SELF ASSESSMENT OF ORAL HEALTH AND RISK FACTORS AFFECTING ORAL HYGIENE STATUS IN ADOLESCENTS ATTENDING DENTAL CLINIC IN UNIVERSITY COLLEGE HOSPITAL, IBADAN

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ABSTRACT

Introduction: **Globally, there is an increasing incidence of Non-Communicable Diseases (NCDs). Major oral diseases such as caries and periodontal disease which are classified as NCDs, are not left out of this trend. Recent reports are suggestive of increasing prevalence and severity of oral diseases among adolescents, despite accessibility of dental services. Ascertaining the oral health status of adolescents making use of dental services and how they perceive their oral health could help develop preventive and therapeutic strategies. This study therefore aims to determine the self-perception of adolescents utilizing dental services about their oral health and factors affecting their oral hygiene status.**

Methodology: **This clinic-based cross-sectional study was carried out among adolescents attending the Dental Center, University College Hospital, Ibadan Nigeria. A total of 113 adolescents were recruited into this study using a systematic random sampling technique. A WHO Oral health questionnaire was administered to the participants. Questions were asked on socio-demographics, self-perception of oral health and oral hygiene practices. Descriptive statistics such as frequency, percentages, mean, standard deviation were used to present the data. Independent T test and One way ANOVA were used to analyze categorical exposure variables with normally distributed numerical outcomes. A p-value of <0.05 was considered statistically significant.**

Results: **Majority of study participants had positive self-perception of health of their teeth (53.1%) and gingiva (62.8%) respectively, their mean OHI-S was 2.24 with 62.8% of adolescents having a fair oral hygiene. Mean DMFT was 0.96 with 75.2% of participants having a very low DMFT. OHI-S and DMFT were both significantly associated with age of adolescents, with late adolescents having significantly higher mean OHI-S and DMFT scores than early adolescents (p < 0.05). Adolescents who cleaned their teeth at least twice daily had significantly higher DMFT values than those who cleaned once daily (P < 0.05).**

Conclusion: **This study found late adolescents had higher DMFT and OHI-S scores. There might be need to increase oral health awareness in senior secondary schools and tertiary institutions to help improve their oral health status. Its pertinent that adolescents are encouraged and taught good oral hygiene measures when they visit dental clinics, in school and at home. Adolescents utilizing dental services are likely to be more self-conscious about their oral health thus increasing the frequency of their teeth cleaning.**

Keywords: Oral health, Adolescents, Self-perception

INTRODUCTION

Oral health is a component of overall health of an individual which the WHO defined as a state of complete physical, mental, emotional, and social well-being and not merely the absence of disease or infirmities. Oral health affects people physically, psychologically and socially in the way individuals talk, self-perception of themselves and interaction with others.[1,2] Globally, oral diseases are among the commonest chronic disorders, with a reported estimate of about 90% of individuals worldwide having

experienced oral diseases at one time or the other.[2, 3] Oral diseases also seem to share common risk factors such as sugar consumption and tobacco use with leading non-communicable diseases like diabetes, cardiovascular diseases, cancers and chronic respiratory disorders.[4, 5] Worldwide, several studies have reported the effect of oral diseases on the daily lives of individuals with resultant loss of millions of school and work hours yearly, hence the public health importance of oral disease due to its socioeconomic impact.[2, 6]

Oral health has been reportedly given lesser attention compared to other aspects of global health, perhaps this might be due to the perception in some cultures that "teeth are seen as expendable" or the belief that "poor oral health often results in greater morbidity than mortality" hence most governments prioritize spending their limited resources on more life threatening conditions.[7-9] Oral diseases includes dental caries and periodontal diseases, these two are the commonest cause of tooth loss globally, other conditions are oral cancers, premalignant disorders, oral lesions in immunocompromised people, salivary gland diseases, orofacial pain, developmental disorders (orofacial clefts), dental erosion, dental fluorosis and oro-dental trauma.

In the mid and late 20th century majority of studies on oral health focused more on adults and elderly, nevertheless towards the late 20th century and early 21st century more attention is being paid to oral health of children and adolescents due to a 21% increase in oral diseases in 2010 compared to 1990 as reported by the 2010 global burden of disease study.[8, 9] Variations in the prevalence and severity of caries and periodontal diseases during childhood (pre-adolescent) and adolescent have been observed with significant increase at ages 12 and 15-19.[9, 10] Previous studies on dental caries and treatment need among Nigerian children, have reported high prevalence of dental caries within a range of 30-43% among Nigerian adolescents.[11-13] Another study by Popoola et al. amongst Nigerian adolescents aged 11-16 years reported "adverse periodontal tissue changes with about 90% of the sextants assessed involved in various forms of periodontal ill health".[14] These studies suggest adolescents may require special attention.

There had been reports of a relationship between self-perception of oral health by adolescents with personal care, professional care, social support and other external factors.[15,16] A study carried out amongst Brazilian adolescents aged 15 to 19 years reported that 64% of their respondents classified their oral health as good, 18.4% considered that the appearance of their teeth

and gingiva affected their relationship with others.[16] In another study carried out among young adolescents in a rural area in Oyo state Nigeria, the frequency of tooth cleaning, toothache in the preceding months and satisfaction with oral health conditions were reported as important factors that determine how adolescents self-rate the health of their teeth and gums.[17]

There is necessity to enhance adolescent's awareness about their own oral health and more importantly convey this knowledge to intermediaries such as dental personnel and parents. To successfully achieve these aims, it is pertinent to know how adolescents making use of dental services feel about their oral health. We therefore set out to determine the self-perception of teeth and gingivae, oral hygiene status of adolescents and factors affecting the Oral hygiene status of adolescents visiting UCH dental Centre.

METHODOLOGY
Study Design and Location
This study was a clinic-based cross-sectional study that was carried out amongst adolescents aged 10-19 years attending the Dental Centre, University College Hospital, Ibadan, Nigeria. Ethical approval was gotten for this study from the UI/UCH ethical review committee (UI/EC/18/0362). Participants were recruited into the study from August to November 2018.

Sample Size
Sample size was determined using prevalence of poor oral health from a previous study by Popoola et al.,[14] at a 5% level of precision and a 2-sided 5% level of significance, adjusting for finite population and a 10% non-response rate, we arrived at a sample size of 113.

Sampling Technique
Adolescents were recruited using a systematic random sampling technique from the records of adolescents attending the Dental Centre. An average of 60 adolescents are seen in the Dental Centre every month with peak periods of visits during the holidays (March, April, August, September, December). A sampling interval was calculated to be 3 based on the pattern of dental visits of adolescents within the last six months and the estimated sample size for the study. The first member to be recruited was determined by balloting from a list of all adolescents enrolled for consultation on the clinic day, thereafter every 3rd adolescent in the clinic attendance register was enrolled for the study.

Inclusion Criteria
Participants' last birthday should be within the ages of 10 and 19 years; those aged 18 and 19 years who have given informed consent; Participants aged 10 to 17

years who have given assent and informed consent has been obtained from their parents

Exclusion Criteria
Adolescents aged 10-19 years who are mentally impaired; Participants or parents of adolescents who refused to give informed consent.

Instrument for Data Collection
A WHO validated questionnaire was used to collect data.[18] The questions on sociodemographic characteristics, self-perception of their teeth and gingiva, oral hygiene practices, dietary sugar consumption. Intra-oral examination of all adolescents was carried out by a single calibrated (against an experienced consultant pediatric dentist) examiner. Adolescents were asked to rank their perception of their teeth and gingival health on a Likert scale. Participants were then examined, and their oral hygiene status was assessed using the Decayed, Missing and Filled Teeth (DMFT) Index and the Simplified Oral Hygiene Index (OHI-S).

Data Collection
An interviewer-administered questionnaire following the WHO oral health questionnaire template was administered by a single calibrated examiner, who also performed the clinical oral examination. Prior to the commencement of the study, 10 adolescents were assessed by test and retest procedures and were not included in the final study. Intra-examiner variability with respect to recording of the DMFT index and OHI-S index was assessed with Intra-class correlation coefficient (ICC) and a score of 0.92, which represents an excellent correlation was obtained.

Data Management and Analysis
Self-perception rating by each adolescent was given ascending grades with 'don't know' responses given a minimum score of "0" and 'excellent' responses given a maximum score of "6". The scores of each adolescent were dichotomized into two. Scores of "0 – 3" represented a negative perception about the teeth or gingiva while scores of "4 – 6" represented a positive perception about the teeth or gingiva. Each response of adolescents on dietary sugar consumption were given ascending grades with 'never' responses given a score of 0, and 'several times a day' given a score of 5. The total score for the 7 different questions were then calculated and categorized as follows: Mild consumption (0 – 10), Moderate consumption (11–20) and Severe consumption (21 – 35).

Analysis was done using the Statistical Package for Social Sciences (SPSS Inc. Chicago) IBM version 23. Independent T and One way ANOVA tests were used to test the difference between categorical variables with numerical outcome variables (OHI-S and DMFT) which were found to be normally distributed using Shapiro-Wilk's test ($p > 0.05$).

RESULTS
A Total of 44(38.9%) males and 69(61.1%) females presented during the period under study and the overall approximate male to female ratio was 1:1.6 (Table 1). The mean age of participants was 5.17 ($\pm$ 2.63), 28.3%

Table 1: Sociodemographic characteristics of respondents.

Variable (N = 113)		Frequency (%)
Gender	Male	44 (38.9)
	Female	69 (61.1)
Age categories	10 – 13	32 (28.3)
	14 – 16	43 (38.1)
	17 – 19	38 (33.6)
Residential Location	Urban	54 (47.8)
	Semi-urban	43 (38.1)
	Rural	16 (14.1)
Educational level	Primary	3 (2.7)
	Junior secondary	24 (21.2)
	Senior secondary	44 (38.9)
	Post-secondary	42 (37.2)
Father's education	Don't know	7 (6.2)
	No formal schooling	1 (0.9)
	Primary	4 (3.5)
	Secondary	16 (14.2)
	Tertiary	85 (75.2)
Mother's education	Don't know	6 (5.3)
	No formal schooling	3 (2.7)
	Primary	3 (2.7)
	Secondary	19 (16.8)
	tertiary	82 (72.6)

Table 2: Comparison of adolescents' self-perception of their teeth and gingival health.

	Positive perception	Negative perception	X²	P-value
Teeth	60 (53.1)	53 (46.9)	2.193	0.138
Gingiva	71 (62.8)	42 (37.2)		

Table 3: Assessment of Oral hygiene status of adolescents (OHI-S and DMFT index).

	Frequency (%)	Mean (SD)
OHI-S		2.24 (1.05)
Good	17 (15)	
Fair	71 (62.8)	
Poor	25 (22.2)	
DMFT		0.96 (1.47)
Very low	85 (75.2)	
Low	10 (8.8)	
Moderate	14 (12.4)	
High	3 (2.7)	
Very high	1 (0.9)	

were early adolescents, 38.1% were mid adolescents and 33.6% were late adolescents. Majority of participants had positive self-perception of their teeth (53.1%) and gingival health (62.8%), there was no statistically significant difference (p = 0.138) in the proportion of adolescents with positive and negative self-perception of both teeth and gingiva (Table 2).

The mean OHI-S score of participants was 2.24 (± 1.05) with 62.8% of them having a fair oral hygiene (Table 3). The mean DMFT score of the participants was 0.96 (± 1.47), with 75.2% of them falling into the very low category (Table 3). The mean scores of OHI-S and DMFT was found to be increasing from the early adolescent group to the late adolescent group. This pattern of increase was found to be statistically

Table 4: Comparison of socio-demographic factors with OHI-S index.

Variable	Mean OHI-S (SD)	P-value
Gender		
Male	2.40 (1.23)	0.496*
Female	2.14 (0.91)	
Age groups		
10 - 13	2.06 (1.10)	0.047**^
14 - 16	2.10 (0.93)	
17 - 19	2.58 (1.08)	
Residential Location		
Urban	2.29 (1.03)	0.759**
Semi-urban	2.14 (0.96)	
Rural	2.39 (1.41)	
Educational level		
Primary + Junior secondary	2.24 (1.29)	0.801**
Senior secondary school	2.21 (1.10)	
Post-secondary	2.27 (0.86)	
Father's education		
Pre-tertiary	2.35 (1.27)	0.805*
Tertiary	2.21 (0.98)	
Mother's education		
Pre-tertiary	2.44 (1.19)	0.430*
Tertiary	2.17 (0.99)	

*Independent T test   **One way ANOVA   ^ p< 0.05

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Table 5: Comparison of oral hygiene practices with OHI-S index.

Variable	Mean OHI-S (SD)	P-value
Last dental visit		
≤ 6 months	2.33 (0.93)	0.179**
> 6 months	1.93 (0.97)	
First visit	2.38 (1.20)	
Frequency of teeth cleaning		
Once a day	2.27 (1.10)	0.650*
2 or more times daily	2.16 (0.97)	
Wooden toothpick		
No	2.19 (1.07)	0.254*
Yes	2.40 (1.01)	
Dental floss		
No	2.25 (1.07)	0.757*
Yes	2.21 (0.99)	
Toothbrush texture		
Hard	2.44 (1.11)	0.441**
Medium	2.28 (0.89)	
Soft	2.06 (1.03)	
Dietary sugar consumption		
Mild	2.48 (1.18)	0.481**
Moderate	2.16 (1.02)	
Severe	2.31 (1.06)	

*Independent T test   **One way ANOVA   ^ p< 0.05*

significant for both OHI-S (p = 0.047) and DMFT (p = 0.036) as shown in Table 4 and Table 6. Further post-hoc test revealed the difference was between the early (10-13) and late adolescent (17-19) age groups.

Adolescents who cleaned their teeth twice daily were found to have higher DMFT scores compared to those who cleaned once daily (Table 7), this difference was found to be statistically significant (p = 0.048).

Table 6: Comparison of socio-demographic factors with DMFT Index.

Variables	Mean DMFT (SD)	P-value
Gender		
Male	0.95 (1.60)	0.822*
Female	0.96 (1.39)	
Age groups		
10 - 13	0.50 (0.98)	**0.036**^
14 - 16	0.91 (1.23)	
17 - 19	1.39 (1.90)	
Location		
Urban	0.87 (1.35)	0.792**
Semi-urban	1.12 (1.67)	
Rural	0.80 (1.37)	
Educational level		
Primary + Junior secondary	0.77 (1.37)	0.260**
Senior secondary school	0.75 (1.16)	
Post-secondary	1.31 (1.76)	
Father's education		
Pre-tertiary	1.14 (1.74)	0.541*
Tertiary	0.89 (1.37)	
Mother's education		
Pre-tertiary	1.06 (1.67)	0.697*
Tertiary	0.91 (1.39)	

*Independent T test   **One way ANOVA   ^ p< 0.05*

Table 7: Comparison of oral hygiene practices with DMFT index.

Variables	Mean DMFT (SD)	P-value
Last dental visit		
≤ 6 months	1.03 (1.42)	0.657*
> 6 months	1.24 (1.84)	
First visit	0.77 (1.23)	
Frequency of teeth cleaning		
Once a day	0.74 (1.24)	0.048*^
2 or more times daily	1.39 (1.82)	
Wooden toothpick		
No	0.98 (1.46)	0.543*
Yes	0.90 (1.50)	
Dental floss		
No	0.99 (1.48)	0.425*
Yes	0.82 (1.44)	
Toothbrush texture		
Hard	0.82 (1.29)	0.923**
Medium	1.00 (1.48)	
Soft	1.05 (1.58)	
Dietary sugar consumption		
Mild	0.95 (1.54)	0.295**
Moderate	1.09 (1.55)	
Severe	0.58 (1.10)	

*Independent T test   **One way ANOVA   ^ p< 0.05*

DISCUSSION

This study reported that majority of adolescents had positive perception of their teeth and gingiva, this was similar to the finding of Batista *et al.*,[16] who reported that 64% of Brazilian adolescents aged 15 to 19 years had a good perception of oral health, though the age group for this study was broader. The similarity to the finding by Batista *et al.* is perhaps due to the educational status of the parents, some studies have reported an association between educational level of parents and dental utilization as important factors in how adolescents perceive their teeth and gums.[19,20] Majority of the parents of adolescents in this study have had at least tertiary education, this might have influenced the adolescent's positive perception of their teeth and gingival health. Furthermore, the educational status of the parents may indirectly influence the frequency of tooth cleaning and awareness about oral health, these factors have been reported to positively influence the perception of adolescents about their oral health.[17]

The overall Mean DMFT score for the study population was very low which may not be unexpected for most developing countries.[2] This may be due to the reduced consumption of refined sugars in comparison with adolescents in developed countries. Nevertheless, there have been recent reports of decline in caries and DMFT scores in developed countries and an increasing incidence of caries in developing countries.[21,22] Assess to fluoride therapy and better commitment to maintain good oral hygiene even in the presence of increased refined sugar consumption amongst adolescents in developed countries compared to developing countries has been touted as the possible explanation for this recent trend.

Majority of participants had a fair oral hygiene which is similar to that reported by Kolawole *et al.*,[23] the pattern of distribution of participants across the categories of oral hygiene was also similar to the findings by Kolawole *et al.* Females had lower OHI-S scores than males in both studies and this may be due to the higher tendency of females to give good attention to their oral health and overall dental appearance. Females have also been reported to follow oral hygiene instructions and perform more active daily brushing activities compared to males.[24,25] We also found lower overall mean scores for OHI-S in comparison to Kolawole *et al.* Possibly, our study being a clinic-based one which was not restricted to first time patients had greater proportion of participants who have had previous dental care as a plausible explanation for the lower OHI-S scores in this study.

Our findings show the age group of adolescents to be associated with both the OHI-S and DMFT indices of adolescents visiting dental clinic, with OHI-S and

DMFT scores increasing as the age groups increases. While all the OHI-S scores are within the fair category, there's perhaps a tendency for most indices assessing oral health to cumulatively increase with age. Nevertheless, the age range between adolescents in this study is quite narrow and this reasoning may not fully justify the significant difference between the late and early adolescents. This study also found the frequency of teeth cleaning to be associated with DMFT index. We found adolescents who cleaned their teeth two or more times daily had a higher mean DMFT compared to those who cleaned once daily, this finding is rather contrasting to previous studies amongst adolescents.[26,27] Perhaps those who cleaned at least twice a day were already having symptoms of toothache and resorted to self-help by brushing more frequently, before presenting in dental clinic.

The findings of this study may be difficult to generalize to the adolescent population at large, it's more likely for adolescents attending dental clinics. Clearly, one limitation of this study is the degree of variation in the experiences of an 11-year-old adolescent and an 18-year-old adolescent, hence it may be statistically difficult to obtain a valid conclusion on their subjective assessment of certain situations such as self-perception about their teeth and gums.

In conclusion, this study found majority of participants had a positive self-perception of their teeth and gingiva health. Additionally, late adolescents were also found to have poorer oral hygiene status with higher DMFT and OHI-S values. There might be need to increase oral hygiene awareness in senior secondary schools and tertiary institutions to help improve their oral hygiene status. Its pertinent that adolescents are encouraged and taught good oral hygiene measures whenever they visit the dental clinic, and they should be advised to visit the dentist at least once every 6 months.

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