RELATIONSHIP BETWEEN ORAL HEALTH BEHAVIOURS AND DENTAL PROBLEMS AMONG SECONDARY SCHOOL STUDENTS IN ANAMBRA STATE NIGERIA

E.J. Ibeagha[1], Ngwuoke Edwin Obioma[2] and Nnaemezie Nkiru Onyinyechukwu[3]

[1,2,3] Department of Health Promotion and Public Health Education Nnamdi Azikiwe University, Awka

ABSTRACT

Oral health is an essential component of general health and quality of life. Oral health status is significantly related to oral health behavior. Oral health is affected by a person's oral health behaviors and oral habits, including tooth brushing, use of dental floss, and regular dental visits. Hence, behavior modification, therefore, may have a positive effect and produce improvement in oral health. This study was therefore designed to ascertain the relationship of oral health behaviors and dental problems among secondary school students in Anambra State. To guide the study, nine research questions were raised and answered and five hypotheses were formulated and tested at 0.05 level of significance. A descriptive survey design was used for this study. The area of study for this research was Anambra State. The sample size for the study comprised 500 secondary school students in Anambra State. The data required for this study were collected with two structured test instrument which was designed by the researcher and titled "Oral Health Behavior Questionnaire (OHBQ)" and "Dental Problem Questionnaire (DPQ)". The reliability analysis yielded alpha value of .716 for oral hygiene behaviors; .620 for oral dietary behaviors; .756 for oral addictive behaviors and .713 for dental problems. Research questions were answered with mean, percentage and chi square, and hypotheses were tested using Chi square, T-test and Pearson's correlation at 0.05 level of significance. The findings show among others that there is no significant relationship between the oral health behaviors and dental problems among secondary school students in Anambra State. Furthermore, Male and female secondary school students in Anambra State were not significantly different in their oral health behaviors. Also, the proportions of male and female secondary school students in Anambra State experiencing different types of dental problems were not significantly different. Based on the findings and conclusion, recommendations among others was made that; Secondary school students need to be educated and sensitized on the importance of use of dental floss and how to use it, and that Health education on healthy feeding should be disseminated to the students as well as their parents.

(Keyword: Oral Health, behaviour and dental health)

Introduction

Oral health is the state of the mouth, teeth and orofacial structures that enables individuals to perform essential functions, such as eating, breathing and speaking, and encompasses psychosocial dimensions, such as self-confidence, well-being and the ability to socialize and work without pain, discomfort and embarrassment (World Health Organization WHO, 2023). Oral health is an essential part of the overall health and well-being of an individual. Yon (2019) noted that there is a synergic relationship between oral health and overall wellness. Gum diseases resulting from poor oral health is linked to a host of illnesses including heart disease, diabetes, respiratory disease, osteoporosis, and rheumatoid arthritis whereas good oral health has an effect on appearance, allowing people to perform their social functions and daily activities without physical, psychological, or social inconveniences (Centre for Disease Control and Prevention, 2020). Hence, oral health has an impact on overall quality of life and daily performances.

Meanwhile, oral health can be compromised by individuals' oral health behavior just as individuals' health behaviors affect their general health. Health behaviors are actions that can directly affect health outcomes. Healthy behaviors lower the risk of conditions, while unhealthy behaviors raise the risk of conditions (Washington State Department of Health, 2023). Therefore, oral health behavior is defined as the activities undertaken by people to protect, promote, or maintain oral health and to prevent oral diseases or dental problems. The oral health behavior can be positive or

negative to oral health. Hence, changes in lifestyle factors such as diet, use of tobacco, and consumption of alcohol have a significant impact on oral health (World Health Organization, 2021).

However, oral health behaviors as carried out by individuals are in three categories which include; oral hygiene behaviors which is the practice of keeping the mouth clean and free from deposits such as brushing, flossing and tongue cleaning; oral dietary behaviors which is the practice of eating healthy and mouth-friendly foods such as eating of fruits and vegetables, and avoidance of eating of sweets and chocolates; and oral addictive behaviors which is the practice of the use of addictive substances such as such as smoking of tobacco and marijuana (Cleveland, 2022).

Although dental patients can have a favorable belief, yet without a favorable oral health behavior, achieving a good oral health status will be difficult as the presence of dental problem compromises the oral health. The long-term effect of a preventive dental program is therefore, targeted at behavior change in adults and this has shown significant benefits on tooth mortality, dental caries, and periodontal disease (Mark and Paul, 2017). Hence, guidance is given to people to brush their teeth twice daily, on a regular basis, with a fluoridated tooth paste. But for better oral hygiene, it is also important to use adjunct cleaning aids such as dental floss and mouth rinses.

Furthermore, consumption of regularly sweetened soft drinks and juices will increase the risk for both dental erosion and dental caries, and artificially sweetened soft drinks, without regular brushing, will increase the risk for dental erosion. A bidirectional relationship exists between oral health and diet. Diet and nutrition affect the health of the tissues in the mouth; and the health of the mouth affects the food consumed. The consumption of sugars has been associated with an increased risk of developing dental caries (Alfred, 2018). Frequent consumption of acidic food and beverages is associated with an increased risk of erosive tooth wear.

Oral health is a key indicator of overall health, well-being and quality of life, it is essential to the general health and well-being of all humans, as it is a window into the health of the body, hence, poor oral health has serious consequences on the general health (Yon, 2019). Bad oral health behaviors are a major cause of poor oral health. And many students are not aware of the relationship of such bad oral health behaviors such as smoking, inappropriate diet and poor oral hygiene with potential oral diseases such as periodontitis and dental caries. As a result, the secondary school students find it difficult to take up the responsibility of engaging in good oral health behaviors. The students for one reason or the other still engage in the consumption of sugary substances, such as sweetened drinks, biscuits and chocolates (Procter and Gamble, 2021).

Moreover, since oral health is much more than just healthy teeth; but also includes the health of many other anatomical structures in the mouth such as the gums, bones, ligaments, muscles, glands, and nerves, daily oral hygiene behaviours, routine dental visit and healthy diet are vital issues in the maintenance of good oral health. As a result of this, good oral health behaviours such as tooth brushing, mouth rinsing and tongue cleaning are usually entrenched in the education of children right from primary school such that an average secondary school student would have basic knowledge of good oral health behaviours which when properly adopted, would prevent the occurrence of dental problems. But several studies carried out on oral health behaviors and dental problems among secondary school including Jannie, Ulla and Magnus, (2021), Cosmin, Monica, Simona, Anca and Bagdana (2020) and Procter and Gamble (2021) showed that dental problems are common among students and of all the studies, none was done in Anambra State.

The researcher, however, having worked with secondary school students for a few years, observed that many of the students in Anambra State practice bad oral health behaviours such as intermittent consumption of sugary foods like buns, ice cream, candy and biscuits without rinsing their mouth with water or brushing. In addition, a few students have reported bleeding gums while some absented themselves from school and missed their lessons as a result of teeth problem. These teeth problems may be as a result of poor oral health behaviours practiced by these students which predispose them to poor oral health. Hence, the researcher tends to carry out a study on oral health behaviours and associated dental problems among secondary school students in Anambra State.

Purpose of the Study

The purpose of this study is to ascertain the oral health behaviors and associated dental problems among secondary school students in Anambra State. Specifically, the study would like to ascertain:

1. the oral hygiene behaviors adopted by secondary school students in Anambra State.
2. the oral dietary behaviors adopted by secondary school students in Anambra State.
3. the addictive behaviors of secondary school students in Anambra State as affects oral health.
4. the relationship between oral hygiene behaviors and dental problem among secondary school students in Anambra State.

5. the relationship between dietary behaviors and dental problem among secondary school students in Anambra State.
6. the relationship between oral addictive behaviors and dental problem among secondary school students in Anambra State.

Research Questions

The following research questions guided the study
1. What are the oral hygiene behaviors adopted by secondary school students in Anambra State?
2. What are the oral dietary behaviors adopted by secondary school students in Anambra State?
3. What are the oral addictive behaviors adopted by secondary school students in Anambra State as affects oral health?

4. What percentage of secondary school students in Anambra State experience dental problems?

5. What is the relationship between oral hygiene behaviors and dental problems among secondary school students in Anambra State?
6. What is the relationship between oral dietary behaviors and dental problems among secondary school students in Anambra State?
7. What is the relationship between oral addictive behaviors and dental problems among secondary school students in Anambra State?
8. What is the difference between the oral health behaviors of males and females secondary school students in Anambra State?
9. What is the difference between the dental problems of males and females secondary school students in Anambra State?

Hypotheses

The following hypotheses were formulated and tested at 0.05 level of significance;
1. There is no significant relationship between oral hygiene behaviors and dental problems among secondary school students in Anambra State.
2. There is no significant relationship between oral dietary behaviors and dental problems among secondary school students in Anambra State.
3. There is no significant relationship between oral addictive behaviors and dental problems among secondary school students in Anambra State.
4. There is no significant difference between the oral health behaviors of males and females secondary school students in Anambra State.
5. There is no significant difference between the dental problems of males and females secondary school students in Anambra State.

METHODS

A descriptive survey research design was adopted for the study. Area of the Study was Anambra State, The population for this study is 54,554 which comprise of senior secondary school students in the 263 public secondary schools in Anambra State. The sample size for this study was 500 students. The researcher adopted a multistage sampling technique in selecting the sample. The research instruments for data collection in this study are two structured questionnaire titled Oral Health Behaviors Questionnaire (OHBQ) and Dental Problems Questionnaire (DPQ). Mean was used to answer research questions 1, 2, 3 and 8, percentage was used to answer research question 4 and 9 while Pearson's correlation was used for 5, 6 and 7. The hypotheses 1, 2 and 3 were tested at 0.05 level of significance Pearson's correlation. T-test was used to test hypotheses 4 and chi square for hypothesis 5.

Results and Discussion of the findings

Research Question One

What are the oral hygiene behaviors adopted by secondary school students in Anambra State?

Data answering this research question are shown in table 1

Table 1*Mean Responses on the Oral Hygiene Behaviors of Secondary*

School Students

N=479

S/N	Oral Hygiene Behaviors Items	Mean	SD	Remark
1.	Tooth brushing with paste twice	3.54	.65	Adopted
2.	Daily flossing	1.63	1.06	Not Adopted
3.	Daily tongue cleaning	3.70	.71	Adopted
4.	Use of chewing stick for cleaning the teeth	1.95	1.01	Not Adopted
5.	Use of finger and water to the clean the teeth	1.48	.89	Not Adopted
6.	Mouth rinsing after meal (eating)	3.14	1.06	Adopted
7.	Use of charcoal and salt to clean teeth	1.78	1.00	Not Adopted
8.	Scaling and polishing (professional cleaning)	1.66	1.10	Not Adopted
9.	Dental visit/checkup	1.80	1.04	Not Adopted

Research Question Two

What are the oral dietary behaviors adopted by secondary school students in Anambra State?

Data answering this research question are shown in table 2

Table 2: *Mean Responses on the Oral Dietary Behaviors of Secondary School Students*

N=479

S/N	Oral Dietry Behaviors Items	Mean	SD	Remark
1.	Consumption of carbonated drink	3.27	.75	Adopted
2.	Eating of fruits	3.47	.59	Adopted
3.	Eating of vegetables	3.61	.59	Adopted
4.	Consumption of ice cream	2.90	.68	Adopted
5.	Eating buns and biscuits	3.44	.66	Adopted
6.	Eating of chocolates and sweets	3.09	.75	Adopted

Research Question Three

What are the oral addictive behaviors adopted by secondary school students in Anambra State?

Data answering this research question are shown in table 3

Table 3: *Mean Responses on the Oral Addictive Behaviors of Secondary School Students*

N=479

S/N	Oral Addictive Behaviors Items	Mean	SD	Remark
1.	Smoking of tobacco	1.02	.22	Not Adopted
2.	Chewing of tobacco	1.04	.29	Not Adopted
3.	Drinking of alcohol	1.29	.68	Not Adopted
4.	Smoking of marijuana	1.03	.26	Not Adopted
5.	Eating/chewing of marijuana	1.02	.22	Not Adopted

Research Question Four

What percentage of secondary school students in Anambra State experience dental problems?

Data answering this research question are shown in table 4 and 5

Table 4: *Percentage Distribution of Number of Dental Problems Experienced by Secondary School Students in Anambra State*

N=479

Number of Dental Problem	Frequency	Percent
0	307	64.1
1	103	21.5
2	52	10.9
3	12	2.5
4	1	.2
5	4	.8
Total	479	100.0

Table 5: *Percentage Responses on the Dental Problems Experienced by Secondary School Students in Anambra State*

N=479

S/N	**Dental Problems**	**Yes**		**No**	
		N	**%**	**N**	**%**
1.	Dental caries (tooth decay)	67	14	412	86
2.	Halitosis (mouth odour)	11	2.3	468	97.7
3.	Periodontal disease (Swollen /bleeding gum)	99	20.7	380	79.3
4.	Mobile teeth	43	9	436	91
5.	Dental stains (discoloration of teeth)	47	9.8	432	90.2

Research Question Five

What is the relationship between oral hygiene behaviors and dental problems among secondary school students in Anambra State?

Data answering this research question are shown in table 5

Table5 : *Correlations between Oral Hygiene Behaviors and Number of dental experienced by secondary school students in Anambra State.*

N=479

Oral Hygiene Behaviors	**Dental Problems**	**Correlation coefficient**	**Remark**
Tooth brushing with paste twice	Number of dental problems experienced	-0.018	Very low negative Relationship
Daily Flossing	Number of dental problems experienced	0.040	Very low positive relationship
Daily tongue cleaning	Number of dental problems experienced	-0.001	Very low negative Relationship

Use of chewing stick for cleaning the teeth	Number of dental problems experienced	0.058	Very low positive relationship
Use of finger and water to clean the teeth	Number of dental problems experienced	-0.017	Very low negative relationship
Mouth rinsing after meal (eating)	Number of dental problems experienced	0.029	Very low positive relationship
Use of charcoal and salt to clean teeth	Number of dental problems experienced	0.099	Very low positive relationship
Scaling and polishing (professional cleaning)	Number of dental problems experienced	0.069	Very low positive relationship
Dental visit/checkup	Number of dental problems experienced	0.059	Very low positive relationship

Research Question Six

What is the relationship between oral dietary behaviors and dental problems among secondary school students in Anambra State?

Data answering this research question are shown in table 6

Table 6: *Correlations between Oral Dietary Behaviors and Number of dental experienced by secondary school students in Anambra State.*

N=479

Oral Dietary Behavior	**Number of dental problems experienced**	**Correlation coefficient**	**Remark**
Consumption of carbonated drinks	Number of dental problems experienced	-0.076	Very low negative Relationship
Eating of fruits	Number of dental problems experienced	-0.016	Very low negative relationship
Eating vegetables	Number of dental problems experienced	-0.028	Very low negative relationship
Consumption Ice cream	Number of dental problems experienced	-0.028	Very low negative relationship
Eating burns and biscuits	Number of dental problems experienced	-0.105	Very low negative relationship
Eating chocolates and sweets	Number of dental problems experienced	0.024	Very low positive relationship

Research Question Seven

What is the relationship between oral addictive behaviors and dental problems among secondary school students in Anambra State?

Data answering this research question are shown in table 7

Table 7: *Correlations between Oral Addictive Behaviors and Number of dental experienced by secondary school students in Anambra State.*

N=479

Oral Addictive Behavior	Number of dental problems experienced	Correlation coefficient	Remark
Smoking of tobacco	Number of dental problems experienced	-0.016	Very low negative Relationship
Chewing of tobacco	Number of dental problems experienced	-0.074	Very low positive relationship
Drinking of alcohol	Number of dental problems experienced	0.054	Very low positive relationship
Smoking of marijuana	Number of dental problems experienced	-0.015	Very low negative relationship
Eating/chewing of marijuana	Number of dental problems experienced	-0.064	Very low Negative relationship

Research Question Eight

What is the difference in the oral health behaviors of males and females secondary school students in Anambra State?

Data answering this research question are shown in table 8

Table 8: *Mean Responses by Male and Female secondary school students on their Oral Health Behaviors.*

N=479

Oral Health Behaviors Items	Male			Female		
	Mean	SD	Remark	Mean	SD	Remark
Tooth brushing with paste twice	3.59	.64	Adopted	3.49	.65	Adopted
Daily flossing	1.78	1.14	Not Adopted	1.47	.96	Not Adopted
Daily tongue cleaning	3.69	.71	Adopted	3.70	.72	Adopted
Use of chewing stick for cleaning the teeth	2.07	1.03	Not Adopted	1.84	.98	Not Adopted
Use of finger and water to the clean the teeth	1.56	.94	Not Adopted	1.41	.82	Not Adopted
Mouth rinsing after meal (eating)	3.16	1.06	Adopted	3.13	1.07	Adopted
Use of charcoal and salt to clean teeth	1.74	.98	Not Adopted	1.83	1.01	Not Adopted
Scaling and polishing (professional cleaning)	1.74	1.13	Not Adopted	1.58	1.06	Not Adopted
Dental visit/checkup	1.92	1.06	Not Adopted	1.68	1.01	Not Adopted
Consumption of carbonated drink	3.23	.76	Adopted	3.31	.74	Adopted
Eating of fruits	3.46	.57	Adopted	3.47	.61	Adopted
Eating of vegetables	3.65	.51	Adopted	3.58	.66	Adopted
Consumption of ice cream	2.88	.67	Adopted	2.92	.69	Adopted
Eating buns and biscuits	3.42	.61	Adopted	3.47	.72	Adopted
Eating of chocolates and sweets	3.08	.71	Adopted	3.09	.78	Adopted

Smoking of tobacco	1.04	.31	Not Adopted	1.00	.06	Not Adopted
Chewing of tobacco	1.05	.37	Not Adopted	1.02	.18	Not Adopted
Drinking of alcohol	1.32	.71	Not Adopted	1.26	.65	Not Adopted
Smoking of marijuana	1.03	.24	Not Adopted	1.03	.27	Not Adopted
Eating/chewing of marijuana	1.02	.20	Not Adopted	1.03	.23	Not Adopted

Research Question Nine

What is the difference between the dental problems of males and females secondary school students in Anambra State?

Data answering this research question are shown in table 9

Table 9: *Percentage Distribution of Dental Problems by Gender of secondary school students in Anambra State*

Dental Problems		Gender			
		Male		Female	
		N	%	N	%
Dental caries (tooth decay)	Yes	40	8.4	27	5.6
	No	201	42.0	211	44.1
Halitosis (mouth odour)	Yes	8	1.7	3	0.6
	No	233	48.6	235	49.1
Periodontal disease (Swollen /bleeding gum)	Yes	44	9.2	55	11.5
	No	197	41.1	183	38.2
Mobile teeth	Yes	22	4.6	21	4.4
	No	219	45.7	217	45.3
Dental stains (discolouration of teeth)	Yes	27	5.6	20	4.2
	No	214	44.7	218	45.5

Hypothesis One

There is no significant relationship between oral hygiene behaviors and dental problems among secondary school students in Anambra State.

Data in table 10 are used to answer hypothesis one

Table 11: *Significance of Correlations between Oral Hygiene Behaviors and Number of dental experienced by secondary school students in Anambra State.*

N=479

Oral Health Behaviors	**Dental Problems**	**Correlation Coefficient**	***p*-value**	**Decision**
Tooth brushing with paste twice	Number of dental problems experienced	-0.018	.686	NS
Daily Flossing	Number of dental problems experienced	0.040	.375	NS
Daily tongue cleaning	Number of dental problems experienced	-0.001	.986	NS

Use of chewing stick for cleaning the teeth	Number of dental problems experienced	0.058	.199	NS
Use of finger and water to the clean the teeth	Number of dental problems experienced	-0.017	.709	NS
Mouth rinsing after meal (eating)	Number of dental problems experienced	0.029	.522	NS
Use of charcoal and salt to clean teeth	Number of dental problems experienced	0.099	.026	S
Scaling and polishing (professional cleaning)	Number of dental problems experienced	0.069	.121	NS
Dental visit/checkup	Number of dental problems experienced	0.059	.187	NS

Hypothesis Two

There is no significant relationship between oral dietary behaviors and dental problems among secondary school students in Anambra State.

Data in table 11 are used to answer hypothesis two

Table 11: *Significance of Correlations between Oral Dietary Behaviors and Number of dental experienced by secondary school students in Anambra State.*

N=479

Oral Dietary Behavior	**Number of dental problems experienced**	**Correlation coefficient**	***p*-value**	**Decision**
Consumption of carbonated drinks	Number of dental problems experienced	-0.076	.088	NS
Eating of fruits	Number of dental problems experienced	-0.016	.715	NS
Eating vegetables	Number of dental problems experienced	-0.028	.526	NS
Consumption Ice cream	Number of dental problems experienced	-0.028	.535	NS
Eating burns and biscuits	Number of dental problems experienced	-0.105	.019	S
Eating chocolates and sweets	Number of dental problems experienced	0.024	.586	NS

Hypothesis Three

There is no significant relationship between oral addictive behaviors and dental problems among secondary school students in Anambra State.

Data in table 12 are used to answer hypothesis three

Table 12: *Significance of Correlations between Oral Addictive Behaviors and Number of dental experienced by secondary school students in Anambra State.*

N=479

Oral Addictive Behavior	**Number of dental problems experienced**	**Correlation coefficient**	***p*-value**	**Decision**
Smoking of tobacco	Number of dental problems experienced	-0.016	.726	NS
Chewing of tobacco	Number of dental problems experienced	-0.074	.098	NS
Drinking of alcohol	Number of dental problems experienced	0.054	.226	NS
Smoking of marijuana	Number of dental problems experienced	-0.015	.738	NS
Eating/chewing of marijuana	Number of dental problems experienced	-0.064	.154	NS

Hypothesis Four

There is no significant difference in the oral health behaviors of males and females secondary school students in Anambra State.

Data in table 13 are used to answer hypothesis four

Table 13: *T-test on Mean Responses on Oral Health Behavior by Gender of Secondary School Students in Anambra State*

	Male		**Female**		**df**	**t-cal**	***p*-value**	**Decision**
Oral Health Behaviors	**Mean**	**SD**	**Mean**	**SD**				
Tooth brushing with paste twice	3.59	.64	3.49	.65	477	1.793	.074	NS
Daily flossing	1.78	1.14	1.47	.96	477	3.173	.002	S
Daily tongue cleaning	3.69	.71	3.70	.72	477	-.197	.844	NS
Use of chewing stick for cleaning the teeth	2.07	1.03	1.84	.98	477	2.551	.011	S
Use of finger and water to the clean the teeth	1.56	.94	1.41	.82	477	1.837	.067	NS
Mouth rinsing after meal (eating)	3.16	1.06	3.13	1.07	477	0.282	.778	NS
Use of charcoal and salt to clean teeth	1.74	.98	1.83	1.01	477	-0.978	.329	NS
Scaling and polishing (professional cleaning)	1.74	1.13	1.58	1.06	477	1.583	.114	NS
Dental visit/checkup	1.92	1.06	1.68	1.01	477	2.542	.011	S
Consumption of carbonated drink	3.23	.76	3.31	.74	477	-1.147	.252	NS
Eating of fruits	3.46	.57	3.47	.61	477	-0.109	.913	NS

Eating of vegetables	3.65	.51	3.58	.66	477	1.411	.159	NS
Consumption of ice cream	2.88	.67	2.92	.69	477	-0.717	.474	NS
Eating buns and biscuits	3.42	.61	3.47	.72	477	-0.712	.477	NS
Eating of chocolates and sweets	3.08	.71	3.09	.78	477	-0.199	.843	NS
Smoking of tobacco	1.04	.31	1.00	.06	477	1.628	.104	NS
Chewing of tobacco	1.05	.37	1.02	.18	477	1.399	.162	NS
Drinking of alcohol	1.32	.71	1.26	.65	477	1.014	.311	NS
Smoking of marijuana	1.03	.24	1.03	.27	477	0.340	.734	NS
Eating/chewing of marijuana	1.02	.20	1.03	.23	477	-0.642	.521	NS

*Significant

Hypothesis Five

There is no significant difference in the dental problems of male and female secondary school students in Anambra State.

Data in table 14 are used to answer hypothesis five

Table 14: *Chi-square Analysis on Dental Problems by Gender of secondary school students in Anambra State*

Dental Problems		Gender				$X^2(1)$	*p*-value	Decision
		Male		Female				
		N	%	N	%			
Dental caries (tooth decay)	Yes	40	8.4	27	5.6	2.746	.097	NS
	No	201	42.0	211	44.1			
Halitosis (mouth odour)	Yes	8	1.7	3	0.6	2.263	.133	NS
	No	233	48.6	235	49.1			
Periodontal disease (Swollen /bleeding gum)	Yes	44	9.2	55	11.5	1.719	.190	NS
	No	197	41.1	183	38.2			
Mobile teeth	Yes	22	4.6	21	4.4	0.014	.907	NS
	No	219	45.7	217	45.3			
Dental stains (discolouration of teeth)	Yes	27	5.6	20	4.2	1.061	.303	NS
	No	214	44.7	218	45.5			

Discussion of the findings

Oral health behaviors of secondary school students

Findings of the study showed that the oral hygiene behaviors adopted by secondary school students in Anambra state were tooth brushing with paste twice, daily tongue cleaning and mouth rinsing after food. This could be because brushing involves less technicality. As stated by Chen and Robinson (2021), technical difficulties with flossing in children may account for noncompliance unlike tooth brushing. It may also have to do with their age. Rajeh (2022) reported that younger people brush more often, usually twice or more a day than older people probably for aesthetic reasons. However, secondary school students in Anambra State adopt good oral hygiene behaviour. However, there was a significant positive correlation between use of charcoal and salt to clean teeth and the number of dental problems experienced by students. But since eight out of the nine *p*-values were greater than 0.05, the null hypothesis was not rejected.

The findings of this study also showed that Oral dietary behaviour adopted by secondary school students in Anambra state were; consumption of carbonated drink, eating of fruits, eating vegetables, consumption of ice cream, eating buns and biscuits and eating chocolates and sweets; a combination of both good and bad oral dietary behavior. This finding is in line with the finding of Dennys, Pedro and Manuel (2020) and Melissari, Alexopoulos, Mantzourani, Plessas, Voidarou, Tsigalou and Bezirtzoglou (2021) in their separate studies reported that a considerable number of students consume foods rich sugars daily. However, there was a significant negative correlation between eating burns and

biscuits and the number of dental problems experienced by students. Since five out of the six *p*-values were greater than 0.05, the null hypothesis was not rejected

The finding of the study showed also that none of the oral addictive behaviors was adopted by secondary school students in Anambra State. Table 3 shows the mean responses on oral addictive behaviors. The mean values ranged from 1.02 to 1.29 which indicates that none of the oral addictive behaviors was adopted by the secondary school students in Anambra. This is possibly as a result high level of discipline, moral and religious reason and/or health education in the schools on the effects of addictive drug use. This result differs from the findings of Benjamin (2021), who reported that oral addictive behavior (cannabis use) is associated with multiple adverse oral health conditions, most related to periodontal disease among adults.

This study also revealed that male and female secondary school students in Anambra State were not significantly different in their oral health behaviors. T-test on Mean Responses on Oral Health Behavior by Gender of Secondary School Students in Anambra State as presented in table 14 shows there was no significant difference between male and female students on their mean responses on oral health behaviors, *p*-value > 0.05. Since the *p*-values for 17 out of the 20 items where greater than 0.05, the null hypothesis was not rejected. This finding is in line with the result of Skoskiewiez-Malinowska, Kaczmarek and Malicka (2021) who reported that there is no gender-wise difference in oral health parameters. This finding however, differs from the result of Rajeh (2022) who reported that females have higher frequency of tooth brushing and mouth washing than the males.

Dental problems among secondary school students

The finding of the study showed that only thirty-six percent of the secondary school students in Anambra State experience at least one or more dental problems. Percentage distribution of number of dental problems experienced by secondary School students and the percentage responses on the dental problems experienced by Secondary School Students in Anambra State are shown in tables 4 and 5 respectively. Approximately 64% of the respondents did not report experiencing any dental problem while 36% reported experiencing one or more dental problems. Specifically, 25.5% reported just one dental problem, 10.9% reported two dental problem while less than 1% reported experiencing between 4 and 5 dental problems with periodontal disease (swollen/bleeding gum) being the most reported dental problem 99(20.7%) of the respondents, followed by dental caries (tooth decay) reported by 67(14%) of the respondents, and dental stains (discoloration of teeth) being the least among the reported dental problems 47(9.8%) of the respondents. The percentage of students that experience dental problem from table 4 ranged from 9% to 20.7%. This suggests that low percentage of secondary school students in Anambra state experience dental problems. This finding is in line with the finding of Melissari, Alexopoulos, Mantzourani, Plessas, Voidarou, Tsigalou and Bezirtzoglou (2021) who reported a low prevalence of about 13%. This however, differs from the result of Cosmin, Monica, Simona, Anca and Bagdana (2020) who reported who reported a caries prevalent of 95.5%.

From the finding of the study, the dental problem mostly experienced by secondary school students in Anambra State was periodontal disease (swollen /bleeding gum). As shown in Table 5, the dental problem mostly reported was periodontal disease (swollen/bleeding gum) which was reported by 20.7% of the respondents. This was reported by 99(20.7%) of the respondents. This was followed by dental caries (tooth decay) reported by 67(14%) of the respondents, and thirdly, dental stains (discoloration of teeth) reported by 47(9.8%) of the respondents. This differs from the result of Melissari, Alexopoulos, Mantzourani, Plessas, Voidarou, Tsigalou and Bezirtzoglou (2021) who reported dental caries to be the most reported dental problem followed by periodontitis with 6.1% and 5.5% respectively. Furthermore, the proportions of male and female secondary school students in Anambra State experiencing different types of dental problems were not significantly different. Chi-square Analysis on Dental Problems by Gender of secondary school students in Anambra State as shown in table 15 showed that there was no significant difference in the proportion of male and female students experiencing the different dental problems, all *p*-values > 0.05. Since the p-values were greater than 0.05 level of significance, the null hypothesis was not rejected.

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