Original Article

Comparative Assessment of Dental Anxiety among General Population of Varying Socioeconomic Strata of Mumbai and Navi Mumbai: A Cross-Sectional Study

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Abstract

Introduction: Ranked fourth among common fears and ninth among intense fears, dental anxiety (DA) is a major issue not only for the patients but also for dental professionals, and sometimes it prevents from rendering dental treatment more effectively.

Purpose: To assess the prevalence of DA among the population of Mumbai and Navi Mumbai and to relate socioeconomic scale (SES measured by Kuppuswamy scale) with DA measured with modified DA scale (MDAS).

Materials and Methods: A cross-sectional questionnaire-based study was conducted among 1987 people belonging to varying SES measured DA aged 15-75 years, who have undergone dental treatment. Mode of administration was English, Hindi, and Marathi. Around 2050 questionnaire copies were distributed of which 1987 answered with a response rate of 96.92%.

Results: Of 1987 total participants, 1057 were men and 930 were females. Comparison of mean overall score with SES shows that DA is higher for upper class (2.62) of socioeconomic status as compared to lower class (1.62), which was found to be statistically highly significant ($P < 0.001$). The mean MDAS score for the six questions was higher in females as compared to males ($P < 0.001$), with mean overall MDAS score 2.38 ± 1.21 in females and 2.01 ± 1.15 in males. 6% of the total population suffers from DA.

Conclusion: The upper class in the socioeconomic status is more anxious than the lower class. Furthermore, the female population is more anxious than males. A significant number of the population is suffering from DA.

Key words: Dental anxiety, Kuppuswamy's socioeconomic status scale, Modified dental anxiety scale

INTRODUCTION

Anxiety may be defined as a reaction to an unknown danger.[1] Its source is in the unconscious. Anxiety is psychological phenomenon which is difficult to measure because patients may hide their feelings regarding their perceptions about dental treatment, needles, and instruments. Despite the technological advances in modern dentistry fear of pain associated with dentistry are widespread. DA is fear of dentistry or related to receiving dental treatment. DA is a major issue with respect to provisions of dental care and the access to it.[2] It is ranked fourth among common fears and ninth among intense fears. The prevalence of DA has been studied among various socioeconomic classes and cultures.[3] It is a frequent problem among dental patients. The presence of DA is not a predicament for the patients alone but also for the dental experts themselves; and sometimes it causes a hindrance in the treatment to be accomplished successfully. Oral diseases are chief public health concerns, and their prevalence could be promoted by DA.[4] The etiology of DA is poorly understood. The onset of DA is thought to emanate in childhood, peak in early

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adulthood, and decline with age.[5] DA is based on several factors such as family and social environment, general fearfulness, pain and traumatic, and unpleasant experiences. The patient perceptions regarding attitudes of dentists can affect DA and could dominate his or her decision to access dental care. It is therefore becomes imperative to assess the DA quantitatively and qualitatively and its associated factors. Various researchers have conducted surveys in populations of different countries and reported various types of DA ranging from mild and moderate to severe. Very few focus on the effect of independent variables such as age and gender on DA.[6]

One of the possible factors could be socioeconomic status (SES) which is a combination of variables such as education, occupation, and income reflects the patient's affordability of health services, necessities, and purchasing power. High level of reliability and validity of Kuppuswamy's socioeconomic status scale[7] becomes an important tool in measuring SES.[8]

The modified DA scale (MDAS) was used to quantify the participant's levels of DA and to confirm their connectional levels of high anxiety concerning dental treatment. This was modified from the original Corah's DA scale (CDAS). The advantage of the MDAS is because of its crispness, it is simple, easy to complete, and can be used as a practical instrument for population-based research. It has been found to be reliable and is valid cross-culturally and has been translated into different languages. This scale consists of a set of five questions to be presented to the participants, and they are asked to estimate the level of anxiety they would feel if they were in particular dental situations.[9] An MDAS score of 19 and above indicates a strong plausibility of the respondent being dentally phobic.

With this background, a need for felt to investigate the association of socioeconomic status effect on DA, hence this study was planned with the ambitions to assess the prevalence of DA among the population of Mumbai and Navi Mumbai, and to relate SES measured by Kuppuswamy scale with DA measured with MDAS.

Objectives
1. To assess the prevalence of DA among general population of Mumbai and Navi Mumbai
2. To relate SES measured by Kuppuswamy scale with DA measured with MDAS.

MATERIALS AND METHODS

This study being a cross-sectional questionnaire-based survey and it was conducted in the Months of February - May 2016, at Y.M.T Dental College and Hospital in Kharghar, Navi Mumbai among 1987 participants, aged between 15 and 75 years.

Before the start of the study, ethical clearance, and all the necessary permissions were taken from the Institutional Ethics committee, Y.M.T Dental College by submitting the study proposal which was blinded and reviewed by two reviewers.

The patients within the age limit were selected for the study. It was essential for the patient to have taken prior dental treatment. The patients who refused to give consent and those who were undergoing psychiatric treatment or were suffering from any generalized anxiety disorders were excluded from the study. Those patients who were uneducated and were unable to read were helped by the primary investigator for the study purpose.

The sample size was determined using single proportion formula.

$$N = [Z\alpha\ p(1-p)/d]^2$$

Where $Z\alpha$ is Z variate of α error fixed at 1.96, p is the proportion of population expected having the disease or condition. d is expected error in the study fixed at 5%. Substituting the values sample size was obtained as 384.

Since the study involves comparison of DA among five classes of SES. Total sample size estimated is $384 \times 5 = 1920$. Selection of subject/participants was performed as per convenience sampling.

The instrument for data collection was a self-devised pretested questionnaire, the validity and reliability of which was checked in a pilot study was conducted among 15-20 randomly selected patients, and corrections were performed in the questionnaire, and those patients were excluded from this study. The instrument to record responses was self-designed, pretested questionnaire or data recording sheet which had three sections. (Annexure 1). This form was administered in English, Marathi, and Hindi. Translation was performed according to forward and backward blind translation process.

For testing, the validity and reliability of the questionnaire a pilot survey was conducted. This was carried out on 15 patients from the outpatient department of Y.M.T Dental College. The patients were asked for their feedback and necessary changes were performed. These patients were not included in the main study.

Statistical Analysis
Data were compiled on MS Excel Sheet (version 2010). Data were subject to statistical analysis using statistical package

for social sciences (SPSS, v 22.0, and IBM). Percentage and frequency of number of males and females, education, occupation, income, duration of last treatment, response to MDAS Q1-6, overall score, number and percentage of people belonging to each SES, agewise distribution with SES, comparison of Kuppuswamy score between gender was done by independent *t*-test, MDAS Q1-6, and overall score was done using independent *t*-test. One-way Analysis of variance was used to compare means of overall anxiety score with Kuppuswamy SES scores. For all tests, $P < 0.05$ was considered statistically significant.

RESULTS

A total number of participants were 1987. 2050 questionnaire copies were distributed of which 1987 answered with a response rate of 96.92%. 1057 were male and 930 were females. Mean age of the participants were 39.8 ± 13.57 (Minimum 15-Maximum 72). Distribution of age with respect to SES shows that the mean age was higher for lower class (48.12) and least for upper middle class (32). The majority of the participants were graduates/post graduates (601 out of 1987), whereas the minority of the population has passed primary school certificate (42 out of 1987). 927 participants were unemployed, 392 were professionals, 245 were semiprofessionals, 194 were skilled workers, 115 were unskilled workers, 97 were clerical/shop owners, and 17 were semiskilled workers. The majority of the participants monthly family income was ≥ 36017 (617), whereas only 90 earned ≤ 1802. Out of the total 5 SES classes upper middle class had the highest frequency of 412 whereas upper class, upper lower and lower class had a frequency of 393 each and lower middle had a frequency of 396. Duration since the last dental treatment shows that around 33% population had undergone treatment in the last 6 months and 21% population in the last 1-2 years. The frequency of answers for MDAS Q1 TO Q6 is depicted in Table 1. The frequency for the overall MDAS score shows that 729 out of the total participants are not anxious (36.7%), whereas 125 were extremely anxious (6.3%). The mean Kuppuswamy score versus gender shows that the mean Kuppuswamy score was higher in males (15.80) than in females (13.16) and was statistically highly significant ($P < 0.01$). Table 2 shows that there was a nonsignificant difference between the duration of dental treatment among males and females ($P > 0.05$). However, for each of the MDAS Q1 to Q6, there was a highly significant difference with mean anxiety score for each question higher for females as compared to males ($P < 0.01$). Furthermore, mean overall MDAS score in females was 2.38 ± 1.21 as compared to 2.01 ± 1.15 in males and was statistically highly significant ($P < 0.01$). Comparison of SES versus duration of treatment shows that lower class (157) has undergone

treatment in the last 6 months and the $P < 0.01$ which is highly significant. Table 3 shows comparison of SES and MDAS Q1-Q6. It depicts the anxiety level of each class against each MDAS question. Anxiety provoking questions such as drilling, extraction, and injecting in gums incited anxiety in ascending order.

Table 1: Frequency table for MDAS Q1 to Q6

MDAS	Frequency (%)
Q1	
If you were to go to your dentist tomorrow how would you feel?	
Not anxious	938 (47.2)
Slightly anxious	656 (33.0)
Fairly anxious	202 (10.2)
Very anxious	111 (5.6)
Extremely anxious	80 (4.0)
Total	1987 (100.0)
Q2	
If you were sitting and waiting for your treatment how would you feel?	
Not anxious	872 (43.9)
Slightly anxious	692 (34.8)
Fairly anxious	220 (11.1)
Very anxious	128 (6.4)
Extremely anxious	75 (3.8)
Total	1987 (100.0)
Q3	
If you were about to get your teeth drilled how would you feel?	
Not anxious	638 (32.1)
Slightly anxious	662 (33.3)
Fairly anxious	380 (19.1)
Very anxious	188 (9.5)
Extremely anxious	119 (6.0)
Total	1987 (100.0)
Q4	
If you were about to get your teeth scaled and polished how would you feel?	
Not anxious	649 (32.7)
Slightly anxious	674 (33.9)
Fairly anxious	400 (20.1)
Very anxious	161 (8.1)
Extremely anxious	103 (5.2)
Total	1987 (100.0)
Q5	
If you were about to get injected in your gums how would you feel?	
Not anxious	510 (25.7)
Slightly anxious	518 (26.1)
Fairly anxious	483 (24.3)
Very anxious	278 (14.0)
Extremely anxious	198 (10.0)
Total	1987 (100.0)
Q6	
How anxious would you be if you were getting your teeth extracted?	
Not anxious	506 (25.5)
Slightly anxious	505 (25.4)
Fairly anxious	445 (22.4)
Very anxious	271 (13.6)
Extremely anxious	260 (13.1)
Total	1987 (100.0)

MDAS: Modified dental anxiety scale

Table 2: Comparison of mean of variables versus gender

Duration	Gender	*n*	Mean±SD	Standard error mean	*P* value of independent *t*-test
	Male	1057	2.35±1.169	0.036	0.913#
	Female	930	2.35±1.199	0.039	
MDAS Q1	Male	1057	1.75±1.029	0.032	0.000**
If you were to go to your dentist tomorrow how would you feel?	Female	930	1.99±1.099	0.036	
MDAS Q2	Male	1057	1.79±1.034	0.032	0.000**
If you were sitting and waiting for your treatment how would you feel?	Female	930	2.05±1.090	0.036	
MDAS Q 3	Male	1057	2.08±1.135	0.035	0.000**
If you were about to get your teeth drilled how would you feel?	Female	930	2.42±1.188	0.039	
MDAS Q4	Male	1057	2.05±1.102	0.034	0.000**
If you were about to get your teeth scaled and polished how would you feel?	Female	930	2.35±1.145	0.038	
MDAS Q 5	Male	1057	2.34±1.238	0.038	0.000**
If you were about to get injected in your gums how would you feel?	Female	930	2.82±1.280	0.042	
MDAS Q6	Male	1057	2.39±1.294	0.040	0.000**
How anxious would you be if you were getting your teeth extracted	Female	930	2.91±1.343	0.044	
Overall score	Male	1057	2.01±1.153	0.035	0.000**
	Female	930	2.38±1.218	0.040	

**indicates *P*<0.01 = statistically highly significant. #indicates *P*>0.01 = statistically not significant, MDAS: Modified dental anxiety scale, SD: Standard deviation

Mean age is the lowest for upper middle class 32.00 ± 11.81 and highest for lower class 48.12 ± 13.34. When we compare SES and overall anxiety score, we conclude that anxiety is least in lower class (1.62) and most in upper class (2.62) (Table 4).

DISCUSSION

Undeterred by the technological advances made in modern dentistry, anxiety about dental treatment remains prevalent. The impact that DA can have on an individual's life is extensive and influential, leading to the avoidance of dental care and unwanted effects, such as low self-esteem, and psychological problems. Fear of visiting the dentist is common, even among adults.[5]

In our study, results showed that 6.3% of the population was extremely anxious which was more than the study conducted by Deva *et al.*,[3] in which 3% of their patients were dentally phobic.

Mean anxiety score for each question is higher for females as compared to males ($P < 0.01$). Mean overall MDAS score in females was 2.38 ± 1.21 as compared to 2.01 ± 1.15 in males, similar to the results achieved by Mohammed *et al.* (2014) who conducted a study on the prevalence of DA and its relation to age and gender in Coastal Andhra Pradesh population. It was a randomized controlled study among 340 individuals including 180 females and 160 males using CDAS. Mean CDAS score levels were significantly higher in females (10.88) than in males (9.96)($P < 0.0001$).[5]

Comparison between genders showed that female subjects were more anxious than male counterparts. A credible explanation for such observation could be attributed to the fact that women usually admit their fears readily than men. Females have lower tolerance to pain and exhibit higher level of neuroticism.[9]

Anxiety keeps decreasing with age, 2.34 was the mean anxiety score for mean age of 32.00 in and 1.62 for mean age of 48.12. Other studies conducted by Patil *et al.*,[10] Kulkarni *et al.*,[2] Corah,[11] Ayise and Heikki,[12] Vijaya and Ravikiran,[13] and Kumar *et al.*[14] showed similar reading with mean CDAS scores high in young age group. However, study conducted by Nirmala *et al.*,[15] Tunc *et al.*,[16] and Nair *et al.*[17] refute this claim. Decline in anxiety with age could be due to cerebral deterioration which occurs with age, factors such as habituation, adaption toward the inevitable, increased ability to cope with experience aging process itself, and more exposure to debilitating diseases and treatment.[9]

Upper class in which subjects were better educated, employed, and financially affluent and can even rationalize a situation better scored higher on the anxiety scale (2.62) as compared to lower class which scored the least (1.62) (Table 4), contradictory to the results found by Kumar *et al.*[18] and Appukuttan *et al.*[9] One reason for this would be that the mean age in upper class was 45.15 ± 9.67, whereas for lower class was 48.12 ± 13.34.

Findings of studies from different states in India like Gujarat and Haryana indicate that there is a prevalence of DA among the Indian population. This could be attributed to multiple factors such as poor oral health awareness, ignorance about treatment procedures, superstitions and false beliefs about dental treatment, and cultural differences and views.[9]

Table 3: Comparison of SES and MDAS Q1- Q6

MDAS	SES					Total	*P* value of Chi-square test
	Upper class	Upper middle	Lower middle	Upper lower	Lower		
Q1							
If you were to go to your Dentist tomorrow how would you feel?							
Not anxious	112	188	184	195	259	938	
Slightly anxious	149	135	129	141	102	656	
Fairly anxious	56	42	55	29	20	202	0.000**
Very anxious	38	28	19	17	9	111	
Extremely anxious	38	19	9	11	3	80	
Total	393	412	396	393	393	1987	
Q 2			SES				
If you were sitting and waiting for your treatment how would you feel?	Upper class	Upper middle	Lower middle	Upper lower	Lower		
Not anxious	106	163	166	183	254	872	
Slightly anxious	152	151	137	147	105	692	
Fairly anxious	59	51	55	32	23	220	0.000**
Very anxious	47	29	25	19	8	128	
Extremely anxious	29	18	13	12	3	75	
Total	393	412	396	393	393	1987	
Q 3			SES				
If you were about to get your teeth drilled how would you feel?	Upper class	Upper middle	Lower middle	Upper lower	Lower		
Not anxious	64	100	120	143	211	638	
Slightly anxious	141	133	127	131	130	662	
Fairly anxious	98	94	80	71	37	380	0.000**
Very anxious	47	48	49	33	11	188	
Extremely anxious	43	37	20	15	4	119	
Total	393	412	39	393	393	1987	
Q 4			SES				
If you were about to get your teeth scaled and polished how would you feel?	Upper class	Upper middle	Lower middle	Upper lower	Lower		
Not anxious	53	145	135	139	177	649	
Slightly anxious	134	128	124	136	152	674	
Fairly anxious	116	76	83	75	50	400	0.000**
Very anxious	54	37	36	25	9	161	
Extremely anxious	36	26	18	8	5	103	
Total	393	412	396	393	393	1987	
Q 5			SES				
If you were about to get injected in your gums how would you feel?	Upper class	Upper middle	Lower middle	Upper lower	Lower		
Not anxious	50	88	104	113	155	510	
Slightly anxious	100	103	94	105	116	518	
Fairly anxious	123	97	92	90	81	483	0.000**
Very anxious	59	68	66	55	30	278	
Extremely anxious	61	56	40	30	11	198	
Total	393	412	396	393	393	1987	
Q 6			SES				
How anxious would you be if you were getting your teeth extracted	Upper class	Upper middle	Lower middle	Upper lower	Lower		
Not anxious	46	79	100	122	159	506	
Slightly anxious	109	94	97	96	109	505	
Fairly anxious	119	84	86	82	74	445	
Very anxious	60	72	52	54	33	271	
Extremely anxious	59	83	61	39	18	260	
Total	393	412	396	393	393	1987	

**Indicates *P*<0.01 = statistically highly significant, MDAS: Modified dental anxiety scale, SES: Socioeconomic scale

It was concluded that the patients with DA are more difficult to treat. If dentist is aware of DA levels among their patients, they can anticipate patient's behavior and can be prepared to take behavioral or pharmacological measures to reduce DA.[5]

There are certain limitations of this study. Being cross-sectional in design, it involves data collected at a definite time including events that occurred in the past. There is difficulty in recalling past question. Furthermore, convenience sampling was performed and self-administered questionnaire was

Table 4: Comparison of mean overall score with SES

SES	*n*	Mean±SD	Standard error	*P* value of Kruskal-Wallis ANOVA
Upper class	393	2.62±1.246	0.063	0.000**
Upper middle	412	2.34±1.239	0.061	
Lower middle	396	2.26±1.204	0.060	
Upper lower	393	2.07±1.138	0.057	
Lower class	393	1.62±0.896	0.045	
Total	1987	2.18±1.198	0.027	

**indicates P<0.01 = Statistically highly significant, SD: Standard deviation, SES: Socioeconomic scale, ANOVA: Analysis of variance

administered. There are chances that the individuals over or underestimated their responses with respect to actual income, educational qualification, and occupation.[3]

CONCLUSION

From this study, we can conclude that DA is prevalent in our population, with the upper class in the socioeconomic status being more prone to anxiety. Even, females are more anxious as compared to males. A significant quota of the population is tormented by DA. This information can be crucial for dental practitioners and can help them in better anxiety management.

ACKNOWLEGMENT

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ANNEXURE 1

Section A

Age-_____years Sex Male ☐ Female ☐

Education-_____ Occupation _____Income- _____/month

Section B

Kuppuswamy socioeconomic status scale

Education:

Education of the head
Profession or honors
Graduate or Post-graduate
Intermediate or post high school dip
High school certificate
Middle school certificate
Primary school certificate
Illiterate

Occupation:

Occupation of the head
Profession
Semi profession
Clerical, shop owner
Skilled worker
Semi-skilled worker
Unskilled worker
Unemployed

Income:

Family income per month in rupees(2014)
≥36017
18000-36016
13495-17999
8989-13494
5387-8988
1803-5386
≤1802

Total Kuppuswamy score:

Socio-economic class	Score
Upper class (I)	26-29
Upper middle (II)	16-25
Lower middle (III)	11-15
Upper lower (IV)	5-10
Lower (V)	<5

Total Kuppuswamy Score:_____

Section C

Q1: Details of previous dental visit:

Q2: Duration since the last dental visit
Within last 6 months
1 year back
Before 1-2 years back
More than 2 years back

Modified dental anxiety scale:

Q1: If you were to go to your dentist for treatment tomorrow how would you feel?
Not anxious
Slightly anxious
Fairly anxious
Very anxious
Extremely anxious

Q2: If you were sitting in the waiting room waiting for treatment how would you feel?
Not anxious
Slightly anxious
Fairly anxious
Very anxious
Extremely anxious

Q3: If you were about to have your tooth drilled how would you feel?
Not anxious
Slightly anxious
Fairly anxious
Very anxious
Extremely anxious

Q4: If you are about to have your teeth scaled and polished how would you feel?
Not anxious
Slightly anxious
Fairly anxious
Very anxious
Extremely anxious

Q5: If you were about to have a local anesthetic injection in your gum, above and upper back tooth, how would you feel?
Not anxious
Slightly anxious
Fairly anxious
Very anxious
Extremely anxious

Q6: How anxious would you be if you were about to have your tooth extracted?
Not anxious
Slightly anxious
Fairly anxious
Very anxious
Extremely anxious

Total modified dental anxiety scale score:

Not anxious	1	6-10
Slightly anxious	2	11-15
Fairly anxious	3	16-20
Very anxious	4	21-25
Extremely anxious	5	26-30