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ORIGINAL ARTICLE

Dental fear and its related factors among patients managed in a paediatric dental clinic of a university hospital in Tanzania

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ABSTRACT

Objective: This study aimed to determine the prevalence of dental fear and its related factors among patients managed in a pediatric dental clinic of a university hospital in Tanzania.

Material and Methods: This was a cross-sectional study carried out at the paediatric dental clinic of the Muhimbili University of Health and Allied Sciences (MUHAS) between November 2018 and April 2019. It included all paediatric dental patients aged between 6 and 12 years. A questionnaire used in this study captured information regarding patients' socio-demographic characteristics and the number of previous visits to the dental clinic. A fifteen-item Children's Fear Survey Schedule - Dental Subscale (CFSS-DS) was used to assess the dental fear status in these pediatric patients.

Results: A total of 223 paediatric dental patients aged between 6 years and 12 years were included in the study. The mean age of participants was 9.52 ± 1.74 years with a male to female ratio of 1: 1.04. The means CFSS-DS score was 31.1 ± 8.57. Fear scores were high for *Injections* (3.37 ± 1.13), *a stranger's touch* (2.81 ± 1.08) and *choking* (2.69 ± 0.99). The presence of dental fear was found to be significantly associated with the parents' education level ($p=0.001$) and previous dental visits ($p<0.001$).

Conclusion: The results of this study suggest that the prevalence of paediatric dental fear was low among the participants of this study. The education level of parents and previous dental visits were determinants of dental fear in children. Injections, being touched by strangers, and choking were the common fear-provoking factors.

INTRODUCTION

Dental fear is considered to be a significant challenge in the management of pediatric patients[1]. It usually leads to avoidance of dental treatment and neglect of dental care, thereby negatively affecting the child's oral health[2]. The reported prevalence of dental fear among children in different countries range between 5 and 33%[2,3].

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Multiple factors can contribute to dental fear in children, some of these include age and gender of the child and dental fear in parents[2]. Studies hypothesize that dental fear decreases with age[1,5]. Likewise, it has been speculated that parents' dental fear might exert an influence on their children's fear[3]. Other factors that can lead to dental fear in children include cultural background and subjective experiences (such as previous painful dental experiences).

In the recent past, several studies have been carried out to assess the level of dental anxiety/fear in the Tanzanian population[6-8]. However, there is a paucity of documented studies that report the prevalence of dental fear among children in Tanzania. This knowledge gap renders it difficult for the dental professional to estimate the magnitude of the problem and to understand fear-inducing factors among paediatric patients in Tanzania. Therefore, this study was undertaken to determine the prevalence of dental fear and its related factors among patients managed in a paediatric dental clinic of a university hospital in Tanzania. It was hypothesized that the level of dental fear among paediatric patients was independent of children's sex, age, parent's education level, and previous dental visits.

METHODS

The study was a cross-sectional study carried out at the pediatric dental clinic of the Muhimbili University of Health and Allied Sciences (MUHAS) between November 2018 and April 2019. It included all pediatric dental patients aged between 6 and 12 years, however, it excluded those who required emergency dental care or were very sick and in agony.

The population adjustment formula for single proportion estimation[9] was used to estimate the sample size based on a 95% confidence level, a precision of 5%, and power of 0.8 with an expected proportion of 13.8% which was obtained from a similar study done in Italy[10]. The minimum sample was estimated to be 200. A consecutive sampling technique was used until the required sample size was reached.

A questionnaire used in this study captured information regarding patients' socio-demographic characteristics and the number of previous visits to the dental clinic. A fifteen-item Children's Fear Survey Schedule - Dental Subscale (CFSS-DS) was used to assess the dental fear status in these pediatric patients. The items of CFSS-DSwere scored as follows: Not afraid = 1; a little afraid = 2; fairly afraid = 3; quite afraid = 4; and very afraid = 5.

In the presence of patients' caretakers, the children were interviewed while they waited to be attended to/treated.The data obtained was analyzed by using the Statistical Package for the Social Sciences (SPSS) version 23 (IBM, Armonk, NY, USA). Data was presented in the form of the mean for continuous variables and percentages for categorical variables.

The age of the patients was dichotomized into ≤ 9 years and > 9 years. The level of education of the participants' parents was categorized into those with low level (no formal and primary education)and high level (secondary and tertiary education). The level of clinical dental fear was dichotomized according to the total score obtained after adding the individual score of each question. The total CFSS-DS score ranged from 15 to 75. Children with CFSS-DS ≥38 were defined as having clinical dental fear[11].

A one-way Analysis of Variance (ANOVA) was used to assess the differences in dental fear for selected factors (age, sex, combined parents' education, and previous dental visit). The probability level of $p < 0.05$ was selected for statistical significance. Univariate and multivariate logistic regression models were used to assess associations between the socio-demographic characteristic of participants and dental fear.

Ethical clearance was provided by the MUHAS Institution Review Board (Ref. No. DA.282/298/01.C). Permission to conduct the research was sought through the school of Dentistry administration at MUHAS. Informed assent and permission for the study were sought from the

patients' caretaker and the patients respectively before data collection. Participation in this study was voluntary. The confidentiality and rights of the respondents were considered and maintained. The process of data collection was non-invasive, and no harm was done out of this study.

Ethics Approval and Consent to Participate

The study was approved by the Institution Review Board of the Muhimbili University of Health and Allied Sciences. Participation was voluntary and for each participant, a signed informed ascent form was obtained before data collection. The participants were assured of confidentiality and their right to participate or withdraw without any conditions.

Figure 1: The study participants' general mean score for various items of CFSS-DS

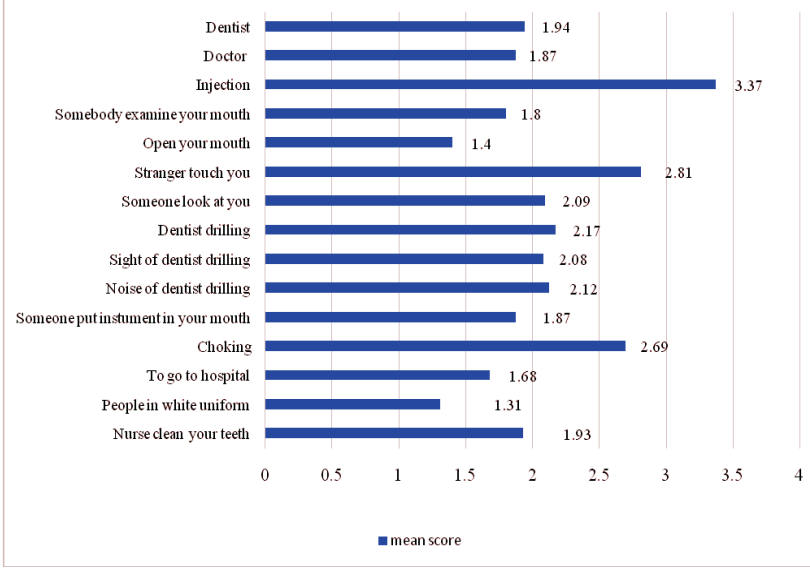

Table 1: Distribution of the paediatric dental patients by their socio-demographic characteristics and previous dental visits.

Socio-demographics and Dental visits	Number (%)
Age	
≤ 9 years	102 (45.7)
> 9 years	121 (54.3)
Sex	
Male	109 (48.9)
Female	114 (51.1)
Combined education level of parents	
Both had a low level	50 (22.4)
Atleast one hada high level	36 (16.1)
Both had a high level	137 (61.4)
Previous visits to the dental clinic	
First visit	47 (21.1)
Not a first visit	176 (78.9)

RESULTS

This study included a total of 223 paediatric dental patients aged between 6 years and 12 years. Their mean age was 9.52 ± 1.74 years. There was an almost equal number of male to female participants (male to female ratio of 1: 1.04). A combined education level of both parents of most (137, 61.4%) participants was secondary and above. A majority (176, 78.9%) of the paediatric patients had been to the dentist in the past (Table 1).

The overall mean CFSS-DS score was 31.1 ± 8.57. Fear scores were high for *Injections* (3.37 ± 1.13) followed by *touch by a stranger* (2.81 ± 1.08) and *choking* (2.69 ± 0.99). The items with the least fear score were seeing *people with white uniforms* (1.31 ± 0.60) and having *to open the mouth* (1.40 ± 0.70) (Figure 1).

The was no statistically significant difference in mean fear scores of different items with the pediatric patients' age. The mean fear score for *injections* was high in females compared to males ($p<0.05$). There was a statistically significant difference in mean fear scores of *dentist, doctor, injection, mouth being examined, opening mouth, someone looks at you, noise of drill, instruments being put in the mouth,*

Table 2: Mean scores (standard deviation) ofCFSS-DS according to selected factors.

Question	Factors												
	Sex		p-value	Age		p-value	—			p-value	Previous visit		p-value
	Female	Male		≤ 9 years	> 9 years		Grp 1	Grp 2	Grp 3		1st visit	Not 1st visit	
Q1	1.87(0.93)	2.01(1.06)	*0.291*	1.95(1.12)	1.93(0.88)	*0.850*	2.40(1.05)	2.19(0.92)	1.70(0.92)	***<0.001***	2.57(1.17)	1.77(0.87)	***<0.001***
Q2	1.87(0.79)	1.87(0.99)	*0.979*	1.96(0.96)	1.79(0.83)	*0.164*	2.48(0.89)	2.03(0.94)	1.61(0.76)	***<0.001***	2.06(1.15)	1.82(0.81)	*0.094*
Q3	3.65(0.99)	3.08(1.19)	***<0.001***	3.33(1.25)	3.40(1.01)	*0.637*	3.72(0.93)	3.56(1.16)	3.20(1.16)	***0.01***	3.83(1.11)	3.25(1.10)	***0.002***
Q4	1.82(0.85)	1.77(1.04)	*0.672*	1.88(1.01)	1.73(0.64)	*0.225*	2.04(0.90)	2.08(1.13)	1.64(0.88)	***0.005***	2.13(1.28)	1.71(0.82)	***0.007***
Q5	1.32(0.51)	1.48(0.84)	*0.102*	1.45(0.75)	1.36(0.83)	*0.308*	1.74(0.75)	1.61(0.93)	1.22(0.52)	***<0.001***	1.77(1.11)	1.30(0.49)	***<0.001***
Q6	2.75(1.08)	2.86(1.08)	*0.456*	2.77(1.15)	2.83(1.01)	*0.679*	3.04(0.97)	2.72(0.74)	2.74(1.18)	*0.223*	3.02(1.11)	2.75(1.07)	*0.126*
Q7	2.06(1.06)	2.13(1.19)	*0.656*	2.17(1.13)	2.03(1.11)	*0.376*	2.58(1.20)	2.42(1.13)	1.83(1.01)	***<0.001***	2.04(1.08)	2.11(1.13)	*0.723*
Q8	2.27(1.05)	2.07(0.91)	*0.133*	2.24(0.96)	2.12(1.01)	*0.403*	2.44(0.93)	2.19(0.95)	2.07(1.00)	*0.078*	2.81(1.11)	2.01(0.88)	***<0.001***
Q9	2.11(1.01)	2.06(0.92)	*0.698*	2.09(0.88)	2.07(1.03)	*0.915*	2.26(0.92)	2.14(0.90)	2.00(0.99)	*0.245*	2.83(1.05)	1.88(0.84)	***<0.001***
Q10	2.20(1.01)	2.03(0.83)	*0.161*	2.17(0.86)	2.07(0.98)	*0.460*	2.32(0.89)	2.31(0.82)	1.99(0.95)	***0.041***	2.74(0.94)	1.95(0.85)	***<0.001***
Q11	1.89(0.89)	1.85(0.94)	*0.790*	1.90(0.94)	1.84(0.89)	*0.632*	2.38(0.85)	1.92(0.84)	1.67(0.88)	***<0.001***	2.51(1.04)	1.70(0.80)	***<0.001***
Q12	2.82(0.98)	2.55(0.98)	*0.044*	2.66(1.05)	2.71(0.93)	*0.685*	2.94(0.71)	2.64(0.93)	2.61(1.07)	*0.116*	2.53(1.06)	2.73(0.96)	*0.229*
Q13	1.73(0.73)	1.57(0.75)	*0.110*	1.74(0.77)	1.58(0.72)	*0.117*	2.02(0.68)	1.92(0.81)	1.45(0.67)	***<0.001***	1.64(0.82)	1.65(0.73)	*0.902*
Q14	1.32(0.57)	1.31(0.63)	*0.962*	1.39(0.71)	1.25(0.49)	*0.074*	1.52(0.81)	1.50(0.70)	1.19(0.43)	***<0.001***	1.55(0.90)	1.25(0.47)	***0.002***
Q15	2.04(0.94)	1.82(0.99)	*0.093*	1.95(0.96)	1.91(0.98)	*0.749*	2.54(0.86)	2.14(0.99)	1.65(0.89)	***<0.001***	2.11(1.15)	1.88(0.91)	*0.157*

Key

Q1. How do you feel about the**dentists**
Q2. How do you feel about the **doctor**
Q3. How do you feel about the **injection**
Q4. How do you feel about having **somebody examine the mouth**
Q5. How do you feel about having **to open your mouth**
Q6. How do you feel about having **a stranger touch you**
Q7 How do you feel about having **someone look at you**
Q8. How do you feel about the **dentist drilling**
Q9. How do you feel about the **sight of a dentist drilling**
Q10. How do you feel about the **noise of dentist drilling**
Q11. How do you feel about having **someone put instruments in your mouth**
Q12. How do you feel about **choking**
Q13. How do you feel about having **to go to the hospital**
Q14. How do you feel about the **people in white uniforms**
Q15. How do you feel about having the **nurse clean your teeth**

going to the hospital, seeing people in white uniform and *nurse cleaning the teeth (*p<0.05) between different groups of parents' education level. and both the combined education level of parents and the number of previous visits to the dentist (p<0.05) (Table 3).

Table 3: Clinical dental fear in pediatric dental patients by their socio-demographic characteristics and previous dental visits.

Socio-demographics and Dental visits	Clinical dental fear		p-value
	Not afraid	Afraid	
Age			
≤ 9 years	77 (75.5%)	25 (24.5%)	0.592
> 9 years	95 (78.5%)	26 (21.5%)	
Sex			
Female	88 (77.2%)	26 (22.8%)	0.982
Male	84 (77.1%)	25 (22.9%)	
Combined education level of parents			
Both had low level	30 (60.0%)	20 (40.0%)	
Atleast one hadhigh level	25 (69.4%)	11 (30.6%)	0.001
Both had high level	117 (85.4%)	20 (14.6%)	
Previous visits to the dental clinic			
First visit	24 (51.1%)	23 (48.9%)	<0.001
Not a first visit	148 (84.1%)	28 (15.9%)	

Pediatric patients whose both parents had a primary or below level of education had higher mean scores (Table 2).

Mean fear score for *doctor, stranger touch you, someone look at you, choking, going to the hospital,* and *nurse cleaning the teeth* were not significantly different between those who were visiting the dentist for the first time and those who already had previous visits (p>0.05) (Table 2).

Generally, only 51 (22.9%) of the pediatric patients had clinical dental fear. There was a statistically significant association between clinical dental fear

Compared to paediatric patients whose both parents had a high level of education, the odds of dental fear among those with only one parent with a high level of education was 2.5 times higher (OR= 2.5, 95% CI 1.09 - 6.04) and almost 4 times higher among those with both parents with a low level of education (OR= 3.9, 95% CI 1.86 - 8.16). The odds of clinical dental fear among those who were visiting the dentist for the first time were five times higher than that of their counterpart (OR= 5.1, 95% CI 2.52 -10.20).

DISCUSSION

This study included children aged 6 to 12 years because in this age group children are already enrolled in school therefore, wereable to understand and respond to the questions without requiring assistance from their parents.To assess the level of dental fear the Children's Fear Survey Schedule-Dental Subscale of the (CFSS-DS) was usedsince it covers mostaspects of the dental situation has better psychometric properties and therefore measures dental fear more precisely[4].

Though the mean CFSS-DS score in this study was comparable to that from Italy[10], it was lower than findings from India[11] but slightly higher than findings from elsewhere[5,12,13]. The data obtained in the present study portrayed that only about 23% of the study population suffered from dental fear. This was higher than findings from India[12] but lower than findings from other studies[5,11]. The reasons for the differences in the proportion of dental fear in this study compared to other studies can be attributed to both socio-cultural differences of the study population and the methodologies of the study.

In the current study, most of the paediatric patients feared *injections*, *touch from a stranger,* and *choking*. Other studies[3,10,11,14,15] have also reported injections, touch by a stranger, and choking to be among the highest-ranked fear-inducing factor among paediatric patients. The injection is associated with pain[16] whereas, choking is associated with the inability to breathe therefore dying[17]. Both fear for injection and choking, as for any other fear-inducing factor maybe be related to genetics, previous stressful life experiences, and parental behavior[16,17].

Though some studies have reported that dental fear decreases with age[1,5], the findings from this study depicted that there was no significant association between the age of the participants and dental fear. Such findings may indicate that fear that develops during childhood may be carried on into teenagehood and/or adulthood if no intervention is taken. Since dental fear is a serious problem that negatively affects the oral health of children and adults[2,12], it is very important to solve the problem early in childhood by encouraging preventive measures. The preventive measures may reduce the level of dental fear among children by preventing the child from experiencing dental pain and subsequently reduce the need for painful procedures like injection and extractions[12].

The parent's level of education had a significant linear relationship with the occurrence of dental fear in their children. Dental fear was more in participants whose parents had only primary school education compared to those whose both parents had higher education levels. Studies[18-20] have indicated that education level is a factor affecting the dental anxiety level of adults. Individuals with a higher level of education are more aware of dental treatment procedures and the importance of dental care hence less anxious compared to their counterparts[18,19]. Considering that children learn from their parents, they are likely to acquire the parents' outlook[12]. Hence when they witness dental fear in their parents they may develop dental fear as well. In addition, it has been suggested that many adults with dental fear may verbalize their fearful feelings in front of their children, creating a negative impression on dental treatment[3].

The results from this study pointed out that children who were visiting the dental clinic for the first time were five times more likely to have dental fear compared to those who had already been to the dentist in the past. These findings might not be surprising because generally, individuals are anxious in a new environment, however with multiple exposures to the same environment, one gets used to it thus the fear reduces. According to the Social Learning Theory (SLT) people tend to learn about their environment via imitation, modeling, and observing the consequences of other people's behavior[21]. This theory can be used to explain why children who had been to the dentist in the past were less likely to have dental fear. It can be speculated that during their initial visits these patients had the opportunity to observe an actual successful dental

procedure, and learned what is considered to be appropriate behavior in the dental setting, and what can be expected in the upcoming treatment session[22].

The findings of the current study can not be generalized because of some inherent limitations. Firstly, it was carried out in a clinical setting which may have induced some degree of fear in the child. Secondly, there is a risk that patients with high levels of dental anxiety did not show up for treatment therefore, the data might not be normally distributed. This calls fora larger community study to quantify the problem in a general population. Despite this, the strength of the study lies in the fact that the study participants filled the questionnaire without the influence of their parents, therefore, the results reflect the true magnitude of the problem in a clinical setting. The clinical implication of this study is that it gives valuable information to the dental professionals regarding dental fear in children, thus they can prepare the pediatric patients psychologically for dental procedures[1] and institute a positive attitude to forthcoming dental treatments.

CONCLUSION

The prevalence of dental fear was low among the participants of this study. Age and sex of the pediatric patients did not influence dental fear. Parents' level of education and children's previous dental visits had a significant association with the presence of dental fear in children. The most fearful dental items reported by the children were injections, being touched by a stranger, and choking.

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COMPETING INTERESTS

The authors declare that they have no competing interests with regards to authorship and/or publication of this paper.

AUTHOR'S CONTRIBUTION

The authors have contributed equally to this work by making substantial contributions to the conception and design, acquisition of data, and analysis and interpretation of data as well as being involved in drafting of the manuscript or revising it critically for important intellectual content. All authors read and approved the final manuscript.

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