Dominique Reid[1], Kemisha Kerr[1], Xavier Carty[1], Jeffrey D'Ornellas[1], Brittney Gervais[1], Dia Joseph[1], Keshava Maharaj[1], Sudesh Soomai[1], Amy-Leigh Teixeira[1], Rahul Naidu[1]

[1]School of Dentistry
Faculty of Medical Sciences
The University of the West Indies
Trinidad and Tobago

Corresponding Author:
Professor Rahul Naidu
Faculty of Medical Sciences
Eric Williams Medical Sciences Complex
Mount Hope.
Trinidad and Tobago
Email: rahul.naidu@sta.uwi.edu

Abstract

Objective: To investigate the prevalence of dental anxiety in an adult Caribbean population and explore its relationship to socio-demographic factors and dental attendance.

Methods: An anonymous self-administered questionnaire was distributed to students attending The University of The West Indies, in Trinidad. The questionnaire included demographic items, self-rated oral health and dental attendance and the Modified Dental Anxiety Scale (MDAS). This self-reported instrument has five questions about anxiety to dental treatment rated on a 5- point scale (1=not anxious to 5=extremely anxious).

Results: 197 university students participated in the study. 51.3% were male. 76% were 18-24 years-old. Overall, 62.4% of participants reported a low level of dental anxiety (MDAS 5-14), 22.3% moderate dental anxiety (MDAS 15-18) and 15.2% severe dental anxiety (MDAS 19+). Over a quarter of participants reported that they would be extremely anxious if they were to have a tooth drilled or about to have a local anaesthetic injection (27.4% and 26.9% respectively). Higher mean anxiety scores were reported by female participants those who had difficulty finding dental care or had avoided going to the dentist due to fear of treatment (t-test $p<0.05$) and those with lower self-rated oral health (ANOVA $p<0.05$),

Conclusions: Among this sample of university students, the majority of participants reported low levels of dental anxiety. Higher dental anxiety levels were associated with gender, difficulty finding dental care, avoiding dental visits due to fear and lower self-rated oral health.

Introduction

Anxiety has been defined as '*generalized pervasive fear*' or '*distress or uneasiness of mind caused by anticipation of danger or misfortune*'.[1,2] Dental anxiety or fear of going to the dentist may be the result of negative past dental experiences and / or the fear of experiencing pain during dental treatment. Some patients may be so anxious about dental treatment that they develop an intense fear or dread resulting in a dental phobia. Phobia has been defined as a '*marked and persistent fear that is excessive or unreasonable caused by the presence or anticipation of a specific object or situation*'.[3] Population data has found that dental anxiety in adults is also associated with gender, age, frequency of dental attendance and socio-economic status (SES).[4] In particular, SES has been associated with a higher level of dental anxiety and this may be also related to problems of access, affordability and availability of dental care. Sociodemographic factors are therefore relevant to how dental care is planned and provided. Furthermore, people with toothache (pulpitis) have significantly higher levels of dental anxiety. Avoidance of dental treatment by anxious patients is associated with a deterioration in oral health related quality of life.[5-7] This may lead to a cycle of unmet treatment need and increasing dental anxiety. Despite some methodological differences, globally the prevalence of dental anxiety shows considerable variation and a possible trend of higher levels of severe dental anxiety in developing countries.[4,8-15] Several measurement scales have been developed to assess a patient's level of dental anxiety, including the Corah Anxiety Scale, the Children's Dental Fear Survey Schedule, and the Modified Dental Anxiety Scale.[16-18]

It should be noted that much of the research on dental anxiety has been conducted on groups of patients attending for dental care. However people with extreme dental anxiety or phobia causing non-attendance may not have been included. Research using samples from non-dental / non-clinical settings are potentially more informative. Dental anxiety has been found to be higher in younger age groups.[4] Samples of younger adults are often accessible in tertiary education institutions settings and among these populations, higher dental anxiety has been associated with poorer oral health, bleeding gums and pain in the mouth.[19,20]

There is little information on the prevalence of dental anxiety in the Caribbean, however findings from a dental hospital-based study in Trinidad suggests the problem may be common.[21]

The aim of this study was to describe the prevalence of dental anxiety in an adult Caribbean population in a non-clinical setting and explore relationship with demographic factors (gender / age), self-rated oral health and use of dental services and the implications for dental care.

Methods

Ethical approval for this study was obtained from The University of the West Indies Campus Research Ethics Committee. The study design involved a cross-sectional survey of students attending the University of the West Indies St. Augustine campus in Trinidad. A convenience sample of 200 individuals from this population was determined to be accessible and manageable within the resources and time-frame for data collection. The sample included full or part-time students of the University over 18 years of age, with no exclusion by gender or ethnicity

Over a two month period, students on the main campus of the University of the West Indies in Trinidad, were approached by the research group in recreation areas just before or just after classes and invited to participate in the study. Verbal consent was requested following an explanation of the aims of the research that all information recorded would remain confidential and anonymous. Students who met the inclusion

criteria and consented to participate in the study, filled out the survey questionnaire. With no subject identifiers recorded. All completed questionnaires were collated for entry to an electronic database and analysed using SPSS version 21. Analyses included descriptive statistics and bivariate analyses (*t*-test, ANOVA) to explore associations between dental anxiety levels, demographic variables and dental service utilization.

The questionnaire items included demographics, dental attendance, self-rated oral health and the Modified Dental Anxiety Scale (MDAS).[18] The MDAS is a self-administered instrument consisting of five questions on aspects of dental treatment with responses scored on a scale from 1 not anxious) to 5 (extremely anxious). Overall anxiety level for an individual is derived from the sum of scores for the five question items. Scores can therefore range from a minimum of 5 to a maximum of 25. This instrument has been shown to have good psychometric properties.[18] For this study an additional question item was included relating to having a tooth extracted, however data for this variable was not included in the MDAS score.

Results

Demographic characteristics

From a convenience sample of 200 students who met the inclusion criteria, 197 agreed to participate in the study, giving a response rate of 98.5 %. Data analysis was conducted on all 197 who participated. The majority of participants 76%, were 18-24 years-old and 51% were male. The main ethnic groups were Indian 39.6% and African 26.9%.

Over a quarter of participants 26.4% only visited the dentist when in pain whereas 30.5% visited every six months. The majority 84.3% had no difficulty finding dental care and 28.3% had avoided going to the dentist because of anxiety about dental treatment and 70% rated their oral health as good or better.

Dental Anxiety levels

Based on the total MDAS score, the majority of participants 62.4% had low levels of dental anxiety (Table 1).[5-14]

Table 1: Dental anxiety levels based on total MDAS score (N=197)

MDAS score / (anxiety level)	Participants (N=197)	
	n	%
5-14 (Low)	123	62.4
15-18 (Moderate)	44	22.3
19+ (Severe)	30	15.2

Severe dental anxiety (MDAS 19+) was reported by 15.2% of participants. Table 2 describes participant level of dental anxiety for each MDAS question, along with the item mean score.

Table 2: Participant response to each MDAS question and mean item score (n=197)

How would you feel...	Not anxious %	Slightly anxious %	Fairly anxious %	Very anxious %	Extremely anxious %	MDAS* Mean (sd)**
if you went to your dentist for treatment tomorrow?	43.1	22.8	18.8	10.2	5.1	2.11 (1.22)
if you were sitting in the waiting room?	33.5	33.0	17.8	11.7	4.1	2.20 (1.15)
if you were about to have your tooth drilled?	18.1	14.2	22.8	27.4	27.4	3.52 (1.30)
if you were about to have your teeth cleaned and polished?	47.7	25.4	14.7	5.6	6.6	1.98 (1.20)
if you were about to have a local anaesthetic injection?	14.2	11.7	21.8	25.4	26.9	3.39 (1.37)
(additional question item): **if you were about to have a tooth extracted?**	7.1	12.2	14.3	19.3	46.7	3.86 (1.32)

* Modified Dental Anxiety Scale =1 (not anxious) – 5 (extremely anxious).
** Standard Deviation

Over a quarter of participants reported that they would be extremely anxious if they were to have a tooth drilled or about to have a local anaesthetic injection (27.4% and 26.9% respectively). From the inclusion of the additional question on extraction, 46.7% reported that they would be extremely anxious if they were to have a tooth extracted. Highest mean anxiety scores were- having a tooth drilled 3.53, local anaesthetic injection 3.39 or having a tooth extracted 3.86.

Significantly higher overall mean anxiety scores were reported by female participants, those who had difficulty finding dental care and those who had avoided going to the dentist due to fear of treatment (t-test $p<0.05$) (Table 3).

Table 3: Dental anxiety (mean MDAS score), gender and dental attendance.

	n	Mean MDAS* (sd)**	t-test

Male		101	2.47 (0.95)	
Female		95	2.81 (0.95)	$p<0.05$
Difficulty finding dental care	**Yes**	30	3.17 (0.81)	
	No	166	2.55 (0.96)	$p<0.05$
Avoided going to dentist due to fear	**Yes**	56	3.31 (0.77)	
	No	135	2.36 (0.88)	$p<0.05$

*Modified Dental Anxiety Scale =1 (not anxious) – 5 (extremely anxious).
** Standard Deviation

Higher mean anxiety scores were also reported among participants who had lower self-rated oral health (ANOVA $p<0.05$). There was a significant difference in MDAS scores and self-rated oral health (ANOVA $p<0.05$), with a trend of higher scores in participants who had lower self-rated of oral health.

Discussion

The majority of participants in this study reported low levels of dental anxiety. This may suggest that dental anxiety is not a problem among these young adults, possibly due to positive dental care experiences and generally good oral health. However, the prevalence of severe dental anxiety 15.2% (MDAS 19+), was similar to previous data from Trinidad.[21] This is a higher prevalence than MDAS data for severe dental anxiety in the UK 11.6%. Comparison between findings from convenience sampling and population data should however be made cautiously.

Although not a national study, the ethnic composition of this sample was similar to that of the wider community in Trinidad, which is ethnically diverse with the two main groups being those of Indian or African ancestry. In similar studies, levels of dental anxiety were influenced by being on a clinical course, therefore the present study aimed to include predominantly non-clinical students.[19,20]

As expected, invasive dental treatment, such as having a tooth drilled, or a local anaesthetic injection elicited higher anxiety scores, indicating that people may perceive these types of procedure as potentially uncomfortable or painful. This may stem from past experiences of dental care but can also be influenced by anecdotal information from family and friends or negative cultural perceptions of dentistry. Tooth removal is still a common treatment option for decayed teeth in public health settings in the West Indies, therefore a question on anxiety in relation to having a tooth extracted was included although not actually part of the MDAS instrument. Interestingly this item showed the highest dental anxiety scores, confirming its relevance to measuring dental anxiety levels in a Caribbean population.

Consistent with the literature this study found that female participants had greater anxiety about dental treatment than male participants.[23] The reasons for this gender difference are unclear. One explanation could be that some male participants were not reporting the full extent of their anxiety. Furthermore, this finding may not be clinically relevant in view of the small sample size and use of convenience sampling.

The majority of participants in this study were not regular attenders despite over three quarters reporting that they did not have difficulty finding dental care. Irregular dental attendance has been associated with higher dental anxiety.[4] Dental attendance patterns can also be influenced by the level of awareness of local dental services and affordability of treatment. Importantly, participants who had avoided going to the dentist due to fear or anxiety had significantly higher MDAS scores. This finding is consistent with the literature. Dental anxiety can impact the frequency of dental visits with anxious patients visiting the dentist less frequently than non-anxious patients.[22] Dental anxiety was also higher in participants with lower self-rated oral health, suggesting they have unmet dental treatment needs.

As invasive dental treatment can elicit high levels of anxiety, methods to reduce anxiety must be considered for dental patients to improve dental service utilization and quality of care. Therefore when anxious patients access dental services they need to be managed appropriately and with empathy, consistent with the ethos of patient-centred care.[21] Furthermore dental anxiety management should be based on an assessment of the patients' anxiety level so that appropriate anxiety management regimes can be utilized.[24] These could include the use of anxiolytics, cognitive behavioural therapy (CBT), conscious sedation via inhalational or intravenous methods. Also, clear referral pathways, between primary and secondary care services should be instituted for dentally phobic patients.

This research had some limitations. Due to the use of a convenience sampling and small sample size the findings may not be generalizable to the wider adult population. Baseline data for dental anxiety testing was not available and information on SES was not recorded. As clinical dental examinations were not undertaken, associations between anxiety levels and clinical oral health status could not be assessed.

Conclusion

Among this sample of university students, the majority of participants reported low levels of dental anxiety. Higher dental anxiety levels were associated with gender, difficulty finding dental care, avoiding dental visits due to fear and lower self-rated oral health.

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