

Effect of Dental Anxiety on the Dental Caries Status among Patients Visiting a Dental College in Kerala - A Cross Sectional Study

Kollat Parvathy, Joy Aleesha, Mathew Josey, George Liza, R.V Vineet, Paul Sinju

Department of
Conservative Dentistry &
Endodontics
Annoor Dental College &
Hospital, Muvattupuzha,
Kerala

Received : 12-01-2022
Revised : 01-02-2022
Accepted : 22-02-2022

Abstract:

Aim: To determine the dental anxiety level of patients reporting for treatment in a dental college in Kerala and to evaluate the relationship between dental anxiety level and dental caries status of patients.

Materials and methods: Patients visiting the Department of Conservative Dentistry and Endodontics at Annoor Dental College & hospital, Muvattupuzha, in a period of two months who were older than 18 years were selected for the study. All participants were asked to fill out a Modified Dental Anxiety Scale (MDAS) to evaluate their level of dental fear. Gender, age, education level, socioeconomic status and oral health awareness were noted. Dental Caries statuses of patients were determined with DMFT index. Data collected were analyzed and frequencies were calculated. Pearson's correlation test was applied to assess the relationship between dental anxiety level and dental caries status of the patients.

Results: There is significant association between the baseline characteristics of, age, sex, educational level, socioeconomic standards of the participants and their dental anxiety. Relationship between DMFT scores of the patient and anxiety level of the patient was also found to be significant.

Conclusion: Patients with high level of dental anxiety have high caries status. So, elimination of dental fear is very important and should be managed by a patient-centered approach.

Keywords: Dental anxiety, DMFT index, Dental caries.

Address for correspondence:

Dr. Joy Aleesha, Assistant Professor, Dept. of Conservative Dentistry & Endodontics, Annoor Dental College & Hospital, Muvattupuzha, Kerala

E-mail: aleeshajoy.1991@gmail.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial ShareAlike 4.0 license, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Introduction

Dental anxiety is a common predicament encountered by those in the field of dentistry and may cause significant influence upon an individual's dental health status¹.

Dental fear and dental anxiety are different psychological states of patients. The term 'dental anxiety' was introduced by Coriat who defined it as 'an excessive dread of anything being done to the teeth' while 'dental fear' is considered a 'physiological, behavioral and emotional response to a feared stimulus'¹.

Dental fear and dental anxiety are often used interchangeably and pertains to a difficult circumstance frequently encountered by dentists. Lauth defined 'Dental phobia' as 'a special kind of fear, out of proportion to the demands of the situation, which will not respond to reason, is apparently beyond voluntary control and leads to avoidance of dental treatment where this is really necessary' and can be considered a continuum of dental anxiety².

Dental anxiety is a complex, multifactorial obstacle and can be regarded a predominant barrier to dental attendance.² It may cause hinderance to a patient's ability to unbiasedly consider a viable treatment option and may impair the understanding of information provided by the dentist. Apprehension experienced by the patient may lead them to cancel dental visits or avoid treatment entirely. In addition, patients experiencing dental anxiety may be harder to manage during procedure, may be unsatisfied with the treatment due to miscommunication and, due to the improper development of patient-dentist relationship, can result in misdiagnosis leading to escalation of their anxiety. This phenomenon appears to be affected by several variables including age, gender, education level and socioeconomic factors. Dental anxiety may lead to a diminished quality of life and a poor dental status.

Hence this cross-sectional study aims to evaluate relationship of dental anxiety to dental caries status amongst patients visiting a dental college in Kerala.

Aim:

The aim of this study was to determine the dental anxiety level of patients reporting for treatment in a dental college in Kerala and to evaluate the relationship between dental anxiety level and dental caries status of patients.

Materials and methods:

This cross-sectional study was conducted in the Department of Conservative Dentistry and Endodontics of Annoor Dental College & hospital, Muvattupuzha, Kerala. Patients visiting the department in a period of two months who were older than 18 years, with no cognitive impairments and are able to complete the questionnaire independently were included in the study. Participants with a history of mental illness, illiteracy, non-cooperation and have taken anxiolytic, sedative, or

analgesic agents within three days before the survey were excluded.

All participants were asked to fill out a Modified Dental Anxiety Scale (MDAS) to evaluate their level of dental fear. Gender, age, education level, socioeconomic status and oral health awareness are noted. Modified Dental Anxiety Scale developed at St. Andrews University in Scotland is utilized for the evaluation of dental anxiety.³

Dental Caries statuses of patients were determined with DMFT index. Decayed, Missing and Filled Teeth index (DMFT) which was developed by Klein and Palmer is used in measuring prevalence of dental caries⁴.

The examination of each patient was done in a well-lit room while sitting comfortably on a dental chair. The intraoral examination was done under bright natural light with gloved hands and a (Community Periodontal Index of Treatment Needs) CPITN probe. The principal investigator and two trained and pre-calibrated research assistants carried out all the oral examinations. Calibration of examiners were done to minimize the inter-examiner variability. This is done by duplicate examinations of 15 randomly selected participants. The scores of both sets of examinations were compared and reproducibility determined using the kappa statistic which yield a good level of reproducibility between 0.7 - 1.

Statistical analysis:

Data collected were analyzed and frequencies were calculated. Pearson's correlation test was applied to assess the relationship between dental anxiety level and dental caries status of the patients. SPSS version 23 was used for data analysis.

Results:

The sample consisted of 373 patients and the mean age was 53 years with 206 (55.4%) female participants and 166 (44.6%) male participants. Majority of the participants were graduated, with high level of education (189, 50.8%). 175 (47%) patients were school educated and 8 (2.2%) patients had postgraduation. Regarding the socioeconomic level of the participants, 190 (51.1%) were of low level, 178 (47.8%) were of mid-level, and 4 (1.1%) were of high level of socioeconomic background. Table 1 shows the baseline characteristics of the participants.

Table 2 shows the frequency of dental anxiety among participants. 284(76.3%) of patients were not anxious on going for a dental treatment.² (0.5%) Patients were extremely anxious of going for a dental treatment. About 23.2% patients fell between slightly anxious to very anxious group on going for a dental treatment. 211(56.7%) patients were not anxious of tooth drilling and 288(77.4%) of patients were not anxious on going for a scaling. Whereas 66(17.7%) of patients were extremely anxious on administration of local anesthetic injection.

Table 3 shows association of Dental anxiety with baseline characteristics. It was found that there is statistically significant association between the baseline characteristics and the dental anxiety of the patients. Highest anxiety level was found with participants of age group less than 18 years. The anxiety level decreases as the age increases, as the lowest anxiety level was found with participants who are in the age group of more than 60 years. Female patients were more anxious when compared to that of male patients. Regarding the educational status, participants with school education were more anxious towards dental treatment than those with graduation and postgraduation. Regarding the socio-economic status, it was found that the anxiety level decreases as the income increases.

Table 1
Baseline characteristics of the participants

Characteristics	Frequency (%)
Age group (years)	
≥18	26 (7.0)
19-43	197 (53.0)
44-59	114 (30.6)
≥60	35 (9.4)
Gender	
Male	166 (44.6)
Female	206 (55.4)
Education	
School educated	175 (47.0)
Graduate	189 (50.8)
Post graduate	8 (2.2)
Socioeconomic status (₹/month)	
<5,000	0
5,000-10,000	190 (51.1)
10,000-50,000	178 (47.8)
>50,000	4 (1.1)

Table 2 - Frequency of dental anxiety among participants

Questions	Not anxious	Slightly anxious	Fairly anxious	Very anxious	Extremely anxious
If you went to your dentist for treatment tomorrow, how would you feel?	284 (76.3)	64 (17.2)	19 (5.1)	3 (0.8)	2 (0.5)
If you were sitting in the waiting room (waiting for treatment), how would you feel?	274 (73.7)	75 (20.2)	19 (5.1)	2 (0.5)	2 (0.5)
If you were about to have a tooth drilled, how would you feel?	211(56.7)	64 (17.2)	71 (19.1)	17 (4.6)	9 (2.4)
If you were about to have your teeth scaled and polished, how would you feel?	288(77.4)	46(12.4)	33(8.9)	4(1.1)	1 (0.3)
If you were about to have a local anaesthetic injection in your gum, above an upper back tooth, how would you feel?	193(51.9)	42(11.3)	48(12.9)	23(6.2)	66(17.7)

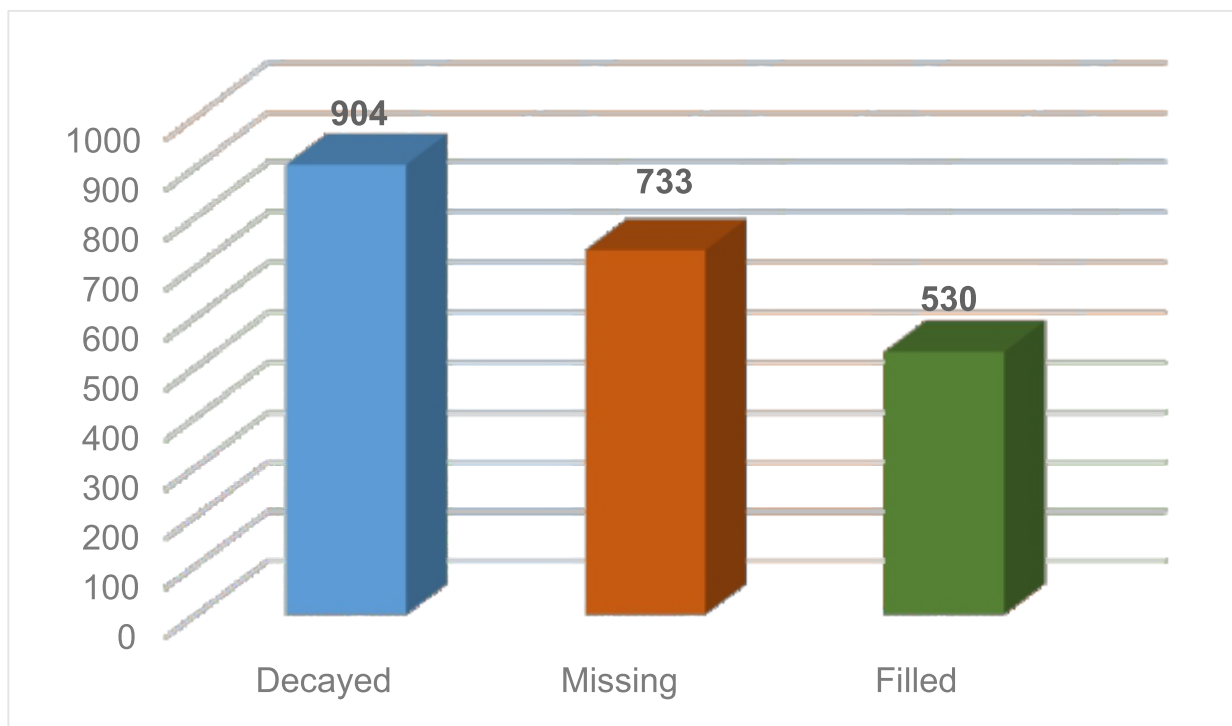


Fig 1: Distribution of decayed, missing and filled teeth among the participants

Table 3 - Association of Dental anxiety with baseline characteristics

Characteristics	Mean±sd	Median (Min-max)	p-value
Age group			
≤18	9.04±4.8	7.50 (5-19)	<0.0001
19-43	8.91±3.8	8.00 (5-19)	
44-59	6.81±2.9	5.00 (5-15)	
≥60	6.63±2.8	5.00 (5-13)	
Gender			
Male	6.80±3.0	5.00 (5-17)	<0.0001
Female	9.07±3.9	9.00 (5-19)	
Education			
School educated	7.14±3.3	5.00 (5-19)	<0.0001
Graduate	8.91±3.8	8.00 (5-19)	
Post graduate	8.00±2.5	9.50 (5-10)	
Socioeconomic statu			
5,000-10,000	7.12±3.4	5.00 (5-18)	<0.0001
10,001-50,000	9.04±3.7	9.00 (5-19)	
>50,000	9.00±2.7	10.00 (5-11)	

Table 4 - Association of DMFT and baseline characteristics			
Characteristics	Mean±sd	Median (Min-Max)	p-value
Age group			
≤18	2.73±1.9	2.00 (0-8)	<0.0001
19-43	4.30±2.8	4.00 (0-16)	
44-59	7.44±4.2	7.00 (1-27)	
≥60	11.40±6.2	11.00 (1-25)	
Gender			
Male	5.83±4.2	5.00 (0-25)	0.7
Female	5.82±4.5	5.00 (0-27)	
Education			
School educated	6.99±4.9	6.00 (0-27)	<0.0001
Graduate	4.85±3.6	4.00 (0-20)	
Post graduate	3.25±1.5	2.50 (2-5)	
Socioeconomic status			
5,000-10,000	7.08±5.0	6.00 (0-27)	<0.0001
10,001-50,000	4.56±3.2	4.00 (0-16)	
>50,000	2.00±0.8	2.00 (1-3)	

Table 5 - Descriptive statistics of Dental anxiety and DMFT index and their correlation				
	Mean±Sd	Median (Min-Max)	Spearman’s Rho	p-value
Dental Anxiety	8.06± 3.7	6.00 (5-19)	-0.249	<0.0001
DMFT	5.82±4.4	5.00 (0-27)		

Table 4 shows association of DMFT and baseline characteristics. There was a statistically significant association between the age groups and educational & socioeconomic background of the patients with the DMFT scores of the patients. There was no statistically significant relationship between the gender and DMFT scores of patients. Figure 1 shows the Distribution of decayed, missing and filled teeth among the participants.

Table 5 shows descriptive statistics of Dental anxiety and DMFT index and their correlation. There was a significant correlation in the distribution of DMFT scores and dental anxiety.

Discussion:

Anxiety is a natural human emotion encountered in various situations. Dental anxiety is patient’s psychological condition and reaction to the dental environment. Despite of the technological advances in modern dentistry, anxiety associated with dental practice and fear of pain related to dentistry remain common³. Anxiety towards dental treatment and fear of pain is one of the major reasons for avoidance of dental care which will result in deterioration of personal oral health⁴. Schuller et al., reported that patients who had

high fear to visit the dentist have more decayed and more missing teeth³. Since it is within the capacity of the dentist to reduce the environmental and practitioner related factors, this study aimed to assess the level of anxiety in relation to the educational & socioeconomic background of the patients and also to evaluate the association of dental anxiety with DMFT index of the patients so that the oral health status of the individual can be correlated to anxiety level of the patients.

In this study MDAS was used to evaluate the level of dental anxiety, because it is a simple, valid, and also a good predictor of patients' distress in the dental operatory⁵. Findings of the present study indicate that the patients have low levels of anxiety with dental check-ups whereas there was a high prevalence of dental anxiety among the participants towards local anaesthesia and tooth drilling. This is similar to that of the results reported in previous studies^{6,7,8}. Findings indicate that invasive stimuli like drilling of a tooth tend to be most anxiety-provoking. This may be explained by the fact that invasive procedures are often associated with pain which has a vicious relation with anxiety.

Dental anxiety is typically related to demographic variables such as age, sex, and education⁶; In this study, the association between age, sex, education level and socioeconomic status of the participants and the level of anxiety were statistically significant.

According to the results found in the current study, it was found that younger individuals are more anxious towards dental treatment than that of older individuals. Although findings from some studies showed that the relationship between age and dental anxiety are conflicting, younger individuals have commonly been shown to be more anxious than older individuals². Many studies have shown dental anxiety is more prevalent among younger individuals, but other studies have indicated that younger individuals have less dental anxiety than older individuals⁹. There was a significant reverse association of age and anxiety: anxiety decreases with advancing age. Also, the high anxiety level in young patients could be due to insufficient experience of dental treatment equipment, such as the needle, hand piece, or any other fear invoking equipment¹⁰. Thus, younger adults have prejudices about dental procedures as they are more affected by environmental factors such as bad treatment experiences of other people.

Another generally reported variable associated with dental anxiety is gender of the patients. According to the findings in the literature, dental anxiety is more common

in females¹¹⁻¹⁵. Similar results were obtained in our study also. Most authors believe anxiety is more common in females because women tend to easily express their feelings of fear^{14,15,16}.

Differences in educational level and the socio-economic status will affect the level of dental anxiety between the groups. Many studies have reported that people with lower socioeconomic status and with less education have more anxiety; however, other studies have reported more dental anxiety in those with higher education levels^{6,16}. The findings of the current study show that there was an association between dental anxiety and different levels of education. In the present study, patients with only school education had the lowest anxiety scores and were therefore less anxious about dental treatment compared with those with postgraduate education. Also, participants from high socio-economic background were more anxious than those from a lower socio-economic background. Results of the current study on dental anxiety in terms of the educational and socio-economic status of the participants is contrary to the results of some previous studies reported^{15,16}. Differences in the prevalence of anxiety between the current study and others may be attributed to the different research methodologies used, type of study setting, and the characteristics of study population. Some previous studies have indicated that education level is a factor affecting the dental anxiety level of patients^{15,16}. Possible reasons might be that subjects with a higher level of education and socio-economic status are more aware of dental treatment procedures and the importance of dental care. DMFT is a predictable indicator of oral health status of an individual. According to the results of the present study, there was a statistically significant difference between the age groups and educational & socioeconomic background of the patients with the DMFT scores of the patients and no difference between the gender and DMFT scores of patients were found.

According to the results of this study, it was found that there is a statistically significant difference in the distribution of DMFT scores between the age groups. In the present study, we found that DMFT values were higher among younger individuals. This is a matter of concern as this shows decrease in oral health practices among young individuals. Results of this study shows that educational and socioeconomic status of an individual is related to their oral health status. Patients from lower educational and socioeconomic status had high DMFT scores. This current finding is consistent

with evidence that people from lower socioeconomic backgrounds have poorer dental health^{15,16}. Hence more oral hygiene awareness programs have to be implemented in individuals from lower educational and socio-economic background. So that the dental hygiene status of the general population can be improved.

There was statistically significant correlation between the dental anxiety and the oral health status of the individual. This is similar to that of the results of the previous studies reported¹⁴⁻¹⁶. It was reported that serious dental anxiety with avoidance of dental treatment procedures has a detrimental effect on dental health¹⁶. Generally, dental anxiety is related to poor oral health. Individuals who have high levels of dental anxiety have poor oral function and a higher frequency of oral diseases. There are longer intervals between dental visits for these persons¹⁰. Schuller et al., reported that patients who had high fear to visit the dentist less often and these individuals have more decayed and more missing teeth¹⁶.

Findings of the current study revealed that individuals from lower educational and socio-economic status have high DMFT scores, which indicates the poor oral health practice among those individuals from lower educational and socio-economic background. Hence, oral health awareness programs have to be implemented focussing this population in future so that the general health and well-being of the individuals can be improved.

This study showed that dental anxiety affects oral health status, which has adverse effects on the oral health status of the affected individuals. As many patients have fear regarding their dental health and treatment needs, such actions may lead to treatment delay and avoidance towards oral health care and health of the individual in general. Hence, assessment of anxiety levels and treatment needs may be very helpful for the provision of good-quality dental care, better management, and psychological uplifting of an individual.

Conclusion:

Dental fear is a widespread problem for both the dentists and the patients, which can have a significant impact on the individual's oral health. So, there is a high need for the dentists to understand what patients feel about dental treatment procedures and this may aid dentist to improve patient care. Elimination of dental fear is very important and should be treated according to a patient-centred assessment. In this study, dental anxiety levels were related to many other variables including age,

gender, education level and socioeconomic status of patients. Patients should be informed about dental treatment procedures, so their anxiety can be eliminated. Patients with a high level of dental anxiety can be given psychiatric support so they can be comfortable with the treatment procedure. The results of the present study revealed an unwelcome trend that the dental anxiety and the DMFT values were higher among younger individuals. This calls for more dental health awareness programs which cater to the younger population so that the dental anxiety can be brought down and the oral hygiene practices can also be improved along with the advocacy of timely dental treatment.

Further studies should be carried out using large random samples before generalizing this conclusion.

Ethics statement:

The study was approved by institutional review board and informed consent was obtained prior to the study.

Financial support and sponsorship: Nil

Conflicts of interest: None declared

References:

1. Yildirim TT. Evaluating the relationship of dental fear with dental health status and awareness. *J Clin Diagn Res.* 2016;10:105-9.
2. 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.
3. Ali Amir, Shivalingesh Kamate, Puneet Gupta, Anushka Gupta, Jyotsana Singh, Shivani Singh. Assessment of Dental Anxiety Using MDAS (Modified Dental Anxiety Scale) among Students in Bareilly City - A Cross Sectional Study. *International Journal of Contemporary Medical Research* 2018;5:4-6.
4. Katge F, Rusawat B, Shitoot A, Poojari M, Pammi T, Patil D. DMFT index assessment, plaque pH, and microbiological analysis in children with special health care needs, India. *J Int Soc Prev Community Dent.* 2015;5:383-8.
5. Ganesh R, Goswami C, Munshi R. Comparison of dental anxiety among patients visiting a dental

- college and private dental clinics in Thiruvallur district, India. *SRM J Res Dent Sci* 2014;5:14-20.
6. Kauther Musalam, Karpal S. Sohal, Sira S. Owibingire, Baraka Kileo. Magnitude and Determinants of Dental Anxiety among Adult Patients Attending Public Dental Clinics in Dar-Es-Salaam, Tanzania. *International Journal of Dentistry*. 2021;10:7.
 7. Peter Milgrom, J. T. Newton, Carole Boyle, Lisa J. Heaton, Nora Donaldson. The Effects Of Dental Anxiety And Irregular Attendance On Referral For Dental Treatment Under Sedation Within The National Health Service In Londo Community Dent Oral Epidemiol. 2010;38: 453–459.
 8. Marie L. Caltabiano¹, Felicity Croker, Lauren Page, Anton Sklavos, Jade Spiteri, Louise Hanrahan, Richard Cho. Dental anxiety in patients attending a student dental clinic. 2018;2-8.
 9. Mwimanzi P, Kahabuka FK. Dental fear and associated factors among adults in Dar es Salaam, Tanzania. *Tanzania Dental Journal*. 2007;14:34-9.
 10. Bashiru BO, Omotola OE. Prevalence and determinants of dental anxiety among adult population in Benin City, Nigeria. *Eur J Gen Dent* 2016;5:99-103..
 11. Alhamed SA, Halawani RT, Ahmed HA, Alzaher ZH, AlDebaiban RO. Dental anxiety among adult patients attending public dental clinics in jeddah, Saudi arabia. *Current Science International*. 2019;8:363-7.
 12. Abrahamsson KH, Berggren U, Hallberg LR, Carlsson SG. Ambivalence in coping with dental fear and avoidance: a qualitative study. *J Health Psychol*. 2002;7:653-64
 13. Schuller AA, Willumsen T, Holst D. Are there differences in oral health and oral health behavior between individuals with high and low dental fear? *Community Dent Oral Epidemiol*. 2003;31:116-21.
 14. Muglali M, Komerik N. Factors related to patients' anxiety before and after oral surgery. *J Oral Maxillofac Surg*. 2008;66:870-77.
 15. Ekanayake L, Dharmawardena D. Dental anxiety in patients seeking care at the university dental hospital in Sri Lanka. *Community Dent Health*. 2003;20:112- 16.
 16. Teo CS, Foong W, Lui HH, Vignehsa H, Elliott J, Milgrom P. Prevalence of dental fear in young adult Singaporeans. *Int Dent J*. 1990;40:37-42.

How to cite this article:

Parvathy K, Aleesha J, Josey M, Liza G, Vineet R V, Sinju P. Effect of dental anxiety on the dental caries status among patients visiting a dental college in Kerala - A cross sectional study. *J Oral Biomed Sci* 2022;1:11-8.