Impact of Malocclusion on the Oral Health Related Quality of Life (OHRQoL) of 8 to 10 years old School Children

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ABSTRACT

Objective: To investigate the impact of malocclusion on the Oral Health Related Quality of Life (OHRQoL) of school children.

Methods: This was a cross-sectional study among four hundred and twenty five (425) 8-10 years school pupils in Lagos Nigeria. Malocclusion was assessed using the Dental Aesthetic Index while OHRQoL was assessed using the Child Perception Questionnaire (CPQ 8-10). Data entry and analyses was done with SPSS Version 23.0. Data were subjected to descriptive statistical analysis and Chi-square test and one-way ANOVA were used for comparison between variables. Level of significance was set at 0.05.

Results: Gender distribution of the study population was; 48.8% (208) males and 51.2% (217) females. The mean age of the participants was 9.23±0.83 and their median age was 9 years. The prevalence of malocclusion according to DAI was 25.9%. Over 70% of the children were found to have no/ or slight need for orthodontic treatment (DAI score < 25), elective treatment was needed in 19.1% of subjects (DAI score 25-30), while in 6.8% of the surveyed population; treatment was highly desirable/mandatory. The differences in the prevalence of malocclusion among the different age groups was observed to be statistically significant (P = 0.038). The overall mean CPQ 8-10 was 19.51±17.1. There was no statistically significant difference in mean CPQ scores between gender (P=0.565), age (P=0.524) and severity of malocclusion (P=0.296)

Conclusion: The prevalence of malocclusion in this study was 25.9% with an overall mean CPQ of 19.51±17.1. Higher mean CPQ values were observed with females, older age group and subjects with DAI 31-35; however, it was not statistically significant.

Keywords: Oral Health Related Quality of Life, Dental Aesthetic Index, Malocclusion, Child Perception Questionnaire.

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INTRODUCTION

A good and healthy occlusion confers many benefits to its owner some of which are; ability to carry out oral functions easily, such as speech and mastication as well as positive enhancement of facial appearance.[1] A good occlusion and consequently a good smile can give one greater confidence, there by positively impacting on one's social life and relationships.[1] A good occlusion does not necessarily mean a perfect occlusion; one without flaws. Indeed, a perfect or an ideal occlusion as it is so called in orthodontics rarely exists in nature, but rather what exists are various deviations from the ideal.[2]

When these deviations are negligible in terms of oral function, health, aesthetics or social acceptability, typically they will not require intervention and are termed normal occlusion.[1]In various cultures, what is an acceptable /unacceptable deviation from an ideal occlusion vary. However, in situations where there are obvious deviations from the ideal, especially if they are not socially acceptable or there's a compromise in oral health, the term malocclusion is then used.[2,3]

Malocclusion has been defined by a number of authors, the summary of the definitions being; a term used to describe irregularity of the teeth or a mal-relationship of the dental arches beyond what is accepted as normal.[3]The severity of the malocclusion may not be noticed until it presents with some form of handicap, which may be affecting patient's function and or psychology, which encompasses emotional and social health as well as self-esteem.[4-6]

The mixed dentition stage is characterized by a broad spectrum of occlusal features and patterns, which may not necessarily qualify as malocclusion but could be distressing enough to make a child and/or respective caregiver want to seek orthodontic intervention.[7,8] As children in this stage have already begun to develop self-awareness about self-esteem and social acceptance, in a manner that isn't too different from adults,[7-9] it becomes important therefore to understand the effect/impact of certain occlusal features which may be characteristic of this age group to the wellbeing of the individual. [8,9]

Over the years, several occlusal indices have been used to objectively determine the prevalence of malocclusion, its severity and treatment needs. Some of these include Index of Orthodontic Treatment Need (IOTN), Dental Aesthetic Index; Treatment Priority Index etc. [10]The Dental Aesthetic Index (DAI) is a weighted occlusal index which assesses 10 occlusal characteristics.[11] A weighted score (regression coefficient) is assigned to each occlusal characteristic.[11]The sum of the regression coefficient of these occlusal characteristics obtained after clinical assessment of the subject is added to a constant (a value of 13) to derive the DAI score. Scores obtained range from 0 to 100, with 36 being the cut off point for handicapping malocclusion, hence mandatory orthodontic treatment need. The ability of this orthodontic index to assess dental aesthetics aids to determine/demonstrate malocclusion capable of causing psychosocial handicap. [11]

DAI index is advantageous, besides being easy and fast for application in epidemiological studies, is recommended by the World Health Organization for oral health surveys, facilitating international standardization of research.[11]

To complement the assessment of treatment needs, Oral Health Related Quality of Life (OHRQoL) measures have been developed as they help provide a more holistic approach to management, showing the social, emotional, functional and psychological effects of adverse oral conditions.[12]

A number of OHRQoL assessment tools have been developed for different age groups, to help identify the impact of adverse health conditions. Some which have been specifically designed for children include: Child Oral Health Impact Profile (COHIP), Child Perception Questionnaire for ages 11-14 years (CPQ $_{11-14}$), Child Perception Questionnaire for ages 8-10 years (CPQ$_{8-10}$), to name a few.[4,12] The analysis of results from these assessment tools together with clinical indicators help to determine the need for orthodontic treatment as well as objectively assessing the impact of malocclusion on patients' quality of life.[4,12]

The CPQ (Child Perception Questionnaire) gives a very good assessment of OHRQoL. It also offers a broad view on oral diseases and disorders in children. It also has the capability to help determine highly beneficial treatments and interventions, help with monitoring progress, and evaluate the outcomes of interventions for affected children.[13] The information obtained from the CPQ can be used in several contexts like research purposes, clinical practices, and formulation of new policies.[13]

The CPQ for 8–10-year-old children (CPQ8–10) was developed and validated in Canada10. It showed

good construct validity, excellent internal consistency, and acceptable test–retest reliability.[13,14] It is one of the most commonly used scales to detect OHRQoL[14] It consists of 25 items distributed among 4 domains: oral symptoms, functional limitations, emotional well-being, and social well-being. It is self-reported by 8–10-year-old children using a 5-point Likert scale, and responses range from 0–4 for each item. Responses to each item were scored on a five-point Likert scale with numerical values ranging from 0 (never) to 4 (Almost all the time) with a lower score indicating satisfactory Oral Health Related Quality of Life (OHRQoL).[13,14]

This particular age group was selected because documented evidence has shown that early orthodontic intervention has been found to be beneficial in a lot of cases, intercepting malocclusion, reducing the need for more complex treatment in the future, and improving quality of life.[15]

This study aimed to determine the impact of malocclusion in School Children aged 8-10 years using the Dental Aesthetic Index and the Child Perception Questionnaire CPQ8-10.

MATERIALS AND METHODS

This was a cross sectional epidemiological study of primary school aged 8-10 years at a University primary school in Lagos State Nigeria. This age group represents the period of development of the dentition (mixed dentition) with a manifestation of a majority of potential orthodontic problems.

The study population comprised all pupils within the age group 8-10 years attending the University staff School of the University of Lagos Nigeria. The pupils in this age group were predominantly in upper primary except 2 pupils in lower with special needs and were excluded from the study.

Participation in this study was voluntary and ethical approval was obtained from the Health Research and Ethics Committee before commencement of the study (ADM/DCST/HREC/APP2838). Permission to conduct the study was obtained from the University Staff School Management. Consent forms were sent out to the parents/guardians of the intended study participants a week prior to the study. Only pupils whose consent forms were properly filled and returned to the school were recruited into the study.

Students were considered participants for the study if they met the following criteria:

1. Their consent forms were properly filled and returned to the school
2. Aged 8-10 years
3. No severe dentofacial anomalies e.g. cleft lip and palate or special needs
4. Had not been hospitalized for major medical conditions or surgeries in the past 6 months.
5. No history of previous or ongoing orthodontic intervention; subjects who had a history of orthodontic treatment was excluded from the study

Data was obtained using an instrument which comprised 3 sections:

Section A: captured the demographic information of the subjects which included; age, gender, class,

Section B: The Dental Aesthetic Index Score (Table 1)

Section C: A self-administered pre-tested English version of the Child Perception Questionnaire (CPQ_{8-10}) designed by Jokovic et al[13] was used (Table 2).

This questionnaire has 25 items under 4 component headings:

1. Oral health
2. Functional wellbeing
3. Emotional wellbeing
4. Social wellbeing.

The study was a single day study and was carried out in the school hall. The intended participants were addressed in the school hall and the modality of the study was described in details prior to the commencement of the study. The components of the Child Perception Questionnaire for ages 8-10 years were also described to ensure accurate filling of the instrument. The pupils returned to their classrooms and 3 dental examination points were subsequently set up in the school hall. Each examination point comprised a table and chair.

The subjects were seated on a chair and information on their biodata obtained and recorded by the investigator. They were subsequently examined under natural light using a tongue depressor, face mask and latex gloves. All infection control measures and the malocclusion assessed using the Dental Aesthetic Index (DAI), [11] after which the subject was given the CPQ_{8-10} questionnaire to complete. Subjects were informed that they were at liberty to opt out of the research process at any point without fear of victimization.

Clinical examinations/ assessments were carried out by 3 calibrated dentists. To reduce error in measurement and ensure good intra examiner and inter rater reliability, 5 subjects who were not part of the study were randomly selected and examined by all the dentists participating in the study. A repeat examination was done after two weeks for each of the 5 randomly selected subjects.

The consistency and reliability of both measurements assessed using Intra-class correlation coefficient was very high for both intra examiner and inter rater reliability (ICC =0.90).

Subjects with DAI scores of 0-25 were considered to have no/mild malocclusion with little or no need for treatment. Individuals with a score of 26 to 30 had definite malocclusion with elective need for treatment. Scores of 31-35 were considered severe with orthodontic treatment highly recommended while a score of 36 and above was considered handicapping malocclusion and treatment was mandatory.[11] All participants with a score greater than 25 were therefore considered to have a malocclusion in this study.

Table 1: Dental Aesthetic Index (DAI) scoring

	Occlusal parameters	**Regression coefficient/Score**
1.	Number of missing visible teeth (incisors, canines, and premolars in maxillary and mandibular arch)	6
2.	Crowding in incisal segment (0 = no segments crowded, 1 = 1 segment crowded, 2 = 2 segments crowded)	1
3.	Spacing in incisal segment (0 = no spacing, 1 = 1 segment spaced, 2 = 2 segments spaced)	1
4.	Midline diastema, in millimeters	3
5.	Largest anterior maxillary irregularity, in millimeters	1
6.	Largest anterior mandibular irregularity, in millimeters	1
7.	Anterior maxillary Overjet, in millimeters	2
8.	Anterior mandibular Overjet, in millimeters	4
9.	Vertical anterior open bite, in millimeters	4
10.	Anteroposterior molar relationship, largest deviation from normal either left or right (0 = normal, 1 = ½ cusp mesial or distal, 2 = 1 full cusp or more mesial or distal)	3
11.	Constant	13
	Total	DAI score

Scoring of the CPQ$_{8-10}$ Questionnaire

Responses to each item were scored on a five-point Likert scale with numerical values ranging from 0 (never) to 4 (Almost all the time) with a lower score indicating satisfactory Oral Health Related Quality of Life (OHRQoL). Each participant rated whether they "Never had" "had once or twice" "Sometimes had" "Often had" "Had every day or almost every day" in the past 4 weeks any of the situations listed in the questionnaire under the 4 components being assessed. The total CPQ$_{8-10}$ scores ranged from 0- 100, which was obtained by summing up the total subscales. The higher the CPQ$_{8-10}$ scores obtained, the greater the negative impact on the quality of life.

All participants were treated equally, without preference. Their privacy and confidentiality were preserved.

Data were subjected to descriptive statistical analysis and Chi-square test was conducted to test for association between categorical variables, while t-test and one-way ANOVA where appropriate, were used to compare differences in means. The level of significance was set at 0.05.

Table 2: Child Perceptions Questionnaire 8-10

1. Have you had pain in your teeth or mouth in the past 4 weeks?
Never Once or twice Sometimes Often Everyday or almost every day
2. Have you had sore spots in your mouth in the past 4 weeks?
Never Once or twice Sometimes Often Everyday or almost every day
3. Have you had pain in your teeth when you drink cold drinks or eat foods in the past 4 weeks?
Never Once or twice Sometimes Often Everyday or almost every day
4. Have you had food stuck in your teeth in the past 4 weeks?
Never Once or twice Sometimes Often Everyday or almost every day
5. Have you had bad breath in the past 4 weeks?
Never Once or twice Sometimes Often Everyday or almost every day
6. Do you need longer time than others to eat your meal because of your teeth or mouth?

Never	Once or twice	Sometimes	Often	Everyday or almost every day
7. Do you have a hard time biting or chewing food like apples, corn on the cob or steak because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
8. Do you have trouble eating foods you would like to eat because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
9. Do you have trouble saying some words because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
10. Do you have a problem sleeping at night because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
11. Have you been unhappy because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
12. Have you felt bad because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
13. Do you feel shy because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
14. Do you feel concerned what other people think about your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
15. Have you been worried that you are not as good-looking as others because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
16. Have you missed school because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
17. Have you had a hard time doing your homework because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
18.Have you had a hard time paying attention in school because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
19. Have you felt like not wanting to speak or read out loud in class because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
20. Do you try not to smile or laugh when with other children because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
21. Have you felt like not wanting to talk to other children because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
22. Have you felt like not wanting to be with other children because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
23.Have you stayed away from activities like sports and clubs because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
24.Other children teased you or called you names because of your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day
25.Other children asked you questions about your teeth or mouth?				
Never	Once or twice	Sometimes	Often	Everyday or almost every day

Scoring: Never' (scoring 0); 'Once or twice' (1); 'Sometimes' (2); 'Often' (3); and 'Everyday' or 'Almost everyday' (4).
Oral health- questions 1-5, Function- questions 6-10, Socio-emotional well being- questions 11-15, School environment- questions 16-20, Self-image- questions 21-25

RESULTS

A total of hundred and sixty nine (469) subjects were recruited for the study. Forty five pupils who did not meet the inclusion criteria were disqualified. Four hundred and twenty five children (425 pupils) in the upper primary school participated in the study. They were aged 8 to 10 years with a mean age of 9.23±0.83 and median of 9. The 10-year-olds comprised the largest percentage of children surveyed (41.4 %), with the 8-year-olds in the minority (18.4%). Gender distribution showed males accounting for 208(48.8 %) and 217 females (51.2%) (Table 3).

Of the 425 subjects examined, 315(74.1%) had a Dental Aesthetic Index of 25 and below, indicating absence of a malocclusion or a mild malocclusion, with no need for orthodontic treatment. The prevalence of malocclusion in the present study was therefore 25.9%, representing those with a need for orthodontic treatment. About 19.1 % of the school children had definite malocclusion with a DAI score of 26-30, while 6.8% had severe malocclusion with orthodontic treatment highly desirable (Figure 1).

The Dental Aesthetic Index score of the males and females were comparable and showed no statistically significant difference, with a prevalence of malocclusion of 25.5% and 26.3% observed in the males and females respectively (P=0.890). Although females showed an overall higher prevalence of malocclusion, more males had severe malocclusion (Table 4). The prevalence of malocclusion by age was found to be 17.9%, 22.2 % and 33% among the 8-, 9- and 10-year-olds respectively, with the 10-year-olds showing the highest prevalence of malocclusion and need for orthodontic treatment. The differences in the prevalence of malocclusion among the different age groups was observed to be statistically

significant (P=0.038), with higher prevalence observed with increasing age in the study (Table 5).

Table 3: Socio-Demographic Characteristics of the Study Population.

Characteristics	Frequency (n)	Percent (%)
Age (years)		
8	78	18.4
9	171	40.2
10	176	41.4
Gender		
Male	208	48.8
Female	217	51.2
Class		
Primary 4	205	48.2
Primary 5	170	40
Primary 6	50	11.8
Total	425	100.0

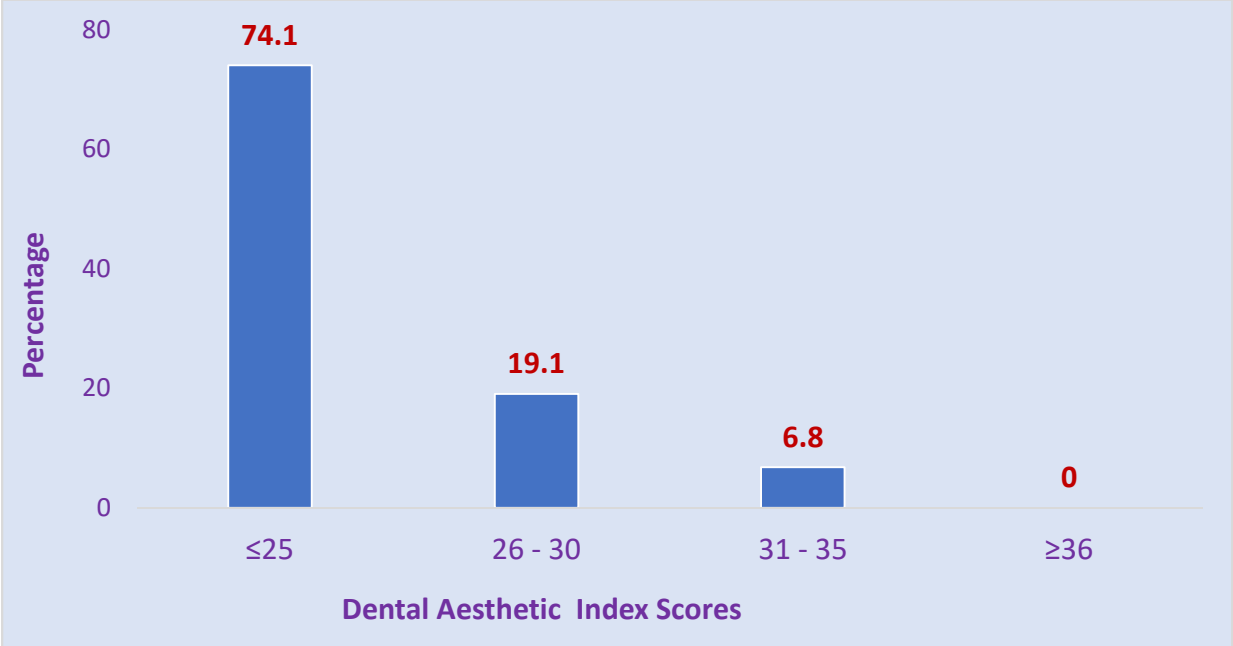

Figure 1: Prevalence of malocclusion using Dental Aesthetic Index (DAI) in the study population

Table 4: Presence and Severity of malocclusion using the DAI Scores

DAI Scores	Male n (%)	Female n (%)	χ^2	P-value
≤25	155 (74.5)	160 (73.7)	0.23	0.890
26-30	38 (18.3)	43 (19.8)		
31-35	15 (7.2)	14 (6.5)		

The assessment of the Oral Health Related Quality of Life (OHRQoL) using the CPQ $_{8-10}$ showed an overall mean CPQ mean of 19.51±17.1. The emotional and social domains demonstrated the highest negative impact with CPQ means of 5.19 (4.7) and 6.71(4.6) respectively. (Table 6).

A comparison of the CPQ means between the males and females showed higher values in the females in all domains of the CPQ instrument except the oral health domain signifying a more negative impact of malocclusion on the Oral Health related Quality of life in females. This impact was however not statistically significant (P= 0.565) (Table 7).

Table VI shows the impact of malocclusion among the different age groups and their mean CPQ. Although the CPQ means for the 4 subscales (oral health, functional wellbeing, emotional and social wellbeing) were found to be comparable with no statistically significant difference, the 10-year-olds demonstrated the highest overall CPQ mean (20.61±19.7) when compared to younger children. (Table 8).

Table 9 showing the CPQ mean scores for various DAI scores revealed that all CPQ subscale means were comparable irrespective of the DAI score albeit subjects with DAI scores of between 31-35(severe malocclusion) consistently exhibited higher CPQ subscales means in all 4 domains of the CPQ questionnaire although statistically insignificant.

An evaluation of the overall CPQ means for mild, moderate and severe malocclusion showed that mild malocclusion was associated with the lowest negative impact on the Oral Health related Quality of Life (overall CPQ mean=19.59±16.1, while severe malocclusion (DAI of 31-35) demonstrated the highest negative impact (overall CPQ mean= 20.61±19.3) values were however not statistically significant (Table 9).

Table 5: DAI Scores within the age groups

DAI scores	8years n (%)	9years n (%)	10years n (%)	Total n (%)	χ^2	P-value
≤25	64 (82.1)	133 (77.8)	118 (67)	315(74.1)	10.32	0.038
26-30	9 (11.5)	31 (18.1)	41 (23.3)	81(19.1)		
31-35	5 (6.4)	7 (4.1)	17 (9.7)	29 (6.8)		

Table 6: Impact of Malocclusion on CPQ subscales

Domains	Frequency (%)	CPQ Mean±SD
Oral health	425 (100)	3.09±3.6
Functional wellbeing	425(100)	4.52±4.0
Emotional	425(100)	5.19±4.7
Social well being	425 (100)	6.71±4.6
Overall	425(100)	19.51±17.1

SD = standard deviation

Table 7: Sex Distribution and the Impact of Malocclusion on CPQ subscales

Variable	Male n (%)	Female n (%)		
DAI Scores			χ^2	P-value
DAI score ≤25	155 (74.5)	160 (73.7)	0.23	0.890
DAI score 26-30	38 (18.3)	43 (19.8)		
DAI score 31-35	15 (7.2)	14 (6.5)		
CPQ$_{8-10}$ domain	Mean±SD	Mean±SD	t	P-value
Oral health	3.09±3.5	3.08±3.7	0.52	0.674
Functional wellbeing	4.17±4.0	4.86±4.0	1.76	0.079
Emotional	5.18±4.5	5.19±4.7	0.03	0.972
Social well being	6.60±4.0	6.82±3.8	0.58	0.559
Overall	19.03±17.0	19.94±16.2	0.57	0.565

SD = standard deviation

Table8: Age and the Impact of Malocclusion on CPQ subscales

CPQ8-10 domain	8years Mean±SD	9years Mean±SD	10years Mean±SD	F	P-value
Oral health	3.37±3.8	3.57±3.7	2.95±4.1	0.669	0.647
Functional wellbeing	4.40±3.7	4.64±3.7	4.34±4.3	0.656	0.657
Emotional	5.12±4.4	5.99±4.7	5.56±4.6	0.736	0.596
Social wellbeing	5.82±3.2	6.34±3.5	7.76±3.4	0.666	0.655
Total	18.22±18.4	20.54±20.3	20.61±19.7	0.647	.524

SD = standard deviation

Table 9: Dental Aesthetic Index and the Impact of Malocclusion on CPQ subscales

CPQ8-10 domains	Dental Aesthetic Index Score ≤25 Mean±SD	26-30 Mean±SD	31-35 Mean±SD	F	P-valuer
Oral health	6.66±4.0)	6.83±3.5	7.03±3.9	0.161	0.851
Functional wellbeing	4.59±3.9)	4.54±3.9	4.69±4.4	0.675	0.510
Emotional well being	4.56±4.7)	5.44±4.4	4.79±3.6	0.235	0.791
Social wellbeing	3.87±3.5)	3.02±3.5	4.16 ±3.1	0.741	0.484
Overall	19.59±16.1)	19.82±17.6	20.61±19.3	0.743	0.296

SD = standard deviation

DISCUSSION

The prevalence and severity of malocclusion varies from country to country, between ethnic groups, gender and various age groups.[16] It is considered the third priority for oral health disease, according to world health organization, second only to caries and periodontal diseases. Studies from Nigeria show that up to 38% of the child population has one form of malocclusion, showing that malocclusion is indeed quite wide spread.[17]

Malocclusion has a large impact on both the individual and society in terms of discomfort, quality of life, psychosocial and functional limitations[18,19]

It is common for individuals with malocclusion to develop various strategies to cope, these include; hiding the teeth while speaking, reluctance to speak, avoiding smiling, avoiding people, avoiding conversations or making as little interactions as possible.[20,21] This is particularly true in children and young adults.[20]. Research has shown that children with pleasing dental appearance are judged to be more intelligent and are less likely to be bullied, while children with obvious malocclusions are considered unattractive, and can be discriminated against by teachers and other students.[21]

In the past, attempts at measuring health related quality of life in pediatric population, was done via the questionnaires addressed to parents/ guardians.[22-25] This was because many abilities in children; cognitive, functional, emotional and behavioral are age dependent[26-27]. However, with the development of ECOHIS, COHIP and CPQs, reports from research from these tools show that the questionnaires for children older than the age of 6 had good reliability and hence reports from parents/guardians of such children should now be considered as complementary and no longer as substitutes.[24,25]

Assessing malocclusion in mixed dentition, especially early mixed dentition is still quite a challenge, as some occlusal characteristics are inherent to this stage ofdevelopment.[22] The challenge with the use of indices such as DAI, IOTN or ICON in early mixed dentition is the tendency to overestimate the presence of malocclusion, where certain features are physiological. Indices such as Index for Preventive Interceptive Orthodontic Needs (IPION) 6 and 9, which were designed specifically for stages of mixed dentition as means of preventing malocclusion, comes with its own shortcomings as it is unable to assess prevalence of malocclusion and as such; the severity of malocclusion present may be down played.[23]

In this study child perceptions questionnaire for 8-10-year-old (CPQ8-10), was used to assess the oral health quality of life, while DAI was used to assess the severity or otherwise of the malocclusion. The prevalence of malocclusion according to DAI (scores

greater than 25) was 25.9%. This is similar to studies by Otuyemi et al.[26] and Aikins et al.[27] who reported a prevalence of malocclusion of 22.6% and 38.1% among children in South western and South-South Nigeria respectively. However, another study among children in South-south Nigeria, reported a malocclusion prevalence of 76%. Comparable to this finding is the report by Utomi and Onyeaso[28] who reported a prevalence of 68%. The later study was however a hospital based study while the former was an epidemiological study carried out in a school population. The variations study methodology such differences in the age of the study population, ethnicity and the assessment tool for malocclusion may account for the differences in the different studies.

The overall CPQ mean in the current study was 19.51± 17.1. This is comparable to a CPQ mean of 12.85± 10.17 reported in a study among 11–14-year-old children in Ile-Ife, Nigeria[29]. Other studies however observed higher impact of malocclusion with higher mean CPQ[30, 31]. The difference in results from various studies may be adduced to differences in study population, method of assessing malocclusion and age of study participants.

The impact of malocclusion as shown by the various CPQ domain scores showed that although the females demonstrated an overall higher mean CPQ value, there was no statistically significant difference between gender on how malocclusion impacts various health domains. This corroborates reports from previous studies which showed no gender difference on the impact of malocclusion on the quality of life.[29,30,31] The slightly higher negative impact of malocclusion observed in females in our study may be attributed to the an increasing level of self-consciousness and awareness in females at this age.[32,33] This is however contrary to the findings of Anosike et al.[34] who observed a significantly higher negative impact of malocclusion in males, in a research done in a similar environment.

Children with severe malocclusion showed negative impacts on OHRQoL., although statistically insignificant. This is in agreement with previous studies in a Nigerian population [29, 30]who reported no significant difference in DAI scores and mean CPQ scores althouh studies were carried out in 11–14-year-old children. This finding is however at variance with reports from other studies in .[5,35] In a study conducted on 8- to 10-year-old Brazilian school children, children with malocclusions were observed to have 30% more negative impact on their OHRQoL .[35] This observation may be explained by the knowledge that, among children and early adolescents, potential functional difficulties and aesthetic complaints, have both been linked to severe and very severe forms of malocclusion. These may in turn affect social relationships [35]

A higher CPQ mean was observed in the 10 years old when compared to the younger children, although statistically insignificant. Studies by Kolawole and Ayodele Oja[29] and Dimberg et al.[36] reported significant association between age and negative impact of malocclusion on quality of life. This could be due to the fact that many abilities in children; cognitive, functional, emotional and behavioral are age dependent , and so it is expected that older children are more self-aware and able to express themselves better than younger children and hence more likely to be impacted by malocclusion.[24,25] The negative effects observed in the older children may be associated with teasing and bullying of subjects with certain occlusal traits by their peers, as well as dissatisfaction with appearance, as have been previously reported.[36,37]

CONCLUSION

In conclusion, the prevalence of malocclusion in this study was 25.9% with an overall mean CPQ of 19.51 ± 17.1. A significant association was observed between age and prevalence of malocclusion (p=0.038). Higher mean CPQ values was observed with females, older children and subjects with DAI 31-35, however it was not statistically significant. Further studies with larger sample size are desirable. A limitation of this study is that, it evaluated the impact of previous occlusal conditions only over a short period. A longitudinal study design would help strengthen the study by determining the relationship between oral health quality of life during dentition development. Worthy of note is one of the shortcomings of DAI, as it doesn't take into account occlusal features that may be undergoing transient physiological processes, such as the "ugly ducking phase" in early mixed dentition. All participants who were in that phase (as a lot of participants were) may have had such occlusal features that were scored as malocclusion, at the time of examination.[15,16]

The findings of this study are important for a number of reasons. Early diagnosis will facilitate early orthodontic treatment taking advantage of the child's growth potential for growth modification with better treatment stability. An added advantage is the ability to correct or alleviate an impending malocclusion thereby reducing the burden of future

comprehensive orthodontic treatment on the patient.

Also, the findings of this study will help with public health policies establishment, considering the prevalence and the impact of severe malocclusion on the OHRQoL of the affected children, as controversies exist on orthodontic treatments focusing on interceptive orthodontics for children in early mixed dentition should be included in the national health insurance scheme to improve the quality of life of these children as well helping prevent the need for comprehensive orthodontic treatment and heavy financial burden on the national health scheme.

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Conflict of Interest
None declared

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