Prevalence and Predictors of Dental Anxiety in Adult Patients at a Tertiary Dental Hospital in Nigeria

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ABSTRACT

Objective: This study was designed to assess the prevalence and associated factors of dental anxiety among adult patients attending a tertiary dental hospital in Nigeria, while also identifying potential predictors of dental anxiety.

Materials and Methods: A total of 177 adult dental patients completed a self-administered questionnaire comprising socio-demographic information and other information relating to medical conditions, pain, health insurance coverage, previous dental visits, and self-perception of oral health. Dental anxiety was assessed with the modified dental anxiety scale (MDAS).

Results: The prevalence of dental anxiety was 10.73% with an overall severity mean score of 13.36 ± 3.41. Age and sex were associated with the levels of dental anxiety, p= 0.027 and 0.007 respectively. Moreover, age, sex, and level of education were associated with mean anxiety levels, p=0.043, 0.009, and 0.015 respectively. Previous dental visits and self-perception of oral health were associated with dental anxiety, p=0.034 and < 0.001respectively. Sex, marital status, previous dental visits, and self-oral health perception were predictors of high dental anxiety, p=0.028, 0.019, 0.033, and 0.00 respectively.

Conclusion: Demographic factors, previous dental visits, and self-perception of oral health are associated with dental anxiety. Predictors of high dental anxiety are sex, marital status, previous dental visits, and self-oral health perception.

INTRODUCTION

The thought of visiting a dentist can trigger feelings of apprehension in many individuals [1]. Dental anxiety is characterized as an aversive emotional state, accompanied by worry and anticipation of dental treatment[2]. It manifests as an unpleasant vague sensation, often accompanied by a sense of impending undesired outcomes [3]. Unlike fear, anxiety is predominantly anticipatory in nature, arising when the stimulus is absent or not readily identifiable[4].

Various studies have examined the prevalence of dental anxiety among different populations and cultures, yielding diverse outcomes influenced by study design and demographics. Epidemiological surveys indicate that approximately 50 to 70% of individuals experience apprehension prior to and during dental visits [5]. The prevalence of high dental anxiety among the adult population has been reported to range from 10% to 20%[6,7,8]. Among medical undergraduates in Tanzania, a prevalence of 55% was reported [9]. Previous studies conducted in Nigeria have also reported a prevalence of dental anxiety ranging from approximately 7% to 10.7% among the adult population[10,11,12,13].

Numerous factors have been identified as determinants of dental anxiety, including age, gender, irregular dental attendance, invasive pretreatment, and poor emotional well-being [14]. Other reported risk factors include comorbidities, gender stereotypes, dental clinic design, negative experiences, pain perceptions, and dentist's attitude [15]. Furthermore, empirical evidence demonstrates a significant association between high level of dental anxiety and irregular dental attendance [16]. General anxiety and depression have also been linked to higher levels of dental anxiety among individuals with irregular dental attendance[17].

Dental anxiety can lead to the avoidance of necessary dental treatment, resulting in various oral health challenges [18]. Individuals with dental anxiety often fail to optimize and maintain their oral health, which can have serious implications for their overall well-being and quality of life [19]. Chronic dental and periodontal infections can adversely affect overall health, aesthetics, and functions such as mastication, digestion, speech, and even existing medical conditions can be exacerbated [20]. Furthermore, individuals with high levels of dental anxiety tend to exhibit poor oral health habits, increasing their need for dental treatment[21].

While some studies have addressed dental anxiety in the Nigerian population, recent evidence underscores the need for further understanding due to significant intercultural differences in the prevalence of dental anxiety [10,22]. It is also important to evaluate dental anxiety from time to time to see whether the condition is improving or degenerating. Dentists who are aware of their patients' anxiety levels can anticipate their behaviour and employ measures to alleviate anxiety [10]. Therefore, it is crucial for dentists to be able to evaluate their patients' anxiety levels and develop treatment strategies tailored towards ameliorating the apprehension experienced by these patients. Consequently, this study seeks to contribute additional scientific evidence on the prevalence, severity, and determinants of dental anxiety among adult dental patients.

MATERIALS AND METHODS

This was a cross-sectional study conducted using a self-administered structured questionnaire for data collection. The questionnaire captured socio-demographic variables including age, sex, marital status, education, employment status, and occupation. The participants' medical histories were also gathered through a section of the questionnaire to determine the presence of chronic medical conditions, and current medication use. Information regarding dental history and self-perception of oral health (categorized as bad, fair, good) was also collected.

To evaluate dental anxiety, a modified dental anxiety scale (MDAS) was incorporated into the questionnaire. The MDAS consists of five items, each with five response options ranging from "not anxious" to "extremely anxious", with corresponding scores from 1 to 5, indicating increasing severity of dental anxiety. Scores between 5 and 11 were considered low, 12 and 18 as moderate, and 19 and 25 as high anxiety levels. The internal reliability of the MDAS for this study, assessed by Cronbach's alpha test, yielded a score of 0.89.

The questionnaires were randomly distributed to consenting adult patients attending the Dental Centre of the Obafemi Awolowo University Teaching Hospitals Complex in Ile-Ife while they were waiting to be transferred to the oral diagnosis clinic. Exclusions from the study comprised patients under the age of 16, those in urgent need of attention, and those who declined to participate.

Sample size for this study was scientifically calculated with a resultant figure of 177 while ethical approval was obtained from the Institute of Public Health Obafemi Awolowo University Health Research Ethics Committee (HREC No: IPH/OAU/12/1977).

STATISTICAL ANALYSES

Data analysis was performed using Stata 14 statistical software (Statacorp, College Station, Texas). Descriptive statistics were employed to characterize socio-demographic variables such as age, sex, marital status, and occupation. For continuous variables, descriptive measures such as mean, median, minimum value, and maximum value were calculated. Categorical variables were described using simple frequencies and percentages. Bivariate analysis such as chi-square or Fishers' exact test was conducted to compare two categorical variables. To determine independent variables that predict outcome variable (dental anxiety), a multi-nominal logistic regression was used.

RESULTS

A total of 177 patients participated in the study, consisting of 77 (43.50%) males and 100 (56.50%) females. The age range of the participants was 17 to 69 years, with a mean age of 36.31 (±13.1) years. Among the participants, 94 (53.11%) were single. In terms of occupation, more than half of the participants were working-class individuals, totaling 104 (58.76%), while 73 (41.24%) were students (Table 1).

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Table 1: Socio-demographic Characteristics of Participants

Variable	Frequency (n)	Percentage (%)
Age		
17 – 30	72	40.68
31 – 45	63	35.59
46 – 69	42	23.73
Mean (SD) = 36.31 (13.1)		
Sex		
Male	77	43.50
Female	100	56.50
Marital Status		
Single	94	53.11
Married	76	42.94
Widowed	7	3.95
Education		
Primary	5	2.82
Secondary	56	31.64
Tertiary	116	65.54
Occupation		
Student	73	41. 24
Civil Servant	30	16.95
Business/Self -Employed	74	41.81

Most of the participants, 101 (57.06%), experienced moderate anxiety, while 19 (10.73%) exhibited severe anxiety or dental phobia. Low anxiety levels were observed in 57 (32.20%) participants. Overall, the mean anxiety severity score was 13.36±3.41 (Table 2).

Table 2: Prevalence and Levels of Dental Anxiety of Participants

	MDAS SCORE			
	Low (5-11) n (%)	Moderate (12-18) n (%)	High (19-25) n (%)	Total n (%)
Modified Dental Anxiety Scale (MDAS)	57(32.20%)	101(57.06%)	19 (10.73%)	177(100%)
Mean± SD (13.36±3.41)				
Range 6 – 24				

Bivariate analysis, as shown in Table 3, revealed that age and sex were significantly associated with dental anxiety, with p-values of 0.027 and 0.007, respectively (Fisher's exact test). However, no statistically significant associations were found between dental anxiety and other socio-demographic variables.

Table 3: Dental Anxiety and Socio-demographic Characteristics of Participants

Variable	Modified Dental Anxiety Scale (n=177)				
	Low n (%)	Moderate n (%)	High n (%)	Total n (%)	p-Value
Age (years)					
17 – 30	20 (35.09)	43 (42.57)	9 (47.37)	72 (40.68)	0.027*
31 – 45	15 (26.32)	40 (39.60)	8 (42.11)	63 (35.59)	
46 – 69	22 (38.60)	18 (17.82)	2 (10.53)	42 (23.73)	
Mean±SD (36.31±13.1)					
Sex					
Male	32 (56.14)	42 (41.58)	3 (15.79)	77 (43.50)	0.007*
Female	25 (43.86)	59 (58.42)	16 (84.21)	100 (56.50)	
Marital Status					
Single	26 (45.61)	54 (53.47)	14 (73.68)	94 (53.11)	0.202
Married	27 (47.37)	44 (43.56)	5 (26.32)	76 (42.94)	
Widowed	4 (7.02)	3 (2.97)	0 (00)	7 (3.95)	
Education					
Primary	2 (3.51)	3 (2.97)	0 (00)	5 (2.82)	0.054
Secondary	12 (21.05)	33 (32.67)	11 (57.89)	56 (31.64)	
Tertiary	43 (75.44)	65 (64.36)	8 (42.11)	116 (65.54)	
Occupation					
Student	21 (36.84)	44 (43.56)	8 (42.11)	73 (41.24)	0.080
Civil Servant	15 (26.32)	15 (14.85)	0 (00)	30 (16.95)	
Business/ Self Employed	21 (36.84)	42 (41.58)	11 (57.89)	74 (41.81)	

*Fisher's exact, *statistically significant value (p<0.05)*

Table 4: Mean MDAS Score and Sociodemographic Characteristics

Variable	Mean MDAS	Standard Deviation ±	p-value
Age(years)			
17 – 30	13.54	3.64	0.043*
31 – 45	13.89	3.34	
46 – 69	12.24	2.88	
Mean±SD (36.31±13.1)			
Sex			
Male	12.60	3.06	0.009*
Female	13.94	3.56	
Marital Status			
Single	13.87	3.68	0.082
Married	12.84	3.09	
Widowed	12.00	1.41	
Education			
Primary	11.20	3.35	0.015*
Secondary	14.36	3.72	
Tertiary	12.97	3.15	
Occupation			
Student	13.56	3.58	0.219
Civil Servant	12.37	2.24	
Business/ Self Employed	13.54	3.60	

Statistically significant value (p<0.05)

Table 5 highlights the relationship between dental anxiety and additional factors, revealing a statistically significant association between dental anxiety, previous dental visits (χ^2 = 6.76; p = 0.034), and self-perception or rating of oral health (p < 0.001).

Table 5: Dental Anxiety and Other Factors

Variable	Modified Dental Anxiety Scale (n=177)				
	Low (%)	Moderate (%)	High (%)	Total (%)	p-Value
Underlying medical condition(s)					
Present	17 (29.82)	26 (25.74)	7 (36.84)	50 (28.25)	0.584
Absent	40 (70.18)	75 (74.26)	12 (63.16)	154 (87.01)	
Dental Pain					
Present	27 (47.37)	60 (59.41)	14(73.68)	101 (57.06)	0.103
Absent	30 (52.63)	41 (40.59)	5 (26.32)	76 (42.94)	
Health Insurance					
Yes	38 (66.67)	50 (49.50)	8 (42.11)	132(74.58)	0.061
No	19 (33.33)	51 (50.50)	11 (57.89)	81 (45.76)	
Previous Visits					
Yes	32 (56.14)	59 (58.42)	5 (26.32)	96 (54.24)	0.034*
No	25 (43.86)	42 (41.58)	14 (73.68)	81 (45.76)	
Self-perception/Rating of oral health					
Bad	2 (3.51)	6 (5.94)	15 (78.95)	23(12.99)	0.000**
Fair	29 (50.88)	51(50.50)	4 (21.05)	84 (47.46)	
Good	26 (45.61)	44 (43.56)	0 (0.00)	70 (39.55)	

Statistically significant value (p<0.05)   ** *Fisher's Exact, statistically significant value (p<0.05)*

Table 6 shows the multi-nominal logistic regression analysis of the predictors of high dental anxiety. Low dental anxiety (5-11) was used as base outcome with likelihood ratio (χ^2 =108.76; p<0.001).Sex, marital status, previous dental visits, and self-oral health perception were predictors of high dental anxiety relative to low dental anxiety, with p-values of 0.028, 0.019, 0.033, and 0.001 respectively.

Table 6: Logistic regression to predict high dental anxiety

Predicators	Modified Dental Anxiety Scale Score (High dental anxiety)		
	Low dental anxiety (base outcome)		p-value
	Odds Ratio	95% Confidence Interva	
Age (years)	0.96	0.87-1.07	0.554
Sex	11.44	1.29-101.36	0.028*
Marital Status	0.041	0.002-.059	0.019*
Education	3.60	0.307-42.2	0.307
Occupation	5.30	0.88-31.98	0.069
Previous visits	-1.31	-2.53- -0.10	0.033*
Self-oral health perception	0.02	0.002-0.218	0.001*

Statistically significant value (p<0.05)

DISCUSSION

Amidst advancements in pain management techniques and efforts to alleviate dental fears, dental anxiety continues to persist as a formidable challenge for both patients and dentists [23]. The result of this study revealed that most of the participants experienced moderate level of anxiety while fewer participants had severe anxiety. In this study, the prevalence of dental anxiety was 10.73% with a mean dental anxiety score of 13.36 (±3.41). Other Nigerian studies reported lower prevalence rates of 8.7% [10], 7.5% [12], and 7.0% [13]. The variations in prevalence may be attributed to the differences in participant characteristics, methodology, and the specific scale used to measure dental anxiety, particularly the chosen cut-off values. Notably, a similar rate of 10.7% was reported in another Nigerian study [11]. However, these figures are lower compared to rates observed in the United Kingdom (11.6%) [24], Norway (17%) [25], and Australia (15%) [18].

This study revealed a significant association between sex and dental anxiety, with females exhibiting higher mean MDAS scores compared to males. This finding aligns with observations from previous studies where it has been consistently noted that anxiety tends to be more prevalent in females [26,27]. One possible explanation is that women are generally more inclined to openly express their feelings of fear and anxiety. Additionally, it has been proposed that genetic factors and female reproductive hormones might contribute to the manifestation of disorders such as dental anxiety, depression, and fear [28].

Numerous studies have consistently suggested that dental anxiety tends to decrease with advancing age, and the findings from this study support this assertion. The results revealed a significant association between age and dental anxiety, with the younger age group displaying higher mean MDAS scores. The lower level of anxiety observed in the older age group may be attributed to the natural process of ageing, which is often accompanied by a general decline in anxiety levels. This decline can be attributed to increased exposure to dental experiences over time, leading to the development of tolerance and a greater sense of familiarity [10].

In contrast to findings in certain previous

research [29,30], the results of this study indicate that participants with higher levels of education exhibited higher levels of dental anxiety compared to those with lower levels of education, as indicated by a statistically significant higher mean MDAS score. However, this finding is consistent with observations made by other authors [24,31]. A possible explanation for this finding is that individuals with higher levels of education may experience increased dental anxiety due to greater exposure to dental treatment information through the internet, and interactions with family and friends. Consequently, they may have higher anticipatory anxiety about the dental experience compared to individuals with lower levels of education.

The findings of this study revealed a noteworthy disparity in dental attendance among individuals based on their level of dental anxiety. This contradicts the reports from some previous studies [32,33] but is consistent with the findings of other research [34,35]. Specifically, this study found that participants who had previous dental visits exhibited lower levels of dental anxiety. Furthermore, this study identified an association between self-perceived oral health and dental anxiety. Individuals who rated their oral health as poor reported higher levels of dental anxiety compared to those who rated their oral health as good or moderate. These findings are consistent with the observations made by other authors, highlighting the association between self-perceived oral health and dental anxiety [31]. Moreover, logistic regression analysis identified sex, marital status, previous dental visits, and self-perception of oral health as predictors of high dental anxiety. Notably, a separate study conducted in Nigeria corroborated the finding that sex plays a role as a predictive factor of dental anxiety [13].

Findings from this study provide valuable insights into the complex interplay between various demographic factors, self-perceived oral health, and dental attendance. These insights contribute to a deeper understanding of dental anxiety and inform targeted interventions to address this significant oral health concern.

A notable limitation of this study lies in its confined scope within a hospital setting, where patient selection was conducted at random. Therefore, the outcomes cannot be extended to the wider population of Nigerians.

CONCLUSION

The prevalence of dental anxiety in this study was 10.73%. The presence of dental anxiety was associated with various demographic factors, such as sex and age, as well as dental attendance and self-perception of oral health. Moreover, the findings highlighted sex, marital status, previous dental visits, and self-perception of oral health as predictors of high dental anxiety.

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