

Oral health characteristics of children and teenagers with special health care needs in Ile-Ife, Nigeria.¹Akinwonmi B.A., ²Adekoya-Sofowora C.A.¹Department of Dental Services, Federal Medical Centre, Owo, Ondo State, Nigeria.²Department of Child Dental Health, Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria.**ABSTRACT:**

Objectives: The aim of this study is to determine the prevalence of periodontal disease, dental caries and malocclusion traits in children and teenagers who have hearing impairments, visual impairments, physical impairments and intellectual disability attending special schools in Ile-Ife.

Methods: This cross-sectional comparative study comprised of children and teenagers with and without special health care needs aged 6 to 19 years who were recruited from the special schools and some regular schools in Ile-Ife. The prevalence of periodontal disease (gingivitis and periodontitis), dental caries and malocclusion traits were assessed using the Community Periodontal Index of Treatment Need, the Decayed, Missing and Filled Teeth Index and Angle's classification of malocclusion respectively. The severity of dental caries using the pulp exposure, ulceration, fistula and abscess index was also assessed. Chi-square test, Student t-test and ANOVA were conducted $p \leq 0.05$ was considered statistically significant. The findings in children and teenagers with special health care needs (CTSHCN) were compared to that of children and teenagers without special health care needs in the same environment.

Results: The study sample consisted of 206 children and teenagers with special health care needs aged 6 to 19 years. 104(50.5%) were males and 102(49.5%) females. One hundred and eighty-three (88.8%) had gingivitis, 15 (7.3%) had periodontitis and this was most prevalent in those with visual impairment. Significant associations were seen between the presence of gingivitis and periodontitis ($p < 0.001$) and types of special health care needs. The prevalence of dental caries was 22.8%; the mean DMFT/dmft was $(0.20 \pm 0.60 / 0.28 \pm 1.06)$ and the mean PUFA/pufa score was $(0.07 \pm 0.59 / 0.17 \pm 0.81)$. Angles class I malocclusion (85.4%) and spacing (47.1%) were the most prevalent malocclusion traits. The type of special health care needs was not associated with the presence of dental caries ($p = 0.49$) and malocclusion traits ($p = 0.44$). When compared to the findings in 208 children and teenagers without special health care needs, 108(51.9%) males and 100 (48.1%) females, the CTSHCN had significantly higher prevalence of periodontal disease ($p = 0.001$) and malocclusion traits ($p = 0.01$). There was no significant difference in the prevalence of dental caries ($p = 0.86$) in children and teenagers with and without special health care needs.

Conclusion: CTSHCN in Ile-Ife have higher prevalence of gingivitis, periodontitis and malocclusion traits when compared to children and teenagers without special health care needs. Despite the low mean DMFT/dmft in CTSHCN in Ile-Ife, majority of the decayed teeth was left untreated and 49.0% had progressed to involve the pulp.

Key words: Special health care needs, malocclusion, dental caries, periodontal disease.

INTRODUCTION: Good oral health contributes to appearance, comfort, well-being, self-esteem, self confidence, social acceptability as well as good general health¹. Thus, its neglect gives rise to negative

health consequences and unpleasant social life of the individual. People with any physical, developmental, mental, sensory, behavioural, cognitive or emotional impairment or limiting condition that requires medical management, health care intervention, and/or use of specialised services or programmes are referred to as having Special Health Care Needs (SHCN)². There are numerous causes of impairments and disabilities in children and adolescents. The major causes described in the literature are congenital birth defects and infections, malnutrition, maternal infections and malnutrition, accidents, war, diabetes, chronic childhood diseases, HIV infection, AIDS and

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preventable diseases such as measles, poliomyelitis, and tuberculosis³⁻⁵. Children and teenagers with special health care needs (CTSHCN) appear to have poorer oral health compared to those without special health care needs and may be at an increased risk for oral diseases throughout their lifetime. Their oral health condition may be influenced by age, severity of impairment, peculiar dietary habits and living conditions. They may also have limitations in oral hygiene performance due to their potential motor, sensory and intellectual disabilities. Oral health characteristics often reported are poor oral hygiene, increased gingival infection, periodontal diseases, high dental caries prevalence and disturbances in occlusal development⁹⁻¹³. These oral health challenges also arise from the inability or challenges to receive good oral health care from infancy, resulting from inactive support from parents/care givers and challenges to providing personal care and healthy lifestyles³¹⁴. The disease, defect or medical condition in SHCN may hinder their achievement of normal physical growth and development and they may require health and related services of a type or amount beyond that required by individuals generally.¹⁵ In Nigeria, where it is estimated that approximately 19 million out of 140 million Nigerians have disabilities¹⁶, nationwide studies have not been conducted to determine the prevalence of dental diseases among the various populations of children and teenagers with special health care needs (CTSHCN). However, few authors have reported on the oral health conditions and treatment needs of CTSHCN especially in urban Nigeria. In the suburban and rural areas of Nigeria, there is paucity of knowledge on the prevalence of oral diseases among CTSHCN and gaps exist in their ability to achieve or maintain good oral health, access and uptake of oral health care services. The evaluation of the different oral health characteristics existing within this population is, therefore, necessary in order to plan for both the preventive and curative measures and to determine the resources required for these purposes.

METHODS

The study was conducted at the special and some regular schools in Ile-Ife, a sub-urban town in the south-western region of Nigeria. The special schools were located in two of the four Local Government Areas (LGAs) in Ile-Ife: Ife Central and Ife East. Children and teenagers aged 6 to 19 years as of last

birthday were recruited for this study. The list of all the schools providing education for children and teenagers with special health care needs in Ile-Ife and pupils enrolled for the 2013/2014 academic session was obtained from the Local Inspector of Education in the two LGAs. There are four public and one private special schools in Ile-Ife, all providing education for children and teenagers with hearing impairment (HI), visual impairment (VI), physical impairment (PI) and intellectual disability (ID). All the students who were attending the special schools in Ile-Ife, Osun State were invited to participate in this study (this gave all the CTSHCN an opportunity for free dental check and treatment) but only those aged 6 to 19 years were included. The control group were children and teenagers from some regular schools within the two LGAs that host the special schools. The sample size was calculated using the formula for comparative research studies¹⁹, and sample selection was by stratification of the schools into private and public schools using the register of the local school authority. This enabled the selection of participants from all the socioeconomic strata. The sample for the control group was proportionally distributed amongst the LGAs and between the public and the private schools using a multi-stage sampling method involving stratified and simple random techniques. All the schools identified to participate in this study were contacted. The aim and objectives of the study were explained to the head teachers and members of staff of the schools. An Informed Consent Form and a Case Record Form (CRF) were given to the study participants to take home or sent to their parents/caregivers through the teachers. Study participants filled the CRF assisted by their parents/caregivers, the school records of the study participants were also checked to confirm that adequate information was obtained. The study was carried out in two stages: the review of the filled CRF and the clinical examination. A designated space was provided by the schools for the review of each child's CRF and the conduct of clinical examination. Study participants' privacy was ensured during the clinical examinations but few of them were examined with the help of their teachers using head restraints. All study participants were examined using positive reinforcement and the tell-show-do method. Examination was done with dental mirror, probe and metal millimetre ruler. Radiographs were not taken. Standard precaution for cross infection was taken

throughout this study period. Disposable materials used for the study such as cotton rolls, facemask and examination gloves were discarded into a waste bin and incinerated after each day's visit. The instruments used for examination were taken back to the dental clinic of Obafemi Awolowo University Teaching Hospitals Complex for sterilisation. The Simplified Oral Hygiene Index (OHI-S)²² was used to determine the oral hygiene status. The OHI-S comprises debris and calculus score on selected tooth surfaces. Six index teeth were chosen, using the facial surfaces of the maxillary right first permanent molar, maxillary right central incisors, maxillary left first permanent molar, mandibular left permanent incisors and lingual surfaces of the mandibular right and left first permanent molars. Where the first permanent molars were not or fully erupted in the arch, the second primary molars were used.²³ The debris and calculus scores were added and divided by the number of surfaces examined to give the oral hygiene index scores, as recommended. The oral hygiene status was then categorised as good (0-1.2), fair (1.3-3.0) and poor (3.1-6.0), based on the oral hygiene score; maximum possible score was 6. The Community Periodontal Index of treatment need (CPITN) was used as epidemiological screening procedure to assess the level of periodontal disease for this study population. It assessed the presence or absence of calculus, gingival bleeding and periodontal pockets. Record of periodontal pockets was not done for children up to the age of 15 years to avoid confusing the deepened crevices associated with eruption with periodontal pockets, but this was recorded for study participants aged 16 to 19 years. An epidemiological CPITN probe was used. The mouth was divided into six parts (sextants). Each sextant was given a score by examining the index teeth. For this study population less than 20 years, six index teeth were used. The CPITN probe was gently inserted into the gingival sulcus and the depth of penetration read against the colour-coded band. The maximum scores obtained in the study participant's mouth were recorded as the status code: Code 0- healthy periodontium, Code 1- bleeding observed during probing, Code 2- presence of calculus or other plaque retentive factors were seen or felt during probing, Code 3- presence of shallow pocket (4mm to 5.5mm) and Code 4- pathological pocket 6mm or deeper. Code 1 and Code 2 were interpreted as gingivitis and Code 3 and Code 4 as periodontitis. The caries status was assessed using the

Decayed, Missing and Filled Teeth/decayed, missing and filled teeth (DMFT/dmft) index²⁶, while the caries severity was assessed using the Pulpal involvement, Ulceration caused by dislocated tooth fragment, Fistula and Abscess (PUFA/pufa) index²⁷. The Untreated Caries, PUFA Ratio was calculated as PUFA+ pufa divided by D (decayed permanent teeth) + d (decayed primary teeth) multiplied by 100. This provided information on the consequences of untreated dental caries in this population. 'Angles'²⁸ classification of malocclusion was used to assess malocclusion. The inter- and intra-arch relationship of the study participants were also examined. One of the investigators (B.A) was calibrated on the use of the different indices for this study prior to the commencement of the study. There was a strong agreement in the intra-rater reliability in the use of these indices. The intra-examiner reliability kappa scores ranged from 0.8-0.9 for all the indices. For this study, three age range was used, according to the type of dentition, 6-8 years (early mixed dentition stage), 9-12 years (late mixed dentition stage), and 13-19 years (permanent dentition stage). Socio-economic class for the purposes of this study was obtained through a scoring index combining the mother's level of education with the occupation of the father which allocated each child to a social class I to V. The suitability and applicability of this social classification system for the Nigerian environment has been tested and found reliable²⁹. Class I and class II were further classified as the high, Class III as the middle and Class IV and class V as the low socio-economic class. The data generated from the study was analysed using the IBM Statistical Package for Social Science (SPSS) version 21.0. Descriptive statistics was used to summarise the variables in the data set. The mean for the overall sample was determined for the OHI-S, DMFT/dmft and PUFA/pufa. Chi-square test was used to test association between the independent and dependent variables while the student's t-test and ANOVA were used to compare the means between two and more groups respectively. The level of statistical significance was inferred at $p < 0.05$.

RESULTS

A total of 219 CTSHCN were seen in the special schools in Ife-Central and Ife-East LGAs. However, 13 (5.9%) were excluded from the study: 5 (2.3%) were excluded because their ages were outside the 6 to 19 years specified for this study and 8 (3.7%) because

they were very uncooperative and could not be examined even with restraints. Thus, 206 (94.1%) CTSHCN aged 6-19 years from four public and one private special schools, with a mean age of 12.39 ± 3.72 years participated in this study. There were 104 (50.5%) males and 102 (49.5%) females. Majority (82.0%) were from the low socioeconomic class. A greater percentage of the participants had intellectual disability (36.4%), followed by those with hearing impairment (33.5%). Twenty five (12.1%) of the CTSHCN had multiple disabilities. Two hundred and eight children and teenagers without special health care needs aged 6 to 19 years were recruited for this study. Their mean age was 11.95 ± 3.23 years. One hundred and eight (51.9%) were males and 140 (67.3%) were from low socioeconomic class. There were no significant age ($p=0.34$) and sex ($p=0.77$) differences among the study groups. However, a statistically

significant difference ($p=0.001$) existed between the socio-economic class of the study participants: 7 (3.4%) of the CTSHCN were from parents in the high socio-economic class compared to 20 (9.6%) of children and teenagers without special health care needs. Forty four adolescents with special health care needs and thirty one adolescents without special health care needs were aged 16 to 19 years. These were included in the 13 to 19 years age group. Table 1 highlights the mean oral hygiene index score (OHIS) for CTSHCN according to socio-demographic factors. The overall mean OHIS was fair (3.04 ± 1.48). There was a significant association between the mean OHIS and the types of special health care needs ($p<0.001$) with CTSHCN who had intellectual disability having the highest mean OHIS (3.62 ± 1.52). The mean OHIS also increased significantly with age ($p<0.001$).

Table 1: Mean OHIS in CTSHCN according to socio-demographic factors

Variables	N=(206) n (%)	Mean OHIS	p-value
Special needs			
Physical impairment	27 (13.1)	3.38±1.42	<0.001
Intellectual disability	75 (36.4)	3.62±1.52	
Visual impairment	10 (4.9)	3.21±1.30	
Hearing impairment	69 (33.5)	2.31±1.29	
Multiple disabilities	25 (12.1)	2.87±1.19	
Age group (years)			
6-8	36 (17.5)	2.02±1.11	<0.001
9-12	68 (33.0)	2.75±1.15	
13-19	102 (49.5)	3.60±1.55	
Sex			
Male	104 (50.5)	2.99±1.41	0.65
Female	102 (49.5)	3.09±1.56	
Socioeconomic class			
Low	169 (82.0)	3.04±1.43	1.00
Middle	30 (14.6)	3.04±1.77	
High	7 (3.4)	3.06±1.72	
Overall	206 (100.0)	3.04±1.48	

t- test and F- statistics compared means for 2 and more groups respectively

The prevalence of periodontal disease was 96.1% for the CTSHCN which was mainly accounted for by gingivitis (88.8%). Only 3.9% had healthy periodontium (Table 2). There was a significant association between the presence of gingivitis and periodontitis and types of special health care needs ($p < 0.001$).

Table 2: Prevalence of periodontal disease in CTSHCN according to socio-demographic factors

Variables	Healthy Periodontium n=8(3.9%) n%	Gingivitis n=183(88.8%) n%	Periodontitis n=15(7.3%) n%	Total N=206	p-value
Special needs					
Physical impairment	0 (0.0)	24(88.9)	3(11.1)	27(100.0)	
Intellectual disability	1 (1.3)	65(86.7)	9(12.0)	75(100.0)	<0.001*
Visual Impairment	0 (0.0)	8(80.0)	2(20.0)	10(100.0)	
Hearing Impairment	7(10.1)	61(88.4)	1(1.4)	69(100.0)	
Multiple disabilities	0 (0.0)	25(100.0)	0(0.0)	25(100.0)	
Age group (years)					
6-8	4(11.1)	32(88.9)	-	36(100.0)	
9-12	1(1.5)	67(98.5)	-	68(100.0)	0.02*
13-19	3(2.9)	84(82.3)	-	102(100.0)	
Sex					
Male	4 (3.8)	94 (90.4)	6(5.8)	104(100.0)	
Female	4 (3.9)	89 (87.3)	9(8.8)	102(100.0)	0.27
Socio-economic class					
Low	7(4.1)	150(88.8)	12(7.1)	169(100.0)	
Middle	1(3.3)	26(86.6)	3(10.0)	30(100.0)	0.87
High	0(0.0)	7(100.0)	0(0.0)	7(100.0)	

*Likelihood ratio reported

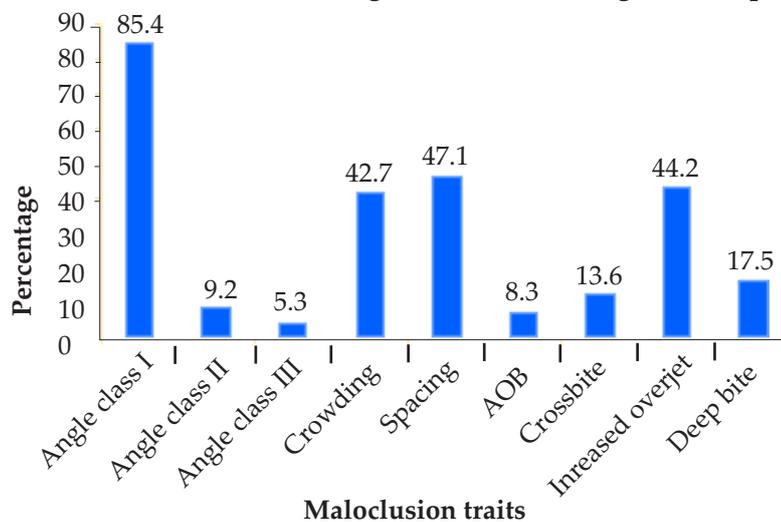
Table 3 shows the prevalence of dental caries in CTSHCN according to socio-demographic factors. Most (77.2%) CTSHCN were caries free. Only an age significant difference ($p=0.05$) was observed with the highest prevalence in children aged 6-8 years. The mean DMFT/dmft scores were $0.02 \pm 0.60 / 0.28 \pm 1.06$ and the mean PUFA/pufa scores were $0.07 \pm 0.59 / 0.17 \pm 0.81$. The Untreated Caries, PUFA Ratio was 49.0% [PUFA score was 15 (P=9; U=3; F=2; A=1), pufa score was 35 (p=25; u=6; f=4; a=0), Decayed permanent teeth =42 and the decayed primary teeth =60].

Table 3: Prevalence of dental caries in CTSHCN according to socio-demographic factors

Variables	Dental caries		Total N=206 n(%)	p-value
	Absent n=159 (77.2%) n (%)	Present n=47 (22.8%) n (%)		
Special needs				
Physical impairment	20 (74.1)	7(25.9)	27(100.0)	0.49*
Intellectual disability	63 (84.0)	12 (16.0)	75(100.0)	
Visual impairment	7 (70.0)	3(30.0)	10(100.0)	
Hearing impairment	50 (72.5)	19(27.5)	69(100.0)	
Multiple disabilities	19 (76.0)	6(24.0)	25(100.0)	
Age group (years)				
6-8	24(66.7)	12(33.3)	36(100.0)	0.05
9-12	49(72.1)	19(27.9)	68(100.0)	
13-19	86(84.3)	16(15.7)	102(100.0)	
Sex				
Male	80(76.9)	24(23.1)	104(100.0)	0.93
Female	79(77.4)	23(22.5)	102(100.0)	
Socio-economic class				
Low	133(78.7)	36(21.3)	169(100.0)	0.32*
Middle	20(66.7)	10(33.3)	30(100.0)	
High	6(85.7)	1(14.3)	7(100.0)	

Figure 1 shows the different malocclusion traits in the CTSHCN. No significant difference was observed in the prevalence of malocclusion traits based on Angles classification by the type of special health care needs (p=0.96), age (p=0.80), sex (p=0.23) and socio-economic class (p=0.70).

Figure 1: Prevalence of malocclusion traits among children and teenagers with special health care needs



*AOB' Anterior Open Bite

Table 4 shows the comparison of the oral hygiene status, prevalence of gingivitis, periodontitis, dental caries and malocclusion traits between children and teenagers with and without special health care needs. There were significant differences between the mean OHIS ($p<0.001$), the prevalence of gingivitis and periodontitis ($p<0.001$) and malocclusion traits ($p=0.01$) of CTSHCN and those without special health care needs.

Table 4: Comparison of the oral hygiene status, prevalence of gingivitis, periodontitis, dental caries and malocclusion traits in children and teenagers with and without special health care needs (N=414)

Variables	With special needs N= 206 n(%)	Without special needs N= 208 n(%)	Total N=414 n (%)	p- value
OHI-S				
Good	20(9.8)	42 (20.2)	62 (15.0)	
Fair	93(45.1)	120 (57.7)	213 (51.4)	
Poor	93 (45.1)	46 (22.1)	139 (33.6)	
Mean OHI-S	3.04±1.48	2.22±1.07		<0.001**
Periodontium				
Healthy	8(3.9)	35 (16.8)	43 (10.4)	<0.001*
Gingivitis	183(88.8)	170(81.7)	353 (85.2)	
Periodontitis	15(7.3)	3(1.4)	18(4.3)	
Dental caries				
Caries free	159 (77.2)	159 (76.4)	318 (76.8)	0.86
Caries present	47 (22.8)	49 (23.6)	96 (23.2)	
Mean DMFT	0.20±0.60	0.29±1.15		0.35**
Mean dmft	0.28±1.06	0.27±1.12		0.98**
Malocclusion traits				
Absent	30(14.6)	52 (25.0)	82 (19.8)	0.01
Present	176(85.4)	156 (75.0)	332 (80.2)	

*Likelihood ratio; **Student's t-test

DISCUSSION

This study found a high proportion of the CTSHCN (82.0%) were from the low socio-economic class which is similar to prior reports from USA³⁰. South Africa³¹ and Nigeria³². This reflects that families with low socio-economic class are more likely to have children with special health care needs. Also, children from the low socio-economic class are at higher risk of being exposed to infective agents, experiencing diseases and malnutrition, and are also likely to miss out on important preventive programmes available to other children³³. The overall oral hygiene index score of the CTSHCN in this study implies fair oral hygiene status and the prevalence of periodontal disease amongst

these CTSHCN was high, mainly accounted for by gingivitis (88.8%). These are similar to findings from other studies in Europe³⁴, Asia³⁵ and Nigeria⁶ that established relationship between poor oral hygiene and increased prevalence of gingivitis in CTSHCN. Previous reports from UK³⁶, Iran²³ and Nigeria¹⁸ had also reported high prevalence of periodontal disease and explained the need for complex periodontal care in CTSHCN. Gingivitis is a common oral problem in children and teenagers and the primary aetiological factor is irritation from microbial plaque. The main reasons proffered for the observed high prevalence of gingivitis in CTSHCN include challenges with maintaining oral hygiene cleanliness resulting from

motor, sensory and intellectual disabilities and the dependence on others for the maintenance of their oral health. Prolonged retention of food particles in the oral cavity might also result in more gingival inflammation. Periodontitis is often a result of poor oral health and a progression from gingivitis. Multiple factors in addition to poor oral hygiene may also be involved in the increased susceptibility to periodontitis. These are environmental factors such as the living conditions, systemic immunodeficiency which predispose patients to infectious diseases including periodontitis, local factors such as malocclusion, lack of normal masticatory functions which trigger traumatic occlusion, oral dryness and attrition due to bruxism in those with severe disability. Majority (77.2%) of the CTSHCN were dental caries free and the mean DMFT/dmft score was below 1.0. The low mean DMFT/ dmft score in this study was similar to the reports in previous Nigerian studies. However, none of the children with caries had restoration. This together with the fair oral hygiene status may indicate cumulative neglect of the oral health care of this population. Likewise, the finding of the present study, on the burden of untreated dental caries using PUFA index, also buttresses this fact. The PUFA ratio gives the percentage of carious lesion that has progressed to the pulp.²⁷ Forty nine percent of the carious lesion had progressed to involve the pulp in these CTSHCN despite the low mean DMFT/dmft. This indicates a neglect of dental care, hence the need to emphasize on the unmet dental needs of this population rather than the low mean DMFT/dmft values. CTSHCN may unfortunately be unable to complain to parents/caregivers about their pain and may, therefore, have oral health problems unattended to. This may contribute to the failure of children to thrive, as multiple studies, have highlighted that untreated dental caries decreases the quality of life of the children and impacts negatively on weight gain of children. This study also observed that a higher proportion of CTSHCN had Angles Class I malocclusion, similar to the observed malocclusion profile of CTSHCN in Nigeria. A higher prevalence of spacing was found among the CTSHCN, corroborating the observation of Onyiaso⁴² among children with special health care needs in Nigeria. When compared to their counterparts without special health care needs, the CTSHCN had poorer oral health conditions. Despite the disparity in the maintenance of oral hygiene between older and younger age group

- as manual tooth brushing skills are acquired and improves with increasing age⁴⁵ older CTSHCN are more vulnerable to dental problems due to greater difficulty of caregivers to maintain surveillance on oral health practices as the individual ages or caregivers become less available⁴⁶. Also, the improvement in plaque control in response to social pressures in adolescents with SHCN may be lacking due to low Intelligence Quotient (IQ) levels, particularly in those with ID, and this may influence both oral hygiene and periodontal status. Most CTSHCN with lower IQ, when compared with their peers without SHCN, are less likely to take care of their general appearance. The observation of an insignificant difference in the prevalence of caries between children and teenagers with and without special health care needs was similar to prior report from 'Nigeria'³² that reported insignificant lower caries prevalence in the CTSHCN. This is contrary to other reports from South 'Africa'⁴⁹ and India where the caries prevalence was higher in the CTSHCN. These disparities in the prevalence of dental caries between the children and teenagers with and without special health care needs may differ based on the living conditions of the children. CTSHCN residing at home with their parents as the primary care provider and with monitored diet have lower caries prevalence when compared with those in institutions. Also, CTSHCN who had access to professional preventive oral health care have lower caries prevalence.⁵² Hence, emphasis should be laid on home care, monitored diet and professional oral health care in this population. CTSHCN had higher prevalence of malocclusion traits than children and teenagers without special health care needs. They also had significantly more children with crowding, increased overjet and deep bite when compared with children and teenagers without special health care needs. These findings were earlier observed by Utomi and Onyiaso,⁴¹ who reported higher prevalence of all malocclusion traits (except crowding) among the intellectually disabled than children without special health care needs. Behavioural risk factors for malocclusion in CTSHCN such as mouth breathing, digit sucking, muscle incompetence which impair lip seal leading to a systematic anterior posture of the tongue⁴⁴ and oral health problems such as missing or premature loss of teeth in the primary and permanent dentition⁴⁵ may have contributed to these observations. Incorporation of dental health

education into the school curriculum of children and teenagers with and without special health care needs and planning for regular dental professional visits to the schools in Ile-Ife will help in the improvement of children's oral health conditions. These will aid early diagnosis of dental diseases, provision of preventive dental care and prompt referrals of cases to the clinics for treatment.

CONCLUSION

Children and teenagers with special health care needs in Ile-Ife have higher prevalence of gingivitis, periodontitis and malocclusion traits when compared to children and teenagers without special health care needs. The neglect of oral health care more than the type of special health care needs was a major oral health problem of the CTSHCN in Ile-Ife. The oral health needs also increased with increasing age of the CTSHCN. Despite the low mean DMFT/dmft in CTSHCN in Ile-Ife, majority of the decayed teeth were left untreated and 49.0% has progressed to involve the pulp. There is further need for dental care, dental health education and oral health promotion for the study population.

REFERENCES

1. British Society of Disability and Oral Health. Clinical guidelines and integrated care pathways for oral health care of people with learning disability 2012. <http://www.rcseng.ac.uk>.
2. American Academy of Pediatric Dentistry (AAPD). Guideline on management of dental patients with special health care needs. *Clinical Guidelines* 2012; 157-162.
3. UNICEF. A study on children and adolescents with disabilities in Zimbabwe. 1997. www.unicef.org/evaldatabase/files/zim_01803. Accessed 7th November 2014.
4. Oredugba FA, Sote EO. Periodontal treatment needs of the handicapped children in Lagos. *Nig Qt J Hosp Med* 1996;6:164-168.
5. Levine MI, Chervenak FA, Whittle M. Fetal and neonatal neurology and neurosurgery. Churchill Livingstone, London, 2001; 4:39-44.
6. Denloye OO. Oral hygiene status of mentally handicapped children in Ibadan, Nigeria. *Odontostomatol Trop* 1998;21:19-21.
7. American Academy of Pediatric Dentistry (AAPD). Symposium on lifetime oral health care for patients with special needs. *Pediatr Dent* 2007;29:92-152.
8. Oredugba FA, Sote EO. Dental caries prevalence among handicapped children in Lagos. *Nig Postgrad Med J* 1999;6:122-125.
9. Oredugba FA, Akindayomi Y. Oral health status and treatment needs of children and young adults attending a day centre for individuals with special health care needs. *BMC Oral Health* 2008;8:30.
10. Arrrup K, Lundin SA, Dahllof G. Analysis of paediatric dental services provided at a regional hospital in Sweden: Dental treatment needs in medically compromised children referred for medical consultation. *Swed Dent J* 1993;17:225-259.
11. Asa R. Special need, special care. *AGD Impact* 2002;30:8-13.
12. Jain M, Kumar TS, Dagli RJ, Duraiswamy P, Kulkarni S. Dentition status and treatment needs among children with impaired hearing attending a special school for the deaf and mute in Udaipur, India. *J Oral Sci* 2008;50:161-165.
13. Jain M, Bharadwaj SP, Kaira LS, Chopra D, Prabu D, Kulkarni S. Oral health status and treatment needs among institutionalised hearing impaired and blind children and young adults in Udaipur, India. *Oral Health Dent Manag* 2013;12:41-49.
14. US Department of Health and Human services, Health Resources and Service Administration, Maternal and Child Health Bureau. The national survey of children with special care needs chartbook. 2009-2010. Available at: <http://mchb.hrsa.gov>. Accessed 6th May 2017.
15. McPherson MG, Arango P, Fox H, Lauver C, Mcmanus M, Newacheck PW et al. A new definition of children with special health care needs. *Pediatrics* 1998;102:137-140.
16. Leonard Cheshire International. Nigeria Country Profile 2010. Internet article: <http://www.lcint.org/3574/nigeria/country-profile.html>. accessed 18th December 2013.
17. Oredugba FA. Oral health condition and treatment needs of a group of Nigerian individuals with Down syndrome. *Down Syndr Res Pract* 2007;12:72-76.
18. Denloye OO. Periodontal status and treatment needs of 12-15 years old institutionalised mentally retarded school children in Ibadan,

- Nigeria. *Odontostomatol Trop* 1999;22:38-40.
- Rosner B, editor. *Fundamentals of biostatistics*. 5th ed. Pacific groove: Calif: Duxubury; 2000; 308.
19. Adleston H. Child patient training. *Fort RevChicago Dent Soc* 1959;38:7-9, 27-29.
 20. Allen KD, Stark LJ, Rigney BA, Nash DA, Stokes TF. Reinforced practise of children's cooperative behaviour during restorative dental treatment. *J Dent Child* 1988;55:273-277.
 21. Greene JC, Vermillon JR. The simplified oral hygiene index. *J Am Dent Assoc* 1964;68:7
 - Behjat AA, Mahboobeh MS, Yar Ali R, Mohammad A. Dental treatment needs of children with disability. *J Dent Res Dent Clin Dent Prospects* 2007;1:93-98.
 22. Cutress TW, Ainamo J, Sardo-Infirri J. The Community Periodontal Index of Treatment Needs (CPITN) procedure for population groups and individuals. *Int Dent J* 1987;37:222-223.
 23. Shellis RP. Relationship between human enamel structure and the formation of caries like lesion in vitro. *Arch Oral Biol* 1984;29:975-981.
 24. Klein H, Palmer CE, Knutson JW. Decayed, Missing, and Filled Teeth. *Health Rep* 1938;63:1021-1032.
 25. Monse B, Heinrich-Weltzien R, Benzian H, Holmgren C, van Palestein H. PUFA- An index of clinical consequences of untreated dental caries. *Community Dent Oral Epidemiol* 2010;38:77-82.
 26. Angle EH. Classification of malocclusion. *Dental Cosmo* 1899;41:248-264, 350-357.
 27. Olusanya O, Okpere E, Ezimokhai M. The importance of social class in voluntary fertility control in a developing country. *West Afr J Med* 1985;4:205-212.
 28. Newacheck PW, Strickland B, Shonkoff JP, Perrin JM, McPherson MG, McManus M, et al. An epidemiologic profile of children with special health care needs. *Pediatrics* 1998;102:117-123.
 29. Van Wyk P, Louw A, du Plessis J. Caries status and treatment needs in South Africa: report of the 1999-2002 National Children Oral Health Survey. *South Afr Dent J* 2004;59:238, 240-242.
 30. Oredugba FA. Use of oral health care services and oral findings in children with special needs in Lagos, Nigeria. *Spec Care Dentist* 2006;26:59-65.
 31. Van Dyck PC, Micheal DK, Mcpherson MG, Weissman GR, Newacheck PW. Prevalence and characteristics of children with special health care needs. *Arch Pediatr Adoles Med* 2004; 158: 884-890.
 32. Altun C, Guven G, Akgun OM, Akkurt MD, Basak F, Akbulut E. Oral health status of disabled individuals attending special schools. *Eur J Dent* 2010;4:361-366.
 33. Aljoharah AA. Oral hygiene practises and periodontal health status of visually impaired Saudi adults in Riyadh, Saudi Arabia. *Pakistan Oral Dent J* 2013;33:82-86.
 34. Shaw L, Maclaurin ET, Foster TD. Dental study of handicapped children attending special schools in Bermingham, UK. *Community Dent Oral Epidemiol* 1986;14: 24-27.
 35. Amano A, Murakami J, Akiyama S, Morisaki I. Etiologic factors of early-onset periodontal disease in Down syndrome. *Japanese Dent Sci Review* 2008;44:118-127.
 36. Oredugba FA, Sote EO. Prevalence of dental abnormalities among handicapped children in Lagos. *J Med & Med Sci* 1999;1:44-49.
 37. Breau LM, Camfield CS, McGrath PJ, Finley AF. The incidence of pain in children with severe cognitive impairments. *Arch Pediatr Adoles Med* 2003;157:1219-1226.
 38. Chukwumah NM, Folan MO, Oziegbe EO, Umweni AA. Impact of dental caries and its treatment on the quality of life of 12- to 15- year old adolescents in Benin, Nigeria. *Int J Paediatr Dent* 2016; 26:66-76.
 39. Palermo TM. Impact of recurrent and chronic pain on child and family daily function: a critical review of the literature. *J Dev Behav Pediatr* 2000;21:58-69.
 40. Waldman HB, Perlman SP, Swerdloff M. Orthodontics and the population with special needs. *Am J Orthod Dentofacial Orthop* 2000;118:14-17.
 41. Utomi I, Onyeaso C. Anteroposterior, vertical and space malocclusions in adolescents with special needs in Lagos, Nigeria. *Odontostomatol Trop* 2011;34:17-23.
 42. Onyeaso CO. Malocclusion pattern among handicapped children in Ibadan, Nigeria. *Nig J Clin Prac* 2002;5:57-60.
 43. Unkel JH, Fenton SJ, Hobbs G, Frere CL.

- Toothbrushing ability is related to age in children. *J Dent Child* 1995;62:346-348.
44. Turner S, Sweeney M, Kennedy C, Macpherson L. The oral health of people with intellectual disability participating in the UK Special Olympics. *J Intellect Disabil Res* 2008;52:29-36.
45. Kumar S, Sharma J, Duraiswamy P, Kulkarni S. Determinants for oral hygiene and periodontal status among mentally disabled children and adolescents. *J Indian Soc Pedod Prev Dent* 2009;27:151-157.
46. Shyama M, Al-Mutawa SA, Morris RE, Sugathan T, Honkala E. Dental caries experience of disabled children and young adults in Kuwait. *Community Dent Health* 2001;18:181-186.
47. Nemutandani MS, Adedija D, Nevhuhlwi D. Dental caries among disabled individuals attending special schools in Vhembe district, South Africa. *South Afr Dent J* 2013;68:458-461.
48. Bharathi MP, Shashidhar A, Meghashyam B. Oral health status and treatment needs of children attending special schools in South India: A comparative study. *Spec Care Dentist* 2010;30:235-241.
49. Bharvsar JP, Damie SG. Dental caries and oral hygiene amongst 12-14 year old handicapped children of Bombay, India. *J Indian Soc Pedod Prev Dent* 1995;13:1-3.
50. Nqco BC, Rudolph MJ, Thekiso M, Joosab Z. Dental caries prevalence in children attending special needs schools in Johannesburg, Gauteng Province, South Africa. *South Afr Dent J* 2012;67:308-313.
51. Utomi IL, Onyeaso CO. Malocclusion and orthodontic treatment need of mentally handicapped children in Lagos, Nigeria. *Pesq Bras Odontoped Clin Integr Joao Pessoa* 2009;9:7-11.