

Oral health related quality of life and satisfaction with dental condition of school age children with dental pain in Ibadan, Nigeria.

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Research

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Abstract

Background Pain of dental origin is a major reason why school age children seek dental care in low resource settings but how it affects their oral health related quality of life and satisfaction with dental condition remains under researched. The aim of the study was to determine the impact of dental pain on oral health related quality of life as well as its association with satisfaction with dental condition of school age children in Ibadan, Nigeria.

Methods This cross-sectional study was conducted among 1006 pupils aged 9-12 years who attended randomly selected primary schools in Ibadan, Nigeria. An interviewer administered questionnaire, Child–Oral Impact on Daily Performances inventory (C-OIDP) in addition to oral examination was used to obtain data. Analysis was done with SPSS version 23 and p value < 0.05 was considered significant.

Results The prevalence of self-reported dental pain was 10.2%. The mean C-OIDP score was 2.6 (± 7.2) overall and 9.8 (± 12.4) for pupils with pain. About 68.9% of pupils with pain reported an impact on quality of life compared to 15.6% of those without dental pain ($p < 0.001$). Self-reported dental pain affected social, psychological and physical activities ($p < 0.001$). More children with dental pain (53.4%) were dissatisfied with their dental condition compared to those (12.8%) without dental pain ($p < 0.001$). Dental pain correlated with dissatisfaction with dental condition ($r_s = 0.32$, $p < 0.001$). Among children with dental pain; those who were dissatisfied with their dental condition were more likely to report impairment in eating and enjoying food (OR=2.2, CI =1.1 - 4.1, $p = 0.018$) as well as in maintaining social contact (OR =3.1, CI =1.1 -9.1, $p = 0.033$).

Conclusion Self-reported dental pain significantly impacted on all the domains of quality of life of the pupils and correlated positively with dissatisfaction with dental condition. Eating and enjoying food as well as maintaining social contact were significant predictors of dissatisfaction with dental condition among children with dental pain.

Background

Pain is commonly associated with many oral diseases in both children and adults. Dental pain is a sequela of oral diseases such as dental caries, traumatic dental injuries among others in children [1–3]. The prevalence of dental pain among children varies across the globe with prevalence rates as high as 64.1% documented among children aged 8 to 12 years in Nigeria [1], 47.5% reported among 8 year olds in England [4] and 33.7% among Brazilian children aged 12–13 years [2]. Factors such as socioeconomic class and demographic characteristics have been shown to influence the occurrence and perception of dental pain [1, 5–8]. Pain of dental origin has been reported as the predominant reason for accessing dental care services among children in low resource settings [9, 10].

Dental pain has been associated with impaired quality of life [2, 11, 12]. It has negative impacts on physical, functional and psychosocial domains of oral health related quality of life (OHRQoL) in children [4, 11, 12]. Although the impact of dental pain on the oral health related quality of life of children has

been investigated, [1, 11–15], little is known about how dental pain affects satisfaction with dental condition among them. In addition, the relationship between the satisfaction with dental condition of children and the domains of oral health quality of life of those in pain remains under researched. This research gap is noteworthy more so, dental care seeking behaviour is likely influenced by self-perception of dental pain [9, 16, 17] and invariably self-assessment of oral health.

Self-assessment or subjective assessment of oral health such as self-rating of oral health and satisfaction with dental condition are useful for summarising oral health status [18, 19]. They may complement clinical indices to provide holistic care in clinical and non-clinical settings [20]. There is however, sparse information about satisfaction rating of oral condition in children both in clinical settings and the community making this study important. Investigating how satisfaction rating with dental condition among children affects overall OHRQoL and its association with dental pain will facilitate understanding the applicability of these subjective assessment tools in children. It will also provide insights on the effects of pain on children's satisfaction with their oral condition. In addition, it will also shed light on the daily activities that must be impaired to cause dissatisfaction with oral condition among children with dental pain in clinical settings and in programme monitoring or evaluation. This study therefore assessed the impact of dental pain on the oral health related quality of life and its association with satisfaction with dental condition among 9 to 12-year-old pupils in Nigeria.

Methods

Study design

A cross-sectional study was conducted among school pupils aged 9–12 years attending randomly selected public schools in Ibadan metropolis.

Sample size

The sample size for the study was calculated using a sample size formula for cross-sectional studies [21]. A prevalence of 64.1% obtained from a previous study [1], a power of 80%, confidence interval of 95% and accuracy of 3% inputted into the formula generated a minimum sample size of 982.

Sampling

The pupils recruited for the study were selected through multistage random sampling technique. The first stage involved selection of 18 primary schools from the list of schools obtained from the State Ministry of Education through the use of a table of random numbers. The second stage involved selection of 9 to 12-year-olds within each selected school. The list of pupils in the fourth and fifth grades aged 9 to 12 years in each school was obtained from the school register from which a total number of 56 pupils were randomly selected. Thus, a total of 1008 pupils were approached for the study. The purpose of the study was explained to them and each pupil took home a consent form (in English Language and the translated form in the local language) through which information about the purpose of the study was explained to their parents. Consent was obtained from the parents of each pupil before recruitment into

the study. Only pupils who were available at the time of the study and gave assent participated in the study. Those who were ill were excluded from the study.

Ethical consideration

Ethical approval for the study was obtained from the State Research Ethics Committee. Permission was also sought and obtained from the State Ministry of Education and from the head teachers of participating schools.

Data collection

Information on dental pain and its impact on the oral health related quality of life was assessed with the use of an interviewer administered questionnaire. The questionnaire contained items on the sociodemographic characteristics of the pupils. The questionnaire enquired "if they were experiencing pain from their teeth at the time of the study and in the preceding four weeks". This was assessed on a graded pain severity scale of 1 to 10 with 10 as the worst pain. The impact of dental pain on the OHRQoL was assessed with the Child-Oral Impact on Daily Performances (C-OIDP) inventory that had been validated in the country [22]. The total C-OIDP score was obtained by multiplication of the frequency and severity scores for each pupil. In addition, satisfaction with the condition of the mouth of each participant was assessed and the response was recorded either as "satisfied" or "dissatisfied". Presence or absence of tenderness to gentle percussion of tooth/teeth was evaluated by a trained and calibrated dentist with a wooden spatula [23]. The intra examiner's kappa score was 0.9. A pilot study was conducted prior to the study among children aged 9 to 12 years in a school that was not included in the study to determine the feasibility of the study and comprehensiveness of the questionnaire.

Data analysis

Data obtained was collated and subjected to statistical analysis using SPSS version 23. Categorical variables were summarised using percentages and proportions. Continuous data were summarised with mean, standard deviation and 95% confidence interval. Tests of association between variables were done using Mann Whitney U statistics, Chi-square statistics and Spearman Rho correlation test. Multivariate analysis was done using multiple logistic regression to determine association between satisfaction with dental conditions and C-OIDP variables that were significant on bivariate analysis. A p value < 0.05 was considered to be statistically significant.

Results

A total of 1006 pupils participated in the study out of the 1008 approached for recruitment i.e. a response rate of 99.8%. The mean age of the participants was 10.5 (SD = 1.1) years and 478 (47.5%) were females. One hundred and three (10.2%) reported dental pain, while 14 (1.4%) had at least a tooth that was tender to percussion on oral examination. The majority (83.0%) were satisfied with the condition of their mouth.

The standardised Cronbach alpha value of the C-OIDP scale was 0.94 and when each of the items of the scale was deleted the Cronbach alpha value was reduced suggestive of the importance of each item of

the C-OIDP scale. Inter-item correlation coefficient ranged from 0.2 to 0.9.

A total of 212 (21.1%) pupils had at least an impact of oral health on their quality of life. The C-OIDP score ranged from 0 to 63. The mean C-OIDP score was 2.6 (± 7.2) overall and 9.8 (± 12.4) for pupils with pain. The median C-OIDP value was 0 overall and 6.0 for those with dental pain. About 71 (68.9%) of pupils with pain reported at least an impact on quality of life compared with 141 (15.6%) of those without dental pain ($X^2 = 158.07$, $p < 0.001$).

Many 835 (83.0%) of the respondents were satisfied with their dental condition and 171 (17.0%) were dissatisfied with their dental condition. More than half, 55 (53.4%), of those who reported dental pain were dissatisfied with their dental condition, whereas among those without self-reported dental pain, 116 (12.8%) were dissatisfied with their dental condition ($p < 0.001$).

(Insert Table 1)

Table 1

Self-reported pain and impacts on the oral health related quality of life with C-OIDP items

C-OIDP Item	Self-reported dental pain	Mean rank	U	Z	p value
Eating /enjoying food			22744.5	-13.035	< 0.001*
	Yes	734.2			
	No	477.2			
Speaking/pronouncing words			36061.0	-7.969	< 0.001*
	Yes	604.9			
	No	491.9			
Cleaning of the teeth			24348.5	-12.273	< 0.001*
	Yes	718.6			
	No	479.0			
Sleeping and relaxing			35204.5	-9.562	< 0.001*
	Yes	613.2			
	No	491.0			
Smiling/showing teeth			36716.0	-7.791	< 0.001*
	Yes	598.5			
	No	492.7			
Emotional stability			36745.0	-9.754	< 0.001*
	Yes	598.3			
	No	492.7			
Doing school work			42903.5	-5.614	< 0.001*
	Yes	538.5			
	No	499.5			

* - Statistically significant U- Mann-Whitney U Test value

C-OIDP Item	Self-reported dental pain	Mean rank	U	Z	p value
Social contact			411952	-6.911	< 0.001*
	Yes	547.7			
	No	498.5			
* - Statistically significant U- Mann-Whitney U Test value					

There was a significant relationship between self-reported dental pain and impact on the oral health related quality of life (Table 1). Furthermore, all the OIDP items were affected by self-reported pain (Table 1). Eating and enjoying food was the most frequently reported activity that was affected by pain (Table 2).

Table 2
Frequency of C-OIDP items affected by self-reported dental pain

Child- OIDP inventory	Number	%
Eating and enjoying food	149	37.0
Speaking and pronouncing words	112	27.8
Cleaning teeth	136	33.7
Smiling	73	18.1
Relaxing/sleeping	104	25.8
Emotional stability	78	19.4
Doing school work	67	16.6
Social contact	82	20.3
At least an impact	167	41.4

(Insert Table 2)

A higher proportion (53.4%) of respondents with pain were dissatisfied with their dental condition than those without pain (12.8%), $p < 0.001$ (Table 3). Normatively assessed dental pain did not have a significant impact on the oral health related quality of life of participants (Table 3).

Table 3
Satisfaction rating of dental condition and pain

Dental pain	Satisfaction with dental condition		Total n (%)	χ^2	p value
	Satisfied n (%)	Dissatisfied n (%)			
Self-reported					
Yes	48 (46.6)	55 (53.4)	103 (100.0)	107.762	< 0.001*
No	787 (87.2)	116 (12.8)	903 (100.0)		
Normatively assessed pain					
Yes	10 (71.4)	4 (28.6)	14 (100.0)	1.348	0.275
No	825 (83.2)	167 (16.8)	992 (100.0)		
* Statistically significant					

(Insert Table 3)

There was no significant association between sociodemographic variables and report of dental pain. Respondents with dental pain who had negative impacts on eating and enjoying food ($p = 0.010$), cleaning teeth ($p = 0.003$), sleeping ($p = 0.047$) and enjoying contact with other pupils ($p = 0.008$) were more dissatisfied with their dental conditions than others (Table 4). Among children with dental pain; those who were dissatisfied with their dental conditions were more likely to report impairment in eating and enjoying food (OR = 2.2, CI = 1.1–4.1, $p = 0.018$) as well as in maintaining social contact (OR = 3.1, CI = 1.1–9.1, $p = 0.033$). The self-reportage of dental pain significantly (moderately) correlated with dissatisfaction with dental condition ($r_s = 0.32$, $p < 0.001$).

Table 4

Satisfaction rating of dental condition and impairment of the C-OIDP items of pupils with dental pain

C-OIDP Item	Satisfaction with dental condition		χ^2	p value
	Satisfied n (%)	Dissatisfied n (%)		
Eating and enjoying food				
No impact	23 (63.9)	13 (36.1)	6.646	0.010*
Negative impact	25 (37.5)	42 (62.7)		
Speaking and pronouncing words				
No impact	37 (50.0)	37 (50.0)	1.22	0.269
Negative impact	11 (37.9)	18 (62.1)		
Cleaning teeth				
No impact	27 (64.3)	15 (35.7)	8.912	0.003*
Negative impact	21 (34.4)	40 (65.6)		
Smiling				
No impact	39 (51.3)	37 (48.7)	2.589	0.108
Negative impact	9 (33.5)	18 (66.7)		
Relaxing/sleeping				
No impact	39 (52.7)	35 (47.3)	3.931	0.047*
Negative impact	9 (31.0)	20 (69.0)		
Emotional stability				
No impact	38 (48.1)	41 (51.9)	0.580	0.306
Negative impact	10 (41.7)	14 (58.3)		
Doing school work				
No impact	46 (48.9)	48 (51.1)	2.355	0.125
Negative impact	2 (22.2)	7 (77.8)		
Social contact				
No impact	47 (51.1)	45 (48.9)	6.964	0.008*
Negative impact	1 (9.1)	10 (90.9)		
*Statistically significant				

(Insert Table 4)

Discussion

The study showed that self-reported pain negatively impacted on the oral health related quality of life of children aged 9 to 12 years and moderately correlated with dissatisfaction with dental condition. The impact of self-reported pain on the oral health related quality of life does not differ from findings by other authors [1, 4, 11, 14]. In addition, children who reported dental pain had six folds' negative impact on their quality of life when compared to other participants. This is a reflection of the magnitude that dental pain has on affected children and a need to institute prevention strategies among school aged children to limit the impact of pain on their oral health related quality of life.

The daily activity that was most frequently affected by pain was "eating and enjoying food". This has been mentioned by others [24, 25]. The role of food in everyday living may be partially responsible for this finding. It is not surprising as the major role of the mouth known by adolescents in a similar setting is eating [26]. The next ranked activity affected by pain was "cleaning the teeth". Cleaning of the teeth requires touching of the teeth with tooth cleaning aid and as such a potential aggravating factor to elicit pain during the act of tooth cleaning. Other activities of the C-OIDP were also affected and included "speaking and pronouncing words", "sleeping and relaxing", "maintaining social contact", "maintaining emotional stability", "smiling" and the last being "doing school work". The finding of "doing schoolwork" as the least reported activity affected by pain may be alluded to the fact that school work is given priority by pupils, parents and teachers. In addition, missing school is usually not taken lightly by all concerned except the child is obviously ill, which often does not take into cognisance dental conditions.

There was no significant association between normatively assessed dental pain and oral health related quality of life of respondents in the study. This may be attributed to the different causes of pain evaluated by percussion of the tooth, which could be periapical pathology as is the case of vertical percussion and periodontal pathology with lateral percussion of the teeth [23]. Therefore, the causes of dental pain affecting these children may not be associated with any of the above listed pathologies. In addition, it is a pointer to the importance of individual assessment or perception of pain, which may differ significantly from that of the clinician's assessment.

More than half of the respondents who reported dental pain were dissatisfied with their dental condition. This finding is similar to that of a previous study where parents reported children's dissatisfaction with their oral conditions [27]. This is suggestive of the crucial role that dental pain plays in the perception of dental condition as being satisfactory or otherwise in children. It is thus worthy of note to clinicians as well as caregivers to place children's satisfaction with their dental conditions at the frontiers of management for a better treatment outcome. Importantly, it may explain the reason why pain is the main motivator for children who seek dental care in low resource settings [9, 10]. The impact of dental pain on the oral health related quality of life affected all the domains; physical, psychological and social. This is another likely explanation for the aforementioned dental care seeking behaviour as observed among

children by previous authors [25]. Furthermore, the relevance of satisfaction ratings with dental condition in children in the monitoring and evaluation of population based interventions and dental care programme cannot be over emphasized. These findings highlight the importance of dental pain as a negative factor that impacts on the oral health related quality of life of children and is also strong enough to cause dissatisfaction with their oral health condition.

“Eating and enjoying food”, “tooth cleaning”, “sleeping and relaxing” and “enjoying contact with other children” were the C-OIDP items that were significantly negatively impacted upon by pain and associated with dissatisfaction with dental condition. These finding suggests that the pupils rate the aforementioned activities highly. In addition, any negative impact or inability to engage in these activities, as in this case dental pain, influences their perception and results in eventual dissatisfaction with the state of their oral conditions. On multivariate analysis, however, only “eating and enjoying food” as well as “maintaining social contacts with other children” resulted in higher dissatisfaction with dental condition. Importantly, these activities should be checked both in the clinic and field settings as the case may be to ascertain the success of treatments and interventions implemented. In addition, dental pain moderately correlated with dissatisfaction with dental condition, which may make the application of the satisfaction rating of dental condition, a useful complementary tool in the monitoring and evaluation of dental pain both at the clinic level and in population based interventions.

Conclusion

Self-reported dental pain significantly impacted on all the domains of quality of life of the pupils and correlated positively with dissatisfaction with dental condition. Among pupils with dental pain; eating and enjoying food and enjoying social contact with other pupils were daily activities negatively impacted upon to cause significantly higher dissatisfaction with dental condition.

Declarations

Ethics approval and consent to participate

Ethical approval for the study was obtained from the State Research Ethics Committee. Permission was also sought and obtained from the State Ministry of Education and from the head teachers of participating schools. Consent was obtained from the parents and assent from the pupils before recruitment into the study.

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors have no competing interests.

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Authors' contributions

FBL conceptualized the study, wrote the initial proposal for the study, designed the questionnaire used for the study, coordinated data collection and analysis and wrote large parts of the manuscript. GAO contributed to the study proposal, the design of the questionnaire and parts of the manuscript. Both authors read and approved the final version of the manuscript.

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Abbreviations

CI

Confidence interval

C-OIDP

Child Oral Impact on Daily Performances

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