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ORIGINAL ARTICLE

Prevalence and determinants of dental anxiety among adult population in Benin City, Nigeria

Braimoh Omoigberai Bashiru, Owoturo Enere Omotola[1]

Department of Preventive Dentistry, Faculty of Dentistry, College of Health Sciences, University of Port Harcourt, P.M.B. 5323, Choba Port Harcourt, Rivers State, [1]Department of Restorative Dentistry, Lagos state University Teaching Hospital, Ikeja, Lagos, Lagos State, Nigeria

Address for correspondence:
Dr. Braimoh Omoigberai Bashiru, Department of Preventive Dentistry, Faculty of Dentistry, College of Health Sciences, University of Port Harcourt, P.M.B. 1, Choba Port Harcourt, Rivers State, Nigeria.
E-mail: omoigberai.braimoh@uniport.edu.ng

ABSTRACT

Objectives: Dental anxiety is a significant determinant of regular dental visits. The objectives of the study were to determine the prevalence and determinants of dental anxiety among adult patients at the dental center of the University of Benin Teaching Hospital. **Subjects and Methods:** A total of 390 respondents aged 16–89-year-old were interviewed for the study. The Participants were selected through a predetermined sequence of systematic random sampling and completed a questionnaire based on the Coral Dental Anxiety Scale (CDAS). Data were analyzed using Statistical Package for Social Sciences version 20.0 (SPSS version 20, IBM Statistics, New York, USA) and means compared using Student's *t*-test and analysis of variance. **Results:** The prevalence of dental anxiety (CDAS ≥ 13) in the study population was 8.7% (n = 34), and the overall mean and standard deviation of CDAS was 7.81 ± 2.50. The total mean dental anxiety score and mean for each item were significantly higher in females than in males (t = 6.17 P = 0.016). There was a significant decrease in mean CDAS score with age (F = 14.51, P = 0.005). Mean CDAS score was significantly higher in respondents without formal education than those with formal education (t = 7.41, P = 0.005). The mean CDAS scores for root canal therapy were 9.66 ± 3.16; extraction, 8.84 ± 2.33; filling, 6.45 ± 2.81; and scaling, 5.12 ± 1.87. The highest and lowest means were not significantly different (t = 2.73, P = 0.07). **Conclusion:** The prevalence of dental anxiety in the study sample was low. Whereas dental anxiety was significantly associated with age, gender, and educational status, there was no significant relationship between dental anxiety and type of dental treatment.

Key words
Coral Dental Anxiety Scale, dental anxiety, determinants, prevalence

INTRODUCTION

Professional dental care received on a regular basis can provide an opportunity for prevention, early diagnosis, and treatment of oral and craniofacial disease and conditions.[1,2] People who seek regular preventive care have better oral health than those who do not or who seek care only when needed.[1,2] Dental anxiety is a significant determinant whether people will make regular dental visits.

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Dental anxiety is a "vague unpleasant feeling accompanied by a premonition that something undesirable is going to happen."[3] Unlike fear, anxiety, and its associated symptoms are most often anticipatory in nature, that is they are often felt when a stimulus is not present or readily identifiable.[4]

Various scales and psychological tests are available for the evaluation of dental anxiety in clinical settings

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and for research purposes;[5-9] according to Newton and Buck,[5] the most widely used in clinical settings was the Coral Dental Anxiety Scale (CDAS), this was adopted for this study. CDAS is brief, easy to administer, reliable, valid, and sensitive.[9] The CDAS has a good internal consistency with reliability coefficient of 0.86. It has good concurrent validity, with significant correlations with several measures of stress and anxiety related to dental work.[9] The CDAS is also reported as being sensitive to changes in dental anxiety as results of treatment.[10] It is 4-item questionnaire scored by summing individual item scores (from *a* = 1 to *e* = 5) for a total score from 4 to 20.[5-9]

Dental anxiety is associated with avoidance of dental care. An estimated 9–15% of all Americans avoid much needed care due to anxiety and fear surrounding dental experience.[11,12] This translates to some 30 million people so afraid of dental treatment that they avoid it altogether. In Nigeria, though the level of dental anxiety is low, there is observed avoidance of dental treatment as a result of anxiety.[13] Since patients do not seek dental care, there is rapid deterioration of oral health and preventable oral disease progresses to conditions that will require invasive procedures.[14,15]

Dental anxiety prevents people from optimizing and maintaining their dental health. In terms of dental health and overall well-being, this may have serious ramifications. Besides, chronically infected gingival and teeth, which may affect medical states, the ability to chew and digest can be seriously compromised, and speech may be affected as well. Self-confidence may be compromised if one is insecure about his breath and smile. In addition, it causes stress for many dentists who have to manage such patients, prolonging the chair time required to manage these patients. Therefore, dentists need to diagnose the condition and evaluate strategies to reduce it.[15] It is, therefore, imperative to determine the prevalence of the problem, so as to help in the planning of public health service and provision of clinic-based service, as well as the need for promoting good oral health.

Data on dental anxiety are scarce in Nigeria, particularly so in the South-South region where the study area Benin City is located. If dentists are aware of the level of anxiety of their patients, they may anticipate the patient's behavior and be better prepared to take measure to help alleviate the anxiety. The aim of this study, therefore, was to determine the prevalence and determinants of dental anxiety among adult patient at the dental center of the University of Benin Teaching Hospital (UBTH). Therefore, we hypothesize in this study that dental anxiety is not significantly associated with gender, age, education status, and type of dental treatment.

MATERIALS AND METHODS

The cross-sectional study was carried out at the Dental Centre of the UBTH, Benin City, Edo State, Nigeria. Ethical approval for the study was obtained from the Ethics and Research Committee of UBTH and written informed consent obtained from the participants. The sample size was estimated based on the average number of patients seen in UBTH annually. There were a total of 10,143 patients attending the outpatient dental clinic of the UBTH within a period of 12 months, and a minimum sample of 384 was calculated. The assumptions made were the proportion in the target population of dental patients estimated to have dental anxiety was 50%, precision (d) 5% and confidence interval of 95%, and standard normal deviate at 1.96. Data were collected over 7 months until the sample size was achieved.

The study samples were selected by picking every third patient registered at the medical records department, and the questionnaire was completed by the participants while waiting to see the dentist at the oral diagnosis unit. The questionnaire contained information on gender, age, level of education, previous dental visit, and CDAS.

The scale contains four multiple choice items dealing with the patient's subjective reaction to the dental situation.[7] This includes anticipating visit to the dental clinic, waiting in the dentist's office for treatment, waiting in the dental chair for drilling of teeth, and waiting in the dental chair for scaling the teeth. Each item contains five possible options that are arranged in ascending order, from 1 to 5 and each carries a possible minimum score of 1 and a maximum score of 5, resulting in a total possible minimum score of 5 and a total possible maximum score of 20 for the whole scale.

Statistical analysis was done using Statistical Package for Social Sciences (SPSS version 20, IBM Statistics, New York, USA). Student's *t*-test and analysis of variance (ANOVA) were employed to compare mean CDAS score between variables at 95% confidence interval and significant level at 0.05. Dental visit was classified into irregular visits (dental visits only when in pain) and regular visit (routine dental visits). Similarly, educational status was dichotomized into no formal and formal (primary, secondary, and tertiary) education. Dentally anxious individuals were defined as those with a CDAS score of 13 or more.[7,8] This cutoff point was used in this study.

RESULTS

A total of 390 respondents were interviewed for the study. The age of the participants ranged from 16 to 89 years with a mean age of 34.70 ± 13.51. Most of the respondents (33.8%) were within the 25–34 age

groups and majority (50.8%) had tertiary education. There were more females participants (61.8%) than males (38.2%) [Table 1].

The prevalence of dental anxiety (CDAS ≥ 13) in the study population was 8.7% (n = 34) and the overall mean and standard deviation of CDAS was 7.81 ± 2.50. Whereas the mean for anticipation of dental visit was 1.74 ± 0.91, that for waiting in the dental office, waiting for drill, and waiting for scaling were 1.80 ± 0.78, 2.35 ± 0.90, and 1.91 ± 0.83, respectively. The means for drilling and scaling were statistically significant (t = 7.08, P = 0.032). The mean CDAS score for each CDAS item was significantly higher in females than in males (t = 6.17 P = 0.016) except for anticipation of dental visit [Table 2].

Table 3 shows the distribution of the mean CDAS score according to gender, age, educational level, and dental visits. Respondents in the 16–24 years age bracket had the highest mean CDAS score of 9.30 ± 2.68; this was followed by 25–34, 35–44, 45–54, and above 55 years age group in descending order. ANOVA showed that the decrease in mean CDAS score with age was statistically significant (F = 14.51, P = 0.005). Regarding gender, the mean CDAS score was significantly higher in females (8.54 ± 2.44) than in males (6.62 ± 2.12) (t = 6.7, P = 0.022). Respondents without formal education had a mean score of 8.56 ± 2.85, whereas the mean score was 6.87 ± 2.13 in those with formal education. The difference was statistically significant (t 7.41, P = 0.005). The recorded mean CDAS score for participants who visited the dentist regularly was 7.35 ± 2.48 and those with irregular visit was 7.98 ± 64, the difference was, however, not significant (t = 3.13, P = 0.4).

The mean CDAS score in relation to various treatments is shown in Table 4. The mean CDAS scores for root canal therapy were 9.66 ± 3.16; extraction, 8.84 ± 2.33; filling, 6.45 ± 2.81; and scaling, 5.12 ± 1.87. The highest and lowest means were not significantly different (t = 2.73, P = 0.07).

DISCUSSION

Dental anxiety constitutes a major problem to patients and the dentists despite improvement in techniques in eliminating or decreasing dental pain and phobia.[9] The prevalence of dental anxiety is variable, values as low as 3%,[11] and as high as 30%[16] has been reported. The prevalence of dental anxiety in the present study is 8.7%, this was comparable to 7.5% and 7% reported by Udoye *et al.*[13] and Arigbede *et al.*,[17] respectively, among Nigerians. This prevalence is low compared to 15% reported in Australia,[18] and 17% in Norway[19] and

Table 1: Demographic characteristics of participants

Characteristics	Frequency	Percentage
Age (years)		
16-24	84	21.5
25-34	132	33.8
35-44	86	22.1
45-54	58	14.9
55 above	30	7.7
Sex		
Male	149	38.2
Female	241	61.8
Educational status		
No formal education	59	15.1
Primary	45	11.5
Secondary	88	22.6
Tertiary	198	50.8
Total	390	100s

Table 2: Means and standard deviation of Coral Dental Anxiety Scale items

DAS items	Mean±SD
Anticipation at home	1.74±0.91
Waiting in dental office	1.80±0.78
Waiting for drill	2.35*±0.90
Waiting for scaling	1.91*±0.83
Total	7.81±2.50

*Significant P<0.05. SD – Standard deviation, DAS – Dental Anxiety Scale

Table 3: Mean Coral Dental Anxiety Scale score according to demographic characteristics

	Mean±SD
Age (years)	
16-24	9.30±2.68
25-34	8.09±2.43
35-44	7.05±1.99
45-54	7.01±1.86
55 above	6.66±1.51
Gender	
Male	6.62±2.12
Female	8.54*±2.44
Educational level	
No formal education	8.56*±2.85
Formal education	6.87±2.13
Dental visits	
Regular	7.35±2.48
Irregular	7.98±2.64

*Significant P<0.05. SD – Standard deviation

Table 4: Mean Coral Dental Anxiety Scale score according to type of treatment

	Mean±SD
Extraction	8.84±2.33
Filling	6.45±2.81
Root canal treatment	9.66±3.16
Scaling	5.12±1.87

SD – Standard deviation

Ireland.[20] Study population characteristics, especially race, may be responsible for this difference. For instance, in a study to compare dental anxiety among Puerto Rican patients, the prevalence was lowest among blacks and highest among the Puerto Ricans.[21]

In the present study, female participants were more than male participants. This is similar to other studies conducted in the USA,[12] Nigeria,[13] Australia,[18] and Britain.[22] This may be attributed to better oral health-care seeking behavior exhibited by women as compared to men.[23]

The results of the present study showed that woman had higher total CDAS score and higher score for each CDAS item than men. This is in agreement with other studies that reported similar findings.[22,24-26] Medical and psychological research on human responses to pain stimuli has generally found that women report higher levels of anxiety and exhibit less tolerance for pain at given stimulus intensities than men.[27] It may also be that women are more likely to self-report, whereas men may not express their fear as openly as women.[13] Study bias due to subject distribution as seen in the present study may also be responsible for women reporting a higher level of dental anxiety.

This study shows a characteristic decrease of CDAS score with age. The patients aged 16–24-year-old recorded the highest CDAS score and those 55 years old and above recorded the lowest score. These findings are in conformity with the previous studies.[25,26,28,29] The decrease of dental anxiety with age can be due to the aging process itself characterized by general decline in anxiety.[28]

Considering dental anxiety in relation to the CDAS items; anxiety before drilling of the teeth was found to be the highest followed by scaling. This may be explained by the difference in the age of the participants. Participants <34 years constituted about 55% of the study population. This group is made up of adolescents and young adults, in whom dental caries and its sequelae are more common, and the treatment involves the use of drill. Similarly, respondents older than 34 years are more likely to manifest some degree of periodontal disease and may require meticulous scaling; this is considered painful, especially when the roots are exposed. Unpleasant dental experience associated with the use of drill and scalers among patients with previous dental visits could also account for dental anxiety expressed during drilling and scaling.

Furthermore, education status and dental attendance were associated with dental anxiety. Individuals without formal education were significantly more anxious than those with formal education. Humphris *et al.* reported similar findings.[15] Similarly, participants who attended dental clinic only when in pain (irregular attendees) were more anxious than regular attendees. The relationship between education and dental visits is well documented; education positively influences dental visits. Individuals without formal education are less likely to visit the dentist unless otherwise are in serious pain. Therefore, the avoidance of dental treatment by individuals without formal education may be related to dental anxiety as reported in this study.

Regarding dental anxiety and type of dental treatment; root canal therapy, extraction, and filling, respectively, were the most anxiety-provoking dental procedure among the participants in this study. Although this study corroborates the findings of Udoye *et al.*[13] and Wong and Lytle,[30] the relationship was not significant.

Although the CDAS is widely used, it has been criticized as exhibiting a range of total scores that are too narrow to be used in clinical studies. The Modified Dental Anxiety Scale (MDAS) was introduced to overcome this problem. The MDAS is based on the original CDAS with an increase in the number of possible responses from four to five and introduction of an additional item that asks about responses to administration of local anesthetics.[31] Therefore, the limitation of this study is that CDAS does not enquire about local anesthetic injection, which is a focus for some patients' anxiety. Therefore, study involving the general population in a regional or national scale using the MDAS is suggested. In spite of this limitation, the study provides valuable information on dental anxiety and its determinants among adult population in Edo state, Nigeria.

CONCLUSION

The prevalence of dental anxiety in this study was low when compared to other studies in the similar populations in other countries. This indicates that the intensity of dental anxiety may not be as strong among Nigerians as reported for other countries. Whereas dental anxiety was significantly associated with age, gender, and educational status, there was no significant relationship between dental anxiety and type of dental treatment.

However, it has also been observed that a large percentage of the Nigerian populace avoids dental treatment except when severe pain.[13] The observed avoidance of dental treatment among Nigerians, despite the seemingly low mean DAS scores, may be related to dental anxiety among other factors.

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Conflicts of interest
There are no conflicts of interest.

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