

# Untreated Malocclusions and Oral Health Status of an Urban Population in South-South Nigeria

Elfleda Angelina AIKINS, \*\*Modupeoluwa Omotunde SOROYE

[Department of Child Dental Health, \*\*Department of Preventive Dentistry, Faculty of Dentistry, University of Port Harcourt, Port Harcourt, Rivers State.]

## Correspondence

Dr. Elfleda A. Aikins

\*Department of Child Dental Health,  
Faculty of Dentistry, University of Port Harcourt  
Port Harcourt, Rivers State  
Email: [elfledaaikins@yahoo.com](mailto:elfledaaikins@yahoo.com)

Elfleda A. Aikins,  
<https://orcid.org/0000-0002-8218-4477>  
Modupeoluwa O. Soroye  
<https://orcid.org/0000-0001-9909-0381>

## ABSTRACT

**Objective:** Lack of awareness and an accompanying lack of knowledge results in a lack of utilization of dental services and a consequent increased burden of oral disease. This study assessed untreated malocclusions and the oral health status of an urban population.

**Methods:** A descriptive cross sectional study design was employed. Data was collected from consenting participants using an interviewer administered questionnaire after which an intraoral examination was carried out on each participant. Data was analysed using the SPSS version 20 and the level of significance set at  $p < 0.05$ .

**Results:** There were a total of 403 participants in this study. About a tenth of the participants indulged in oral habits 41 (10.2%). Untreated malocclusions in the form of tooth displacements 35 (8.7%), rotations 32 (7.9%), crossbite 9 (2.2%) and scissors bite 1 (0.3%) were seen in the study population. Majority, 383 (95%) used a toothbrush and flouridated toothpaste to clean their teeth and 264 (65.5%) brushed once a day. Most of the participants 281 (69.7%) had good oral hygiene.

**Conclusion:** Several untreated malocclusions comprising tooth rotations, displacements, crossbite, scissors bite and anterior open bite were seen in our study population. Their utilization of dental services was poor but oral health practices were good which translated to good oral hygiene and low DMFT.

**Keywords:** Untreated malocclusion, oral health status, oral health practices, urban, Nigeria

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## INTRODUCTION

Adequate knowledge and practice of good oral health is very important since these are directly related to general health.<sup>1</sup> Oral health as defined by the World Health Organization (WHO) is "a state of being free from mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss and other disorders that limit an individual's capacity in biting, chewing, smiling, speaking and psychosocial wellbeing".<sup>2</sup> Untreated malocclusions as well as painful oral conditions impact on an individual's wellbeing.

In Nigeria, there are people who have experienced poor oral health but are largely unaware of the need to seek oral or dental healthcare. This lack of awareness and accompanying lack of knowledge results in a lack of utilization of dental services and a consequent increased burden of oral disease.<sup>3,4</sup> Dental caries and periodontal disease are the two most common oral health problems in Nigeria and in the developing world.<sup>5</sup> In Nigeria, the prevalence rates of dental caries and periodontal diseases were found to be 30% and 80% respectively during a national oral health survey.<sup>6</sup> These can however be easily mitigated with adequate oral hygiene practices. Good oral health is necessary not only because of aesthetics but also the accompanying societal values it renders to an individual.<sup>7</sup>

Malocclusion is a deviation from normal occlusion and has been found to have a negative psychosocial impact on many individuals leading to low self-esteem and many times resulting in bullying at school.<sup>8,9</sup> Thus, evaluation and treatment of malocclusions are necessary for early detection and averting of such mental health challenges.<sup>10</sup>

The aetiology of malocclusion is multifactorial involving both general and local factors. Many of the local aetiological factors which include prolonged retention of primary teeth, which predispose to displacements and rotations of teeth among others can be intercepted and easily treated early in life.<sup>11</sup> However, this information is not freely available to the general populace because of the absence or small numbers of orthodontists in some parts of Nigeria, although the majority of dental clinics and practicing orthodontists are in the urban areas.<sup>4</sup> There are presently less than 100 orthodontists in Nigeria serving a population of over 180 million which is grossly inadequate.

Smiles Dental Foundation, a Non-Governmental Organisation (NGO) conducted an oral health awareness campaign in an urban area of Rivers State,

South-South Nigeria in order to educate as well as increase awareness of these oral health needs among the populace. During this outreach the oral health status and untreated malocclusion of the population were assessed in order to have evidence-based data to assist in policy formulation in the State.

## MATERIALS AND METHODS

This was a descriptive cross-sectional study carried out in Borokiri, Rivers State. Ethical approval was obtained from the University of Port Harcourt Teaching Hospital Research and Ethics Committee. Consent was also sought and obtained from the leader of the community (Community Chief) prior to commencement of the outreach. Informed consent was elicited from all members of the community who were willing to participate, whilst minors gave their assent. Data was collected using an interviewer administered questionnaire. Demographic information of the participants including age (as at last birthday), gender and educational status (highest level attained) was elicited in Section A of the questionnaire. Section B contained questions on the oral health practices of the participants: frequency of tooth cleaning and the materials used to do so.

A detailed intra-oral examination which assessed oral hygiene status and untreated malocclusion was then performed on each participant by the authors. Each participant was seated upright on a chair and the examinations were carried out using a tongue depressor and natural light. A disposable surgical facemask and a fresh pair of disposable latex gloves were used for each participant.

The oral hygiene status of participants was assessed using the Simplified Oral Hygiene Index (1964)<sup>12</sup> which is an index based on the amount of debris and calculus on six representative teeth in the mouth.

### Simplified Oral Hygiene Index (OHI-S)

The OHI-S is a composite index that scores debris and calculus deposition on selected teeth.

The following tooth surfaces were examined:

1. The buccal surfaces of the upper right and left first permanent molars
2. The lingual surfaces of the lower right and left first permanent molars
3. The labial surfaces of the upper right and lower left permanent central incisors.

Oral debris and oral calculus were scored 0-3 with 0 describing no debris/ calculus and 3 describing soft debris/supragingival covering more than two thirds of the exposed tooth surface or a continuous heavy

band of subgingival calculus around the cervical portion of the tooth.

After recording the debris and calculus scores for the patient, the index values were then calculated by totaling the debris scores and dividing by the number of surfaces examined.

The average scores known as the Simplified Debris Index (DI-S) and the Simplified Calculus Index (CI-S) are added to obtain the Simplified Oral Hygiene Index (OHI-S). That is  $DI-S + CI-S = OHI-S$ .

The OHI-S values ranged from 0-6 as follows: Good=0-1.2, Fair=1.3-3.0, Poor=3.1-6.0.

### Gingival Index

The gingival index<sup>13</sup> was used to assess the gingival condition and qualitative changes were recorded scoring 0-3 where 0 was normal gingival, 1= mild inflammation, 2= moderate inflammation and 3= severe inflammation.

### Untreated malocclusions

These were assessed as follows:

- Tooth rotations:** Any tooth twisted around the long axis.
- Displacement:** Any tooth positioned lingually/palatally or buccally out of the dental arch.
- Crossbite:** Malalignment of teeth whereby the anterior maxillary teeth and/or the buccal cusps of the posterior maxillary teeth occlude palatal to the opposing mandibular teeth.

d) **Scissors bite:** Malalignment of teeth whereby the palatal cusps of the posterior maxillary teeth occlude buccal to the mandibular opposing teeth.

e) **Anterior open bite:** There is a visible gap between the anterior teeth when the individual is in centric occlusion.

All findings were recorded on a preformed data sheet.

Data analysis was performed using IBM SPSS version 20.0. Results were presented in tables. Demographic variables and associations were tested using chi square and the level of significance was set at  $p \leq 0.05$ .

### RESULTS

There was a total of 403 participants in this study comprising 211 (52.4%) females and 192 (47.6%) males with a mean age of  $29.3 \pm 12.6$  years. Participants aged 20-30 years old constituted the largest group with 147 (36.5%), while only 1 (0.2%) participant was above 70 years old. About half of all the participants had a tertiary education 219 (54.3%). (Table 1). The major untreated malocclusions seen in the participants were tooth displacements 35 (8.7%) and tooth rotations 32 (7.9%) of the participants. Anterior open bite was seen in only 2 (0.5%) of the participants (Table 2).

Table 1: Demographics of participants

Variables	Frequency (n)	Percent (%)
<b>Age group (years)</b>		
10-20	103	25.6
21-30	147	36.5
31-40	83	20.6
41-50	36	8.9
51-60	25	6.2
61-70	8	2.0
71-80	1	0.2
<b>Sex</b>		
Female	211	52.4
Male	192	47.6
<b>Educational status</b>		
None	6	1.5
Primary	63	15.6
Secondary	115	28.5
Tertiary	219	54.3
Total	403	100.0

Mean age =  $29.3 \pm 12.6$  years

The oral health practices of the participants are depicted in Table 3. Over 90% of participants (383, 95.0%) used a toothbrush and toothpaste to clean their teeth with a slight female preponderance (205, 53.5%). Statistically significant findings were seen in the frequency of brushing by participants ( $p=0.012$ ). About two thirds of participants (264, 65.5%) brushed their teeth once daily with more males (142, 53.8%) doing so than females (122, 46.2%). More females (86, 62.8%) than males brushed their teeth

twice a day (51, 37.2%) whilst two females brushed thrice a day. About 70% of participants had good oral hygiene 281 (69.7%) while the proportions with fair and poor oral hygiene were 81 (20.1%) and 41 (10.2%) respectively. Over half of the participants had a gingival index of 0 (241, 59.8%). Table 4. There was a statistically significant association between the participants dental status and education ( $p<0.05$ ) as seen in Table 5. DMFT increased with an increase in level of education of participants.

Table 2: Untreated malocclusions of the participants

Variables	Frequency	%
<b>Tooth Rotation</b>		
Yes	32	7.9
No	371	92.1
<b>Cross Bite</b>		
Yes	9	2.2
No	394	97.8
<b>Tooth Displacement</b>		
Yes	35	8.7
No	368	91.3
<b>Anterior Open Bite</b>		
Yes	2	0.5
No	401	99.5
<b>Scissors Bite</b>		
Yes	1	0.3
No	402	99.7
Total	403	100.0

Those with primary school education had the highest proportion of DMFT=0 (57, 80.3%) when compared with participants with higher levels of education. Majority of participants 256 (63.5%) had never paid a visit to the dentist, there were no gender differences.

Although more females 82 (55.8%) than males 65 (44.2%) had visited the dentist, this was not statistically significant. Dental visits by our participants increased as their level of education increased ( $p<0.05$ ). Table 6

Table 3: Oral health practices of participants

Variables	n (%)	n (%)	n (%)	n (%)	n (%)	$\chi^2$	df	P
<b>Cleaning Items</b>								
Gender	Toothbrush/paste (A)	Chewing stick (B)	A+B	Face Towel	Total			
Female	206 (53.8)	2 (14.3)	3 (60.0)	0 (0.0)	211 (52.4)	2.99	3	0.394
Male	177 (46.2)	12 (85.7)	2 (40.0)	1 (0.0)	192 (47.6)			
Total	383 (100.0)	14 (100.0)	5 (100.0)	1 (100.0)	403 (100.0)			
<b>Frequency of brushing</b>								
Gender	Once	Twice	Thrice	Total				
Female	123 (46.6)	86 (62.8)	2 (100.0)	211 (52.4)	8.77	2	0.012*	
Male	141 (53.4)	51 (37.2)	0 (0.0)	192 (47.6)				
Total	264 (100.0)	137 (100.0)	2 (100.0)	403 (100.0)				

\*Statistically significant

Table 4. Oral Hygiene status of participants

Variables	Frequency (n)	Percent (%)
Oral Hygiene Index (OHI-5)		
Good	281	69.7
Fair	81	20.1
Poor	41	10.2
Total	403	100.0
Gingival Index		
0	241	59.8
1	95	23.6
2	46	11.4
3	21	5.2
Total	403	100.0

Table 5: Association between participants dental status and education

Variables (DMFT)	0	1	2	3	4	5	6	7	8	9	11	Total	$\chi^2$	df	P-value
Educational status													63.075	30	0.031*
No Formal Education	4	0	0	0	0	0	1	0	0	0	0	5			
Primary	57	6	5	0	1	1	0	1	0	0	0	71			
Secondary	98	14	10	4	2	3	2	0	1	1	1	136			
Tertiary	130	25	20	4	6	2	3	0	1	0	0	191			
Total	289	45	35	8	9	6	6	1	2	1	1	403			

\*statistically significant

Table 6: Association between participants dental visit and educational status

Variables	Dental visit			$\chi^2$	df	P-value
	Yes n (%)	No n (%)	Total n (%)			
Gender						
Female	82 (55.8)	129 (50.4)	211 (52.4)	1.09	1	0.297
Male	65 (44.2)	127 (49.6)	192 (47.6)			
Total	147 (100.0)	256 (100.0)	403 (100.0)			
Educational Status						
None	2 (1.4)	4 (1.6)	6 (1.5)	9.98	3	0.02*
Primary	17 (11.6)	46 (18.0)	63 (15.6)			
Secondary	33 (22.4)	82 (32.0)	115 (28.6)			
Tertiary	95 (64.6)	124 (48.4)	219 (54.3)			
Total	147 (100.0)	256 (100.0)	403 (100.0)			

\*statistically significant

## DISCUSSION

Oral health is closely related to our general health; however, it may be neglected due to lack of knowledge and awareness of this fact.<sup>7</sup> In our study majority of the participants had a good oral health status and practiced the recommended oral health practices although their utilization of dental services was low. Utilization may have been low because it has been documented in various studies that many people visit the dentist only when they are in pain<sup>4,11,15-17</sup> and not for bi-annual dental checks as recommended.<sup>4,18,19</sup> Most of the dental clinics in Nigeria are situated in the urban areas, thus making

services readily available and accessible which was the case in our study. Despite this fact, untreated malocclusions were recognized in our participants consisting particularly of tooth displacements and rotations.

Most participants brushed their teeth with a toothbrush and flouridated toothpaste. This may be as a result of urbanization where numerous toothpastes are advertised on television thus increasing awareness of its usage. However, most participants brushed only once daily and not twice as recommended which highlights the need for oral health campaigns in our environment. Chewing stick,

although an effective means of tooth cleaning was not a popular choice. It is no longer popular in urban areas where toothbrushes and various toothpastes are affordable and available. The oral hygiene status of majority of participants was good which is similar to a study carried out in another part of Nigeria where majority of the participants also had good oral hygiene.<sup>20</sup> The presence of various untreated malocclusions also highlights the need for an increased awareness about orthodontic treatment in this part of Nigeria which is readily available in the locality.

Reasons for the presence of untreated malocclusions may vary. A lack of knowledge that treatment for such conditions exists is a major factor to consider in this environment where there is a dearth of orthodontists.<sup>21,22</sup> As at the time of this study there were only two specialist orthodontists in the entire State. Another factor may be the cost of treatment. Orthodontic treatment is deemed to be expensive and payment is made "out of pocket" and not covered by health insurance and therefore unaffordable to majority of people.<sup>23</sup> Untreated malocclusions can lead to the development of poor oral hygiene, periodontal disease and caries,<sup>24</sup> therefore it is important that these malocclusions be treated not only for aesthetic reasons but to also prevent the development of other dental problems.<sup>25</sup> Moreso factors like oral habits which are major aetiological factors of malocclusion can be broken through counselling of the individuals and their parents/caregivers.<sup>26,27</sup> Such a process does not cost a lot of money as presumed,<sup>28</sup> however this service may not be accessed due to the lack of awareness in our environment. Furthermore, it is majorly assumed that such habits will cease with age even though this is not the case as adults are also known to indulge in oral habits.<sup>29</sup>

The oral health practices of the female participants were found to be better than their male counterparts, this finding has been documented previously in some other studies and adduced to the fact that women are more concerned about their appearances than men.<sup>30,31</sup> This is commendable because mothers have a huge influence on their children and will teach them to practice the same good oral health practices. It was observed that the participants oral health practices corresponded with their oral hygiene, the majority of them had good oral hygiene and a low incidence of decayed, missing or filled teeth (DMFT). This is in contrast to reports of caries experience in another urban community where

caries risk increased with urbanization and DMFT was seen to be much higher.<sup>32</sup>

The participants level of education also played a role in their awareness.<sup>33,34</sup> Most of the participants with tertiary education had visited a dentist at least once which is similar to what obtains in other studies<sup>34,35</sup> It was also noted that the larger proportion of those that had tertiary education had visited the dentist previously as against those that only had a secondary education alone. These findings indicate that access to care and level of education are important parameters in determining oral health practices and status.

## CONCLUSION

Several untreated malocclusions comprising tooth rotations, displacements, crossbite, scissors bite and anterior open bite were seen in our study population. The oral health practices and oral hygiene status of participants was good although their level of utilization of dental services was low. Based on our findings, we recommend that oral health campaigns should be carried out in Rivers State in order to increase utilization of dental services and to increase the number of individuals that access orthodontic treatment.

## Source of Support

Nil.

## Conflict of Interest

None declared

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