IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 19, Issue 8 Ser.8 (August. 2020), PP 33-37
www.iosrjournals.org

A Comparison of Caries Prevalence in Children with and Without Cleft Deformities in Enugu, Nigeria

Linda O. Okoye[1], Felix U. Egbonwonu[1], Ifeanyi I. Onah[2]
[1](Department of Restorative Dentistry, Faculty of Dentistry, University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu, Nigeria)
[2](Department of Plastic Surgery, National Orthopaedic Hospital Enugu, Nigeria)

Abstract
Objective:*To evaluate the prevalence of dental caries in patients with cleft lip and/or palate and their non-cleft controls.*
Methods:*A comparative study of 62 children with cleft deformity between the ages of 3 and 18years, and 62 control children. Pretested questionnaires were administered by trained interviewers to record the demographic information and elicit risk factors. Examination for dental caries and oral hygiene was done according to WHO guidelines. Data from the questionnaires and clinical examinations were analyzed using theSPSSversion 16. Chi-square test of association was used to compare proportions and ratios.*
Results:*In this study, a total of 124 children participated. 72 males and 52 females. Sixty two children were affected with cleft lip and/or palate, while 62 made up the control group. Mean age for the children with cleft was 9.8±11.20 and 11.2±2.14 for the non-cleft control. The prevalence of caries amongst children with cleft was 19.4% while the prevalence of caries for the control group was 12.9%. Mean Decayed Missing and Filled teeth (DMFT) and mean dmft were higher in children with cleft than the control in all age groups, though this was not statistically significant (P=0.836). Caries was significantly higher in deciduous than permanent teeth (P = 0.003)*
Conclusion:*We hereby conclude that children with cleft lip and palate experience more decayed, missing or filled teeth when compared to non-affected children. It is therefore important to include dental care early in the management protocol for cleft children to prevent tooth decays.*
Keywords:*cleft lip, cleft palate, caries, DMFT, dmft*

Date of Submission: 30-07-2020 Date of Acceptance: 15-08-2020

I. Introduction

Oral clefts are one of the most common congenital malformations of orofacial structures and constitute approximately 65% of the anomalies affecting the head and neck[1]. They occur in approximately 1:700 to 4:1000 live births with significant racial and geographic variations[1]. The incidence of births with cleft lip and palate varies geographically by regions, affecting approximately 1.3 of every 1,000 live births in Igbo population[2].Dental caries is still a global public health problem and at present, constitutes the main threat to children's oral health. Individuals are susceptible to this disease throughout their lifetime. Dental caries forms through a complex interaction over time, between acid-producing bacteria, fermentable carbohydrate, and many host factors, including teeth and saliva[3]. Children with clefts rarely escape dental complications.The high prevalence of dental diseases in children with cleft lip and/or palate has been attributed to the irregularity of teeth, the anatomy of cleft area, tight repaired lip with a tendency for food to accumulate in the cleft area, nasal discharge through the cleft which acts as a feast for cariogenic microorganisms, hypoplastic defects, prolonged feeding especially at night time and increased consumption of sugary foods[4,5]. These children with cleft lip and palate deformities have been reported to be as children at high caries risk, who need to be diagnosed and managed similar to high caries risk children[5]. Shashniet al[5] while evaluating various risk factors for dental caries in children with cleft lip and palate, found that these children are comparable to non-cleft high caries risk children and are at high risk for developing dental caries. It has often been speculated that the irregularity of the teeth, oral soft tissue defects, and unpredictable dental, skeletal and soft tissue development related to surgical repair could result in a higher frequency of dental caries and poor oral hygiene in cleft lip and palate patients than in normal persons[4]. A higher prevalence ofdental caries has been linked to poorer oral hygiene as a result of a reluctance to brush around the cleft site, poorly aligned maxillary dentition and limited access following surgical repair of the upper lip and possible scarring.

Zhu et al[6] and Tannure et al[7] reported a higher prevalence of caries in patients with oral clefts when compared with those without, while Lucas et al[8] and King et al[9] reported no statistically significant differences

in caries experience between the cleft children and control group. However, reports on dental caries of children affected by clefts in Enugu is limited and there is no publication that has compared clinical samples with control groups. This initiated our present study to compare dental caries experience among 3-18 year-old children with and without cleft in Enugu.

II. Materials And Methods

This is a comparative study involving 124 participants, 72 males and 56 females. Sixty-two children with cleft, between the ages of 3 and 18years were selected from the plastic surgery clinics of National Orthopaedic Hospital, Enugu, the leading cleft centre in the South Eastern Nigeria from January 2009 to December 2016. A control group of 62 non-cleft school children of the same age group and gender from the same geographical area were selected using a multistage sampling technique.

Subject recruitment

Three schools (government owned secondary school, government owned primary and nursery school, and privately owned primary and nursery school) were randomly selected. In each school, different classes were selected for each age group, and the number of students required wasthen selected using the table of random numbers. A total of 62 school children, matched for age groups and gender were selected as control.

Inclusion and Exclusion Criteria

Children between the ages of 3 and 18 years, diagnosed of cleft lip and or palate, with or without surgical correction constitute the study group, while school children without cleft deformities were assigned to the control group. Children with any diagnosed associated syndrome and children undergoing orthodontic treatment were excluded from this study. Children who refused to give their consent or whose parents/guardian failed to give written consent were excluded from the study.

Ethical Consideration

Ethical approval for this study was obtained from the Research and Ethics committee of University of Nigeria Teaching Hospital Enugu. Permission was also obtained from school authorities involved. A written informed consent was obtained from parents or guardians of all the children included and assent obtained from the children.

Questionnaire Administration and Clinical examination

A pretested questionnaire was administered by the trained interviewers to record the demographic information, socio-economic conditions, frequency of tooth brushing, type of toothpaste used, frequency of sugar consumption, type of cleft, decayed missing and filled teeth (DMFT/dmft) and oral hygiene status. A single examiner was trained through a series of clinical training sessions and calibrated prior to the commencement of the study by conducting repeat assessments on 5 children at one week interval. Agreement of clinical assessments was established to be good (Kappa values = 0.72) which validated the examination procedure.

All the recruited children were examined for caries, plaque and calculus. The examinations were carried out in good natural light on sunny days facing the window. Teeth were dried with cotton rolls prior to the examinations. The examination procedures and diagnostic criteria were those recommended in the World Health Organisation Oral Health Survey Basic Methods[10]. Assessment of dental caries experience was done using the Decayed, Missing, and Filled Teeth(DMFT/dmft). The sum of the Debris Index Score (DI-S) and the Calculus Index Score (CI-S) gives the Oral Hygiene Index. The criteria used for the scoring of debris index are as laid out by Greene et al.[11] Calculus Index was scored using the criteria recommended by Spolsky.[12]

Statistical Analysis

Data from the questionnaires and clinical examinations were analyzed using the Statistical Package of Social Science (SPSS) version 16. Chi-square test of association was used to compare proportions and ratios with the significant level set at $P<0.05$ and 95% confidence level.

III. Result

In this study, 124 children participated. 62 children were affected with cleft lip and/or palate, while 62 made up the control group. The control was selected to match each age group of the cleft children (3-6 years group =22, 7-12 years group =28, and 13-18 years group =12).

Mean age for the cleft children was 9.8±11.20 and 11.2±2.14 for the non-cleft control.

Seventy-two children (58.1%) of the study population were males while 52 (41.9%) were females.

The adherence to the preventive oral health habits (tooth-brushing, use of fluoride, and dietary factors) were not different among groups. There was no statistical difference in oral hygiene practices between the cleft and the control groups. (Table 1)

The socioeconomic status of the non-cleft children were significantly higher than those of the cleft children (P=0.001) as shown in Table 1.

Very few children (8-10%) brushed their teeth twice daily or more. Majority of the children (85-90%) used fluoridated toothpaste. More than half of the children (60-70%) consumed sugary snacks in between meals daily.

Prevalence of caries amongst children with cleft deformities was 19.4% while the prevalence of caries for the control group was 12.9%. Mean DMFT for permanent teeth, was higher in cleft (0.25) than the control (0.21). Mean dmft for deciduous teeth at 3-6years group was higher in children with cleft deformities (0.28) than the control (0.12) and at 7-12years group, was also higher in children with cleft deformities (0.40) than the control (0.28). Mean DMFT and mean dmft were higher in children with cleft deformities than the control in all age groups, though this was not statistically significant (P=0.836) as seen in Table 2. Caries was significantly higher in deciduous than permanent teeth (P = 0.003)

Percentage of children with caries increased with decreased oral hygiene status. (Table 3). Percentage caries was highest in the oldest age group (Table 4).

Table 1. Demographic profile of the study participants

	CLEFT N (%)	NON-CLEFT N (%)	T-test
AGE (Years)			
3 – 6	22	22	
7 – 12	28	28	
13 – 18	12	12	
Total	62	62	
Mean Age	9.8 ± 11.20	11.2 ± 2.14	t = 0.97, df=122, *P*=0.336
GENDER		*CHI SQUARE*	
Male	36 (58.1%)	36 (58.1%)	NA
Female	26 (41.9%)	26 (41.9%)	NA
SOCIO ECONOMIC STATUS			
High	19 (30.6)	38 (61.3)	
Middle	21 (33.9)	17 (27.4)	X^2=14.513, df=2, *P*=0.001*
Low	22 (35.5)	7 (11.3)	
Total	62 (100)	62 (100)	
ORAL HYGIENE PRACTICES			
Brushes twice daily or more	6 (9.7)	5 (8.1)	
Used fluoridated toothpaste	53 (85.5)	56 (90.3)	X^2=0.603, df=2, *P*=0.740
Consumes sugary snack in between meals < once a day	19 (30.6)	25 (40.3)	

Table 2: Caries Experience in Cleft and Non-cleft Children

	No of children	No of children with caries n(%)	Mean DMFT	Mean dmft
Cleft children				
3-6 years	22	5 (22.7)	-	0.28
7-12 years	28	4 (14.3)	0	0.40
13-18 years	12	3 ((25.0)	0.25	-
Non-cleft children				
3-6 years	22	2 (9.1)	.-	0.12
7-12 years	28	3 (10.7)	0	0.28
13-18 years	12	2 (16.7)	0.21	-

Chi-square of caries experience among the children: X^2 =2.091, DF=5, P=0.836

Table 3: Oral hygiene and Caries status of Children with cleft and Control

Children with cleft	Oral hygiene status n(%)	Children with caries n(%)	X^2	*P*	DF
Good	20 (32.3)	2 (10.0)	0.574	0.449[y]	1
Fair	32 (51.6)	6 (18.8)	0.010	0.919	1
Poor	10 (16.1)	4 (40.0)	0.897	0.344[y]	1
	62 (100)	12 (19.4)			
Non-cleft children					
Good	27 (43.5)	0 (0)	4.971	0.026[y]	1
Fair	31 (50.0)	6 (18.8)	0.940	0.332[y]	1
Poor	4 (6.5)	2 (50.0)	0.957	0.328[y]	1
	62 (100%)	8 (12.9%)			

Y = Chi-Square likelihood with Yates's correction

Likelihood Chi-Square of oral hygiene and caries among cleft children**:** *X^2=2.400, DF=2, P=0.317*

Likelihood Chi-Square of oral hygiene and caries among non-cleft children:*X^2=9.316, DF=2, P=0.028**

Chi-Square oral hygiene practices among cleft and non-cleft children**:** *X^2=31.961, DF=2, P=0.000*

Table 4: Caries experience according to age among cleft and non-cleft children

Age (years)	Cleft children n(%)	Non-cleft children n(%)	X^2	*P*-value	DF
3 – 6	5 (22.7)	2 (9.1)	0.083	0.439[y]	1
7 – 12	4 (14.3)	3 (10.7)	0.000	1.000[y]	1
13 – 18	3 (25.0)	2 (16.7)	0.000	1.000[y]	1
Total	12 (19.4)	8 (12.9)			

Y = Chi-Square likelihood with Yates's correction

IV. Discussion

This study investigated the caries prevalence in children with cleft in comparison with a non-cleft control group in Enugu. The participants were categorized into three age groups as shown in the results above.

Prevalence of caries amongst the children with cleft deformity was 19.4%, which is higher than the prevalence of 12.9% observed in the non-cleft control group. This is similar to the findings of Zhu et al[6] and Tannure et al[7], who reported higher prevalence of caries in children with cleft deformity than their control in England and China respectively. Mean DMFT for permanent teeth and mean dmft for deciduous teeth were higher in children with cleft deformity in all age groups, though this was not statistically significant (P=0.836). This could be as a result of sample size, a larger, multi-centered study in our environment is recommended to elucidate this. Children with cleft lip and palate had been labelled as children at high caries risk, who need to be diagnosed and managed similar to highcaries risk children[5]. Higher prevalence of caries in children with cleft deformity have been linked to poor oral hygiene as a result of reluctance to brush around the cleft side, poorly aligned maxillary dentition, limited access following surgical repair of the upper lip and possible scarring[4]. Following lip repair there may be redundant mucosa filling the space of the alveolar cleft, or sometimes a tight scar limiting the space around the alveolus thereby affecting tooth brushing and predisposing to caries.

Caries was significantly higher in deciduous than permanent teeth (P = 0.003). This agrees with the report of Zhu et al[6] among the Chinese children. Caries experience on teeth increases with time[13], and deciduous teeth have stayed longer in the mouth than the permanent teeth in this study.

The socioeconomic status of the non-cleft control group was found to be significantly higher than that of the children with cleft deformity (P=0.001). This may be as a result of the sampled control group, but agrees with findings by JacOkereke and Onah that children with clefts are mostly from a low socioeconomic background.[2]Children with cleft deformity are not usually of high socioeconomic status. This was taken into consideration by sampling both government and private school children for control.

Percentage of children with caries increased with decreased oral hygiene status (Table 3). Poor oral hygiene had been reported[4] to be a risk factor for dental caries. It is important that mothers and/or care givers are encouraged to commence tooth brushing early in life, though difficulties and disturbances increase as more teeth erupt into the cleft mouth.

There was no significant difference in the oral hygiene practices between the cleft and control children in this study. More children with cleft deformity (40.3%) than the control (30.6%) consumed sugary snacks more than once a day. Sugary diet has always been implicated as a risk factor in dental caries risk[5]. From the result is this study, dietary modification for children with cleft deformity to reduce sugar content and frequency of sugar intake is highly advised.

Percentage caries was highest in the oldest age group. Dental caries disease is currently defined as biosocial and multifactorial disease with the prevalence increasing with age[13,14].

V. Conclusion

We hereby conclude that cleft lip and palate pediatric patients are associated with more decayed, missing and filled teeth when compared to non-affected children. It is therefore important to include dental care early in the management protocol for children with cleft deformities to prevent tooth decays. Further research is recommended to describe and evaluate different integrated models of care for individuals with cleft lip and palate and to determine if the type and severity of cleft influence the risk of caries.

References

[1]. Butali A, Adeyemo WL, Mossey PA, Olasoji HO, Onah II, Adebola A, et al. Prevalence of orofacial clefts in Nigeria. Cleft Palate Craniofac J: 2014; 51: 320-325.
[2]. Jac-Okereke CA, Onah II. Epidemiologic indices of cleft lip and palate as seen among Igbos in Enugu, Southeastern Nigeria. J Cleft Lip Palate CraniofacAnomal 2017;4(Suppl S1):126-31.
[3]. Weraarchakul W, Weraarchakul W. Dental Caries in Children with Cleft Lip and Palate. J Med Assoc Thai 2017; 100 (Suppl. 6): S131-S135.
[4]. Cheng LL, Moor SL, Ho CT. Predisposing factors to dental caries in children with cleft lip and palate: a review and strategies for early prevention. Cleft Palate Craniofac J 2007 Jan;44(1):67-72.
[5]. Shashni R, Goyal A, Gauba K, Utreja AK, Ray P, Jena AK. Comparison of risk indicators of dental caries in children with and without cleft lip and palate deformities. ContempClin Dent. 2015;6:58-62.
[6]. Zhu WC, Xiao J, Liu Y, Wu J, Li JY. Caries experience in individuals with cleft lip and/or palate in China. Cleft Palate Craniofac J 2010 Jan;47(1):43-47.
[7]. Tannure PN, Costa MeC, Küchler EC, Romanos HF, Granjeiro JM, Vieira AR. Caries experience in individuals with cleft lip and palate. Pediatr Dent 2012 Mar-Apr;34(2):127-131.
[8]. Lucas VS, Gupta R, Ololade O, Gelbier M, Roberts GJ. Dental health Indices and caries associated microflora in children with unilateral cleft lip and palate. Cleft Palate Craniofac J 2000 Sep;37(5):447-452.
[9]. King NM, Wong WL, Wong HM. Caries experience of chinese children with cleft lip and palate. Cleft Palate Craniofac J: 2013;50:448-455.
[10]. World Health Organization. Oral health surveys. Basic methods. 4th ed. Geneva: World Health Organization; 1997.
[11]. Greene JC, Vermillion JR. The simplified oral hygiene index. J Am Dent Assoc; 1964; 68:7–13.
[12]. Spolsky V. The epidemiology of gingival and periodontal disease. In Caranza FA Jr. Glickman's Clinical Periodontology 7th Ed. Philadelphia:1990; Pp:302-329.
[13]. Okoye LO, Ekwueme OC. Prevalence of dental caries in a Nigerian Rural Community: A preliminary survey. Ann Med Health Sci Res: 2011; 1:187-192.
[14]. Okoye LO. Oral Health Status of Cleft Children in Enugu, Nigeria. Nig J Med Dent Educ: 2019; 1(1&2):52-56.

Linda O. Okoye, et. al. "A Comparison of Caries Prevalence in Children with and Without Cleft Deformities in Enugu, Nigeria." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(8), 2020, pp. 33-37.