

Prevalence and factors associated with dental anxiety among primary school teachers in Ngara District, Tanzania

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Abstract

Background: Dental anxiety has been associated with several negative effects on patients and communities' oral health. The objective of this study was to assess the prevalence and factors associated with dental anxiety among primary school teachers in Ngara district, Tanzania.

Methods: This descriptive cross-sectional study utilized self-administered questionnaire to collect socio-demographic and behavioural details. A Kiswahili version of the Modified Dental Anxiety Scale (MDAS) was used to assess dental anxiety.

Results: The Kiswahili version of MDAS showed good face validity and reliability with standardized Cronbach's alpha coefficient of 0.86. The prevalence of high dental anxiety (MDAS \geq 19) was 1.2%. A significant higher percentage of schoolteachers with dental anxiety was observed among those with low education; who visited a dentist at least once in the past two years; and those who visited the dentist when having a dental problem. Sex, age, marital status and perceived oral health status did not show a significant difference.

Conclusion: The Kiswahili version of MDAS showed acceptable psychometrics. The prevalence of dental anxiety among school teachers in a rural district of Ngara in Tanzania was low. To maintain the low prevalence of dental anxiety and subsequently reducing it, oral health education and promotion on preventive dental health seeking behaviours is advocated.

Keywords: dental anxiety, scale, oral health, Tanzania

Introduction

Dental anxiety is an unpleasant poorly defined, or not immediately present dental stimulus accompanied by a strong feeling that something harmful usually within a dental context is about to happen <http://www.st-andrews.ac.uk/dentalanxiety/>. The feeling can be psychologically aversive and is usually unknown to an individual. Dental anxiety, however, can be distinguished from dental fear in that, the later is described as a normal emotional reaction to a known threatening stimuli in the dental situation (Chadwick, 2002). Dental anxiety is a common problem affecting societies worldwide, and hence a public health concern, as it impinges on patients' decision to visit the dentist with consequential effects on their oral health. Anxiety on dental issues has been reported to contribute to irregular dental attendance, delay in seeking dental care and even avoidance of dental care. It ultimately leads to deterioration of oral health (Chadwick 2002) which may have a significant influence on the individuals' oral health related Quality of Life (OHQoL) (Kumar *et al.*, 2009; McGrath & Bedi 2004).

In common with negative effects on patients and community's oral health, anxiety also, poses a challenge to clinicians during patient management. For the clinician to successfully accomplish treatment planned to a patient, pharmaceutical, such as sedation, and psychological modalities might be needed (Marya *et al.*, 2012). The later entails that dentists are expected to be able to diagnose and take care of patients showing signs of anxiety, and avoidance in the dental

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situation. Anxious patients, therefore, have been significantly perceived by dentists as one of the important main sources of stress in practice (Cooper *et al.*, 1987; Moore & Brødsgaard, 2001).

Various methods for measuring dental anxiety have been developed and utilized by clinicians and researchers. The most commonly used include the Corah's Dental Anxiety Scale (DAS) with four item scale (Corah, 1969), the Modified Dental Anxiety Scale (MDAS) with five items (Humphris *et al.*, 1995), the Kleinknecht's Dental Fear Survey (DFS) with 20 items (Kleinknecht *et al.*, 1984), Stouthard's Dental Anxiety Inventory (DAI) with 36 items and its shorter version (DAI-S) with 9 items (Stouthard *et al.*, 1993, 1995).

The Corah's DAS (CDAS) and the MDAS have been seen to be suitable for use in screening of populations and diagnosing patients with dental anxiety. The former has been used extensively in epidemiological and clinical studies and showed good psychometric properties. However, it does not have any reference to local anaesthesia (LA) injections, a major focus of anxiety for many (Ekanayake & Dharmawardena, 2003; Appukuttan *et al.*, 2012). Additionally, CDAS, unlike the MDAS, can provide meaningful measures only of extremely high or extremely low dental anxiety (Humphris *et al.*, 1995). Furthermore, MDAS has been used to measure dental anxiety without raising anxiety to respondents (Humphris *et al.*, 1995; Humphris & Hull, 2007). To date, the MDAS has been considerably utilized worldwide, among participants in clinical and in community settings (Humphris *et al.*, 1995; King & Humphris, 2010) in different languages with acceptable psychometric properties (Coolidge *et al.*, 2008; Yuan *et al.*, 2008; Coolidge *et al.*, 2010; Marya *et al.*, 2012).

Several studies have revealed a significant number of populations with dental anxiety. Prevalence rates among different groups of adult populations having an MDAS score of ≥ 19 were reported to be 19.5% (N=200) in Belfast, Northern Ireland; 6% in Dubai, UAE and; 8.8% Jyvaskyla and 3% Helsinki, in Finland (Humphris *et al.*, 2000). In the Netherlands, more than half of the studied populations were reported to be highly anxious (Stouthard & Hoogstraten, 1990). In developing countries, Koleoso & Akhigbe (2014) reported a prevalence rate of dental anxiety of 10.7% among Nigerian adults. Community based studies reveal that there are a number of factors that are associated with dental anxiety. Higher levels of anxiety have been observed among younger than older adults (Marya *et al.*, 2012; Appukuttan *et al.*, 2015); and among women than males (Naidu & Lalwah, 2010; Arigbede *et al.*, 2011; Malvania & Ajithkrishnan, 2011; Marya *et al.*, 2012). Socio-economic status such as literacy rate, dental health status and awareness on oral health issues as well as dental attendance patterns have also been reported to influence dental anxiety (Stouthard & Hoogstraten, 1990; Arigbede *et al.*, 2011; Appukuttan *et al.*, 2012; Egbor & Akpata, 2014). Humphris & King (2011) reported that dental and non-dental past experiences might, as well, have an influence on reported dental anxiety.

Assessment of level of dental anxiety among populations and factors associated with dental anxiety is envisaged to provide information that would be useful for clinicians to aid in treatment planning. The information would as well aid in understanding the communities and hence provide focused interventions that would be effective. This study, therefore, was carried out to: (i) determine the prevalence of dental anxiety; and (ii) assess psychometric properties of a Kiswahili version of the MDAS and factors associated with dental anxiety among primary school teachers in Ngara District, Tanzania.

Materials and Methods

Study area and design

This descriptive cross-sectional study was conducted among primary school teachers in Ngara district, Kagera region in north-western Tanzania. Primary school teachers were selected due to ease of accessibility and being a role model in most communities. According to the 2012 National census,

the district has a population of 320,056 residents. Primary schools were selected from a list of all schools (N= 120) in the district, by assigning each school a number. A total of 18 schools were randomly selected by collecting pieces of papers that contained the numbers assigned to the schools. A total of 250 primary school teachers, who were present at the school during data the collection period (August and September, 2014) as well as willing to participate in the study were included.

Data collection

A structured self-administered questionnaire constructed in English and translated into Kiswahili (the official language of Tanzania) was utilized. Before being administered in the field translation and back translation of the questionnaire was done and reviewed by oral health professionals fluent in Kiswahili. The questionnaire was given to the teachers while seated in their staff room. The questionnaire included information on socio-demographic details on their age, sex and level of education and coded as low education (Universal Primary Education and Certificate education) versus high education (diploma and graduate education); dental attendance behaviours in terms of frequency of dental attendance in past two years (coded not attended vs. attended at least once); their perceived oral health status; and assessment of dental anxiety using a Modified version of Dental Anxiety Scale (MDAS). MDAS score was categorized into three; non-anxious (score 5-15), low to moderate anxiety (score 16-18) and highly anxious (score 19 and above). MDAS score of 19 and above was considered as the level for which a dental practitioner would have to use additional approaches to manage the patient - such as desensitization, relaxation and pharmacological intervention.

Data analysis

Analyses utilized a statistical package of social sciences (SPSS) version 23. Cross tabulation and Chi-square statistics were used to assess bivariate relationships; to test whether socio-demographic and behavioural factors can significantly be discriminated by the adults' perceived level of dental anxiety (MDAS ≥ 19 and MDAS ≥ 16). The significant level was set at 95% confidence interval ($p < 0.05$). Validity of Kiswahili version of MDAS inventory was assessed by identification of variables with missing values. Additionally, internal consistency reliability in terms of inter-item correlation coefficient was determined by utilizing SPSS version 23.

Ethical consideration

Ethical approval for the study was obtained from the Muhimbili University of Health and Allied Sciences. The permission to conduct the study was sought from the District Education Officer in Ngara. Participants who consented were included in the study. All participants were assured on confidentiality of information and no names were included in the questionnaires.

Results

A total of 250 primary school teachers were involved in the study, with 53.2% being males. About three quarters (71.2%) of the teachers belonged to a young adult age group of 22-35 years. A larger percentage of the teachers (91.6%) had low education and more than half are either married or had once been married (58.4%) (Table 1).

Table 1: Socio-demographic characteristics of the respondents and their perceived oral health status and dental health behaviours

Variable	Response	N (%)
Sex	Male	133 (53.2)
	Female	117 (46.8)
Age	Young adults 22-35years	178 (71.2)
	Middle / Older adults >35years	72 (28.8)
Level of education	Low (UPE / Certificate)	229 (91.6)
	High (Diploma / Degree)	21 (8.4)
Marital status	Single	104 (41.6)
	Married/Divorced/separated/widow	146 (58.4)
Perceived Oral Health Status	Good	240 (96)
	Bad	10 (4)
Dental attendance in the past two years	Never attended	145 (58)
	Attended at least once	105 (42)
Reason for dental attendance	With or without dental problem	20 (8)
	Only when I have dental problem	227 (92)

Almost all teachers (96%) perceived their oral health as being good. Nonetheless, less than half (42%) reported to have attended dental clinic at least once in the past two years. Most teachers (92%) reported to have attended dental clinic 'only when they had a dental problem'. The five-item MDAS frequency scale was filled out by the primary school teachers, with no omitted frequency item. Internal consistency reliability analysis showed homogeneity of the MDAS scale items. The corrected item-total correlation coefficient, which refers to the correlation between each item and the total score after omitting the item, ranged between Cronbach's Alpha 0.62 and 0.76 with standardized Cronbach's alpha coefficient of 0.86.

Table 2: Internal consistency reliability of the Kiswahili version of Modified Dental Anxiety Scale among school teachers

MDAS item	Corrected Item - Total Correlation	Cronbach's Alpha if Item deleted
1. Appointment	0.626	0.835
2. Waiting room	0.633	0.834
3. Tooth drilling	0.761	0.801
4. Scaling and polishing	0.702	0.818
5. Local anaesthesia	0.668	0.835
Standardized Cronbach's Alpha		0.861

The prevalence of high dental anxiety (MDAS score of ≥ 19) among primary school-teachers was 1.2%, the mean MDAS score was 11.9 ± 2.9 SD; range 16 (min 7.0; max 23). The anxiety scores were skewed

towards lower values, with the percentage of school-teachers' of 86.8% (N=217), 12% (N=30) and 1.2% (N=3) having a score of 5-15 (no anxiety), 16-18 (low/moderate anxiety) and ≥ 19 (high anxiety), respectively. The percentage of school-teachers exhibiting dental anxiety score that includes low/moderate/high level (MDAS score of ≥ 16) was 13.2%.

The prevalence of dental anxiety according to specific stimuli among the school-teachers ranged from 60.8% (being anxious when 'they have to go to a dentist the next day') to 100% (being anxious to 'local anaesthetic injection'). There was an increase in percentage of school-teachers' dental anxiety with an increase with specific MDAS stimuli (Figure 1).

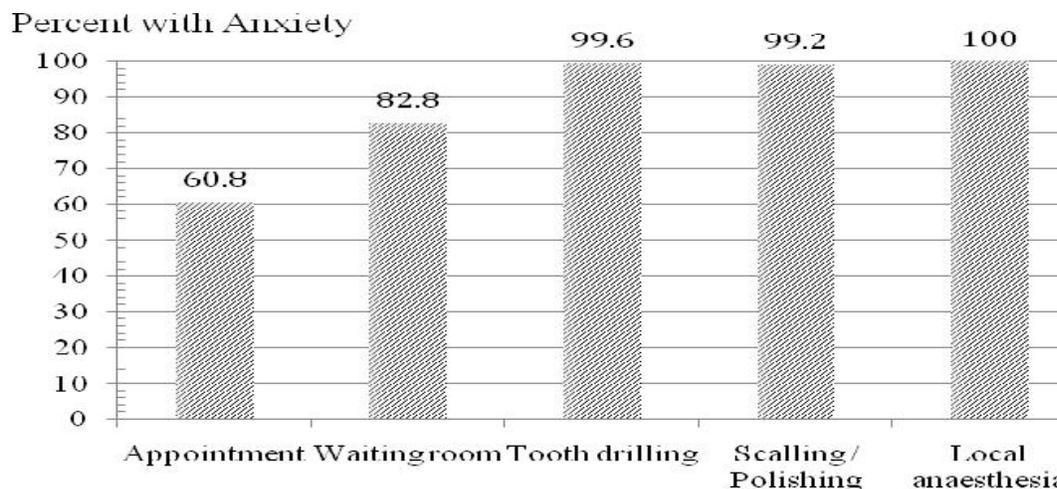


Figure 1: Percentage of primary school teachers anxious to specific stimuli

Regarding the extent (severity) of dental anxiety, the majority of the primary school teachers were slightly to fairly dentally anxious (Figure 2). All the teachers were anxious of local anaesthetic injection and the stimuli that exerted more severe anxiety (i.e. very anxious and extremely anxious) were in descending order, the local anaesthetic injection (27.2% and 6%, respectively) followed by tooth drilling (8.8% and 0.8%, respectively); and scaling and polishing (8% and 0%, respectively).

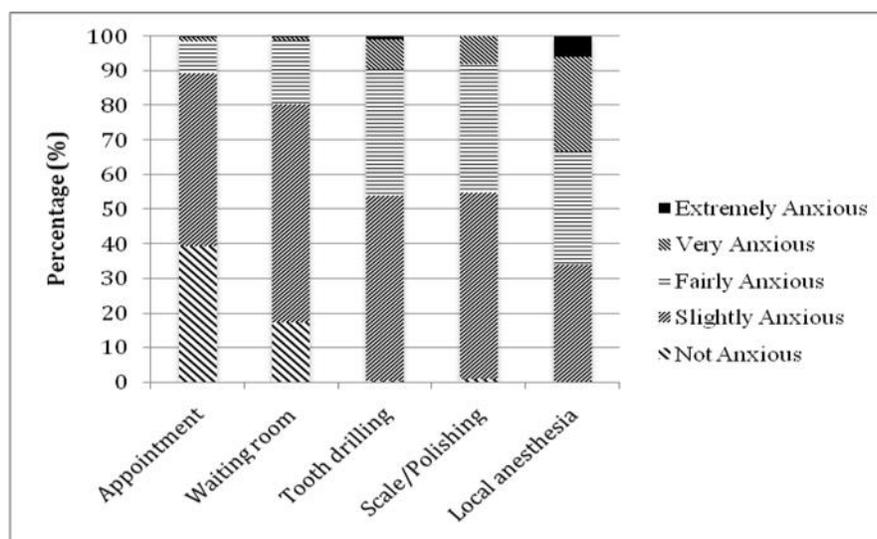


Figure 2: The extent / severity of dental anxiety to different stimuli

Table 3 shows the percentage of primary school-teachers who perceived to have high level (MDAS score of ≥ 19) and low/moderate/high level (MDAS score of ≥ 16) of dental anxiety according to different socio-demographic and behavioural variable. All primary school-teachers who perceived to have high level of anxiety with MDAS score ≥ 19 , belonged to a group with low education level ($p < 0.05$); among those who reported to have attended to a dentist at least once in the past two years ($p < 0.05$) and those who gave the reason for visiting a dentist only when they have a dental problem ($p > 0.05$). Similarly, though not statistically significant ($p > 0.05$), a higher percentage of male school-teachers, those who were middle-aged or older as well as those who were single and those who perceived to have a poor oral health status, had high dental anxiety (MDAS score ≥ 19) (Table 3).

The level of dental anxiety among school-teachers was observed to be of low/moderate. When the cut-off point was lowered to include those with low/moderate dental anxiety a similar trend of percentage of school-teachers with dental anxiety (MDAS score of ≥ 16) as those with high dental anxiety (MDAS score of ≥ 19) was revealed (Table 3). This was true for all the variables except age of respondents whereby higher percentage of young adults had anxiety compared to middle/older adults. None of the primary school-teachers with 'high education' in Ngara district reported to have dental anxiety. A similar situation is observed when the cut-off point was lowered and the difference was statistically significant. Furthermore, lowering the cut-off point exaggerated the level of significance for education level ($p < 0.05$), 'dental attendance' in the past two years ($p > 0.05$) and reason for dental attendance variables ($p < 0.05$) (Table 3).

Table 3: Modified Dental Anxiety Scale score of ≥ 16 and ≥ 19 according socio-demographic and behavioural variables

Variable		N (%) MDAS ≥ 16	N (%) MDAS ≥ 19
Sex	Male	21 (15)	2 (1.5)
	Female	12 (10.3)	1 (0.9)
Age	Young adults 18-35years	25 (14)	2 (1.1)
	Middle/Older adults >35years	8 (11.1)	1 (1.4)
Level of education	Low (UPE/Certificate)	33 (14.4) *	3 (1.3)
	High (Diploma/Degree)	0 (0)	0 (0)
Marital status	Single	17 (16.3)	2 (1.9)
	Married/Divorced/separated/widow	16 (11)	1 (0.7)
Perceived Oral Health Status	Good	30 (12.5)	2 (0.8)
	Poor	3 (30)	1 (10)
Dental attendance in the past two years	Never attended	15 (10.3)	0 (0)
	Attended at least once	18 (17.1) *	3 (2.9) *
Reason for dental attendance	With or without dental problem	0 (0) *	0 (0)
	Only when I have dental problem	33 (14.3)	3 (1.3)

* Chi-square statistics, $p < 0.05$

Discussion

The MDAS was chosen to be an instrument for assessment of dental anxiety among primary school teachers in this study since it is simple to use compared to other similar instruments (Humphris *et al.*, 1995; Armfield, 2010); and it has been utilized in a number of studies in different languages with acceptable psychometric properties (Koleoso & Akhigbe, 2014). In this study, the Kiswahili version of MDAS showed good psychometric properties among Tanzanian adults. Similar findings have been

reported in other studies (Naidu & Lalwah, 2010; Appukuttan *et al.*, 2013). The primary school teachers responded to all MDAS items. The lack of missing responses observed in this study indicates that the Kiswahili version of MDAS has good face validity. Furthermore, the percentage of respondents' perception to specific stimuli showed that anxiety increased in the expected direction with an increase in stimulus. The reliability scores in this version of MDAS inventory are considered satisfactory whereby the internal consistency reliability in terms of *Cronbach's alpha* of 0.86 being above the recommended level of 0.70. Furthermore, the corrected item total correlation coefficients, ranging from *Cronbach's Alpha* 0.62 to 0.76 were above the minimum level of 0.20 for inclusion of an item into a scale (Streiner *et al.*, 2014).

The prevalence of reported dental anxiety among primary school teachers is considered to be low. Similar findings have been reported in a study in India (Appukuttan *et al.*, 2013). Contrary to these findings, a high prevalence of 10.7-12.2% have been reported among dental patients, students and nurses in Nigeria (Koleoso & Akhigbe, 2014), among University students in U.K. (Humphris & King, 2011) and Spanish speaking adults the United States (Coolidge *et al.*, 2010). The difference in prevalence of dental anxiety could be due to dissimilarities in research methodologies, as well as characteristics of the study population. In most studies with high prevalence, subjects were recruited from dental emergency clinics or hospital premises waiting for treatment (Kanegane *et al.*, 2003; Malvania & Ajithkrishnan, 2011; Koleoso & Akhigbe, 2014), pain and discomfort of patients being interviewed may have lead them to reporting anxiety of higher extent. In our current study, the participants were selected from a community in a school setting, which might contribute to the observed low prevalence among this studied population.

The prevalence of high dental anxiety among males and females was similar. Similar findings have been reported among patients attending dental education in Chennai, India (Appukuttan *et al.* 2013). However, other previous studies females having higher dental anxiety than males (Kanegane *et al.*, 2003; Naidu & Lalwah, 2010; Arigbede *et al.*, 2011; Malvania & Ajithkrishnan, 2011; Marya *et al.* 2012) this is likely to be attributable to females having lower threshold for pain than males. On the other hand, though not statistically significant, higher percentage of younger adults was more dentally anxious than their older counterparts. This lack of significance is similar to what was reported elsewhere by Moore *et al.* (1993). Most previous studies though, report a significant decrease in dental anxiety with increasing age (Stouthard & Hoogstraten, 1990; Marya *et al.*, 2012; Appukuttan *et al.*, 2015). The later has been considered to be related to the ability of older adults to cope with stressful situation hence report lower dental anxiety.

In this study, dental anxiety was not reported among highly educated school-teachers. Like in our study, Appukuttan *et al.* (2012) reported that uneducated individual in India were more anxious than their educated counterparts. It was speculated that those with higher education have ability to rationalize stressful situations hence more able to cope. It could, as well, be due to better access to information on oral health among the educated community than the uneducated (Egbor & Akpata, 2014).

Despite the low prevalence score of severe dental anxiety, a high percentage of primary schoolteachers reported to have dental anxiety, which was of low to moderate extent. This entails that a few of the studied adults would need a dentist to use additional approaches such as desensitization, relaxation and medications to manage them. More than half of the participants in this study reported that they have not attended to a dentist in the past two years. Their perceived anxiety might have been brought about from lay community hearsay rather than their own dental visit experience, which could be the reason for them to report anxiety of low / moderate extent.

Almost all primary schoolteachers perceived to have a 'good oral health status'. Similar findings have been reported in other studies (Stouthard & Hoogstraten, 1990; Appukuttan *et al.*, 2012). The fact that the majority of the primary schoolteachers also stated that they attend to a

dentist ‘when in pain’ might explain the high percentage of them reporting to have a good oral health status believing that lack of pain means absence of dental problems and hence lower their dental anxiety. Those who reported to have ‘attended to the dentist in the past two years’ were significantly, more anxious than those who ‘never attended’. Other studies have reported that negative past dental visit experience contributes to dental anxiety (Malvania & Ajithkrishnan, 2011; Arigbede et al., 2011; Appukuttan et al., 2015). Specifically for this group of population, all the participants reported to be anxious of ‘local anaesthetic injection’, and to attend to the dentist when they are in pain. Previous studies in Tanzania report that the main treatment option provided is tooth extraction using local anaesthesia (Mosha & Scheutz, 1993; Kikwilu et al., 2009; Nyamuryekung’e et al., 2015). The main reason being patients attending the dental clinic when in pain, usually occurring at the late stages of disease progression (Kikwilu et al. 2008). This might, therefore, mean that all those who attended to a dentist could most probably have received dental extraction and other traumatic procedures and hence raised their anxiety.

In conclusion, the Kiswahili version of MDAS inventory had acceptable psychometrics among schoolteachers in Ngora district. The prevalence of dental anxiety, which will require additional approaches to be utilized by a dental practitioner during management, is low in the studied population. Dental attendance habits have been seen to have significant negative influence on dental anxiety among the studied primary schoolteachers. To maintain the low prevalence and subsequently reducing it, oral health education and promotion focusing on messages that encourage preventive dental health seeking behaviour is advocated. Furthermore, since almost all participants had anxiety over local anaesthetic injections and drilling, selecting simple and atraumatic treatment procedures on the part of a dentist is imperative, to build positive attitudes to the communities.

Competing interests

Authors declare that they have no competing interests

Author contributions

IKM and ACJ participated in conception of the study, design of study, statistical analysis and manuscript writing. GJM participated in statistical analysis and manuscript writing.

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