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RESEARCH ARTICLE
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PREVALENCE OF DENTAL ANXIETY AND ASSOCIATED FACTORS IN PATIENTS ATTENDING A TERTIARY CARE DENTAL HOSPITAL

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ABSTRACT

Introduction: Dental anxiety represents a significant barrier to oral healthcare utilization, leading to treatment avoidance and deteriorating oral health. Despite its clinical importance, limited research has examined dental anxiety prevalence and associated factors in tertiary care dental hospitals in Maharashtra. This study assessed the prevalence of dental anxiety and identified sociodemographic and clinical correlates among patients attending a tertiary care facility.

Methods: A hospital-based cross-sectional study was conducted from October 2017 to March 2018 at N. K. P. Salve Institute of Medical Sciences & Research Centre and Lata Mangeshkar Hospital, Nagpur, Maharashtra. Using consecutive sampling, 468 adult patients were recruited. Data were collected through structured questionnaires incorporating sociodemographic information, clinical characteristics, and the Modified Dental Anxiety Scale (MDAS). Statistical analysis included descriptive statistics, chi-square tests, independent t-tests, ANOVA, and logistic regression using SPSS version 20.0.

Results: The overall prevalence of dental anxiety was 60.3% (95% CI: 55.8-64.7%), with 18.4% experiencing high anxiety. The mean MDAS score was 13.42 ± 5.68. Females demonstrated significantly higher anxiety than males ($p<0.001$). Dental anxiety decreased with advancing age and increasing education levels. Past negative dental experiences were strongly associated with elevated anxiety ($p<0.001$). Local anesthetic injections (mean score 3.42) and tooth drilling (2.96) emerged as the most anxiety-provoking procedures. Significant associations were found between dental anxiety and monthly income, previous dental visits, reason for visit, and self-perceived oral health status.

Conclusion: High prevalence of dental anxiety among tertiary care patients necessitates systematic screening protocols and targeted interventions, particularly for younger females with limited dental experience and lower socioeconomic status.

Keywords: Dental anxiety, Modified Dental Anxiety Scale, tertiary care hospital, prevalence study, sociodemographic factors

INTRODUCTION

Dental anxiety represents a significant public health concern that continues to persist despite remarkable advances in modern dentistry and the development of less invasive treatment modalities. This psychological phenomenon is characterized by feelings of apprehension, worry, or fear specifically related to dental treatment situations, ranging from mild uneasiness to severe phobia

that can substantially impair an individual's ability to seek necessary oral healthcare (Armfield & Heaton, 2013). The implications of dental anxiety extend beyond mere emotional discomfort, creating a complex web of consequences that affect both individual oral health outcomes and broader healthcare delivery systems.

The global prevalence of dental anxiety varies considerably across different populations and geographical regions, with reported rates ranging from approximately 4% to 20% for severe dental anxiety, while milder forms affect substantially larger proportions of populations (Locker, Shapiro, & Liddell, 1996). Research conducted in various countries has demonstrated that dental anxiety is not merely a transient emotional state but a persistent condition that significantly influences dental care-seeking behaviors. In a comprehensive epidemiological study, Berggren and Meynert (1984) found that approximately 10% of the general population experiences such intense dental anxiety that they avoid dental care altogether, leading to deteriorating oral health and increased treatment needs when they eventually seek care. This avoidance behavior creates a cyclical pattern where delayed treatment results in more complex dental problems, which in turn reinforces existing anxieties about dental procedures.

The Indian context presents unique challenges in understanding and addressing dental anxiety. Several studies conducted across different regions of India have revealed notably high prevalence rates of dental anxiety compared to Western populations. Acharya (2008) conducted a landmark study among patients attending a university dental clinic in South India, finding that approximately 42% of participants exhibited moderate to high levels of dental anxiety. This finding was corroborated by subsequent research in various Indian states, with Malvania and Ajithkrishnan (2011) reporting that 46% of patients attending a dental institution in Gujarat experienced dental anxiety. The consistently elevated prevalence rates observed across diverse Indian populations suggest that cultural, socioeconomic, and healthcare accessibility factors may play crucial roles in shaping anxiety responses to dental treatment.

The factors associated with dental anxiety are multifaceted and interconnected, encompassing demographic characteristics, previous dental experiences, socioeconomic status, and individual psychological predispositions. Gender differences in dental anxiety have been consistently documented across multiple studies, with females typically demonstrating higher anxiety levels than males (Locker & Liddell, 1991). This gender disparity appears to persist across different age groups and cultural contexts, suggesting both biological and sociocultural influences on anxiety expression. Age represents another significant demographic variable, though its relationship with dental anxiety demonstrates more complex patterns. While some research indicates that dental anxiety decreases with advancing age, possibly due to increased dental treatment experience and improved coping mechanisms (Humphris, Morrison, & Lindsay, 1995), other studies have found that younger adults experience particularly high anxiety levels, potentially related to limited exposure to dental environments and greater susceptibility to anxiety-provoking stimuli.

Educational attainment and socioeconomic status have emerged as important correlates of dental anxiety in multiple investigations. Individuals with lower educational levels and those from disadvantaged socioeconomic backgrounds frequently report higher dental anxiety scores (Doerr, Lang, Nyquist, & Ronis, 1998). This association may reflect limited health literacy, reduced access to preventive dental care, and increased likelihood of painful dental experiences resulting from delayed treatment seeking. The relationship between previous negative dental experiences and current anxiety levels has been extensively documented, with traumatic dental encounters, particularly during childhood, serving as powerful predictors of adult dental anxiety (Locker, Liddell, Dempster, & Shapiro, 1999).

In the Indian healthcare context, where a significant proportion of the population relies on public sector tertiary care facilities for specialized dental treatment, understanding the prevalence and determinants of dental anxiety becomes particularly crucial. Tertiary care dental hospitals serve as referral centers receiving patients with complex dental conditions, often after unsuccessful treatment attempts at primary care facilities. Patients attending these institutions may present with elevated anxiety levels due to the severity of their dental problems, previous treatment failures, and

apprehensions about unfamiliar hospital environments. Despite the critical importance of identifying and addressing dental anxiety in these settings, limited research has been conducted to systematically assess anxiety prevalence and associated factors among patients attending tertiary care dental hospitals in Maharashtra.

The Modified Dental Anxiety Scale has emerged as the most widely used instrument for assessing dental anxiety in both research and clinical settings. Originally developed by Humphris, Morrison, and Lindsay (1995), the MDAS represents a refinement of the earlier Corah Dental Anxiety Scale, with the addition of a specific question addressing anxiety related to local anesthetic injections. The scale demonstrates excellent psychometric properties, including high internal consistency (Cronbach's alpha of 0.91) and strong test-retest reliability (Newton & Edwards, 2005). Its brevity, consisting of only five questions, makes it particularly suitable for use in busy clinical settings while maintaining robust validity and reliability. The MDAS has been successfully translated and validated in numerous languages and cultural contexts, including Indian populations, confirming its cross-cultural applicability (Acharya, 2008).

Understanding the prevalence of dental anxiety and its associated factors in the local population is essential for developing targeted interventions, improving patient management strategies, and enhancing the overall quality of dental care delivery. This knowledge enables dental practitioners to identify high-risk patients, implement appropriate anxiety reduction techniques, and create more supportive treatment environments. Furthermore, epidemiological data on dental anxiety patterns can inform healthcare policy decisions regarding resource allocation, professional training priorities, and the development of specialized anxiety management services within tertiary care facilities.

The aim of this study was to assess the prevalence of dental anxiety and identify associated sociodemographic and clinical factors among patients attending the Department of Dentistry at N. K. P. Salve Institute of Medical Sciences & Research Centre and Lata Mangeshkar Hospital, Nagpur, Maharashtra.

METHODOLOGY

Study Design

A hospital-based cross-sectional study design.

Study Site

The study was conducted at the Department of Dentistry, N. K. P. Salve Institute of Medical Sciences & Research Centre and Lata Mangeshkar Hospital, Nagpur, Maharashtra. This tertiary care teaching hospital serves as a major referral center for the Vidarbha region of Maharashtra, providing comprehensive dental care services to a diverse patient population from both urban and rural areas.

Study Duration

The study was conducted over a period of six months, extending from October 2017 to March 2018.

Sampling and Sample Size

A consecutive sampling technique was employed, whereby all eligible patients attending the dental outpatient department during the study period were invited to participate in the research. This non-probability sampling method was selected to ensure efficient recruitment while minimizing selection bias, as every eligible patient who visited the department during the specified timeframe was considered for inclusion. The sample size was calculated using the formula for estimating a single population proportion: $n = (Z^2pq)/d^2$, where Z represents the standard normal variate (1.96 for 95% confidence level), p denotes the expected prevalence of dental anxiety (taken as 46% based on a previous study by Malvania and Ajithkrishnan, 2011), q equals 1-p (0.54), and d represents the allowable error (5%). Based on this calculation, the minimum required sample size was 382 participants. To account for potential incomplete responses and non-participation, the final target sample size was increased to 450 participants. A total of 468 patients were successfully recruited during the study period, exceeding the predetermined sample size requirement and thereby strengthening the statistical power of the study.

Inclusion and Exclusion Criteria

The inclusion criteria for the study comprised adult patients aged 18 years and above who attended the dental outpatient department for any type of dental treatment, possessed the ability to read and comprehend either English or the local language (Marathi or Hindi), and provided informed consent to participate in the study. Both male and female patients were included to examine potential gender-related differences in dental anxiety prevalence. Patients presenting for their first visit as well as those with previous dental treatment history at the facility were eligible for participation, enabling the assessment of anxiety across different levels of dental care experience. The exclusion criteria eliminated individuals who were unable to provide informed consent due to cognitive impairment or severe mental illness, patients who had been diagnosed with generalized anxiety disorders or were currently receiving psychiatric treatment for anxiety-related conditions (as these individuals' anxiety might not be specifically related to dental situations), completely edentulous patients (as their anxiety profiles might differ significantly from dentate individuals), patients who declined participation, and those who provided incomplete questionnaire responses that precluded meaningful data analysis.

Data Collection Tools and Techniques

Data were collected using a structured, self-administered questionnaire that comprised three main sections. The first section gathered comprehensive sociodemographic information including age, gender, educational qualification (categorized as primary education, secondary education, higher secondary, graduate, and postgraduate), occupation (employed, unemployed, student, homemaker), monthly family income, residential area (urban or rural), and marital status. The second section collected relevant clinical information encompassing the reason for the current dental visit, previous dental treatment history, time elapsed since the last dental visit, previous traumatic or painful dental experiences, frequency of dental visits, and self-perceived oral health status. The third section employed the Modified Dental Anxiety Scale to assess dental anxiety levels. The MDAS consisted of five questions addressing anxiety in different dental situations: dental visit scheduled for the next day, sitting in the waiting room, undergoing tooth drilling, receiving scaling and polishing, and receiving a local anesthetic injection in the upper back gum. Each question was scored on a five-point Likert scale ranging from 1 (not anxious) to 5 (extremely anxious), yielding a total score range of 5 to 25. Patients with MDAS scores of 19 or above were classified as having high dental anxiety, scores between 12 and 18 indicated moderate anxiety, and scores below 12 suggested low anxiety, based on previously established cut-off points (Humphris, Freeman, Campbell, Tuutti, & D'Souza, 2000). Prior to the main study, the questionnaire was pilot tested on 30 patients to assess clarity, comprehensibility, and time required for completion. Based on pilot study feedback, minor modifications were made to improve question clarity. The data collection process involved approaching eligible patients in the waiting area, explaining the study purpose and procedures, obtaining written informed consent, and providing the questionnaire for self-completion in a private corner of the waiting area to ensure confidentiality. Research assistants remained available to clarify doubts and assist participants who required help with reading or understanding questions, while ensuring that responses reflected the participants' genuine feelings rather than socially desirable answers.

Data Management and Statistical Analysis

All completed questionnaires were checked for completeness and accuracy on the same day of collection. Data were entered into a Microsoft Excel spreadsheet by trained data entry operators, with double entry performed for 10% of questionnaires to check data entry accuracy. The data were subsequently imported into Statistical Package for the Social Sciences (SPSS) version 20.0 for analysis. Descriptive statistics were computed for all variables, with continuous variables presented as mean and standard deviation, and categorical variables expressed as frequencies and percentages. The prevalence of dental anxiety was calculated as the proportion of participants with MDAS scores of 12 or above, with 95% confidence intervals. Bivariate analysis was performed to examine

associations between dental anxiety and various sociodemographic and clinical factors using appropriate statistical tests. The chi-square test was employed for categorical variables, while independent t-tests were used for comparing mean anxiety scores between two groups. One-way analysis of variance (ANOVA) was applied when comparing means across three or more groups, followed by post-hoc tests when significant differences were detected. Pearson's correlation coefficient was calculated to assess relationships between continuous variables and MDAS scores. Multivariable logistic regression analysis was conducted to identify independent predictors of high dental anxiety while controlling for potential confounding variables. Variables demonstrating significant associations ($p<0.05$) in bivariate analysis were included in the regression model. Odds ratios with 95% confidence intervals were calculated to quantify the strength of associations. The level of statistical significance was set at $p<0.05$ for all analyses. Model fit was assessed using the Hosmer-Lemeshow goodness-of-fit test, and multicollinearity was checked using variance inflation factors.

Ethical Considerations

The study protocol received approval from the Institutional Ethics Committee of N. K. P. Salve Institute of Medical Sciences & Research Centre prior to the commencement of data collection. The research was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and adhered to the Indian Council of Medical Research ethical guidelines for biomedical research involving human participants.

RESULTS

TABLE 1: Sociodemographic Characteristics of Study Participants (N=468)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	198	42.3
	Female	270	57.7
Age Group (years)	18-25	142	30.3
	26-35	156	33.3
	36-45	98	20.9
	46-55	52	11.1
	>55	20	4.3
Education	Primary	68	14.5
	Secondary	112	23.9
	Higher Secondary	138	29.5
	Graduate	110	23.5
	Postgraduate	40	8.5
Occupation	Employed	186	39.7
	Unemployed	92	19.7
	Student	124	26.5
	Homemaker	66	14.1
Monthly Income	<10,000 INR	158	33.8
	10,001-20,000 INR	176	37.6
	>20,000 INR	134	28.6
Residence	Urban	298	63.7
	Rural	170	36.3
Marital Status	Married	264	56.4
	Unmarried	204	43.6

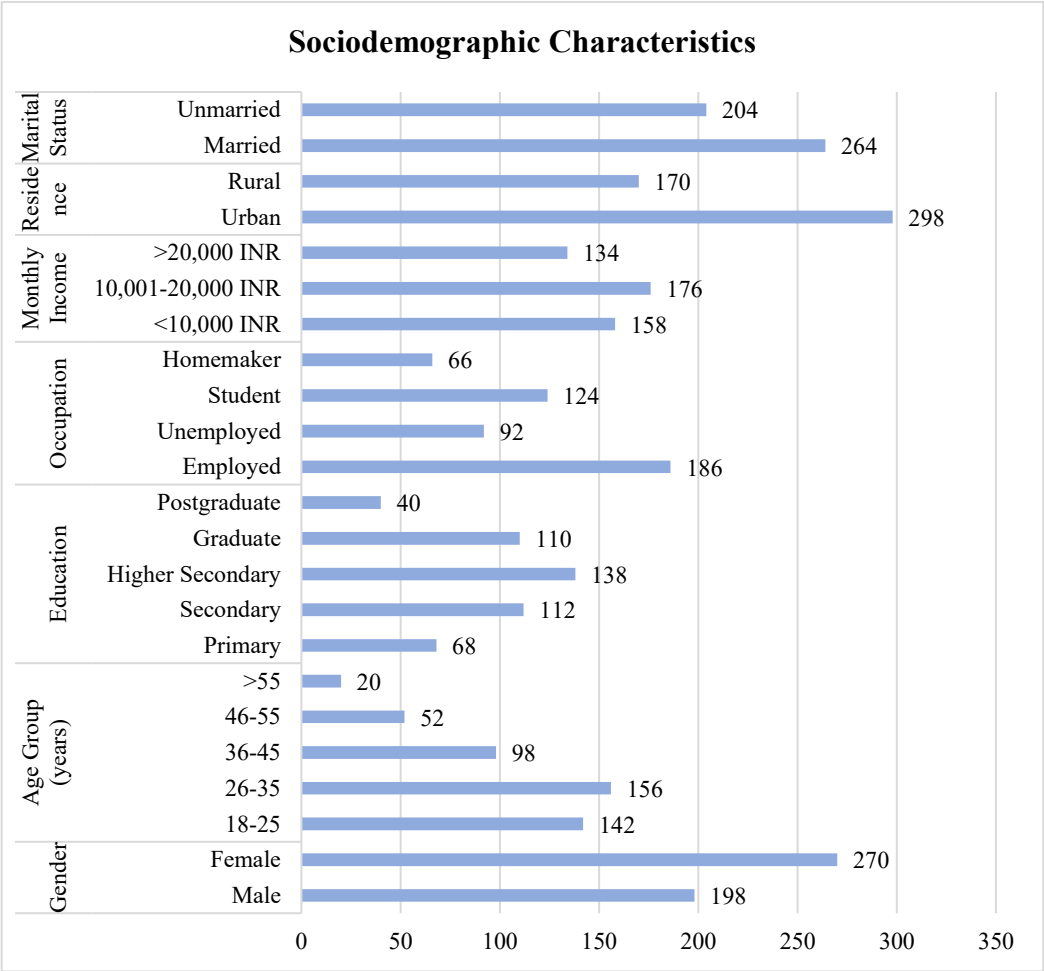

Fig: 1

TABLE 2: Prevalence of Dental Anxiety Based on Modified Dental Anxiety Scale Scores (N=468)

Anxiety Level	MDAS Score Range	Frequency (n)	Percentage (%)	95% CI
Low Anxiety	5-11	186	39.7	35.3-44.2
Moderate Anxiety	12-18	196	41.9	37.4-46.4
High Anxiety	≥19	86	18.4	14.9-22.2
Total		**468**	**100.0**	
Overall Dental Anxiety (≥12)		**282**	**60.3**	**55.8-64.7**

Mean MDAS Score: 13.42 ± 5.68 (Range: 5-25)

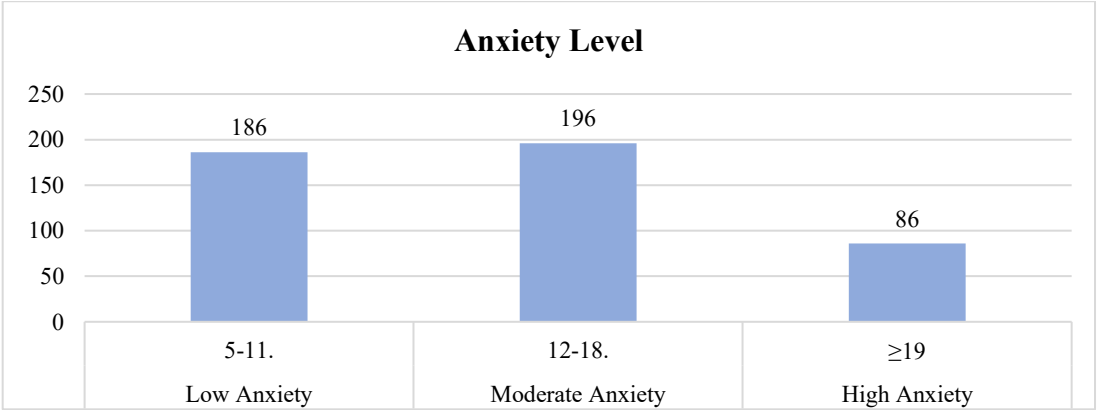

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TABLE 3: Association Between Sociodemographic Factors and Dental Anxiety (N=468)

Variable	Category	Low Anxiety n(%)	Moderate Anxiety n(%)	High Anxiety n(%)	χ^2	p-value
Gender	Male	96 (48.5)	78 (39.4)	24 (12.1)	16.82	<0.001*
	Female	90 (33.3)	118 (43.7)	62 (23.0)		
Age Group	18-25	42 (29.6)	62 (43.7)	38 (26.8)	28.46	0.001*
	26-35	58 (37.2)	68 (43.6)	30 (19.2)		
	36-45	44 (44.9)	38 (38.8)	16 (16.3)		
	46-55	28 (53.8)	22 (42.3)	2 (3.8)		
	>55	14 (70.0)	6 (30.0)	0 (0.0)		
Education	Primary	18 (26.5)	28 (41.2)	22 (32.4)	24.68	0.002*
	Secondary	38 (33.9)	50 (44.6)	24 (21.4)		
	Higher Secondary	54 (39.1)	60 (43.5)	24 (17.4)		
	Graduate	52 (47.3)	44 (40.0)	14 (12.7)		
	Postgraduate	24 (60.0)	14 (35.0)	2 (5.0)		
Income	<10,000	46 (29.1)	68 (43.0)	44 (27.8)	22.36	<0.001*
	10,001-20,000	68 (38.6)	78 (44.3)	30 (17.0)		
	>20,000	72 (53.7)	50 (37.3)	12 (9.0)		

*Statistically significant at p<0.05

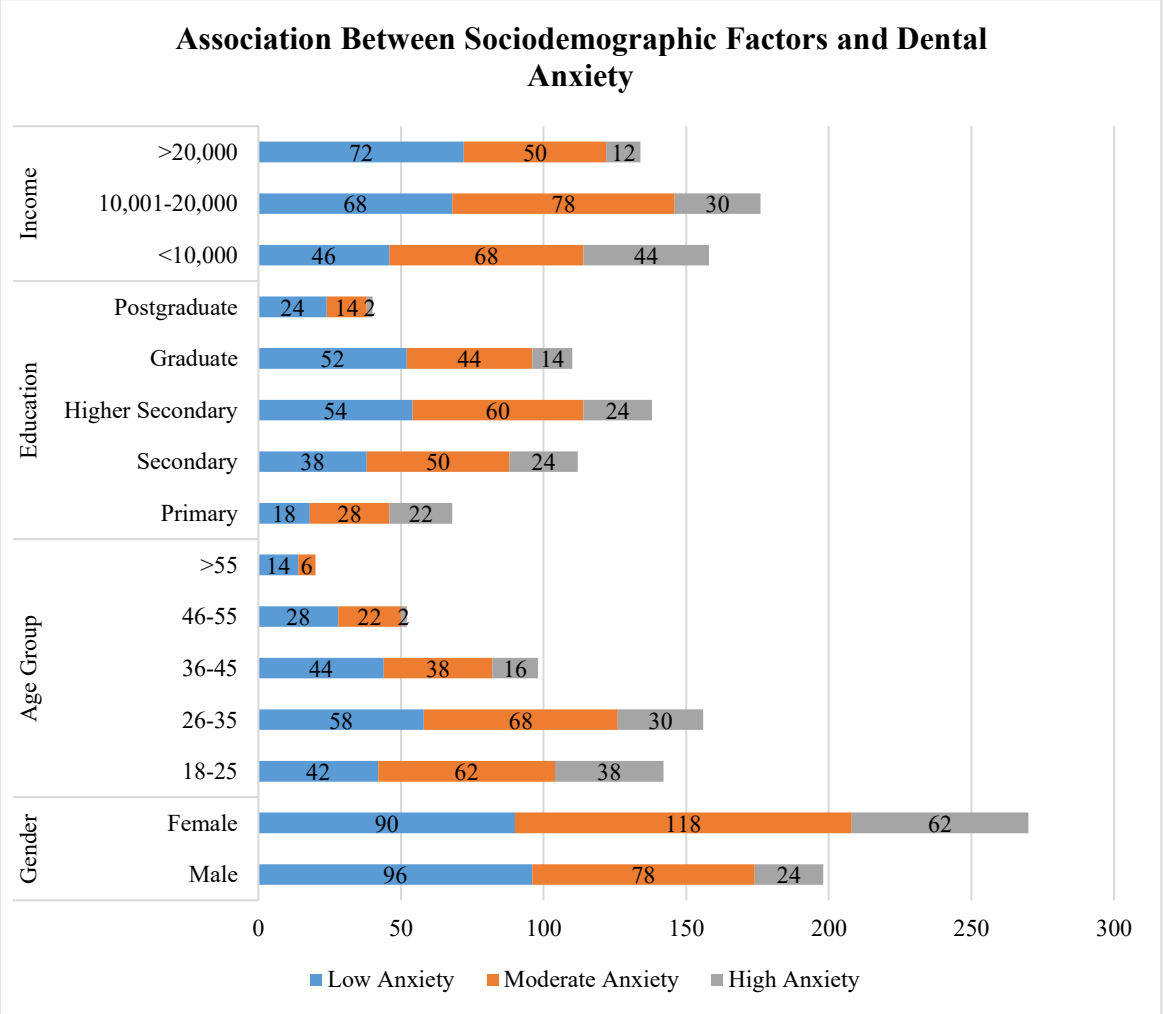

Fig: 3

TABLE 4: Association Between Clinical Factors and Dental Anxiety (N=468)

Variable	Category	Low Anxiety n(%)	Moderate Anxiety n(%)	High Anxiety n(%)	χ^2	p-value
Previous Dental Visit	Yes	148 (43.9)	142 (42.1)	47 (14.0)	18.42	<0.001*
	No	38 (29.0)	54 (41.2)	39 (29.8)		
Last Dental Visit	<6 months	82 (51.9)	62 (39.2)	14 (8.9)	32.56	<0.001*
	6-12 months	54 (42.2)	56 (43.8)	18 (14.1)		
	1-2 years	32 (34.4)	42 (45.2)	19 (20.4)		
	>2 years	18 (22.0)	36 (43.9)	28 (34.1)		
Past Negative Experience	Yes	36 (19.7)	76 (41.5)	71 (38.8)	96.84	<0.001*
	No	150 (52.6)	120 (42.1)	15 (5.3)		
Reason for Visit	Routine checkup	94 (58.4)	58 (36.0)	9 (5.6)	68.24	<0.001*
	Pain/Emergency	48 (26.1)	82 (44.6)	54 (29.3)		
	Treatment continuation	44 (35.8)	56 (45.5)	23 (18.7)		
Self-Perceived Oral Health	Excellent/Good	102 (56.4)	64 (35.4)	15 (8.3)	54.38	<0.001*
	Fair	64 (36.6)	82 (46.9)	29 (16.6)		
	Poor	20 (17.7)	50 (44.2)	43 (38.1)		

*Statistically significant at p<0.05

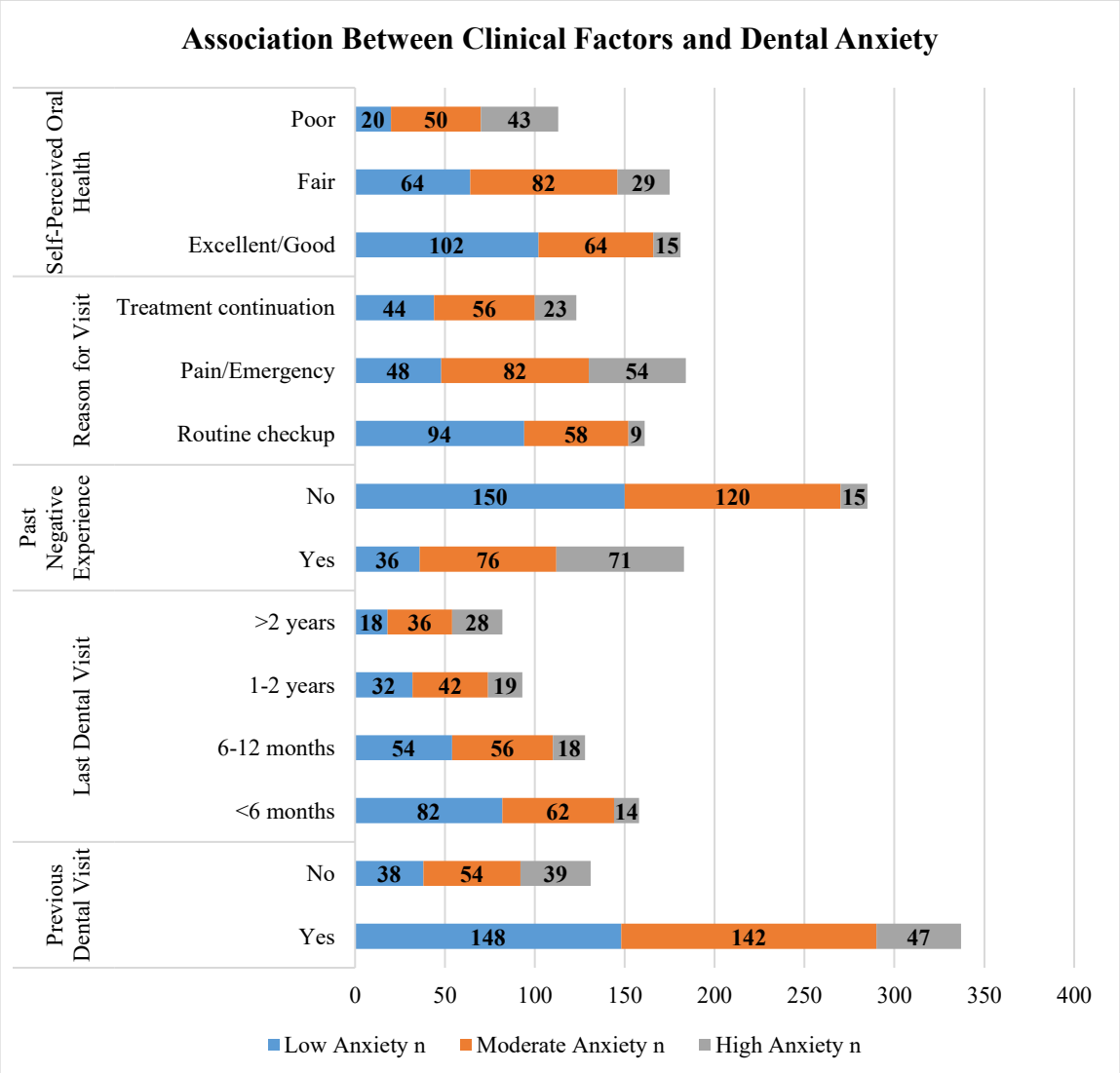

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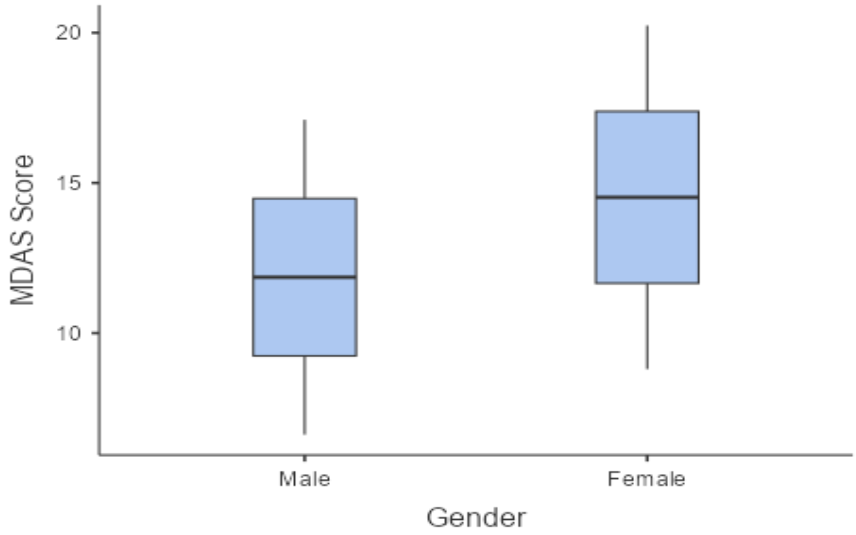
TABLE 5: Mean MDAS Scores Across Different Variables (N=468)

Variable	Category	Mean MDAS Score ± SD	t/F value	p-value
Gender	Male	11.86 ± 5.24	4.82	<0.001*
	Female	14.52 ± 5.72		
Age Group	18-25	15.24 ± 6.12	8.46	<0.001*
	26-35	13.68 ± 5.38		
	36-45	12.42 ± 5.16		
	46-55	10.38 ± 4.52		
	>55	8.95 ± 3.86		
Education	Primary	15.82 ± 6.34	6.72	<0.001*
	Secondary	14.28 ± 5.86		
	Higher Secondary	13.12 ± 5.42		
	Graduate	11.94 ± 4.98		
	Postgraduate	10.15 ± 4.26		
Previous Dental Visit	Yes	12.64 ± 5.32	3.86	<0.001*
	No	15.48 ± 6.12		
Past Negative Experience	Yes	17.26 ± 5.94	10.42	<0.001*
	No	11.18 ± 4.62		
Monthly Income	<10,000	15.64 ± 6.18	7.28	<0.001*
	10,001-20,000	13.22 ± 5.34		
	>20,000	11.08 ± 4.86		
MDAS Component Scores	Visit tomorrow (Q1)	2.84 ± 1.46		
	Waiting room (Q2)	2.52 ± 1.38		
	Drill (Q3)	2.96 ± 1.52		
	Scaling (Q4)	2.18 ± 1.28		
	Injection (Q5)	3.42 ± 1.58		



*Statistically significant at p<0.05

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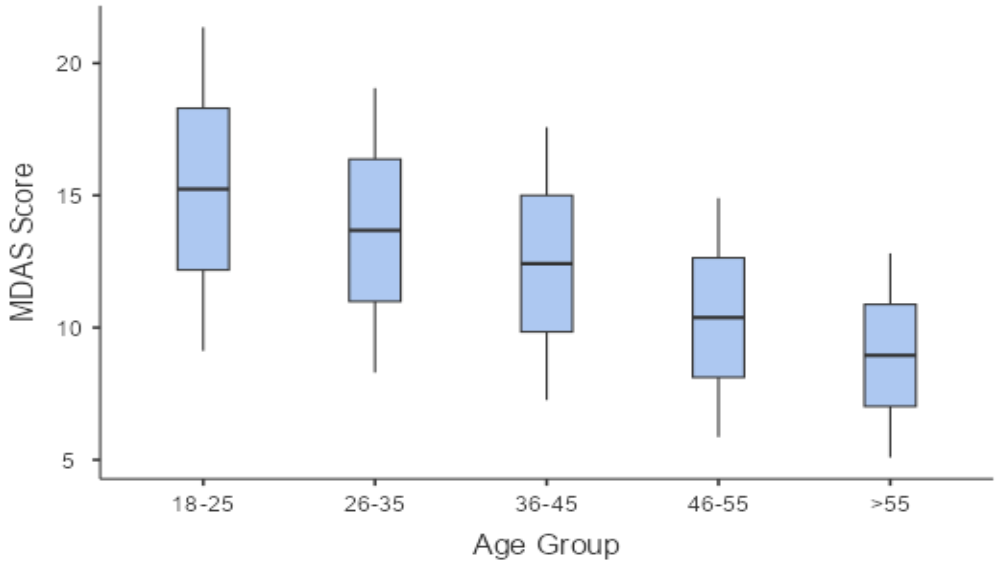
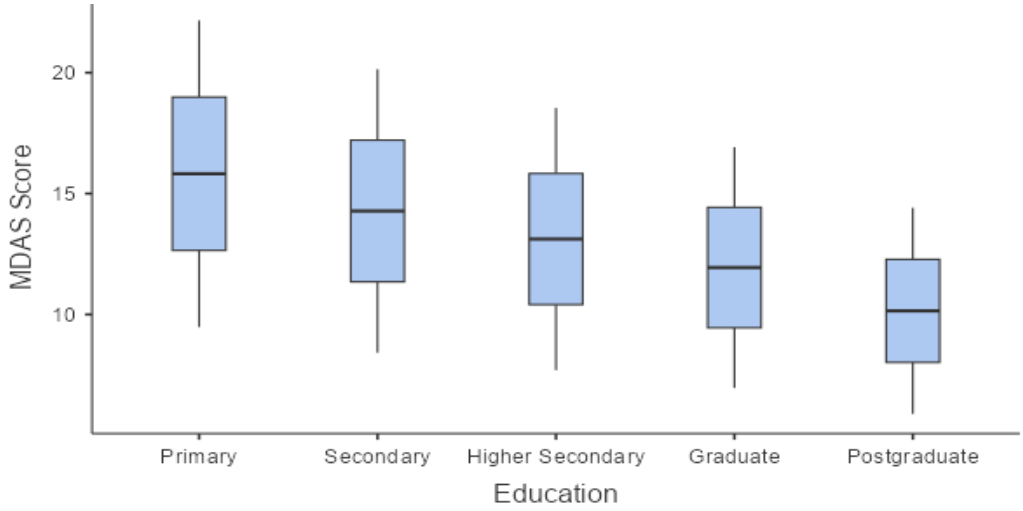


Fig: 5(ii)



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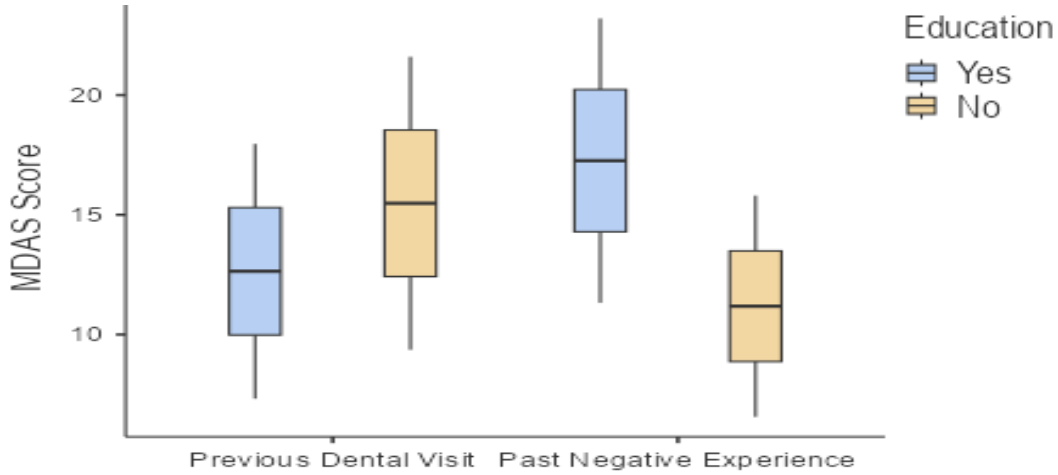

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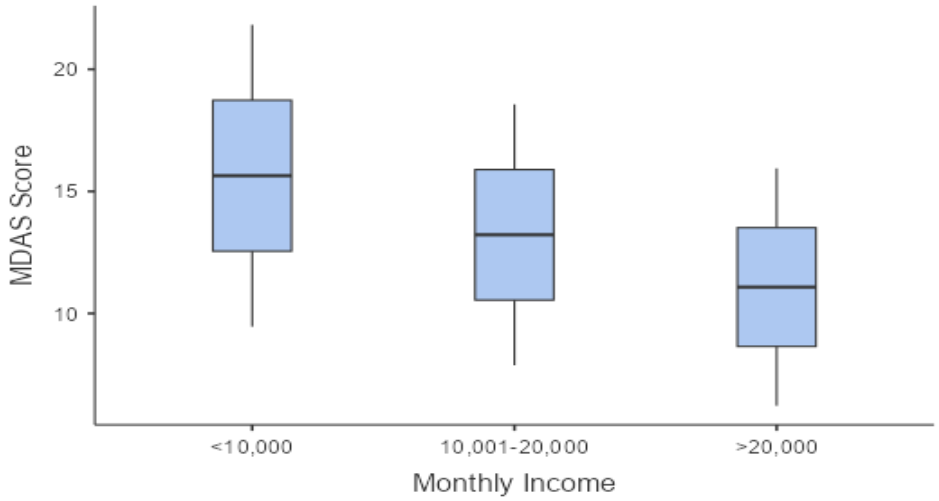

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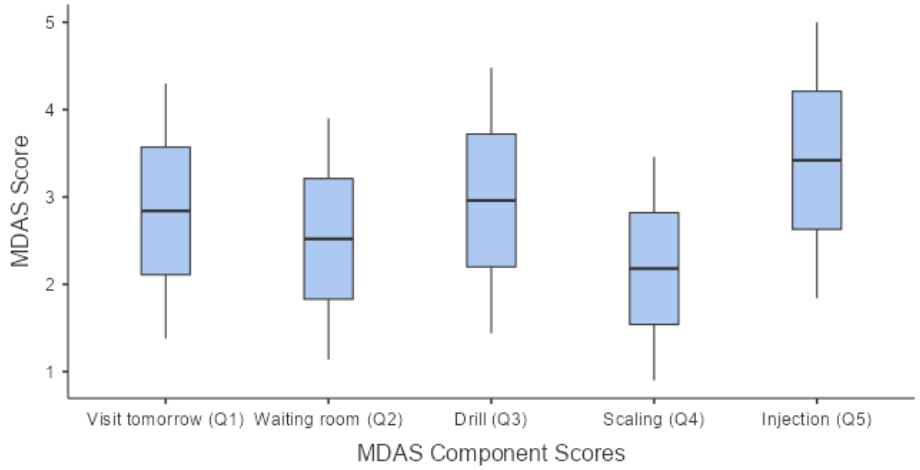

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DISCUSSION

The present study revealed that 60.3% of patients attending the tertiary care dental hospital experienced some degree of dental anxiety, with 18.4% demonstrating high dental anxiety as measured by the Modified Dental Anxiety Scale. The overall mean MDAS score was 13.42 ± 5.68, indicating moderate anxiety levels in this population. These findings are consistent with previous research conducted in Indian settings, which has consistently reported higher prevalence rates compared to Western populations. Appukuttan, Subramanian, Tadepalli, and Damodaran (2015) documented dental anxiety in 42% of South Indian adults, while Malvania and Ajithkrishnan (2011) reported a 46% prevalence among patients in Gujarat. The slightly higher prevalence observed in our study may be attributed to the tertiary care hospital setting, where patients often present with more complex dental conditions requiring specialized treatment, potentially amplifying anxiety levels.

The elevated prevalence of dental anxiety in Indian populations compared to Western countries has been attributed to several contextual factors. Acharya (2008) suggested that limited oral health awareness, restricted access to preventive dental care, cultural beliefs surrounding dental treatment, and higher rates of emergency dental visits due to pain contribute to increased anxiety levels. In developing countries like India, many patients seek dental care only when experiencing severe pain or complications, resulting in more invasive treatment requirements that reinforce negative perceptions of dental procedures. Additionally, the findings align with research by Mohammed et al. (2014), who reported a 77.4% overall prevalence of dental anxiety in Visakhapatnam, although their study included lower severity anxiety, making direct comparisons challenging.

The current study demonstrated significant gender differences in dental anxiety prevalence, with females exhibiting substantially higher anxiety levels than males ($p<0.001$). The mean MDAS score for females (14.52 ± 5.72) was significantly higher than for males (11.86 ± 5.24). Furthermore, 23.0% of female participants showed high dental anxiety compared to only 12.1% of males. These findings corroborate extensive research documenting gender disparities in dental anxiety across diverse populations. Locker and Liddell (1991) identified similar patterns among older adults, while Humphris, Freeman, Campbell, Tuutti, and D'Souza (2000) reported consistent gender differences across four countries including Belfast, Helsinki, and Dubai.

The mechanisms underlying these gender differences remain multifaceted. Biological factors, including hormonal influences on anxiety sensitivity and pain perception, may contribute to heightened anxiety responses in females. Sociocultural factors also play important roles, as societal norms may permit greater expression of fear and anxiety among women while discouraging such admissions among men. Doerr, Lang, Nyquist, and Ronis (1998) suggested that gender-related differences in coping strategies, with females more likely to report anxiety openly while males may underreport due to social desirability bias, contribute to observed disparities. Additionally, research by Folayan and Fatusi (2005) indicated that females may be more willing to acknowledge and discuss their anxieties, leading to more accurate anxiety assessment.

The study revealed a significant inverse relationship between age and dental anxiety, with younger participants demonstrating considerably higher anxiety levels than older adults ($p<0.001$). The highest mean MDAS score was observed in the 18-25 age group (15.24 ± 6.12), while the lowest was found in participants above 55 years (8.95 ± 3.86). This age-related decline in dental anxiety supports findings from Humphris, Morrison, and Lindsay (1995), who documented similar patterns in their UK population study. The progressive reduction in anxiety with advancing age may reflect several interconnected factors, including increased dental treatment experience, development of more effective coping mechanisms, habituation to dental environments, and reduced physiological anxiety responses associated with aging.

Locker, Shapiro, and Liddell (1996) proposed that older adults' lower anxiety levels might result from survivor bias, whereby individuals with extreme dental anxiety avoid regular care and consequently may not be well-represented in clinic-based samples. However, the consistent pattern observed across multiple studies suggests genuine age-related changes in anxiety experience. Younger adults, particularly those in the 18-25 age group, may experience heightened anxiety due to limited dental treatment exposure, greater sensitivity to pain and discomfort, peer influence regarding dental treatment narratives, and higher baseline anxiety levels characteristic of this developmental period. The findings underscore the importance of implementing age-appropriate anxiety management strategies, with particular attention to younger patients who may benefit from graduated exposure, enhanced communication, and behavioral interventions.

Educational attainment demonstrated a strong inverse relationship with dental anxiety in this study. Participants with only primary education exhibited the highest mean MDAS score (15.82 ± 6.34), while those with postgraduate education showed the lowest (10.15 ± 4.26). Similarly, dental anxiety decreased significantly with increasing monthly income, with the lowest income group showing the highest anxiety levels. These socioeconomic gradients in dental anxiety align with previous research by Acharya (2008), who found that lower educational levels and disadvantaged socioeconomic status were associated with elevated dental anxiety in Indian populations.

The relationship between socioeconomic status and dental anxiety likely reflects multiple pathways. Individuals with lower educational levels may possess limited health literacy, reducing their understanding of dental procedures and increasing fear of the unknown. Economic constraints often necessitate delayed treatment-seeking until dental problems become severe, resulting in more painful and invasive procedures that reinforce anxiety. Moore and Brodsgaard (2001) suggested that socioeconomically disadvantaged individuals frequently encounter barriers to accessing preventive dental care, leading to poorer oral health status and greater treatment needs upon presentation. Additionally, cognitive and emotional resources for managing anxiety may be compromised by socioeconomic stressors. Locker, Liddell, Dempster, and Shapiro (1999) emphasized that

individuals from lower socioeconomic backgrounds often report higher rates of traumatic dental experiences, partially mediating the relationship between socioeconomic status and current anxiety levels.

Previous dental experiences emerged as powerful predictors of current dental anxiety in this investigation. Participants reporting past negative dental experiences demonstrated significantly higher mean MDAS scores (17.26 ± 5.94) compared to those without such experiences (11.18 ± 4.62, $p<0.001$). Furthermore, 38.8% of individuals with negative experiences exhibited high dental anxiety, compared to only 5.3% without such history. These findings strongly support the conditioning model of dental anxiety development proposed by Berggren and Meynert (1984), which posits that traumatic dental encounters, particularly involving pain or perceived lack of control, serve as critical etiological factors in anxiety development.

The relationship between previous dental visits and current anxiety was similarly significant. Participants without any previous dental experience showed higher anxiety levels (mean MDAS 15.48 ± 6.12) compared to those with prior visits (12.64 ± 5.32). This finding suggests that familiarity with dental environments and procedures may provide some protective effect against anxiety. However, the quality of previous experiences appears more important than mere exposure, as evidenced by the elevated anxiety among those with negative experiences despite having visited dentists. Locker, Shapiro, and Liddell (1996) documented that negative dental experiences, especially during childhood and adolescence, create lasting anxiety responses that persist into adulthood.

The timing of the last dental visit also influenced anxiety levels, with those who had not visited a dentist for more than two years showing significantly higher anxiety. Regular dental attenders demonstrated lower anxiety, possibly due to habituation effects, positive reinforcement from routine visits, better oral health status requiring less invasive treatment, and development of trust relationships with dental care providers. Kent (1984) emphasized that avoidance behavior resulting from dental anxiety creates a vicious cycle where irregular dental attendance leads to deteriorating oral health, necessitating more complex treatments that further reinforce anxiety.

The reason for dental visit significantly affected anxiety levels, with emergency presentations due to pain associated with the highest anxiety scores. Participants visiting for routine checkups showed considerably lower anxiety (mean MDAS 10.24) compared to those presenting with pain or emergencies (mean MDAS 16.82). This pattern reflects the heightened emotional state associated with acute dental pain and the apprehension regarding potentially painful emergency procedures. Self-perceived oral health status also demonstrated strong associations with dental anxiety, with individuals rating their oral health as poor showing substantially higher anxiety levels. This relationship may be bidirectional, as dental anxiety leads to avoidance and poor oral health, while poor oral health increases treatment needs and associated anxiety.

Analysis of individual MDAS components revealed that anxiety about receiving a local anesthetic injection elicited the highest anxiety scores (mean 3.42 ± 1.58), followed by tooth drilling (2.96 ± 1.52) and anticipated dental visits (2.84 ± 1.46). This pattern corroborates the rationale for including the injection question in the Modified Dental Anxiety Scale, as Humphris, Morrison, and Lindsay (1995) recognized that injection-related anxiety represented a major source of dental fear not adequately captured in earlier scales. The prominence of injection anxiety in this population suggests that needle phobia significantly contributes to overall dental anxiety among Indian patients.

These findings have important clinical implications for anxiety management strategies. Given that injections and drilling represent the most anxiety-provoking aspects of dental treatment, practitioners should prioritize techniques to minimize discomfort associated with these procedures. Kleinknecht, Klepac, and Alexander (1973) demonstrated that systematic desensitization targeting specific anxiety-provoking stimuli, particularly injections and drilling sounds, effectively reduces dental anxiety. Modern anxiety management approaches, including topical anesthetics before injection, slow injection techniques, distraction methods, and comprehensive patient education about procedures, may help mitigate anxiety associated with these highly fear-inducing components.

CONCLUSION

This study revealed a high prevalence of dental anxiety (60.3%) among patients attending a tertiary care dental hospital in Maharashtra, with 18.4% experiencing severe anxiety. Significant associations were identified between dental anxiety and multiple factors including female gender, younger age, lower educational attainment, reduced socioeconomic status, absence of previous dental visits, past negative dental experiences, and poor self-perceived oral health. Local anesthetic injections and tooth drilling emerged as the most anxiety-provoking treatment components. These findings underscore the critical importance of implementing systematic anxiety screening protocols and targeted intervention strategies in tertiary care dental settings to improve patient experiences and treatment outcomes.

RECOMMENDATIONS

Early identification of high-risk patients through routine MDAS screening should be implemented in tertiary care dental hospitals. Gender-sensitive and age-appropriate anxiety management protocols must be developed, particularly targeting younger female patients. Emphasis should be placed on creating positive first dental experiences and preventing traumatic encounters that contribute to long-term anxiety. Community-based oral health education programs focusing on preventive care could reduce emergency presentations and associated anxiety. Dental professionals require enhanced training in behavioral management techniques, effective communication strategies, and anxiety reduction methods including tell-show-do approaches, distraction techniques, and graduated exposure for anxious patients.

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