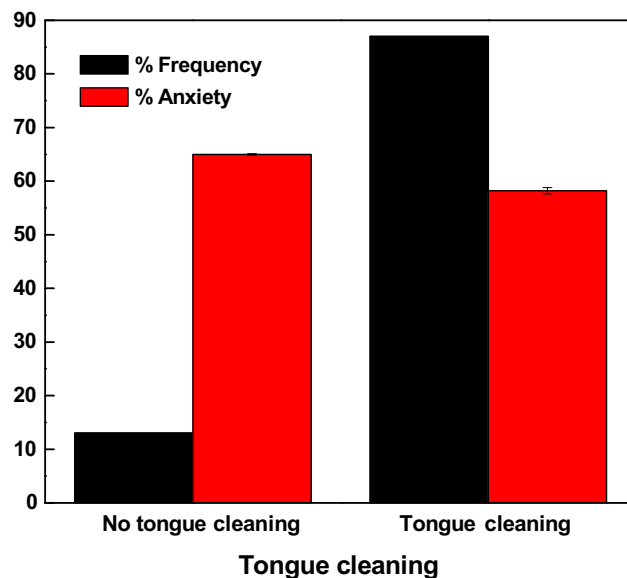


Figure 8. Dental anxiety as a measure of tongue-cleaning habits.

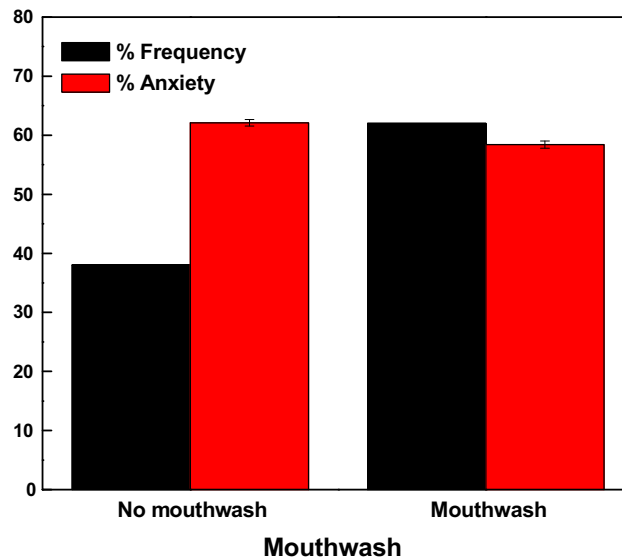


Figure 9. Dental anxiety as a measure of mouthwash usage.

contributes to the negligent patient visit until early adolescence [31]. According to the Oral Health Atlas published by the World Dental Federation, for caries, 83% of Indian adolescents aged between 6 years and 19 years were affected in 2003 [32]. About 18% of the sample went for teeth scaling procedures. Because the treatment is centered on better looks and appearance, without any prominent pain of drilling involved, it caused the least anxiety of 47%. The category of braces treatment followed next in line with a frequency of 15%. Although braces, too, are primarily concerned with better alignment of the teeth, this also may be the first time an adolescent visits a dentist in the Indian scenario. This might be a reason for an anxiety score of 57%.

Because the time of ortho treatment and the first probable visit coincided in many of the individuals, their anxiety was cumulative to both. They were anxious due to the various complex treatments, wires, and long durations involved during orthodontic therapy. Past researchers indicate that complex treatments like orthodontics evoked higher anxiety [27,34].

Root canal treatment was the second least important procedure which college students sought 11% of the time. Being a relatively uncommon treatment for teenagers, it could be a possible reason why the degree of apprehension associated with it fell in a “high” category of 66.16%. Several studies suggest that the information people hold about the surgical techniques involved in a

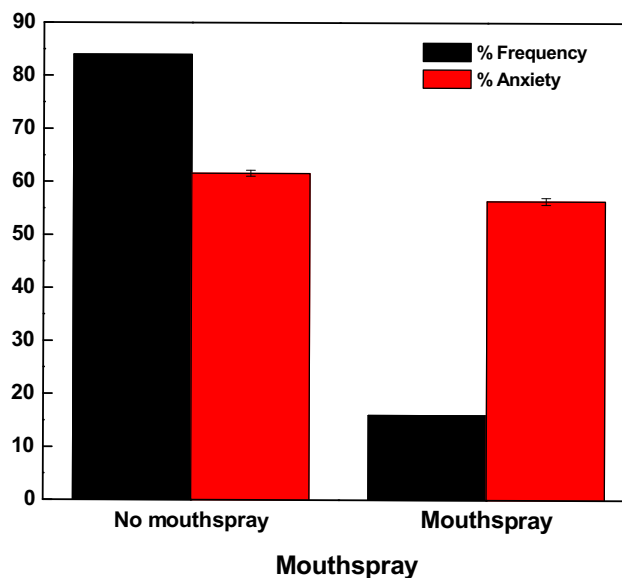
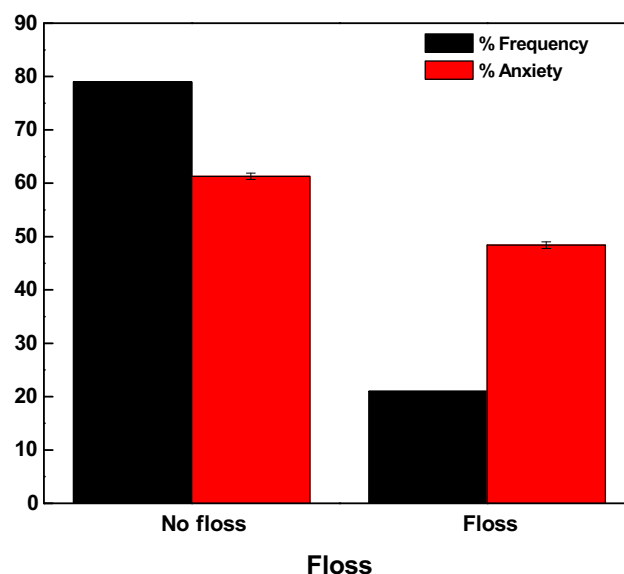


Figure 10. Dental anxiety as a measure of use of mouthspray.





**Figure 11.** Dental anxiety as a measure of use of dental floss.

root canal treatment further reinforce anxiety about it [35]. Owing to the neglectful and anxious behavior of patients towards dental treatments, they often tend to overlook a problem until it is serious enough to make them socially, physically, and functionally incapacitated. This is especially true of the majority of the Indian population that carried an evasive attitude of delaying treatment rather than symptomatic prevention towards any medical illness. Prospective patients become increasingly anxious at the very thought of visiting a dentist, and end up procrastinating consultation, delaying treatment, and leading to the worsening of oral disease. This leads to a vicious cycle becoming the cause of severe infection, swelling, and disability, eventually reinforcing the need for a root canal treatment. At various times, anxious patients loose teeth which otherwise could have been saved by routine dental procedures, but due to neglect and delays, can no longer be restored. It has also been reported by Armfield [1] and Armfield et al [2,36,37] that higher dental anxiety is often associated with more missing and decayed teeth.

The most interesting observation was that the least existing treatment of “general check-up” had a frequency rating of only 7%. Moreover, this small group of the population experienced the highest degree of dental anxiety with a score of 78.3%. As shown in Figure 6, this statistic reflects that routine care is not considered important enough in the medical sphere of this population. This observation is further highlighted by the fact that only one participant, from a group of 100, reported a monthly frequency (12 visits per year) of regular check-ups, revealing a grave reality about the Indian dental scene. These findings are, in turn, related, to a higher magnitude of anxiety, suggesting that even the most basic of all treatments are avoided due to a

profound fear of the dentist, equipment, and techniques. However, as one starts visiting the doctor, this nervousness becomes less, even if the procedures are more strenuous in nature. This fact emerges to the fore from the respective frequencies and anxiety levels of other more serious procedures. The SD scores were minimal and varied from 0.3 to 1.61.

Next, descriptive statistical computations were carried out for oral habits of youngsters. Brushing habits were the first to be discussed. A total of 73% of participants brushed once a day whereas the remaining 37% brushed their teeth twice a day (Figure 7). The respective percent anxiety scores were 62% and 54%, suggesting a positive relationship, i.e., as brushing frequency increases, the anxiety level decreases. Plaque is a soft bacterial deposit that forms over the tooth surface and is responsible for gingivitis and periodontitis [38]. Brushing effectively removes the plaque and in addition the toothpaste delivers cariostatic fluorides to the tooth [39], thereby preventing diseases of the hard and soft tissues. According to a recent study by Janković et al [27], factors such as changing a tooth brush frequently were inversely related with severe dental anxiety.

Tongue-cleaning was the next basic habit to be surveyed. About 87% of participants cleaned their tongue after brushing and had a moderate anxiety of 58.2%, as can be seen in Figure 8. The remaining 13% did not clean their tongue and thus experienced a high anxiety of 65%. The dorsal surface of the tongue harbors millions of bacteria [40], including the periodontopathic bacteria, oral streptococci [41,42], the *Candida sp.* [43], and microbial flora [44]. These microorganisms, in addition to detached mucosal epithelial cells, food, saliva, and other components, form a soft deposit which is often referred to as tongue plaque or tongue coating.

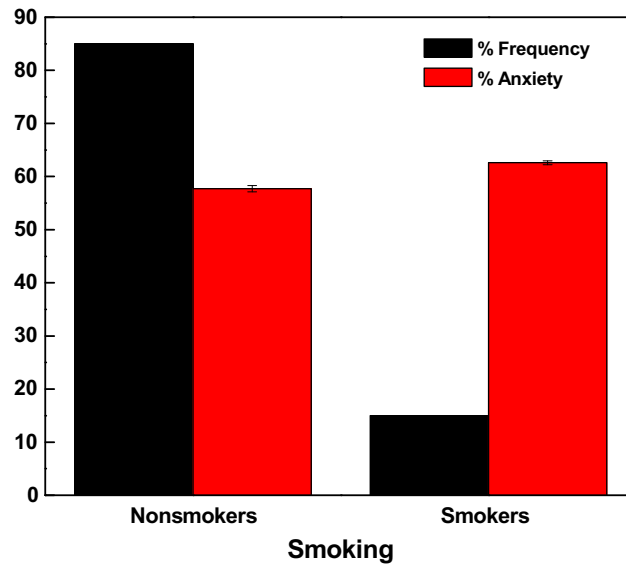


Figure 12. Dental anxiety as a measure of smoking habits of adolescents.

Furthermore, as many as 62% of youngsters used mouthwash and believed it to be an effective procedure in countering oral problems, as indicated by an anxiety score of 58.4%. By contrast, the remaining 38% who did not use mouthwash had a higher anxiety of 62.1% (Figure 9). A strong contributing reason to the frequent use of mouthwash could be the appeal of public advertisements of mouthwash brands. Using a mouthwash is often depicted to be associated with being more popular among peers, which is a developmental need of the adolescent group of 17–20 years [46]. The unpleasant smell coming out of the oral cavity, due to the degradation of organic substances into volatile sulfur rich compounds by anaerobic bacteria present in the oral

cavity, may be called foul odor, bad breath, or halitosis [40–45,47]. As stated above, these bacteria are also associated with gingivitis and periodontitis, and are commonly found in the soft deposits over the dorsum surface of the tongue, referred to as tongue plaque [42]. Psychologists cite that there is a direct relationship between an individual's socioeconomic group, level of education, and anxiousness about a dental procedure or visit [17]. People with a good economic background not only have a greater dental awareness and oral hygiene, but are also inclined to be product and brand conscious, as applicable to the use of mouthwash.

Mouthspray, by contrast, was a relatively less common product to be used by youngsters, about 16% of the

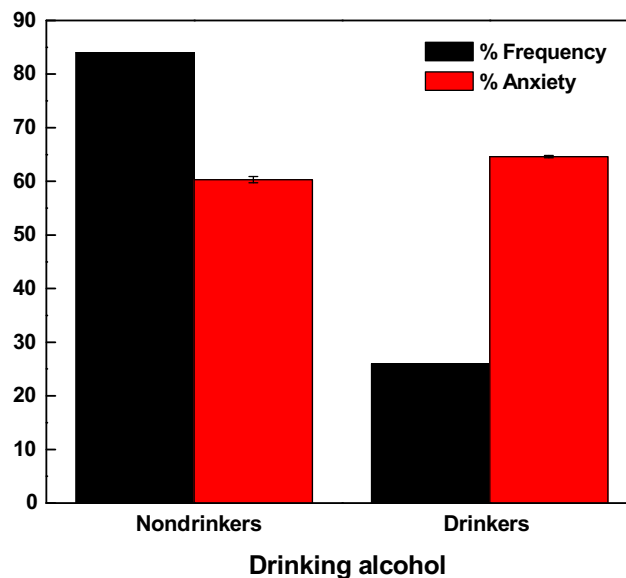


Figure 13. Dental anxiety as a measure of alcohol intake.

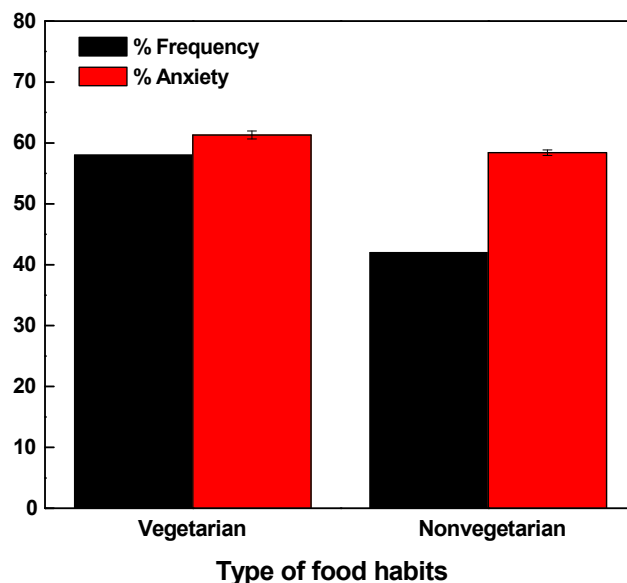


Figure 14. Dental anxiety as a measure of food habits.

time; however, it was perhaps more effective in countering the dental anxiety (56.4%) as it was a mobile product that could be carried and used anywhere, as compared to a mouthwash (Figure 10). Non-mouthspray users, by contrast, were significant in number (83.3%) but had higher dental anxiety (61.6%). Mouthsprays work similarly to mouthwashes, but owing to infrequent use and unpopularity, this cannot be considered an important anxiety parameter. Further, mouthsprays were used by people who had dental awareness and were, therefore, already taking additional oral hygiene measures to improve oral health and related anxiety in a dental situation. The use of sprays and rinses supplements the DeDonno theory of reduced anxiety for better oral health [24].

As several researches have proven in the past [24,38,47–50], we also found dental floss to be the most effective procedure to counter anxiety. Figure 11 shows that although only 21% of the participants used floss, their anxiety was also at a low of 48.4%. This suggests that very few people have a full and accurate awareness about dental care. This is supported by the fact that 79% individuals never used floss and in turn experienced a high anxiety of 61.3%. Dental floss is an important measure to improve oral health [24,38,47–50]. It is a silken thread used to remove soft deposits and food particles along the interdental spaces and clean the proximal surfaces of teeth. Literature suggests that improved oral prophylaxis measures result in lower anxiety for patients during their dental visits [13–20]. Further, according to Newman et al [38], flossing greatly reduces interdental deposition, further improving oral and general physical health. According to DeDonno [24], there is a learned association between anxiety and oral hygiene practices and specific education strategies

can be developed to motivate oral health and reduced anxiety.

In addition to dental cleaning habits, smoking habits were also found to be strongly associated with the degree of anxiety people experienced. A total of 85% of the Indian college population belonged to the nonsmoking category, whereas only 15% were smokers (Figure 12). Their anxiety levels were 57.7% and 62.6%, respectively. The relationship between the use of tobacco and cancers of the head, neck, and the lungs has been established for almost 5 decades. Of the estimated 53,000 cases diagnosed with head and neck cancer each year in the United States, around 85% are attributed to the use of tobacco. Smoking causes mutations in tumor suppressor genes and dominant oncogenes and by impairing the immunological response and the mucociliary clearance in the lungs, it promotes cancer development [51–53].

According to the Oral Health Atlas published by the World Dental Federation, smoking-induced oral cancers showed an incidence of 12.8 and 7.5 for men and women, respectively, for every 100,000 people in 2002 [32].

Intake of alcohol was also assessed and related with anxiety levels among teenagers. Regular drinkers were found to be higher in proportion in comparison to smoking, i.e., 26%, probably because drinking was a more socially prevalent and acceptable habit in the Indian setting. However, anxiety levels also increased at the same time to 64.6% (Figure 13). According to Anxiety and Depression Association of America [54], about 15 million adults in the United States have social anxiety disorder in any given year. These people drink excessively to evade the anxious situation, which is not just a temporary escape mechanism, but also increases

the susceptibility to increased fears and anxiety. Several researchers have reported that there is a strong correlation between drinking alcohol and various types of cancers [55,56]. According to the report on carcinogens by the US Department of Health and Human Services, alcohol has been categorized as a human carcinogen. Research indicates that increased alcohol consumption multiplies the risk of alcohol related onco-diseases. An estimated 19,500 deaths in the United States each year are due to the consumption of alcohol [57]. The latest research indicates there is a much greater risk of developing oral cancer, especially pharynx, larynx, and esophagus, with the use of alcohol and tobacco together than when used alone [58]. Thus, smoking and drinking not only contribute to the fear of an oral disease but invariably contribute to anxiety for an unexpected, unknown onco-disease predisposing the patients to a greater anxiety in any treatment situation. The non-smokers and/or nondrinkers have greater oral, general, physiological, and psychological health, and are more confident and better able to cope with any anxious events during any type of treatment.

Intake of food was also measured as a factor of anxiety prevalent among students. In the Indian population, 42% of participants were vegetarians and 58% were nonvegetarians. Their anxiety scores were 58.4% and 61.3%, respectively, (Figure 14). This small increase from a moderate to high category suggests that the kind of food consumed is also a significant contributing factor to the anxiety people experience. Several researchers have concluded that dental anxiety varies in different social groups and tribes [14], depending on varying food habits and lifestyles. The vegetarian diet is rich in minerals, vitamins, and proteins, with a high fiber content compared to the nonvegetarian diet, which has a high amount of sticky fats. These sticky fats stick to the hard and soft tissues in the oral cavity and promote growth of bacteria and plaque, thereby increasing acid attack, foul odor, and other related oral problems. The vegetarian lifestyle is associated with better oral hygiene and thus reduced fears and anxiety. However, diet alone is not sufficient. A patient with a vegetarian diet but poor oral practices may be more prone to oral problems compared to a nonvegetarian with excellent oral hygiene practices. Several interrelated practices need to be considered to correctly evaluate the dental anxiety among the youth.

#### 4. Discussion

The prototype of a dentist is often an intimidating one, where one imagines sitting in the dentist's chair, receiving a local anesthetic injection, and teeth being drilled. Anxiety feelings associated with visiting a dentist, prevalent among young patients, were determined in this study. This overall treatment experience

was also explored on the basis of regularity, dental hygiene, and personal habits. MDAS served as a highly stringent and reliable tool that was also simple, brief, and easy to understand. Other than its psychometric properties, this instrument was also chosen for its optimum usage in dentistry-based studies, as was also observed in past research.

Descriptive statistical computations were carried out to obtain measures of mean raw scores, mean percentage anxiety, variability scores, and frequency percentages. Data analysis revealed that college-going adolescents experienced moderately high levels of anxiety, about 60.75% of the time, from which a majority of 54% experienced high anxiety estimates of 67.23%, whereas 5% of the sample group was found to lie in the "phobic or extremely anxious" category. Furthermore, this sample group was found to be most fearful of dental procedures, namely, having a tooth drilled, gum injected and a tooth taken out. The neglectful attitude of Indian parents and youngsters towards dental hygiene and care was gathered by the fact that the mean age of the first visit to the dentist among the Indian youth was 12.14 years. A huge majority of youngsters, 95.84%, were irregular visitors to a dental clinic, with a restriction to two consultations/year. Moreover, getting routine check-ups were the least treatment type and cavities were the most commonly occurring problem for which treatment was sought, with anxiety scores of 78.3% and 58.05%, respectively. This suggests that avoidance and evasiveness from seeing a dentist further magnified the feelings of apprehension and worry. Furthermore, on the basis of personal dental habits and product consumption, the sample subgroup using mouthwash and mouthspray, nonalcoholic in nature, and brushing twice a day, experienced the maximum reduction in their anxiety about dental procedures.

Thus, we conclude that in the Indian situation, core problems include deficient health care knowledge, lack of adoption of patient-sensitive pedagogy to train dental professionals, inaccessibility of services, and a dismissive attitude towards medical help. Targeting grass-root efforts such as community outreach programs, medical camps, psycho-education, and wide availability of resources, will probably serve as the best measure to increase informative and hygienic practices among the Indian population. Contributions of this study include bringing to the fore the relevance of closely attending to evasive and anxiety-provoking reactions among the patient population that a dental professional strongly ignored issues of a doctor's training, doctor-patient ratio, doctor-patient-stress, social awareness, cultural practices, and food preferences, suggesting that dental anxiety is a far from simple notion. There are implications in the area of symptomology and diagnosis, patient counselling, treatment techniques, educational and training measures, and social stereotypes.

## Conflicts of interest

All authors declare no conflicts of interest.

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