Prevalence and predictors of dental caries and trauma among institutionalised and non-institutionalised street children in Ibadan.

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ABSTRACT

Objective: Urbanization is increasing the number of street children in most regions of the world especially in many African cities which may be due to poverty and unemployment status of many parents. This study was aimed at determining the predictors and prevalence of dental caries and trauma among institutionalized (those in juvenile correctional home) and non-institutionalized street children in Ibadan.

Methods: This cross-sectional study was carried out among institutionalized (juvenile correctional home) and non-institutionalized street children. Cluster sampling technique was used in the selection of children for this study. Children were selected from the juvenile correctional home and four major motor parks in Ibadan metropolis.

Results: One hundred and thirty eight children participated in this study. Male constituted 65.9% while female was 34.1%. Thirty five (25.4%) are from the juvenile correctional home (institutionalized street children) while 103 (74.6%) are from the streets. The prevalence of dental caries among the children generally was 29.0%, while that of dental trauma was 18.8%.

Conclusion: The significant predictors of dental caries were gender, tooth hypoplasia and the presence of visible plaque on the anterior teeth while those of dental trauma were lip competence, substance use, age and gender.

Keywords: Street children, Juvenile home, Caries, Trauma.

INTRODUCTION: Street children include those boys and girls for whom the street in its widest sense has become their habitual residence or source of livelihood. They are inadequately protected, supervised, or directed by responsible adults[1]. Broadly, these children can be categorized into: children of the street, children on the street, children who are part of a street family, and those in institutionalized care such as the Juvenile correctional home[1]. Urbanization is increasing the number of street children in most regions of the world especially in many African cities which may be due to poverty and unemployment status of many parents[2]. According to Ebigbo[3], an average population of working children per hour per street reported were 44.4, 195.9 and 193.1 in Enugu, Kaduna and Ibadan respectively. The inmates of Ibadan remand home have fluctuated between 59 and 64 between 1976 and 2010[4-5]. These children are said to have been under represented in health research for long[6]. They also have little or no access to the conventional healthcare system, yet they are plagued with myriad of both general and oral health challenges[6-8]. Over half of abandoned street boys and girls reported health problems including dental caries[7]. Their use of dental services is less than the general population[8]. Some of their daily habits make them to be especially prone to oral health problems. These habits include, but not limited to regular substance abuse and poor oral hygiene practices[8]. Dental caries prevalence among street children in Mexico was found to be 94.6%[9], while another study in a Midwest urban city was 50.3% showing a higher prevalence compared to the national average[10]. Srinivas et al[11], in India found that 50.2% of institutionalized children had dental caries while a similar study in Brazil revealed a prevalence of 93.1%[12]. There is paucity of data concerning the prevalence of

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dental caries among street children in Nigeria. Although dental trauma was found to be prevalent among 90% of incarcerated youth screened in Toronto-area youth centre[13], there still seems to be a dearth of information on recent reviews pertaining to its prevalence among street children both in this environment and globally. Meanwhile, varying prevalence of dental trauma have been reported from studies carried out among other children in Nigeria[14-19]. Predictors of dental caries generally include diets, oral hygiene and other host factors while those of dental trauma include Angles' Class II division 1 malocclusion, gender and certain socio-demographic factors[20,2,1]. This study was aimed at determining the prevalence and predictors of dental caries and trauma among non-institutionalized and institutionalized street children in Ibadan due to limited information about these dental challenges among these groups of children in addition to their poor access to healthcare.

METHODS

This was a cross-sectional study carried out among institutionalized (juvenile correctional home) and non-institutionalized street children. Cluster sampling technique was used in the selection of children for this study. Ibadan metropolis has one juvenile correctional home, and all the 7 - 15 years old children in the institution were recruited. For the selection of non-institutionalized streets children, two Local Government Areas (LGAs) out of the five in Ibadan metropolis were randomly selected by balloting. Out of these two LGAs, two major motor parks, where street children could be located were randomly selected by balloting from each of the local government areas. All the street children between the ages of 7 and 15 years in these four selected major motor parks were recruited into the study. The children were categorized into age groups of 7 – 9, 10 – 12 and 13 – 15. Those in age groups 7-9 and 10-12 were in mixed dentition years where there will be likelihood of poor oral hygiene due to the discomfort experienced while brushing mobile deciduous teeth. At age 13-15 years, they become more active in contact sports and experimenting with substance use. They also have access to more cariogenic diets as a result of earnings from menial jobs they were involved in on the street. The Sample size was calculated using the formula[22] $n = Z^2pq/d^2$. Where n = the desired sample size, z = the standard normal deviate set at 1.96 (corresponding to 95% confidence level), $q = 1.0 - p$, d = degree of accuracy desired, set at 0.05 (5%). With an estimated prevalence of 10%, the calculated sample size was 138. Interviewer-administered questionnaire was utilized in obtaining the demographic information (age and gender)of each child, frequency of tooth cleaning, tooth cleaning materials (tooth brush, chewing stick and others like the use of finger and cotton wool),frequency of daily snacking in between meals and the use of psycho-active substances which may predispose them to violence that can make them sustain physical injury and dental trauma. Intra-oral examination was done under natural light and caries detection was done using the Classification of carious lesions by G.V. Black[23] with its modification, and the World Health Organization (WHO)[24] code description for scoring caries experience. Sterile mouth mirror and CPI probe were used for this purpose. For the assessment of the predictors of dental caries, salivary function and duct patency was done by drying the Stenson's duct on the buccal mucosal using sterile gauze and gently massaging or squeezing the duct until saliva was expressed with the time taken to express saliva for each child was noted[25] and oral hygiene using Simplified Oral Hygiene index of Greene and Vermillion[26]. Furthermore, presence of visible plaque on anterior teeth, presence of gingivitis using the gingival index of Löe and Silness[27], presence of white spot lesions on drying each tooth with manual pump, presence of teeth with enamel hypoplasia and retentive pits and fissures were assessed. Also determined were the predictors of dental trauma which include some predisposing anatomical factors that may increase the susceptibility to dental injuries, among which are Angle's Class II division 1 malocclusion, increased over-jet (greater than 4 mm), anterior open bite, short or hypotonic upper lip and oral breathing individuals. Other factors assessed include the presence of an existing traumatic dental injuries, using Ellis classification 28. Classes VI – IX were not assessed because no radiographs were taken. Data processing was carried out with the aid of SPSS version 21(SPSS Inc., Chicago Illinois, USA). Summary statistics (frequency, percentage) were performed to determine the prevalence and pattern of presentation. Chi square was used for categorical variables and t-test was used for continuous variables in determining the relationship/association between variables. An observation was considered significant

when the p value is ≤ 0.05. Ethical approval was obtained from University of Ibadan/University College Hospital Ethical Review Committee before commencement of the study. Approval for the study was sought from the Oyo State Ministry of Women Affairs, Community Development and Social Welfare. Parental consent was waived in view of the difficulties that were encountered in tracing the parents of the noninstitutionalized street children while care-givers in juvenile correctional homes (Institutionalized) were 'locus parentis' and consent obtained from them.
Individual assent was obtained from the children.

RESULTS

One hundred and thirty eight street children participated in this study. There were 91 (65.9%) males and 47 (34.1%) females. Thirty five (25.4%) were from the juvenile correctional home (institutionalized street children) while 103 (74.6%) were noninstitutionalized. (Table 1) The prevalence of dental caries among the children generally was 29.0%.
(Tables 2) Prevalence of dental caries among the institutionalized children was 20.0%. More females (23.1%) than the males (18.2%) were affected. Fifty per cent of those aged 7-9, 11.8% of those within 10-12 and 21.4% of 13-15 had dental caries. (Table 3) On the other hand, the prevalence of dental caries among the noninstitutionalized group was 32.0%. (Table 4) The prevalence of dental trauma among the studied children generally was 18.8% (Table 5). That of the institutionalized children was 25.7% (Table 6), while it was 16.5% among non-institutionalized street children (Table 7). Statistically significant predictors of dental caries identified among the combined groups of children were gender, presence of visible plaque on anterior teeth, tooth cleaning materials, hypoplasia and gingivitis ($p< 0.05$) (Table 2). None of the predictors of dental caries among the institutionalized and non-institutionalized street children was found to be statistically significant among the children (Table 4). However, it was observed among the non-institutionalized street children that females (32.4%) were more affected than the males (31.9%). Also, 47.1% of those in ages 7-9 were affected compared to 27.7% of 10-12 and 30.8% of 13-15 (Table 5). Among the two groups of children, more males (23.1%) than females (10.6%) suffered dental trauma (Table 5). Lip competence was the only statistically significant predictor of dental trauma among the institutionalized children ($p < 0.05$). Also, among institutionalized children, only 25% of those without Anterior Open Bite (AOB) had dental trauma whereas, as much as 33.3% of those with AOB were affected by dental trauma (Table 6). Among the noninstitutionalized street children, age, gender and substance use were the statistically significant predictors of dental trauma ($p < 0.05$). Also, among these children, 20% of those with AOB had dental trauma while only 16.3% of those without AOB were involved (Table 7).

DISCUSSION

The prevalence of dental caries among the children in this study was found to be higher than the average prevalence in the previous studies among school children in this environment[15,29]. This may be attributable to the poorer oral hygiene status observed among street children compared to school children[8,30.] On the other hand, the prevalence among the institutionalized street children is lower compared to the findings of some previous studies[11,12]. Similarly, the prevalence found among the non-institutionalized street children is lower compared to the study of Contreras-Bulnes et al[9] in Mexico and Chiu et al[10] among African-American homeless children. The reasons for the disparities observed between these previous studies and the present study may be related to cheap and abundant availability of cariogenic snacks in developed countries. Also, the possibility of differences in diets among the populations involved, such that, in between meals seem impossible among Nigerian institutionalized and non-institutionalized street children due to economic reasons, a situation that may be different in the western societies. Comparatively, the prevalence of dental caries among non-institutionalized children is higher than that of institutionalized children in this study. This might be related to the fact that majority of the noninstitutionalized street children live an independent life where there is no parental guidance or any responsible adult influence thereby squandering the little money they make on cariogenic diets. These are similar to some of the reasons observed by Kahabuka and Mbawalla[30.] Furthermore, the prevalence of dental trauma among children in this study was slightly higher compared to the observations in previous studies among school children by Otuyemi[14,] Adekoya-Sofowora et al[15], and Ajayi et al[31]. This may be related the lifestyle of substance use and abuse, and the predominance of

violence among street children[8]. Also, those of the institutionalized and non-institutionalized children were also higher than the report of a previous study[11]. This previous study was carried out among institutionalized street children who must have had adequate number of staff carefully watching over the children to prevent activities that may lead to dental trauma among them. Comparison of dental trauma prevalence between the two groups of children in this study found a higher prevalence among the institutionalized group. It is obvious that both groups of children were prone to dental trauma. It is understandable why the prevalence of dental trauma in juvenile correctional home (institutionalized children) was higher when taken separately considering the fact that most of the children were taken from the streets where they had a history of unbridled freedom, independence and violence. On their arrival at the juvenile correctional home, they would find themselves in the midst of other children from the streets, hence, fights for territoriality could ensue to increase their risks of dental trauma. Among all the predictors considered for dental caries in the present study, gender, tooth cleaning materials, tooth hypoplasia, the presence of visible plaque on the anterior teeth and gingivitis were statistically significant.

The findings in the present study was similar to those of previous studies where it was reported that dental caries experience was more common among children who had enamel hypoplasia and developmental defects of enamel in their posterior teeth than among those with none of these defects[32,33]. This was also in agreement with the study of Pascoe and Seow[34] and Hong et al[35] who reported that a strong association exists between enamel hypoplasia and dental caries. This may be attributed to the fact that such defects provide a favourable local environment for adhesion and colonization of cariogenic bacteria which may remain at the base of the defect in contact with exposed dentin thereby leading to dental caries formation[36]. Also, defective enamel has been found to have higher acid solubility than normal enamel, making it more susceptible to caries attack[36,37,]. Furthermore, the results of this study show that there is slight gender difference on the development of dental caries with the female gender being slightly more prone than male. This is in agreement with Ur- Rehman et al[38] who reported a higher mean DMFT for girls compared to boys. This may be attributable to the fact that female tend to consume refined carbohydrates more frequently than males[39]. However, Dawani et al,[40] had reported that the mean dmft for males was higher compared to females, although some studies reported that there is no difference in the prevalence of dental caries between male and female[41-42]. Presence of visible plaque on the labial aspect of the lower anterior teeth, which is indicative of poor oral hygiene, was significantly linked with dental caries in this study. Generally, street children have been found to have a tendency for a poorer oral hygiene compared to those who are not on the street which will predispose them to development of carious lesions[30]. This is in line with a few previous reports[43,44]. However, some studies concluded that there is a only weak evidence showing that brushing of teeth prevents dental caries[21,45]. Inadequate oral hygiene predisposes to plaque accumulation leading to gingivitis which is also found to be a predictor of dental caries in this present study. Tooth brushing had been recommended as a tool against dental caries and gingivitis[21,46]. Tooth cleaning material was also found to be significantly associated with dental caries in this present study. This is in line with the previous studies where it has been observed that chewing stick is as effective as a toothbrush for reducing plaque on tooth surfaces[47,48]. Dental caries among those between ages 7 and 9 years was found to be higher compared to those who are 10 – 12 and 13 – 15 years. These 7 to 9 year old children are in the mixed dentition period where the mobile deciduous teeth are not adequately cleaned because of pain and the fear of traumatic exfoliation. This is in agreement with Demirci et al[49] and Al-Sultani[50] who found that the incidence of dental caries decreases with age. However this finding was not in agreement with that of Sogi et al[51] and Fonseca et al[52] where dental caries experience on permanent teeth were found to be worsened with increase in age. Ur-Rehman et al[38] also found that dental caries is most prevalent within the ages of 11 and 14 years. However, Sgan-Cohen et al[53] reported no difference among different age groups as regards dental caries prevalence. Considering the predictors of dental trauma, lip competence (among the institutionalized street children), substance use, age and gender (among noninstitutionalized street children) were the statistically significant predictors. Incompetent lip seal may be due to the absence of the cushioning effects of the lips during a fall or any accident thereby exposing the anterior teeth to dental injuries. This

Table 1: Distribution of the participating children

Variable	N	%
Group		
Non -institutionalized	103	74.6
Institutionalized	35	25.4
Total	**138**	**100.0**
Sex		
Male	91	65.9
Female	47	34.1
Total	**138**	**100.0**
Age		
7-9	21	15.2
10 -12	64	46.4
13 -15	53	38.4
Total	**138**	**100.0**
School		
Yes	112	81.2
No	26	18.8
Total	**138**	**100.0**
Caries		
Yes	40	29.0
No	98	71.0
Total	**138**	**100.0**
Trauma		
Yes	26	18.8
No	112	81.2
Tot al	**138**	**100.0**

Table 2: Association between the predictors of dental caries and prevalence among the children

Predictors	Dental Caries		Total	2	p-value
	Yes	No			
Sex					
Male	26(28.6)	5(71.4)	91(100.0)		
Female	14(29.8)	3(70.2)	47(100.0)	0.88	**0.02**
Total	**40(29.0)**	**8(71.0)**	**138(100.0)**		
Age					
7-9	10(47.6)	11(52.4)	21(100.0)		
10-12	15(23.4)	49(76.6)	64(100.0)	0.11	4.51
13-15	15(23.5)	38(71.7)	53(100.0)		
Total	**40(29.0)**	**98(71.0)**	**138(100.0)**		
Frequency of tooth cleaning					
Once daily	31(31.6)	67(68.4)	98(100.0)		
Twice daily	7(31.8)	15(68.2)	22(100.0)	3.76	0.15*
Less than once daily	2(11.8)	16(88.9)	18(100.0)		
Total	**40(29.8)**	**98(71.0)**	**138(100.0)**		
Tooth cleaning materials					
Tooth brush and paste	36(27.3)	96(72.7)	132(100.0)		
Tooth brush and chewing stick	4(80.0)	1(20.0)	4(100.0)	6.46	**0.04***
Others	0(0.0)	1(100.0)	1(100.0)		
Total	**40(29.0)**	**98(71.0)**	**138(100.0)**		

Salivary flow					
Before 1 minute	40(29.4)	96(70.6)	136(100.0)		
After 1 minute	(0.0)	2(100.0)	2(100.0)	0.83	1.00*
Total	**40(29.0)**	**98(71.0)**	**138(100.0)**		
Presence of visible plaque on anterior teeth					
Yes	31(29.0)	76(71.0)	107(100.0)		
No	9(29.0)	22(71.0)	31(100.0)	0.99	**0.00**
Total	**40(29.0)**	**98(71.0)**	**138(100.0)**		
Presence of deep pits and fissures					
Yes	3(50.0)	3(50.0)	6(100.0)	0.25	1.35*
No	37(28.0)	95(72.0)	132(100.0)		
Total	**40(29.00)**	**98(71.0)**	**138(100.0)**		
Presence of enamel hypoplasia					
Yes	1(33.3)	2(66.7)	3(100.0)		
No	39(28.9)	96(71.1)	135(100.0)	0.87	**0.03***
Total	**40(29.0)**	**98(71.0)**	**138(100.0)**		
Frequency of sugar snack consumption					
Less than three times daily	29(26.1)	82(73.9)	111(100.0)		
Three or more times daily	11(40.7)	16(59.3)	27(100.0)	0.44	2.69
Total	**40(29.0)**	**98(71.0)**	**138(100.0)**		
				t test	***Sig value***
Oral hygiene	**2.1±0.92**	2.21±1.14		0.25	0.51
Gingivitis	1.10±0.30	1.21±0.50		1.34	**0.01**

Table 3:Association between the predictors of dental caries and prevalence among institutionalized street children.

Risk Factors	*Dental Caries*		Total	χ^2	*p-value*
	Yes	No	N (%)		
	n(%)	N(%)	35(100.0)		
	7(100.0)	28(100.0)			
Age (years)					
7-9	2(50.0)	2(50.0)	4(100.0)		
10-12	2(11.8)	15(88.2)	17(100.0)	2.9	0.22*
12-15	3(21.4)	11(78.6)	14(100.0)		
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Sex					
Male	4(18.2)	18(81.8)	22(100.0)		
Female	3(23.1)	10(76.9)	13(100.0)	0.12	0.73*
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Frequency of tooth cleaning					
Once daily	4(23.5)	13(76.5)	17(100.0)		
Twice daily	1(33.3)	2(66.7)	3(100.0)	0.88	0.64
Less than once daily	2(13.3)	13(86.7)	15(100.0)		
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Tooth cleaning materials					
Tooth brush and paste	6(17.6)	28(82.4)	34(100.0)		
Toothbrush & chewing stick	1 (100.0)	0(0.0)	1(100.0)	4.11	0.20
Others	0(0.0)	0(0.0)	0(0.0)		
Total	**7(20.0)**	**28(80.0)**	**35(100.)**		
Before 1 minute	7(20.0)	28(80.0)	35(100.0)		
After 1 minute	0(0.0)	0(0.0)	0(0.0)	-	-
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Presence of visible plaque					
Yes	5(17.2)	24(82.8)	29(100.0)		
No	2(33.3)	4(66.7)	6(100.0)	0.81	0.37*
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Presence of white spot lesions					
Yes	7(20.0)	28(80.0)	35(100.0)		
No	0(0.0)	0(0.0)	0(0.0)	-	-
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Presence of deep pits and fissures					
Yes	7(20.0)	28(80.0)	35(100.0)		
No	0(0.0)	0(0.0)	0(0.0)	-	-
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Intra-Oral appliances					
Yes	0(0.0)	0(0.0)	0(0.0)		
None	7(20.0)	28(80.0)	35(100.0)	-	-
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Presence of enamel hypoplasia					
Yes	7(20.6)	27(79.4)	34(100.0)		
No	0(0.0)	1(100.0)	1(100.0)	0.26	0.61*
Total	**7(20.0)**	**28(80.0)**	**35(100.0)**		
Frequency of sugar snack					
None	0(0.0)	1(100.0)	1(100.0)		
Less than 3 times/day	7(21.2)	26(78.8)	33(100.0)	0.27	0.61*
3 or more timely/day	0(**0**)	1(100.0)	1(100.0)		
3 or more times/day	7(20.0)	28(80.0)	35(100.0)		

Table 4: Association between the predictors of dental caries and prevalence among non-institutional street children

Risk Factors	Dental Caries		Total	χ^2	p-value
	Yes n(%)	No n(%)	N (%)		
Age (years)					
7-9	8(47.1)	9(52.9)	17(100.0)		
10-12	13(27.7)	34(72.3)	47(100.0)	2.20	0.33
12-15	12(30.8)	27(69.2)	39(100.0)		
Total	**33(32.0)**	**70(68.0)**	**103(1100.0)**		
Sex					
Male	22(31.9)	47(68.1)	69(100.0)		
Female	11(32.4)	23(67.6)	34(100.0)	0.00	0.96
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Frequency of tooth cleaning					
Once daily	27(33.3)	54(66.7)	81(100.0)		
Twice daily	6(31.6)	13(68.4)	19(100.0)	2.38	0.30*
Less than once daily	0(0.0)	3(0.0)	3(100.0)		
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Tooth cleaning materials					
Tooth brush and paste	30(30.6)	68(69.4)	98(100.0)		
Toothbrush & chewing stick	3(75.0)	1(25.0)	4(100.0)	0.96	0.33*
Others	0(0.0)	1(100.0)	1(100.0)		
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Presence of visible plaque					
Yes	26(33.3)	52(66.7)	78(100.0)		
No	7(28.0)	18(72.0)	25(100.0)	0.25	0.62
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Presence of white spot lesions					
Yes	0(0.0)	0(0.0)	0(0.0)		
No	33(32.0)	70(68.0)	103(100.0)	--	--
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Presence of deep pits and fissures					
Yes	3(50.0)	3(50.0)	6(100.0)		
No	30(30.9)	67(69.1)	97(100.0)	--	--
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Intra-Oral appliances					
Yes	0(0.0)	0(0.0)	0(0.0)		
No	33(32.0)	70(68.0)	103(100.0)	0.94	0.33*
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Presence of enamel hypoplasia					
Yes	1(50.0)	1(50.0)	2(100.0)		
No	32(31.7)	69(63.3)	101(100.0)	0.30	0.58*
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
Frequency of sugar snack					
None	0(0.0)	0(0.0)	0(0.0)		
Less than 3 times/day	23(29.5)	55(70.5)	78(100.0)		
3 or more times/day	10(40.0)	15(60.0)	25(100.0)	0.96	0.32*
Total	**33(32.0)**	**70(68.0)**	**103(100.0)**		
		Mean ±SD		*t*	*p-value*
Oral hygiene	**2.11±0.91**	1.85±0.76		-1.57	0.12
Gingivitis	1.01±0.10	1.05±0.25		-0.91	0.37

***Fisher's Exact Test Values**

Table 5: Association between the predictors of dental trauma and prevalence among the children

Risk Fa ctors	Dental trauma Yes N (%)	No N (%)	Total N (%)	χ^2	p-*value*
Age					
7-9	2(9.5)	19(90.5)	21(100.0)		
10-12	10(15.6)	54(84.4)	64(100.0)		
13-15	14(26.4)	39(73.6)	53(100.0)	0.16*	3.61*
Total	**26(18.8)**	**112(81.2)**	**138(100.0)**		
Sex					
Male	21(23.1)	70(76.9)	91(100.0)		
Female	5(10.6)	42(89.4)	47(100.0)	0.08	3.14
Total	**26(18.8)**	**112(81.2)**	**138(100.0)**		
Lip competence					
Competent	15(15.0)	85(85.0)	100(100.0)		
Potentially competent	10(32.3)	21(67.7)	31(100.0)	0.10	4.71
Incompetent	1(14.3)	6(85.7)	7(100.0)		
Total	**26(18.8)**	**112(81.2)**	**138(100.0)**		
Anterior open bite					
Present	2(25.0)	6(75.0)	8(100.0)		
Absent	24(18.5)	106(81.5)	130(100.0)	0.65*	0.21*
Total	**26(18.8)**	**112(81.2)**	**138(100.0)**		
Angles class of occlusion					
Class I	26(19.4)	108(80.6)	134(100.0)		
Class II (Division 1)	0(0.0)	4(100.0)	4(100.0)	1.00*	0.96*
Total	**26(18.8)**	**112(81.2)**	**138(100.0)**		
Over-jet Measurement					
0-4mm	26(19.3)	109(80.7)	135(100.0)		
>4mm	0(0.0)	3(100.0)	3(100.0)	1.00*	0.71*
Total	**26(18.8)**	**112(81.2)**	**138(100.0)**		
Substance use					
Yes	20(16.9)	98(83.1)	118(100.0)		
No	6(30.0)	14(70.0)	20(100.0)	0.17	1.91
Total	**26(18.8)**	**112(81.2)**	**138(100.0)**		

***Fisher's Exact Test values**

Table 6: Association between presenc e of predictors of dental trauma and prevalence among institutionalized street children

Risk Factors	Dental trauma			χ^2	*p-value*
	Yes	No	Total		
	N (%)	N (%)	N (%)		
	9(100.0)	26(100.0)	35(100.0)		
Age					
7-9	1(25.0)	3(75.0)	4(100.0)		
10-12	6(35.3)	11(64.7)	17(100.0)	1.77	0.41*
13-15	2(14.3)	12(85.7)	14(100.0)		
Total	**9(25.7**	**26(74.3)**	**35(100.0)**		
Sex					
Male	6(27.3)	16(72.7)	22(100.0)	0.08	0.80 *
Female	3(23.1)	10(76.9)	13(100.0)		
Total	**9(25.7)**	**2(74.3)**	**35(100.0)**		
Lip competence					
Competent	1(5.0)	19(95.0)	20(100.0)		
Poten tially competent	7(58.3)	5(41.7)	12(100.0)	11.3	**0.04** *
Incompetent	1(33.3)	2(66.7)	3(100.0)		
Total	**9(25.7)**	**26(74.3)**	**35(100.0)**		
Anterior open bite					
Present	1(33.3)	2(66.7)	3(100.0)		
Absent	8(25.0)	24(75.0)	32(100.0)	0.10	0.75 *
Total	**9(25.7)**	**26(74.3**	**35(100.0)**		
Angles class of occlusion					
Class I	9(27.3)	24(72.7)	33(100.0)		
Class II (Division 1)	0(0.0)	2(100.0)	2(100.0)	0.73	0.39 *
Class II (Division 2)	0(0.0)	0(0.0)	0(0.0)		
Total	**9(25.7)**	**26(74.3)**	**35(100.0)**		
Over -jet Measurement					
Reversed Over -jet	0(0.0)	0(0.0)	0(0.0)		
0-4mm	9(25.7)	26(74.3)	35(100.0)	-	-
>4mm	0(0.0)	0(0.0)	0(0.0)		
Total	**9(25.7)**	**26(74.3)**	**35(100)**		
Substance use					
Yes	0(0.0)	2(100.0)	2(100.0)		
No	9(27.3)	24(72.7)	33(100.0)	0.73	0.40 *
Total	**9(25.7)**	**26(74.3)**	**35(100.0)**		

***Fisher's Exact Test values**

Table 7: Association between predictors of dental trauma and prevalence among non-institutionalized street children

Risk Factors	Dental trauma			χ^2	p-value
	Yes	No	Total		
	N (%)	N (%)	N (%)		
	17(100.0)	**86(100.0)**	**103(100.0)**		
Age					
7-9	1(5.9)	16(94.1)	17(100.0)		
10-12	4(8.5)	43(91.5)	47(100.0)	9.33	**0.01** *
13-15	12(30.8)	27(69.2)	39(100.0)		
Total	**17(16.5)**	**86(83.5)**	**103(100.0)**		
Sex					
Male	15(21.7)	54(78.3)	69(100.0)		
Female	2(5.9)	32(94.1)	34(100.0)	4.16	**0.04** *
Tot al	**17(16.5)**	**86(83.5)**	**103(100.0)**		
Lip competence					
Competent	14(17.5)	66(82.5)	80(100.0)		
Potentially competent	3(15.8)	16(84.2)	19(100.0)	0.85	0.65 *
Incompetent	0(0.0)	4(100.0)	4(100.0)		
Total	**17(16.5)**	**86(83.5)**	**103(100.0)**		
Anterior open bite					
Present	1(20.0)	4(80.0)	5(100.0)	0.05	0.83
Absent	16(16.3)	82(83.7)	98(100.0)		
Total	**17(16.5)**	**86(83.5)**	**103(100.0)**		
Angles class of occlusion					
Class I	17(16.8)	84(83.2)	101(100.0)		
Class II (Divis ion 1)	0(0.0)	2(100.0)	2(100.0)	0.40	0.53 *
Class II (Division 2)	0(0.0)	0(0.0)	0(0.0)		
Total	**17(16.5)**	**86(83.5)**	**103(100.0)**		
Over -jet Measurement					
Reversed Over -jet	0(0.0)	0(0.0)	0(0.0)		
0-4mm	17(17.0)	83(83.0)	100(100.0)	0.61	0.43 *
>4mm	0(0.0)	3(100.0)	3(100.0)		
Total	**17(16.5)**	**86(83.5)**	**103(100.0)**		
Substance use					
Yes	6(33.3)	12(66.7)	18(100.0)	4.48	**0.03**
No	11(12.9)	74(87.1)	85(100.0)		
Total	**17(16.5)**	**86(83.5)**	**103(100.0)**		

***Fisher's Exact Test values**

finding is similar to the report from many previous studies[14,54]. Substance abuse is one common activity among homeless young people in many societies[8]. Individuals under the influence of some of these substances may be prone to violence and fall that can cause trauma to their teeth as well as any other parts of their body. This was in agreement with the findings of Cavalcanti et al[55] who observed a positive association between facial fracture and alcohol consumption. Similarly, Filho et al[56] and Paiva et al[57] reported a positive association between dental trauma and illicit drug use and binge drinking respectively. The prevalence of dental trauma among the children, according this study, is highest between ages 13 and 15 years compared with those who are between 7 – 9 and 10 – 12. This has been suggested to be the result of previous dental trauma which might have occurred before the child attains the present age. It has also been observed that older children are most likely to be involved in contact sports and interpersonal violence compared to the younger age groups[58]. Also, as observed in this present study, anterior open bite, among other forms of malocclusion has been linked with increased risk of dental trauma in permanent dentition by previous studies[59].

CONCLUSION

The prevalence of dental caries and trauma among these groups of children were high compared to the previous studies among of school children in this environment. Also, the prevalence of dental caries is lower compared to the previous studies among the children in other countries. Furthermore, dental caries is higher among non-institutionalized than institutionalized children. On the other hand, dental trauma among both groups of children is higher than the previous findings among school children in this environment and street children in other countries. Institutionalized street children have higher dental trauma prevalence compared to non-institutionalized children. The significant predictors of dental caries were gender, frequency of tooth cleaning, tooth hypoplasia, presence of visible plaque on the anterior teeth and gingivitis, while those of dental trauma were lip competence, substance use, age and gender. It is therefore recommended that more studies are to be carried out among these children in Nigeria. Also, school oral health programmes should be extended to institutions like juvenile correctional homes while dental treatments are given at subsidized rate to these children.

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