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ORIGINAL ARTICLE

Impact of Untreated Dental Caries on Daily Performances of Children From Low Social Class in an Urban African Population: The Importance of Pain

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Abstract

Objective: To determine the impact of untreated dental caries on the oral health related quality of life (OHRQoL) of children from low social class in an urban Nigerian population. **Material and Methods:** The study was conducted among 6 to 15-year-old pupils from low social class in randomly selected primary schools in Ibadan. An interviewer-administered Child Oral Impact on Daily Performances (C-OIDP) questionnaire was used to obtain required information. Oral examination was conducted by calibrated examiners. Data obtained were analyzed with SPSS and test of association done with Mann-Whitney U and Chi-square tests. **Results:** A total of 1286 pupils participated in the study and 130 (10.1%) had untreated dental caries, out of which 26 (20.0%) had pain from carious tooth. The C-OIDP of children with dental caries was similar to that of children without caries [median 0.0 vs. median 0.0; r = -0.025; p=0.368]. The median C-OIDP (3.0) of those with untreated dental caries and pain was higher than that of participants with painless caries [0.0; r=-0.768; p<0.001]. There were significant impacts on all eight domains of the OHRQoL of those with untreated dental caries and pain (71.4 – 100.0%) when compared to those with painless caries (0.0 – 28.6%; p<0.05). **Conclusion:** Untreated dental caries significantly impacts on OHRQoL of pupils from low social class only when associated with pain.

Keywords: Quality of Life; Social Class; Dental Caries; Toothache.

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Introduction

Dental caries is one of the commonest chronic childhood diseases worldwide with the prevalence varying from one region to another [1]. Prevalence rate as high as 91.8% and 77.7% has been documented among children in some regions such as Russia [2] and India [3] respectively. In Nigeria, the prevalence varies from 5.7% to 42.7% [4]. Furthermore, the prevalence of dental caries has been reported to be on the increase among children in Southwestern Nigeria [5].

Importantly, and of note, from various studies conducted in Nigeria, is the decayed component (signifying untreated carious tooth/teeth) of the Decayed, Missing and Filled Teeth (DMFT) index that accounts for the majority of the index [4-10]. Untreated dental caries has been reported to be commoner among children from low social class in urban settings and among children in rural communities [2,8]. Untreated dental caries exists with many consequences and are the commonest reasons for dental care service utilization in children in developing countries such as Nigeria [11,12].

Surprisingly, how untreated dental caries impacts on the quality of life of affected children despite the high unmet needs from dental caries that exist in Nigeria still remains unknown. Although the effect of unmet dental needs and oral health on the quality of life of children has been evaluated in Nigeria [13,14] the extent to which untreated dental caries impacts on the quality of life of children remains unresearched.

Determining the impact of dental caries on daily performances of children is important as it is a subjective assessment of how this condition affects the children and their daily performances. Subjective assessment, which is concerned with how the individual is affected by the disease, plays crucial roles in describing the burden of a disease condition and in promoting oral health among the studied population. In addition, assessing the impact of untreated dental caries on the quality of life of children particularly those from the low social class is important in view of health inequities and inequalities that exist in social class from the public health point of view. This study, therefore assessed the impact of untreated dental carious lesions on the quality of life of primary school children from the low social class in Ibadan, Nigeria.

Material and Methods

Sample

This study was conducted among pupils aged 6 to 15 years in randomly selected public primary schools in Ibadan. Ibadan is the capital city of Oyo State and it is the largest city in West Africa. The primary schools were selected from the list of schools in two randomly selected Local Government Areas (LGAs) obtained from the State Ministry of Education. The schools were allotted numbers and were randomly selected by balloting. A total of 12 schools were selected and all pupils aged 6 to 15 years available at the time of the study, whose parents were from low social class as outlined by modification of Office of Population Census and Surveys (OPCS) used for this environment [15,16] and those who had no special needs were recruited for the study. Pupils who

were ill at the time of the study were excluded. For each pupil, a written translated informed consent was obtained from either parent and assent obtained from the pupil.

Data Collection

The Child-OIDP (C-OIDP) questionnaire was used to obtain the impact of oral health on quality of life of the pupils. A translated Yoruba version, which had been validated in Nigeria [13] was used to obtain the required information in addition to oral examination.

The C-OIDP measure assessed the oral health related quality of life of the respondents by asking the question "In the last three months, how often has the problem with your teeth affected the following: eating and enjoying food, speaking and pronouncing words, cleaning the teeth, smiling and laughing without shame, sleeping and relaxing, emotional stability, doing your school work, and enjoying social contact with your friends and other people". The response was on a scale from 0 i.e. no impact to 3 i.e. maximum impact. The questionnaire also consisted of questions assessing the sociodemographic characteristics of the respondents. The questionnaire was pretested among 40 pupils in a school in another LGA that was not one of those selected for the main study. The face validity and comprehensibility of the questionnaire was evaluated during this period. The applicability of the questionnaire to the younger age groups was also ascertained.

The questionnaire was administered by five trained research assistants after explaining the purpose of the study and obtaining the signed informed consents from parents and assents from respondents. After filling of the questionnaires, each respondent underwent an intraoral examination. Intraoral examination was conducted by two trained and calibrated examiners. The examination was conducted according to standard guidelines [17] and utilized the DMFT (Decayed, Missing and Filled Teeth for permanent teeth) and dmft (decayed, missing and filled teeth for deciduous teeth) indices.

The pupils were examined sitting upright on a school chair outside their classes and natural lighting served as source of illumination. Teeth with carious lesions that were tender to percussion were also documented as either present or absent. Consistency of the examiners was assessed prior to the study and during the study by examining, at random, 20 pupils and the inter examiners' reliability was determined using Kappa's statistics.

Data Analysis

Data obtained was cleaned and computed with SPSS Statistics Software, version 23 (IBM Corp., Armonk, NY, USA). The C-OIDP scores were computed by adding up the response scores for each question on the frequency scale for each individual to generate a total frequency score. Higher scores denoted poorer quality of life. Overall C-OIDP score for an individual was summed up from scores of the responses to each question. Frequencies and proportions were generated and numeric variables were summarized by medians and range in view of the skewness of the data. Analysis of the C-OIDP domains and presence or absence of dental caries was done using Chi-square statistics.

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Differences in the median C-OIDP scores of those with and without dental caries was analysed with Mann-Whitney U test. Level of significance was set at p<5%.

Ethical Aspects

Permission to conduct the study was obtained from the Schools' Board and the head teachers of each school. Ethical clearance for the study was given by the Oyo State Ethics Review Board.

Results

A total of 1286 children aged 6 to 15 years participated in the study of which 668 (51.9%) were males. All the study participants belonged to the low social class. The Cronbach alpha score of the C-OIDP frequency scale used to obtain information on the oral health related quality of life of the study participants was 0.831. Deletion of any of the items of C-OIDP frequency scale resulted in lowering of the Cronbach alpha value. The inter examiners' variability ranged from 0.8 to 0.9.

Intraoral examination showed that 130 (10.1%) participants had dental caries of which 26 (20 %) had pain from the carious tooth/teeth at the time of the study. The number of carious teeth ranged from 1 to 9 and total number of decayed teeth was 251. The distribution of carious tooth was such that 67 (51.5%) participants had only one carious tooth, 35 (26.9%) had two carious teeth, 15 (11.5%) had 3 carious teeth, 6 (4.6%) had 4 carious teeth while 2 (1.5%) had 5, 2 (1.5%) had 6 as well as 2 (1.5%) had 7 carious teeth and 1 (0.8%) participant had 9 carious teeth. The median number of decayed teeth among those with dental caries was 1.0. None of the study participants had missing or filled tooth due to dental caries.

Table 1. Association between caries and the C-OIDP frequency scores (median and range).

Variables	N	Median	Range	U	z	r	p-value
Dental Caries							
Absent	1156	0.0	0 – 12	72546.5	-0.901	-0.025	0.368
Present	130	0.0	0 – 22				
Dental Caries and Pain							
Caries with Pain	26	3.0	0 – 22	215.5	-8.752	-0.768	<0.001*
Caries without Pain	104	0.0	0 – 12				
Dental Caries with Pain and Others							
Caries with Pain	26	3.0	0 – 22	4685.5	-8.702	-0.243	<0.001*
Others	1260	0.0	0 – 12				

*Statistically Significant.

A fifth (21.4%) of the pupils reported impacts of oral health on their quality of life. The median OIDP score for participants with dental caries was 0.0 (range 0 – 22) and 0.0 (range 0 – 12) for those without dental caries (r= -0.025; p=0.368). The median C-OIDP score for those with painful carious lesion was significantly higher, 3.0 (range 0 – 22), than that for those with painless dental carious lesion (0.0; range 0 – 12; r = -0.768; p<0.001) (Table 1).

Overall there was no significant difference between participants with dental caries and those without dental caries as it related to the eight C-OIDP domains and with C-OIDP scores (Table 2).

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Table 2. Impact of dental caries on the quality of life of the participants.

C-OIDP Domain#	Dental Caries		Total	p-value
	Present N (%)	Absent N (%)	N (%)	
Eating and Enjoying Food				
Impact	29 (13.0)	194 (87.0)	223 (100.0)	0.115
No Impact	101 (9.5)	962 (90.5)	1063 (100.0)	
Speaking and Pronouncing Words				
Impact	11 (11.6)	84 (88.4)	95 (100.0)	0.621
No Impact	119 (10.0)	1072 (90.0)	1191 (100.0)	
Cleaning Teeth				
Impact	24 (12.4)	170 (87.6)	194 (100.0)	0.257
No Impact	106 (9.7)	986 (90.3)	1092 (100.0)	
Sleeping and Relaxing				
Impact	7 (9.6)	66 (90.4)	73(100.0)	0.879
No Impact	123 (10.1)	1090 (89.9)	1213 (100.0)	
Smiling and Laughing without Shame				
Impact	7 (9.0)	71 (91.0)	78 (100.0)	0.732
No Impact	123 (10.2)	1085 (89.8)	1208 (100.0)	
Self-Consciousness or Irritability				
Impact	5 (8.8)	52 (91.2)	57 (100.0)	0.732
No Impact	125 (10.2)	1104 (89.8)	1229 (100.0)	
Doing School Work				
Impact	3 (15.0)	17 (85.0)	20 (100.0)	0.465
No Impact	127 (10.0)	1139 (90.0)	1266 (100.0)	
Enjoying Social Contact with Other Children				
Impact	3 (12.0)	22 (88.0)	25 (100.0)	0.751
No Impact	127 (10.1)	1134 (89.9)	1261 (100.0)	

#Abbreviated phrases used to represent the inventory items.

There were significant impacts on all eight domains of the OHRQoL of those with untreated dental caries and pain (71.4 – 100.0%) when compared to those with painless caries (0.0 – 28.6%; $p<0.05$) (Table 3).

Table 3. Impact of dental caries associated with pain on the quality of life of study participants.

C-OIDP Domain#	Caries with Pain N (%)	Caries without Pain N (%)	Total N (%)	p-value
Eating and Enjoying Food				
Impact	21 (72.4)	8 (27.6)	29 (100.0)	<0.001*
No Impact	5 (5.0)	96 (95.0)	101 (100.0)	
Speaking and Pronouncing Words				
Impact	8 (72.7)	3 (27.3)	11 (100.0)	<0.001*
No Impact	18 (15.1)	101 (84.9)	119 (100.0)	
Cleaning Teeth				
Impact	19 (79.2)	5 (20.8)	24 (100.0)	<0.001*
No Impact	7 (6.6)	99 (93.4)	106 (100.0)	
Sleeping and Relaxing				
Impact	5 (71.4)	2 (28.6)	7 (100.0)	<0.001*
No Impact	21 (17.1)	102 (82.9)	123 (100.0)	
Smiling and Laughing without Shame				
Impact	5 (71.4)	2 (28.6)	7 (100.0)	<0.001*
No Impact	21 (17.1)	102 (82.9)	123 (100.0)	

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Self-Consciousness or Irritability				
Impact	5 (100.0)	0 (0.0)	5 (100.0)	<0.001*
No Impact	21 (16.8)	104 (83.2)	125 (100.0)	
Doing School Work				
Impact	3 (100.0)	0 (0.0)	3 (100.0)	0.007*
No Impact	23 (18.1)	104 (81.9)	127 (100.0)	
Enjoying Social Contact with Other Children				
Impact	3 (100.0)	0 (0.0)	3 (100.0)	0.007*
No Impact	23 (18.1)	104 (81.9)	127 (100.0)	

*Statistically Significant; FET – Fisher's Exact Test.

The most frequently reported daily activities affected was eating and enjoying food followed by cleaning of the teeth and mouth (Table 4).

Table 4. Frequency of impact on daily activities reported by study participants.

C-OIDP Domain	Frequency of Impact (%)
Eating and Enjoying Food	81.1
Speaking and Pronouncing Words	35.5
Cleaning Teeth	70.5
Sleeping and Relaxing	26.5
Smiling and Laughing without Shame	28.3
Self-Consciousness or Irritability	20.7
Doing School Work	7.2
Enjoying Social Contact with Other Children	9.1

Discussion

This study aimed to determine how untreated dental carious lesions affect the quality of life of children from the low social class. Our findings showed significant association between having untreated dental caries and quality of life only when there was associated pain from the carious tooth. A wide age range of pupils was ensured in this study so as to capture pupils at the different stages of dentition; primary, secondary and mixed. This is to enhance the generalizability of the findings to children from the low social classes in Nigeria and developing countries with similar population metrics.

The C-OIDP frequency scale used in this study has good reliability and internal consistency. It has a Cronbach alpha value over the recommended value of 0.7 and is comparable to the result obtained when it was validated in a previous study [13]. In addition, all the items in the measure were important and necessary for the scale to function optimally.

The prevalence of dental caries in this study was 10.1%, which is within the prevalence range reported in Nigeria [4] but lower than the prevalence reported among children in Brazil (23.1% – 75.0%) [18-20] and Australian children (43.0%) [21]. This further supports the fact that there is a lower caries experience in Nigeria and similar developing countries than in the more developed countries [1]. All the pupils with dental caries had the decayed component solely contributing to the DMFT/dmft caries index. This is similar to findings from previous studies where it was reported that almost all the children with dental caries experience have high unmet dental needs from untreated dental caries [4-10].

Only 21.4% of the pupils in the present study reported at least an impact on their quality of life. Higher proportions than this have been reported in other studies [13,18,22]. Varying distribution of oral diseases and differences in perception across the globe may be responsible for this. Our findings showed that there was no significant difference between the median C-OIDP score of children with dental caries and those without dental caries; similar to previous findings [23]. This however contrasts with what some have reported [18,24-26] that dental caries has negative impacts on the oral health related quality of life of affected children. The differences between the findings in the studies can be attributed to variations in disease distribution and perceptions of children worldwide. Further explanation for this might be the presence of other oral diseases among the participants of this study that could have resulted in impacts on their quality of life.

On the other hand, severity of carious lesions exhibited by presence of pain resulted in significant impact on the quality of life of the respondents with a large effect size (r = -0.768) in the test of association between median C-OIDP scores and painful vs. painless dental caries. This may be attributed to the importance of pain among the studied population; pain has also been documented as the leading cause of dental care service utilization among children in this part of the world [27]. Lack of pain associated with initial carious lesion as well as to the chronicity of the disease and further adaptation to long-standing carious lesion may be another explanation for this finding. This is corroborated by the three months' duration of history of impacts enquired by the C-OIDP measure. Furthermore, having pain has been the major driving force for seeking dental care among children in this part of the world [27]. The role of pain in driving dental consultation was similarly observed in a previous study [23].

All the domains of the quality of life measure were affected by painful carious teeth. Eating and enjoying food was the most frequently reported activity impacted by dental caries. Cleaning teeth was also affected according to quite a number of respondents. The least reported activity impacted upon by painful dental caries was social contact. These findings are similar to reports from a previous study [26] and may be due to the value attributed to the functionality of the teeth as seen in "eating" before "social contacts" are considered. In addition, social contact may be considered secondary to diet as it relates to dental caries more so that it commonly affects posterior teeth.

A major limitation of this study is basing the severity of dental caries on pain. Use of indices such as PUFA/pufa may be more accurate for this. It is important, however, to note that pain is a crucial symptom driving access to dental care in this environment and in the realm of subjective assessment, scores quite high in influencing children and their parents to take oral health impacting decisions.

Conclusion

Untreated dental caries significantly impacts on OHRQoL of pupils from low social class only when associated with pain. Untreated painful dental caries significantly impacts on all the domains of the Child-OIDP measure.

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References

[1] Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bull World Health Organ 2005; 83(9):661-9. https://doi.org/S0042-96862005000900011.

[2] Gorbatova MA, Gorbatova LN, Grjibovski AM. Dental caries experience among 15-year-old adolescents in north-west Russia. Int J Circumpolar Health 2011; 70(3):232-5. https://doi.org/10.3402/ijch.v70i3.17824

[3] Grewal H, Verma M, Kumar A. Prevalence of dental caries and treatment needs in the rural child population of Nainital District, Uttaranchal. J Indian Soc Pedod Prev Dent 2009; 27(4):224-6. https://doi.org/10.4103/0970-4388.57657

[4] Folayan MO, Chukwumah NM, Onyejaka N, Adeniyi AA, Olatosi OO. Appraisal of the national response to the caries epidemic in children in Nigeria. BMC Oral Health 2014; 14:76. https://doi.org/10.1186/1472-6831-14-76

[5] Sofola OO, Folayan MO, Oginni AB. Changes in the prevalence of dental caries in primary school children in Lagos State, Nigeria. Niger J Clin Pract 2014; 17(2):127-33. https://doi.org/10.4103/1119-3077.127419.

[6] Abiola AA, Eyitope OO, Sonny OJ, Oyinkan OS. Dental caries occurrence and associated oral hygiene practices among rural and urban Nigerian pre-school children. J Dent Oral Hyg 2009; 1(5):64-70.

[7] Adekoya-Sofowora CA, Nasir WO, Oginni AO, Taiwo M. Dental caries in 12-year-old suburban Nigerian school children. Afr Health Sci 2006; 6(3):145-50. https://doi.org/10.5555/afhs.2006.6.3.145

[8] Adeniyi AA, Agbaje O, Onigbinde O, Ashiwaju O, Ogunbanjo O, Orebanjo O, et al. Prevalence and pattern of dental caries among a sample of nigerian public primary school children. Oral Health Prev Dent 2012; 10(3):267-74.

[9] Denloye O, Ajayi D, Bankole O. A study of dental caries prevalence in 12-14 year old school children in Ibadan, Nigeria. Pediatr Dent J 2005; 15(2):147-51.

[10] Udoye C, Aguwa E, Chikezie R, Ezeokenwa M, Jerry-Oji O, Okpaji C. Prevalence and distribution of caries in the 12-15 year urban school children in Enugu, Nigeria. Internet J Dent Sci 2009; 7(2):1-5.

[11] Folaranmi N, Akaji E, Onyejaka N. Pattern of presentation of oral health conditions by children at University of Nigeria Teaching Hospital, Enugu: A retrospective study. Niger J Clin Pract 2014; 17(1):47-50. https://doi.org/10.4103/1119-3077.122836

[12] Olatosi OO, Sote EO. Causes and pattern of tooth loss in children and adolescents in a Nigerian tertiary hospital. Nig Q J Hosp Med 2012; 22(4):258-62.

[13] Lawal FB, Dauda MA. Applicability and cross-cultural adaptation of the self-administered Child-OIDP in a rural Nigeria community. Afr J Med med Sci 2017; 46(3):297-303.

[14] Lawal FB, Ifesanya JU. Oral Health Impact Profile (OHIP-14) and its association with dental treatment needs of adolescents in a rural Nigerian community. Braz J Oral Sci 2016; 15(3):215-20. https://doi.org/10.20396/bjos.v15i3.8649984

[15] Esan TA, Olusile AO, Akeredolu PA, Esan AO. Socio-demographic factors and edentulism: The Nigerian experience. BMC Oral Health 2004; 4(1):3. https://doi.org/10.1186/1472-6831-4-3

[16] Lawal F, Arowojolu M. Sociodemographic status of patients seeking routine scaling and polishing in a resource challenged environment. West Afr J Med 2015; 34(3):193-6.

[17] World Health Organization. Oral Health Surveys: Basic Methods. Geneva: World Health Organization; 2013.

[18] Martins LGT, Pereira KCR, Costa SXS, Traebert E, Lunardelli SE, Lunardelli AN, et al. Impact of dental caries on quality of life of school children. Braz Res Pediatr Dent Integr Clin 2016; 16(1):307-12. https://doi.org/10.4034/PBOCI.2016.161.32

[19] Martins MT, Sardenberg F, Vale MP, Paiva SM, Pordeus IA. Dental caries and social factors: Impact on quality of life in Brazilian children. Braz Oral Res 2015; 29(1):1-7. https://doi.org/10.1590/1807-3107BOR-2015.vol29.0133

[20] Martins-Júnior P, Vieira-Andrade R, Corrêa-Faria P, Oliveira-Ferreira F, Marques L, Ramos-Jorge M. Impact of early childhood caries on the oral health-related quality of life of preschool children and their parents. Caries Res 2013; 47(3):211-8. https://doi.org/10.1159/000345534

[21] Do LG, Spencer A. Oral health-related quality of life of children by dental caries and fluorosis experience. J Public Health Dent 2007; 67(3):132-9.

[22] Alsumait A, ElSalhy M, Raine K, Cor K, Gokiert R, Al-Mutawa S, et al. Impact of dental health on children's oral health-related quality of life: A cross-sectional study. Health Qual Life Outcomes 2015; 13(1):98. https://doi.org/10.1186/s12955-015-0283-8

[23] Clementino MA, Gomes MC, de Almeida Pinto-Sarmento TC, Martins CC, Granville-Garcia AF, Paiva SM. Perceived impact of dental pain on the quality of life of preschool children and their families. PloS One 2015; 10(6):e0130602. https://doi.org/10.1371/journal.pone.0130602

[24] Corrêa-Faria P, Paixão-Gonçalves S, Paiva SM, Martins-Júnior PA, Vieira-Andrade RG, Marques LS, et al. Dental caries, but not malocclusion or developmental defects, negatively impacts preschoolers' quality of life. Int J Paediatr Dent 2016; 26(3):211-9. https://doi.org/10.1111/ipd.12190

[25] Martins-Junior P, Oliveira M, Marques L, Ramos-Jorge M. Untreated dental caries: Impact on quality of life of children of low socioeconomic status. Pediatr Dent 2012; 34(3):49E-52E.

[26] Nurelhuda NM, Ahmed MF, Trovik TA, Astrom AN. Evaluation of oral health-related quality of life among Sudanese schoolchildren using Child-OIDP inventory. Health Qual Life Outcomes 2010; 8:152. https://doi.org/10.1186/1477-7525-8-152

[27] Lawal FB, Ibiyemi O, Taiwo JO, Oke GA. Dental care seeking behaviour of children in a rural Nigerian community. Afr J Med Sci 2016; 45(2):143-9.