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# Periodontal Status of Children in Correctional Facilities in Lagos, Nigeria

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Oral Hygiene; Periodontal Status; Calculus, Gingivitis, Street Children, Correctional Facilities, Prevention.

**SUMMARY**
**Objective:** The purpose of the study was to determine the periodontal health status of the children in correctional facilities since there are very few studies done in this area both home and abroad; the few studies done indicated a need for intervention in the oral health of these children.
**Methods:** Children of some of the correctional facilities in Lagos constituted the target population. A questionnaire was administered on each patient followed by dental examinations. Oral hygiene status was evaluated according to Green and Vermilion Simplified Oral Hygiene Index (OHI-S). The gingival health was assessed using The Modified Gingival Index (MGI). Periodontal status was assessed using the Community Periodontal Index of Treatment Needs (CPITN).
**Results:** A total of 238 children and adolescents were examined. Oral hygiene score was 'good' in the majority 65% (154). Poor oral hygiene was observed more among the males. Overall, periodontal disease prevalence was 67% (160). Subjects with healthy periodontal tissues were found to be 33.0% (79/239) while those with calculus were 65% (154). Calculus was the most prevalent (code 2) 49% in 15-18 years group. Overall, mean number of sextants for calculus was 2.27.
**Conclusion:** This study indicates that even though the children were provided with dentifrice for use, great numbers of them still exhibited calculus. These children still need intervention in terms of regular dental checks and dental treatment.

## INTRODUCTION

Correctional facilities are established to ensure children are free from exploitation and abuse; particular emphasis is placed on re-educating and reorienting children and adolescents in conflict with their parents and/or the laws of the land. Lagos being the national commercial nerve center has experienced a mass influx of individuals with children and the pressures of city life has resulted in a lot of child abandonment and abuse.

In Lagos, there are eight correctional facilities which were established in conformity with international standards. At these centers, special attention is given to children at risk who have suffered various forms of abuse, victims of rape and defilement, children picked off the streets begging or hawking and victims of child trafficking.

A street child can be defined as any boy or girl for whom the street has become habitual abode and/or source of livelihood; and who is inadequately protected, supervised, or directed by responsible adults.[1] These children are considered to be disadvantaged because they are physically, mentally or socially deprived.[2]

Most of the children(89%),[3]came to live on the streets because of hunger and poverty; other reasons include absence of a father or mother, exploitation by stepmother or father, broken family relationships, polygamy, violence including physical, emotional and sexual abuse. Some are due to rural to urban migration.[3]

These children have been found to require special attention with their personal hygiene because the environment in which they resided and the associated lifestyles on the street made them vulnerable to a wide range of health-related problems including malnutrition, infectious diseases, poor oral health such as dental caries and gingivitis. They also have reduced access to oral health diagnostic, preventive, interceptive and treatment services. It is critical to prevent dental diseases in these individuals because of the importance of poor oral hygiene in the causation of the two common dental diseases: dental caries and periodontal disease.[2]

Periodontal disease combines a number of diseases of the periodontal tissue that can be broadly divided into gingivitis and periodontitis.[3]

Gingivitis is the most common and prevalent form of periodontal diseases among children and adolescents. Its incidence and severity in creases through they ears; from childhood as young as 5years old to adolescence, reaching a peak prevalence of 80% at 9 to 14years of age. A peak prevalence of gingivitis has been determined at 10years in

females and 13 years in males, which is consistent with the onset of puberty.[4]

Voluminous literature exist on the oral hygiene status and gingivitis among children, especially mentally and physically-challenged institutionalized children in Nigeria.[5,6] These studies and others done in other parts of the world have shown that these children have poor oral health.[5,6] However there are very few studies on periodontal status of children in correctional facilities in the developing world. Such studies are important in order to expand the level of knowledge and to contribute to baseline data.

Hence an attempt has been made in this present study to assess the periodontal status among children in correctional facilities in Lagos State, Nigeria.

## MATERIALS AND METHODS

A cross sectional study was conducted among 7 to 18-year-old children in four of the seven correctional institutions in Lagos, Lagos State. The institutions were selected randomly in March 2015. Consent was obtained from the Ministry of Youths and Social Welfare of the Lagos State Government. The administrative staff of the selected institutions was informed. Informed consent of the subjects was obtained as well as permission from the authorities of the facility before conducting the study. All the children present on the day of examination in each selected facility were examined. Informed consent of the subjects and permission was obtained from the authorities of the facility before conducting the study. The purpose of the study was explained to the home minders and the children, before conducting the examination. The ethnical approval for the study was obtained from the Ethical committee of the Lagos State University Teaching Hospital (LASUTH).

A pre-formed questionnaire was used to record all the information required for the study. The information contained in the questionnaire was divided into three parts. The first part contained general information (demographic data), the second part on oral hygiene practices and the third part contained the clinical examination. Clinical Dental Examination was conducted on all subjects by one examiner under adequate light with the patient sitting on an ordinary upright chair using plain mouth mirrors and Community Periodontal Index (CPI) probe.

The oral hygiene status was measured using Simplified Oral Hygiene Index by Greene and Vermillion.[7] Based on OHI-S score, oral hygiene status was assessed as good (0.1-1.2), fair (1.3-3.0) and poor (3.1-6.0). The gingival health was assessed using The Modified Gingival Index (MGI),[8] who introduced changes to the criteria of the Gingival Index.[9] In this modification, there is no probing (it is non-invasive) and it resets the rating for mild and moderate inflammation. The following criteria are adopted:

0 = absence of inflammation;

1 = mild inflammation or with slight changes in color and texture but not in all portions of gingival marginal or papillary;

2 = mild inflammation, such as the preceding criteria, in all portions of gingival marginal or papillary;

3 = moderate, bright surface inflammation, erythema, edema and/or hypertrophy of gingival marginal or papillary;

4 = severe inflammation: erythema, edema and/or marginal gingival hypertrophy of the unit or spontaneous bleeding, papillary, congestion or ulceration.

Gingival units as well as the calculation of the index follow the same criteria described in original Gingival Index (GI).[9] The scores of the four areas of the tooth can be summed and divided by four to give the GI for the tooth. The GI of the individual can be obtained by adding the values of each tooth and dividing by the number of teeth examined. The Gingival Index may be scored for all surfaces of all or selected teeth or for selected areas of all or selected teeth. A score from

0.1-1.0 = mild inflammation;

1.1-2.0 = moderate inflammation from, and

2.1-3.0 signifies severe inflammation

Periodontal status was assessed by Community Periodontal Index of Treatment Needs index (CPITN)[10] and according to different ages. Children below the age of 15years were assessed for bleeding and calculus only, there was no probing the their gingival sulcus to avoid recording of deepened sulci associated with eruption as periodontal pockets, while presence of gingival bleeding, calculus, and probing for periodontal pockets was assessed for children 15 years and above.

### Statistical analysis

The data was analyzed by using Statistical Package for Social Science (SPSS) version 17(SPSS Inc.,Chicago, USA).

Chi square test was applied for the qualitative data while the t test was used for the quantitative data. All the analysis was made at the 0.05 level of significance.

## RESULTS

The total population was 249 but 11 subjects aged between 5 and 6 years old were excluded because their index teeth were not fully erupted at the time of this study. Hence the total study population was 238; comprising 62%(148) males and 38% (90) females in the age group of 7 -18 years. The mean age was 13.5 ± 3.4 years. Out of the total population, 66.0% (157), brushed once daily and 98.7% (235/238) brushed with toothbrushes (Table 1).

Age and gender distribution of the subjects showed that in all the age groups, the boys are more than the girls, with about twice the number of boys in age group 16-18years (Table 2).

Oral hygiene score was 'good' in 64.4%(154) of the children and adolescents. Poor oral hygiene was observed more among the male subjects 91.0 % (17/21) and in age group 11-14years 47.6% (10/21). Oral hygiene score was statistically significant with gender, but not with age group, frequency of tooth brushing, and previous dental the visit (Table 3).

About 56.3% (134/238) of the participants had mild gingivitis. The highest percentage of those with good and mild gingivitis was in the 15-18 years age group, with 44%(37/85) and 36.5%(49/134) respectively, while moderate gingivitis was most prevalent in the 11-14 years age group with 68%(13/19). The gingival index score and mean G.I was statistically significant with gender $p<0.001$ and age group $p<0.03$, but not with frequency of tooth brushing and previous dental visit (Table 4).

**Table1. Distribution of the participants**

| Variables | Frequency | % |
|---|---|---|
| **Age** | | |
| 7-10 | 34 | 14.3 |
| 11-14 | 95 | 39.9 |
| 15-18 | 109 | 45.8 |
| **Sex** | | |
| Female | 90 | 37.8 |
| Male | 148 | 62.2 |
| **Oral hygiene status** | | |
| Good | 154 | 64.7 |
| Fair | 63 | 26.5 |
| Poor | 21 | 8.8 |
| **Gingival index** | | |
| Normal | 85 | 35.7 |
| Mild | 134 | 56.3 |
| Moderate | 19 | 8.0 |
| **Frequency of cleaning teeth** | | |
| Once a day | 157 | 6.0 |
| Twice or more a day | 81 | 34.0 |
| **Teeth cleaning Aids** | | |
| Toothbrush | 235 | 98.7 |
| Tooth brush and chewing stick | 3 | 1.3 |
| **Previous Dental Visits** | | |
| Visits | 41 | 17.2 |
| No Visits | 197 | 82.8 |
| **Total** | **238** | **100** |

Overall periodontal disease prevalence was 67% (160). Subjects with healthy periodontal tissues were found to be 33.0% (79). Subjects with calculus were 64.4%(154); and those with shallow pockets (4-5mm) were 0.7%(2). Of the 154 children with Code 2 for calculus, 15-18y age group was the mode age group followed by the 11-14y age group (Table 5).

Gender distribution of periodontal scores showed no major differences between the two sexes. Periodontal disease was statistically significant with age and gender. (Table 5).

The mean number of healthy sextant in the study population was 3.59. Sextants affected by calculus (code 2) were 2.27. Sextants affected by code 3 were in the 15 to18 age group and was 0.02 (Table 6).

**Table 2: Age and Gender distribution of participants**

| Sex | Age Group | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 7-10 | | 11-14 | | 15-18 | | Total | |
| | N | % | N | % | N | % | N | % |
| Girls | 15 | 44.1 | 44 | 18.4 | 32 | 13.4 | 90 | 38.0 |
| Boys | 19 | 55.9 | 52 | 21.7 | 77 | 32.2 | 148 | 62.0 |
| **Total** | **34** | **14.2** | **96** | **40.2** | **109** | **45.6** | **238** | **100** |

P=0.0

**Table 3: Oral hygiene scores of participants according to Gender and Age group**

| Variables | Oral Hygiene Scores and Mean | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Good | | Fair | | Poor | | Mean OHI± S.D | Total | |
| | N | % | N | % | N | % | | N | % |
| **Sex** | | | | | | | | | |
| F | 65 | 42.2 | 21 | 33.3 | 4 | 19.0 | 0.92±1.03 | 90 | 37.8 |
| M | 89 | 57.8 | 42 | 66.7 | 17 | 81.0 | 1.32±1.22 | 148 | 62.2 |
| P=0.08** | | | | | | | P=0.03** | | |
| **Age group** | | | | | | | | | |
| 7-10 | 26 | 16.9 | 5 | 7.9 | 3 | 14.3 | 0.97±1.27 | 34 | 14.3 |
| 11-14 | 59 | 38.3 | 26 | 41.3 | 10 | 47.6 | 1.26±1.25 | 95 | 39.9 |
| 5-18 | 69 | 44.8 | 32 | 50.8 | 8 | 38.1 | 1.14±1.06 | 109 | 45.8 |
| P=0.46 | | | | | | | P=0.57 | | |
| **Frequency of brushing** | | | | | | | | | |
| Once | 96 | 62.3 | 45 | 71.4 | 16 | 76.2 | 1.23 ± 1.23 | 157 | 65.7 |
| Twice or more | 58 | 37.7 | 18 | 28.6 | 5 | 23.8 | 1.13± 1.13 | 81 | 34.3 |
| P=0.26 | | | | | | | P=0.24 | | |
| **Previous dental visit** | | | | | | | | | |
| Visit | 24 | 15.6 | 14 | 22.2 | 3 | 14.3 | 1.15 ± 1.11 | 41 | 17.2 |
| No visit | 130 | 84.4 | 49 | 77.8 | 18 | 85.7 | 1.17 ± 1.19 | 197 | 82.8 |
| P=0.47 | | | | | | | P=0.94 | | |
| **Total** | **154** | **100** | **63** | **100** | **21** | **100** | **1.16±1.17** | **238** | **100** |

** - Significant

**Table 4: Severity of gingivitis of participants according to Gender and Age group**

| Variables | Gingival scores and Mean | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Good | | Mild | | Moderate | | Mean GI sd | Total | |
| | N | % | N | % | N | % | | N | % |
| **Sex** | | | | | | | | | |
| F | 48 | 56.5 | 40 | 29.9 | 2 | 10.5 | 0.26±0.37 | 90 | 38.1 |
| M | 37 | 43.5 | 94 | 70.1 | 17 | 89.5 | 0.37±0.56 | 148 | 61.9 |
| p<0.001** | | | | | | | P=.000** | | |
| **Age group** | | | | | | | | | |
| 7-10 | 15 | 17.6 | 16 | 12.0 | 3 | 15.8 | 0.33±0.46 | 34 | 14.2 |
| 11-14 | 33 | 38.8 | 49 | 36.5 | 13 | 68.4 | 0.54±0.61 | 95 | 40.2 |
| 15-18 | 37 | 43.5 | 69 | 51.5 | 3 | 15.8 | 0.42±0.44 | 109 | 45.6 |
| p=0.03** | | | | | | | P=0.02** | | |
| **Frequency of brushing** | | | | | | | | | |
| Once | 56 | 65.9 | 84 | 62.7 | 17 | 89.5 | 0.46±0.53 | 157 | 66.0 |
| Twice | 29 | 34.1 | 50 | 37.3 | 2 | 10.5 | 0.44±0.51 | 81 | 34.0 |
| P =0.07 | | | | | | | P =0.60 | | |
| **Previous dental visit** | | | | | | | | | |
| Visit | 16 | 18.8 | 21 | 15.7 | 4 | 21.0 | 0.39±0.61 | 41 | 17.2 |
| No visit | 69 | 81.2 | 113 | 84.3 | 15 | 79.0 | 0.46±0.50 | 197 | 82.8 |
| P=0.75 | | | | | | | P=0.83 | | |
| **Total** | **85** | **100** | **134** | **100** | **19** | **100** | **0.45±0.52** | **238** | **100** |

**Table 5: Periodontal status of participants according to Age group and Gender**

| Variables | CPITN Score | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Code 0 | | | | Code1 | | Code2 | | Code 3 | |
| | N | % | N | % | N | % | N | % | N | % |
| **Age Range** | | | | | | | | | | |
| 7-10yrs | 34 | 14.2 | 19 | 24.0 | 1 | 25.0 | 14 | 9.1 | 0 | 0 |
| 11-14yrs | 95 | 40.2 | 30 | 38.0 | 1 | 25.0 | 65 | 42.2 | 0 | 0 |
| 15-18yrs | 109 | 45.6 | 30 | 38.0 | 2 | 50.0 | 75 | 48.7 | 2 | 100 |
| p<0.0001 | | | | | | | | | | |
| **Sex** | | | | | | | | | | |
| F | 90 | 38.1 | 46 | 58.2 | 2 | 50.0 | 42 | 27.3 | 1 | 50.0 |
| M | 148 | 61.9 | 33 | 41.8 | 2 | 50.0 | 112 | 72.7 | 1 | 50.0 |
| p=0.05 | | | | | | | | | | |
| **Total** | **238** | **100** | **79** | **100** | **4** | **100** | **154** | **100** | **2** | **100** |

**Table 6: CPITN Mean Number of Sextants of participants according to Age group and Gender**

| Variables | Mean No of Sextants | | | |
|---|---|---|---|---|
| | Code 0 | Code 1 | Code 2 | Code 3 |
| **Age Range** | | | | |
| 7-10yrs | 4.73 | 0.17 | 1.1 | 00.00 |
| 11-14yrs | 3.29 | 0.06 | 2.64 | 0.00 |
| 15-18yrs | 3.49 | 0.15 | 2.31 | 0.04 |
| **Sex** | | | | |
| F | 4.41 | 0.12 | 1.45 | 0.02 |
| M | 3.08 | 0.12 | 2.78 | 0.02 |
| **Total** | **3.59** | **0.12** | **2.27** | **0.02** |

## DISCUSSION

The present study population was drawn from four of the eight Correctional facilities in Lagos state, thus this study results can be generalized to all the Correctional facilities in Lagos. It should be noted that the circumstances and the financial resources available differs from institutions to institutions within the nation and between countries therefore only tentative comparison could be made with other studies. In this study, 69% were boys and 31% females. This is similar to earlier studies,[11] and [12]

In this study the 238 children belong to age group of 7 – 18 years with a mean age of 13.52±2.3. Many studies have reported that street children are most often aged between 10–14 years.[12,13,14] Moreover, it was upsetting that 5% of the street children were in the age group of 5 to 6 years. Children reported leaving home when they were between 6

and 16 years of age and having lived on the streets for a period of days to, more frequently, years may grow to be of-the-street youth.[15] About 99% (235) of the children cleaned their teeth with tooth brushes. This was similar to earlier results obtained by the study conducted by Kahabuka *et al*,[11] but in contrast to others.[13] It was believed that this was possible because various charity organizations visited and supplied some of the material needed for daily hygiene.

The oral hygiene practice of tooth brushing once daily was the most common, about 66% in this study and this was similar to report from other studies: 52.1%[16] and 50.6%,[17] but in contrast to others[18] The once-a-day practice may be due to lack of adequate knowledge of periodontal diseases prevention. Good oral hygiene was exhibited by 65% of the subjects. This was close to 86.8% from earlier studies,[17] but higher than what was observed from some other studies.[19,20,21]

Oral hygiene was statistical significant with gender ($p<0.05$), but not with age, frequency of tooth brushing and previous dental visits in this study. The gender difference may be related to poor oral hygiene practices, less positive attitudes toward oral health among males.[17,22] This also suggested that the oral hygiene status of the children in the correctional facilities was in no way different from that of schoolchildren in Lagos[22] and Osogbo[17] in Nigeria. Frequency of tooth brushing was similar to what was obtained from earlier studies(69.7%),[21] and (50.6%).[17] Many (86.8%) of respondents who never visited the dentist had good oral hygiene, the reverse was the case in an earlier study. [21]

The mean OHI-S of this population study was better among female respondents than the male respondents. This was similar to the reports of some other studies.[17, 22] The results of this study revealed that most of these subjects sought dental care that were prompted by the experience of a dental problem rather than oriented towards prevention of disease. Regular Dental Visit will provide valuable oral health knowledge, oral hygiene information and motivate the patients to improve on their oral health habits and maintain oral hygiene practices. Hence those who visit the dentist regularly are more likely to practice the acquired dental knowledge compared to those who did not visit the dentist.

Gingivitis is the most predominant form of periodontal disease in children and adolescents. The prevalence of gingivitis increased during pre-pubertal and pubertal period, from the age of 3-5 years until puberty.[23] The prevalence of gingivitis was similar to some earlier reports16] but in contrast to others.[24] The prevalence of gingivitis in this current study was still considered high as more than half of the study population was affected. This may be due to ineffective oral hygiene measures which can be attributed to inadequate brushing time, improper brushing technique or both factors.

The prevalence of gingivitis correlates was statistically significant with age and gender in this study. This was similar, to some other studies.[25,26] This increase with age, is not age specific, but may be more prevalent due to the mixed dentition period and the physiological changes occur in puberty which contribute to a higher accumulation of the bacterial plaque,[27] and neglect of oral hygiene by the children. This is in contrast to a study which reported a decrease in the prevalence of gingivitis with the increase in age, and was attributed to the increasing knowledge of the brushing technique with age.[28] The mean GI was 0.45±0.52 in this study; this is in contrast to an earlier study,[24] where the mean GI was 2.41.

The present study showed that about 67% of participants suffered from various forms of periodontal disease as assessed by Community Periodontal Index (CPI). Findings of present study were consistent with other studies,[ 13 , 22 ] but in contrast with some other studies.[31,32] The prevalence of periodontal status was related to calculus (65%); this may be due to the cumulative accumulation of deposits as a result of neglect and lack of regular dental care. Moreover 0.80% of the 15-18year old of the subjects presented with shallow pockets, a similar figure was reported earlier[31] The risk factors for periodontal diseases include age, sex, education, rural residence, socioeconomic status, oral hygiene habits. Periodontal disease is predominant in certain age and gender,[4] The periodontal status was influenced by age in this study, similar to the study on detainees in India.[32] In line with previous studies,[4,33,34] females exhibited higher healthy periodontal status and mean of healthy sextants than males. This could be attributed to the fact that females are interested in their grooming habits and appearance, so consciously do a better general and oral hygiene practice..

Mean number of healthy sextants in the present study was in contrast to what was reported in a previous study.[31] This mean number of healthy sextants in this age group was far away from the set global standard of WHO for the year 2010. The goal was that all people aged 15 years should have 5 – 6 healthy sextants mean by the year 2010.[33] The mean number of sextants with periodontal disease was high, hence a high percentage of people in this age group need periodontal treatment (TN1, TN2). There is a need to treat this population so as to arrest and reverse the severity of periodontal diseases that could continue to increase enormously, with increase in age. The increased severity of periodontal disease and bone loss with age is probably related to the length of time, where the periodontal tissues have been exposed to bacterial plaque, and is could be a reflection of individual's cumulative oral habits.[35]

## CONCLUSION

The prevalence and severity of periodontal disease was fair and more than half of the children would need periodontal treatment such as scaling and polishing with oral hygiene instructions. Improvement of the periodontal health of these children and adolescents is important; hence a systematic preventive approach as a component of oral health promotion programs for these group should be undertaken. Oral health promotion should include access to and regular use of oral health services.

### Conflict of Interest

The authors declare no conflict of interest.

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