The Role of Socioeconomic Class on Oral Healthcare Practices and Oral Health Status of Secondary School Students in Lagos, Nigeria

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ABSTRACT

Background: Secondary school students are at a crucial stage in their life where decisions on oral health transit from the role of parents/guardians to their sole responsibility. Understanding factors that influence their oral healthcare practices is of paramount importance. Socioeconomic class (SEC) has been suggested to have a varied effect on oral health.

Objective: To determine the effect of SEC on the oral healthcare practices and oral health status of secondary school students

Methods: The research was a descriptive cross-sectional study. Information collected via a self-administered questionnaire included socio-demographic characteristics, SEC, oral hygiene practices, dietary habits, oral healthcare utilization and oral health perception.

Results: A total of 370 students with mean age 15.0 ± 1.44 participated in the study. SEC distribution was low class 32%, middle class 55%; high class 13%. There were significant associations between high SEC and twice-daily tooth brushing ($p<0.05$), frequent change of toothbrush ($p<0.05$), use of dental floss ($p<0.05$), consumption of carbonated drinks ($p<0.05$), low oral hygiene index score ($p<0.05$), high caries experience ($p<0.005$) and high oral healthcare utilization ($p<0.05$).

Conclusion: Higher SEC is associated with better oral hygiene and oral hygiene practices, poorer dietary habits and higher caries experience.

Keywords: Socioeconomic class; oral healthcare practices; oral health status, secondary school students

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INTRODUCTION

The American Psychological Association defines socioeconomic class as the social standing of an individual or group that is often measured as a combination of education, income and occupation.[1,2] Their examinations of SEC revealed inequities in access to resources, plus issues related to privilege, power and control among various classes.[2] The population of Nigeria can be divided based on SEC into the upper class, middle class and lower class[3] and studies have shown that the SEC affects the lifestyle of individuals in so many ways including working conditions, food availability, access to good education and healthcare, to name a few.[4] With this in mind, individuals with higher SEC are more likely to belong to the healthiest of the three SECs as they are more likely to lead a healthier lifestyle.[3]

Oral healthcare practices include the various ways by which the oral environment is kept healthy and disease free. These include tooth brushing, use of fluoridated dentifrices, dental flossing, interdental brushing, use of mouthwashes, and use of chewing sticks and/or dental wood sticks. The use of dental wood sticks is commonly practiced in rural communities in Nigeria and has been suggested to be an unhealthy practice due to its traumatic effect on the gingivae and the lack of fluoridated dentifrices when it is used.[5] Oral healthcare practices also include periodic and regular dental visits for routine dental examination and oral prophylaxis.[5] The effects of these practices are seen in the oral health status of the individual including their oral hygiene status and dental caries experience. Studies have shown that as the SEC varies so do the oral hygiene and other measures of oral healthcare practices.[6]

Oral healthcare practices are greatly affected by the availability and affordability of dental healthcare products and facilities. Hence, adolescents of higher SEC are more likely to report a better condition of oral health as opposed to those of lower SEC.[7] Oral healthcare practices also involve the type of diet consumed which affects oral health. Dental health problems related to diet include dental caries, dental erosion, periodontal diseases as well as oral cancer and oral infectious diseases.[8] SEC affects the diet of individuals[9] and may have an effect on oral healthcare practices of secondary school students.

Several studies have reported a relationship between SEC and periodontal treatment needs,[9] dental visits,[10] brushing habit,[10] and oral hygiene.[10] Good oral healthcare practice is the basis of the prevention of dental health problems and it is of particular importance to secondary school students because at this age, their brushing and dietary habits are not easily monitored by parents and teachers and they are prone to consuming sweets, biscuits and carbonated drinks necessitating an improved oral healthcare practice. Also, at this age, peer pressure may influence their oral health behavior for example to develop a smoking habit which not only harms the oral health but also general health.

The aim of this study was to determine the relationship between the SEC of secondary school students and their oral hygiene practices, dietary habits, smoking habits, frequency of dental visits and in turn their dental health. In this endeavor, the following objectives were addressed:

- to determine the relationship between the SEC and the oral healthcare practices of secondary school students; and
- to determine the relationship between the SEC and the oral health status of secondary school students

MATERIAL AND METHODS

Study design: This was a descriptive cross-sectional study to determine the effects of socioeconomic class on the oral healthcare practices and oral health status of secondary school students in Lagos, Nigeria. The study population was senior secondary school students aged between 13 and 19 years attending two public secondary schools and two private secondary schools in Lagos, Nigeria.

Sample size determination: A sample size of 385 senior secondary school students was used. This sample size was determined using the sample size calculation formula for descriptive studies.[11]

$n=z^2PQ/e^2$ (where n=sample size; z=formula constant=1.96; P=prevalence from past studies=50% if past prevalence not available; Q=1-P; e=confidence interval=95%). $n=1.96^2 x 0.5 x 0.5/0.05^2=384.16$. This was approximated to 385.

Sampling method: A multistage sampling method was used. Simple random sampling was used to select a local government in Lagos State using the balloting method. A stratified sampling method was used to divide secondary schools into public and private secondary schools. A sampling frame containing the names of all the public and private schools in Surulere Local Government Area, Lagos State was got from the local government office. Two public and two private secondary schools were selected using the balloting method. All senior secondary school students, between the ages of 13

and 19 who provided written consent from their parents, and were present the day data were collected were included in the study.

Data collection: A self-administered questionnaire was used. The questions were well-structured and close-ended. The questionnaire inquired about socio-demographic characteristics including age, gender, religion, fathers' occupation, mothers' occupation, number of siblings and position in the family; SEC using a modified form of the family affluence scale (FAS) by Currie (1997);[12] oral hygiene practices, dietary habits, oral healthcare utilization and perception of oral health status. The FAS is a measure of SEC used for adolescents. For the purpose of this study, the scale was modified and composed of six items;

1. Does your family own a van, car or truck? No (0), yes one or two (1), yes three or more (2)
2. Do you have your own bedroom for yourself? No (0), yes (1)
3. During the past 12 months, how many times did you travel away on holiday with your family? Not at all (0), once (1), twice (2), more than twice (3)
4. How many computers/laptops does your family own? None (0), only owned by parents (1), owned by parents and some siblings (2), owned by parents and all siblings (3)
5. What type of accommodation/home do you live in? One room apartment (0), room and pallor apartment (1), flat (2), duplex (3), mansion (4)
6. How much is your daily allowance for feeding (lunch)? ₦50 or less (0), above ₦50 – ₦100 (1), above ₦100 – ₦200 (2), above ₦200 – ₦400 (3), above ₦400 (4)

FAS score was calculated as total score from the six items above and ranged from 0 - 17. For analysis, a three point ordinal scale was used; where FAS low (0 – 4) indicated low SEC, FAS medium (5 – 10) indicated middle SEC, FAS high (11 – 17) indicated high SEC.

Clinical examination to determine oral health status was also conducted and included oral hygiene status using oral hygiene index – simplified, [13] dental caries experience using DMFT index[14] and significant caries (SiC) index[15] and gingival inflammation and sulcus bleeding using the papillary, marginal and attached gingivae (PMA) index.[16]

Data analysis: data entry, analysis and validation were done using EPI Info 7 statistical analysis software. The Chi square test was used to test for association, and the confidence level was set at 95%.

Ethical approval and informed consent: informed consent was sought from each participant and their parents/guardians before the administration of the questionnaire and before carrying out oral examinations. Approval for the study was got from the Lagos University Teaching Hospital, Health Research and Ethics Committee with the assigned number ADM/DCST/HREC/APP/1955.

RESULT

Socio-demographic characteristics: A total of 370 adolescents participated in this study out of the 385 initially planned to take part in the study representing about 96% participation. They consisted of 162 (43.8%) males and 208 (56.2%) females aged between 12 and 19 years with a mean age of 15.0 ± 1.44.

Family Affluence Scale (FAS): The FAS score ranged from 0 to 16. The mean FAS score was 6.47 ± 3.62. (Table 1)

SEC using the Family Affluence Scale revealed that 54.6% are in the middle class**. (Figure 1)**

Oral hygiene practices and SEC: among the 370 respondents, 367 (99.2%) used tooth brush, 363 (98.1%) used fluoridated toothpaste, 227 (61.4%) brushed twice daily, 230 (62.2%) changed their tooth brush after every 3 months and 100 (27.0%) used dental floss. There was a significant association between SEC and tooth brushing frequency (p=0.0028), frequency of changing tooth brush (p=0.0002) and use of dental floss (p=0.0000). Table 2 shows the association between SEC and oral hygiene practices.

Dietary Habits, Smoking History and SEC

Among the 370 respondents, 135 (36.5%) took fermentable sugars in form of carbonated drinks frequently (at least once a day) and 214 (58%) consumed fermentable sugars in form of biscuits, sweets and snacks frequently (at least once a day). 350 (94.7%) respondents frequently consumed sugary snacks in between meals, 237 (64.1%) frequently consumed sugary snacks while reading and 274 (74.1%) frequently consumed midnight snacks. Also, among the 370 respondents, only 2 respondents of high SEC (0.5%) smoked regularly and 14 (3.8%) said they had at least smoked a few puffs of cigarette. There was a significant association between SEC of respondents and frequency of consumption of carbonated and fizzy drinks (p = 0.0000). However, no significant association was seen between SEC and other dietary habits. No significant association was seen between SEC and smoking habit. Table 3 shows the association between SEC and dietary and smoking habits.

Oral healthcare utilization and SEC

Among the 370 respondents, only 138 (37.3%) had been to a dental clinic before. Of the 138, 84 (60.9%) that had visited the dentist in the past 1 year, only 59 (42.8%) of them visited for routine dental check-up. There was a significant association between SEC of respondents and oral healthcare utilization (p = 0.0001). Table 4 shows the association between SEC and oral healthcare utilization.

Oral health perception, prevalence of tooth pain and SEC

Among the 370 participants, 189 (51.1%) were satisfied with their oral health while 181 (48.9%) were not. Among participants dissatisfied with their oral health, reasons for dissatisfaction included poor teeth shape and size (18.2%), poor teeth color (56.9%), poor teeth arrangement (16.6%) and other reasons (8.3%). Also, among the 370 respondents, 154 (41.6%) had experienced tooth pain before and of the 154 respondents, only 30 (19.5%) visited the dentist concerning the tooth pain. The remaining respondents visited chemists (15.0%), and were given analgesics by their parents (22.7%), or did nothing (42.9%). No significant association was noted between SEC and oral health perception (P >0.05) and SEC and prevalence of tooth pain (P >0.05). Table 5 shows the association between SEC and oral health perception, prevalence of tooth pain.

Oral hygiene, gingival inflammation and SEC

Oral hygiene was measured using the oral hygiene index (OHI). The minimum OHI score was 0 and maximum 4.66. The mean OHI score was 1.12 ± 0.62. 264 (71.4%) respondents had good OHI, 101 (27.3%) had fair OHI and 5 (1.4%) had poor OHI. Gingival inflammation was measured using the PMA index. Scores ranged from 0 to 3. The mean PMA score was 0.74±0.53. The prevalence of gingival inflammation (scores above 0) was 78.1%. There was a significant association between SEC and oral hygiene of respondents (p = 0.0131). However, there was no significant association between SEC and the presence of gingival inflammation (p>0.05). Table 6 shows the association between SEC and oral hygiene, gingival inflammation.

Dental caries severity and SEC

The minimum DMFT score was 0 and maximum 7. The mean DMFT score was 0.25 ± 0.76. The prevalence of caries among respondents was 15.1%. The index of treatment needs for the study population was 56.5%, index of treatment failure 23.9% and index of restorative provision 19.6%. The SiC index score was 0.75. There was a significant association between SEC and caries experience (DMFT) of respondents (p = 0.0001). A similar association was also present between SEC and the presence of dental caries (p = 0.0239) and presence of filled teeth due to caries (p = 0.0000). There was no significant association between SEC and missing teeth due to caries. Table 7 shows the association between SEC and dental caries experience

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Table 1: Family affluence scale of respondents

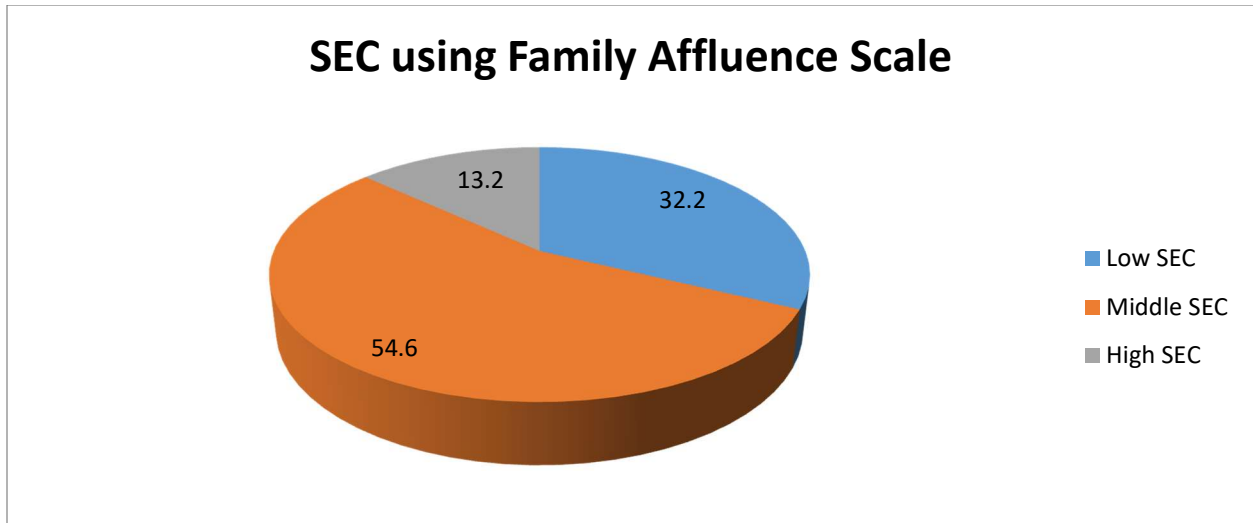| FAS	Frequency	Percentage (%)	Mean	Standard deviation
Low (0 – 4)	119	32.2	2.54	1.23
Middle (5 – 10)	202	54.6	7.26	1.73
High (11 – 17)	49	13.2	12.60	1.60
Total FAS	370	100.0	6.47	3.62

SEC using Family Affluence Scale

Figure 1: SEC using Family Affluence Scale

Table 2: Association between SEC and oral hygiene practices

FAS GROUP SCORES	Tooth brushing frequency			
	Once (%)	Twice (%)	Total (%)	P - value
Low (0 – 4)	60 (50.4)	59 (49.6)	119 (100.0)	0.0028
Middle (5 – 10)	72 (35.5)	130 (64.4)	202 (100.0)	
High (11 – 17)	11 (22.5)	38 (77.6)	49 (100.0)	

FAS GROUP SCORES	Frequency of changing toothbrush				
	Every 3 months (%)	3 to 6 months (%)	>6months (%)	Total (%)	P - value
Low (0 – 4)	74 (61.9)	7 (5.9)	38 (32.2)	119 (100.0)	0.0002
Middle (5 – 10)	122 (60.4)	40 (19.8)	40 (19.8)	202 (100.0)	
High (11 – 17)	35 (71.7)	8 (15.2)	6 (13.1)	49 (100.0)	

FAS GROUP SCORES	Use of dental floss			
	Yes (%)	No (%)	Total	P - value
Low (0 – 4)	12 (10.3)	107 (89.7)	119 (100.0)	0.0000
Middle (5 – 10)	55 (27.7)	147 (72.3)	202 (100.0)	
High (11 – 17)	29 (59.6)	20 (40.4)	49 (100.0)	

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Table 3: Association between SEC and dietary and smoking habits

FAS GROUP SCORES	Consumption of carbonated and fizzy drinks			
	Frequently (%)	Not frequently (%)	Total (%)	P - value
Low (0 – 4)	28 (23.5)	91 (76.5)	119 (100.0)	0.0000
Middle (5 – 10)	69 (34.2)	133 (65.8)	202 (100.0)	
High (11 – 17)	38 (77.6)	11 (22.4)	49 (100.0)	
FAS GROUP SCORES	Consumption of biscuits, sweets and snacks			
	Frequently (%)	Not frequently (%)	Total (%)	P - value
Low (0 – 4)	64 (53.8)	55 (46.2)	119 (100.0)	0.1542
Middle (5 – 10)	123 (60.9)	79 (39.1)	202 (100.0)	
High (11 – 17)	27 (55.1)	22 (44.9)	49 (100.0)	
FAS GROUP SCORES	Consumption of sugary snacks in-between meals			
	Frequently (%)	Not frequently (%)	Total	P - value
Low (0 – 4)	108 (90.8)	11 (9.2)	119 (100.0)	0.0634
Middle (5 – 10)	197 (97.5)	5 (2.5)	202 (100.0)	
High (11 – 17)	45 (91.8)	4 (8.2)	49 (100.0)	
FAS GROUP SCORES	Consumption of sugary snacks while reading			
	Frequently (%)	Not frequently (%)	Total (%)	P - value
Low (0 – 4)	78 (65.5)	41 (34.5)	119 (100.0)	0.0676
Middle (5 – 10)	125 (61.9)	77 (38.1)	202 (100.0)	
High (11 – 17)	34 (69.3)	15 (30.6	49 (100.0)	
FAS GROUP SCORES	Consumption of midnight snacks			
	Frequently (%)	Not frequently (%)	Total (%)	P - value
Low (0 – 4)	90 (75.6)	29 (24.4)	119 (100.0)	0.0563
Middle (5 – 10)	143 (70.8)	59 (29.2)	202 (100.0)	
High (11 – 17)	41 (83.7)	8 (16.3)	49 (100.0)	
FAS GROUP SCORES	Smoking history				
	Smoke regularly (%)	At least one puff (%)	Never smoked (%)	Total (%)	P - value
Low (0 – 4)	0 (0.0)	3 (2.5)	116 (97.5)	119 (100.0)	0.3189
Middle (5 – 10)	0 (0.0)	8 (4.0)	194 (96.0)	202 (100.0)	
High (11 – 17)	2 (4.1)	3 (6.1)	44 (89.8)	49 (100.0)	

Table 4: Association between SEC and oral healthcare utilization

FAS GROUP SCORES	Oral healthcare utilization			
	Yes (%)	No (%)	Total (%)	P – value
Low (0 – 4)	11 (9.5)	108 (90.5)	119 (100.0)	0.0001
Middle (5 – 10)	90 (44.7)	112 (55.3)	202 (100.0)	
High (11 – 17)	39 (78.7)	10 (21.3)	49 (100.0)	

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Table 5: Association between SEC and oral health perception, prevalence of tooth pain

FAS GROUP SCORES	Oral health perception			
	Satisfied (%)	Not satisfied (%)	Total (%)	P – value
Low (0 – 4)	75 (63.0)	44 (37.0)	119 (100.0)	0.8428
Middle (5 – 10)	88 (43.6)	114 (56.4)	202 (100.0)	
High (11 – 17)	26 (53.1)	13 (26.5)	49 (100.0)	
FAS GROUP SCORES	**Past experience of tooth pain**			
	Yes (%)	No (%)	Total (%)	P – value
Low (0 – 4)	61 (51.3)	58 (48.7)	119 (100.0)	0.6819
Middle (5 – 10)	72 (35.6)	130 64.4)	202 (100.0)	
High (11 – 17)	21 (42.9)	28 (57.1)	49 (100.0)	

Table 6: Association between SEC and oral hygiene, gingival inflammation

FAS GROUP SCORES	Oral Hygiene from OHI scores				
	Good (%)	Fair (%)	Poor (%)	Total (%)	P – value
Low (0 – 4)	76 (63.9)	43 (36.1)	0 (0.0)	119 (100.0)	0.0131
Middle (5 – 10)	146 (72.2)	51 (25.3)	5 (2.5)	202 (100.0)	
High (11 – 17)	42 (85.1)	7 (14.9)	0 (0.0)	49 (100.0)	
FAS GROUP SCORES	**Gingival inflammation from PMA scores**				
	No (%)	Mild (%)	Moderate (%)	Severe (%)	Total (%)	P - value
Low (0 – 4)	17 (14.3)	70 (58.8)	20 (16.8)	12 (10.1)	119 (100.0)	0.0534
Middle (5 – 10)	46 (22.8)	84 (41.5)	48 (23.8)	24 (11.9)	202 (100.0)	
High (11 – 17)	18 (36.7)	21 (42.9)	8 (16.3)	2 (4.1)	49 (100.0)	

Table 7: Association between SEC and dental caries severity

FAS GROUP SCORES	Decayed, Missing, Filled Teeth (DMFT)				
	0 (%)	1 – 2 (%)	≥3 (%)	Total (%)	P – value
Low (0 – 4)	112 (94.1)	6 (5.1)	1 (0.9)	119 (100.0)	0.0001
Middle (5 – 10)	169 (83.7)	29 (14.4)	4 (1.9)	202 (100.0)	
High (11 – 17)	32 (66.0)	17 (34.0)	0.00	49 (100.0)	

DISCUSSION

This study showed a significant association between SEC and tooth brushing frequency. It was noted that while majority of students of high SEC brush more than once or brush twice daily, less than half of students of low SEC brush more than once or twice daily. This may be due to the fact that most parents of high SEC are usually well educated and have a better understanding of the importance of brushing twice daily and as such enforce such practices on their wards and dependents. This is similar to results reported by previous local and international studies. The study by Idowu et al[17] reported that 90% of children of higher SEC brushed their teeth more than once daily compared to 6% seen among children of low SEC while the study by Oberoi et al[18] reported that 21.5% of children of higher SEC brushed their teeth more than once daily compared to 1.9% seen in children of low SEC. Although, these studies report an increase in tooth brushing frequency with an increase in SEC, the discrepancies seen between the respondents of different SEC across previous studies may be due to the different implications of the socio-economic differences across different populations.

Various oral hygiene and oral healthcare studies have recommended that the ideal time frame for changing toothbrushes is 3 months.[5, 9] In this study, although more than half of the respondents claimed that they change their toothbrushes every three months, there was a significant relationship between frequency of changing toothbrush and SEC with majority (71.7%) of secondary school students of high SEC changing their toothbrush every three months compared to 61.9% of students of low SEC. This is similar to results reported by Oberoi et al[18] which stated that 54.4% of children of higher SEC changed their toothbrush every three months compared to 20.3% of children of lower SEC. Also, this study reported a statistically significant association between a higher SEC and the use of dental floss with more than half of secondary school students of high SEC reporting that they use dental floss compared to 10.3% seen in students of low SEC. This is similar to results of past studies which reported an increase in the use of dental floss with increase in SEC.[17, 19] This stands to reason as it is only people of high SEC who understand the importance of flossing and have the means to buy them, that are more likely to make use of adjunctive teeth cleaning devices like dental floss.

This study showed a statistically significant association between increased SEC and consumption of carbonated and fizzy drinks. This is similar to results reported by previous local and international studies[17, 20] and can be explained by the fact that these carbonated drinks are more affordable to students of high SEC class compared to students of low SEC. Also in this study, the smoking habit is seen more in respondents of high SEC and although this relationship was not statistically significant, it contradicts the results of past studies which report smoking habit as a consequence of low SEC in adolescents.[21] The lack of a significant result and the conflicting result with past studies may be due to the fact that respondents may not be willing to give truthful accounts of their smoking history due to the negative social stigmatization associated with the habit, particularly in adolescence. Also, the smoking habit is influenced by a myriad of factors including financial ability to purchase a cigarette, peer pressure, psychological instability, strictness on smoking regulations, societal cultures, etc.[22] hence; more studies are needed to understand the relationship between SEC and smoking in adolescents in Lagos, Nigeria.

In this study, only 37% of respondents had previously utilized the dental clinic. This is very low as dental visits should be at least twice yearly. A study by Ajayi et al[23] conducted in Ibadan Nigeria stated that only 27% population had not visited the dentist before. This difference is most likely due to the fact that the study by Ajayi et al[23] was conducted in a hospital setting and may not be representative of the population. Nonetheless, our study emphasizes the importance of increased oral health awareness intervention programs. This study also showed a significant association between high SEC and oral healthcare utilization with that majority (77.6%) of secondary school students of high SEC reporting previous dental visits compared to 9.5% seen in students of low SEC. This is similar to results reported by Oberoi et al[18] who reported that 76.0% of children of higher SEC had previously visited the dentist compared to 18.8% seen in children of lower SEC. This further emphasizes the need for cheaper and more accessible oral healthcare facilities.

The mean OHI score recorded in this study was 1.12 and although it falls within the range of good OHI, this score is high when compared to more developed countries like China with records of mean OHI of 0.69 for their adolescent population.[24] This study showed that respondents of high SEC recorded better OHI scores compared to respondents of low SEC and although respondents of high SEC recorded poorer dietary habits, they also recorded better oral hygiene

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practices and higher utilization of oral healthcare facilities which could be the reason for their lower OHI score.

The prevalence of dental caries among respondents was 15% with mean DMFT of 0.25. This is relatively low compared to a similar study by Hou et al[24] among Tibetian high school students which showed caries prevalence of 40% and mean DMFT of 0.97. This study showed a significant association between caries experience and increase in SEC. This is similar to some studies[25] and also contradicts the results of other studies.[26] The disparities in these results could be due to other local factors that affect caries formation in addition to availability of cariogenic diet such as availability of fluoridated dentifrices, fluoridated water supply, etc. More studies need to be carried out on the effect of SEC on caries experience.

CONCLUSION

The results of this study showed that high SEC was significantly associated with improved oral hygiene practices, oral healthcare utilization and oral hygiene status of secondary school students. However, the results also showed that high SEC was significantly associated with poor dietary habits and high caries experience of secondary school students.

This study also showed poor oral hygiene practices, low oral healthcare utilization and consequently poor oral hygiene status among respondents of low SEC emphasizing the effects of oral health inequalities. The following are recommendations made from this study:

- National authorities and policymakers should take actions geared towards reducing inequalities in oral health by providing cheaper public health facilities that will improve oral hygiene practices and oral healthcare utilization among adolescents of low SEC.
- Urgent steps should be taken to incorporate oral health education into the education system. Majority of secondary school students consume cariogenic snacks during their break-time especially those of high SEC. This increases their caries experience which reduces their oral health-related quality of life and also increases the burden on healthcare.
- More studies should be done on the effect of SEC on the oral healthcare practices of secondary school students to help in the adequate planning of oral health interventions for adolescents

Acknowledgement

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