

TREND OF EARLY CHILDHOOD CARIES IN A TERTIARY HEALTH INSTITUTION: A 7-YEAR RETROSPECTIVE STUDY

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ABSTRACT

Introduction: Early childhood caries (ECC) is a common chronic infectious disease affecting young children and it constitutes a significant public health problem. It is the presence of one or more decayed, missing (due to caries), or filled tooth surfaces in any primary tooth in a child under the age of six.

Aim: To determine the trend of ECC and its prevalence in a tertiary health institution in Lagos State.

Methodology: A retrospective study was carried out among children aged 0-5 years presenting with ECC at the Paediatric Dentistry clinic of the Lagos State University Teaching Hospital (LASUTH) between 2017 and 2023. Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0, employing the chi-square test for bivariate associations.

Results: A total of 5,879 patients presented to the dental clinic during the study period, of whom 451 (7.7%) presented with ECC. Two hundred and twenty (48.8%) of them were boys, while 51.2% were girls. Their mean age was 3.94 ± 1.01 years. Most patients presented with incipient lesions/simple cavitation (50.3%). The Association between the age of presentation and affected teeth was statistically significant at p -value of < 0.05 .

Conclusion: The prevalence of ECC was 7.7% and the presentation was at its lowest in the year 2020 and 2021. The majority of patients presented with relatively early (incipient) lesions, hence Glass Ionomer Cement, (GIC) restoration was the treatment mostly carried out.

Keyword: Early childhood caries; Caries; Prevalence, Trend

INTRODUCTION

Early childhood caries (ECC), a common chronic infectious disease affecting young children, is a significant public health problem.¹ It is defined as the presence of one or more decayed (non-cavitated or cavitated lesions), missing due to caries, or filled tooth surfaces in any primary tooth in a child under the age of six.² It often results in adverse oral health and well-being of the child and may require hospitalization and treatment under general anaesthesia. This condition has been found to increase in different populations despite an increase in knowledge and awareness of importance of oral health.³

The prevalence of ECC has been observed to vary amongst populations. In a systematic review with meta-analysis using the World Health Organization (WHO) diagnostic criteria, Uribe *et al.*⁴ reported a global prevalence of ECC of 48%. The prevalence by

continent was 30% for Africa, 48% for America, 52% for Asia, 43% for Europe and 82% for Oceania. They suggested that their observed wide variations in prevalence within and between countries were likely due to structural or methodological components of the studies.

Some Nigerian studies that have assessed the prevalence of ECC reported values lower than the global prevalence. Olatosi *et al.*⁵ in the prevalence of early childhood caries and its associated risk factors among preschool children referred to a tertiary care institution found the prevalence of ECC to be 21.2%. In another study on prevalence and pattern of early childhood caries in Ibadan, Iyun *et al.*⁶ reported a prevalence of 23.5%. Folayan *et al.*⁷ in a study on the epidemiological profile of early childhood caries in a sub urban population in Nigeria, discovered a prevalence of 4.7%.

Furthermore, Folayan *et al.*⁸ in another study assessed the prevalence of ECC in different age ranges, and the highest prevalence of 12.7% was found in the age range 48 – 59 months, though the overall prevalence of ECC in the study was 6.6%. Meanwhile, in a recent study among the Hausa children in Northern Nigeria, a prevalence of 3.2% was observed by Oziegbe and Schepartz.⁹

The knowledge on prevalence of ECC and its associated factors can help to develop targeted interventions to the prevention and control of this condition. There is therefore a need for more research on the prevalence, aetiologic factors, epidemiology, prevention and management of ECC amongst populations.

The purpose of this study was to determine the trend in ECC presentation and its prevalence in a tertiary health institution in Lagos State. A 7-years review of cases of ECC was carried out at the Dental Centre of the Lagos State University Teaching Hospital (LASUTH), from 2017 - 2023.

METHODOLOGY

It was a retrospective study carried out amongst participants aged 0 - 5 years who presented with ECC while attending the Paediatric dentistry clinic of the Department of Child Dental Health, Lagos State University Teaching Hospital (LASUTH) Ikeja between 2017 and 2023. Ethical considerations were observed based on Helsinki declaration.

Information such as age, gender, presenting complaints, presence or absence of dental caries, diagnosis, teeth affected, the period of presentation, and the treatment done were obtained from the dental records of the patients. Early childhood caries diagnosis had been

made by means of visual/tactile examinations and dental caries were recorded using the decayed, missing, filled teeth (dmft) and surface (dmfs) indices for each child.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0 software (IBM SPSS Statistics for Windows, Version 21.0). Descriptive statistics were used to quantify variables such as age, gender, and teeth affected. Mean and Standard deviation were calculated. The chi-square statistical test was used. Results were presented as tables and charts. Association between the age of presentation, sex of the participants, and the teeth affected was determined, and p value was set at < 0.05

RESULTS

A total of 5,879 participants presented to the dental clinic during the study period. Four hundred and fifty-one (7.7%) of these patients presented with ECC (Figure 1). Two hundred and twenty (48.8%) of those

Table 1: Sociodemographic characteristics of participants

Variables	Frequency (n=451)	Percentage (%)
Age		
1	8	1.8
2	27	6.0
3	112	24.8
4	139	30.8
5	165	36.6
Total	451	100.0
Mean Age (years)		
	3.94 ± 1.01	
Gender		
Male	220	48.8
Female	231	51.2
Total	451	100.0

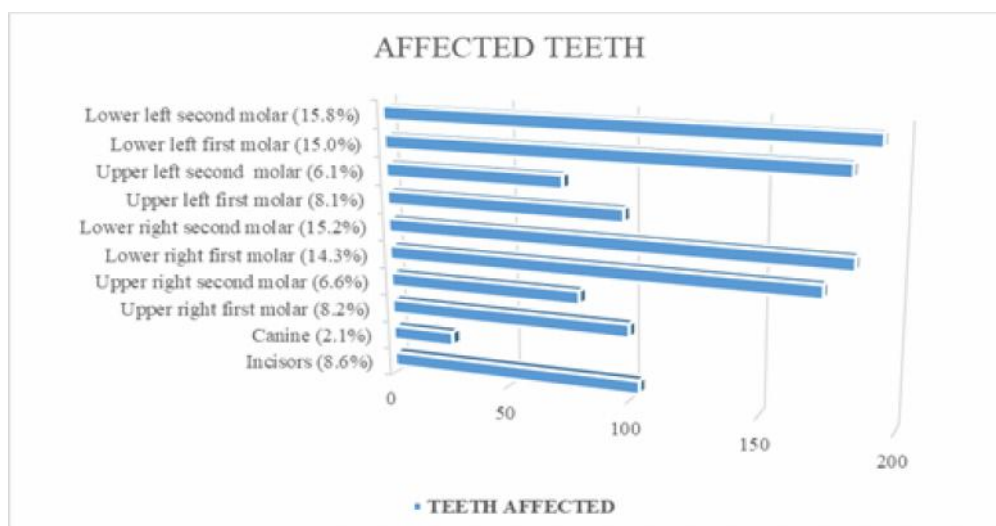


Figure 1: Distribution of teeth affected by caries

Table 2: Association between age and affected teeth in children 0 – 5 years with caries

	1year	2years	3years	4years	5years	Total N(%)	X ²	p-value
Incisors								
No	2(0.6)	10(2.9)	74(21.3)	116(33.4)	145(41.8)	347(100.0)	58.30	<0.001*
Yes	6(5.8)	17(16.3)	38(36.5)	23(22.1)	20(19.2)	104(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
Canines								
No	8(1.9)	25(5.9)	104(24.5)	134(31.5)	154(36.2)	425(100.0)	2.46	0.65
Yes	0(0.0)	2(7.7)	8(30.8)	5(19.2)	11(42.3)	26(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
54								
No	6(1.7)	20(5.7)	90(25.6)	106(30.2)	129(36.8)	351(100.0)	0.88	0.93
Yes	2(2.0)	7(7.0)	22(22.0)	33(33.0)	36(36.0)	100(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
55								
No	8(2.2)	25(6.7)	99(26.7)	117(31.5)	122(32.9)	371(100.0)	14.77	0.03*
Yes	0(0.0)	2(2.5)	13(16.3)	22(27.5)	43(53.8)	80(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
64								
No	7(2.0)	22(6.2)	89(25.2)	99(28.0)	136(38.5)	353(100.0)	6.39	0.17
Yes	1(1.0)	5(5.1)	23(23.5)	40(40.8)	29(29.6)	98(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(35.6)	451(100.0)		
65								
No	8(2.1)	26(6.9)	98(26.0)	110(29.2)	135(35.8)	377(100.0)	8.39	0.02*
Yes	0(0.0)	1(1.4)	14(18.9)	29(39.2)	30(40.5)	74(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
84								
No	7(2.5)	17(6.1)	67(24.1)	89(35.3)	98(35.5)	278(100.0)	3.13	0.54
Yes	1(0.6)	10(5.8)	45(26.0)	50(28.9)	67(38.7)	173(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
85								
No	8(3.0)	21(7.9)	69(25.8)	88(33.0)	81(30.3)	267(100.0)	17.59	<0.001*
Yes	0(0.0)	6(3.3)	43(23.4)	51(27.7)	84(45.7)	184(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
74								
No	6(2.2)	18(6.7)	62(23.0)	84(31.2)	99(36.8)	269(100.0)	2.24	0.84
Yes	2(1.1)	8(4.9)	50(27.5)	55(30.2)	66(36.3)	182(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		
75								
No	8(3.1)	22(8.5)	66(25.6)	78(30.2)	84(32.6)	258(100.0)	18.53	0.02*
Yes	0(0.0)	5(2.6)	46(23.8)	61(31.6)	81(42.0)	193(100.0)		
Total	8(1.8)	27(6.0)	112(24.8)	139(30.8)	165(36.6)	451(100.0)		

FDI tooth notation used to represent posterior teeth

who presented with ECC were boys, while 51.2% were girls. The age with the highest presentation is 5 years (36.6%), while age one was the one with the lowest presentation (1.8%).

The mean age of the participants was 3.94 ± 1.01 (Table 1). Lower primary left second molars (15.8%) were the most affected of the 1,214 carious teeth. This is followed by the lower right second molar (15.2%), then the lower left first molar (15.0%) and lower right first molar (14.3%) (Figure 1). The majority (50.3%) of the participants presented with incipient lesions/

simple cavitation (Figure 3). Glass Ionomer Cement was the commonest form of treatment carried out on the children (Figure 2). There was a relatively high presentation of ECC in the year 2017(25.9%), and the lowest in 2020 (Figure 3).

Concerning the association between age and affected teeth, it was revealed that the incisors (for ages 1,2 and 3) and upper and lower second primary molars (for ages 4 and 5) were statistically significant at *p*-values of < 0.001, 0.03, 0.02, 0.02, 0.001, respectively (Table 2).

Table 3: Association between sex and affected teeth in children 0 – 5 years with caries

	Male	Female	Total	X ²	p-value
Incisors					
No	171(49.3)	176(50.7)	347(100.0)	0.74	0.15
Yes	49(47.1)	55(52.9)	104(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
Canines					
No	207(48.7)	218(51.3)	425(100.0)	1.00	0.02
Yes	13(50.0)	13(50.0)	26(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
54					
No	170(48.4)	181(51.6)	351(100.0)	0.08	0.82
Yes	50(50.0)	50(50.0)	100(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
55					
No	180(48.5)	191(51.5)	371(100.0)	0.05	0.90
Yes	40(50.0)	40(50.0)	80(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
64					
No	175(49.6)	178(50.4)	353(100.0)	0.41	0.57
Yes	45(45.9)	53(54.1)	98(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
65					
No	187(47.2)	199(52.8)	377(100.0)	2.25	0.09
Yes	42(56.8)	32(43.2)	74(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
84					
No	140(50.4)	138(49.6)	278(100.0)	0.72	0.23
Yes	80(46.2)	93(53.8)	173(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
85					
No	119(44.6)	148(55.4)	267(100.0)	4.65	0.04*
Yes	101(54.9)	83(45.1)	184(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
74					
No	135(50.2)	134(49.8)	269(100.0)	0.53	0.50
Yes	85(46.7)	97(53.3)	182(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		
75					
No	119(46.1)	139(53.9)	258(100.0)	2.81	0.25
Yes	101(52.2)	92(47.8)	193(100.0)		
Total	220(48.8)	231(51.2)	451(100.0)		

FDI tooth notation used to represent posterior teeth

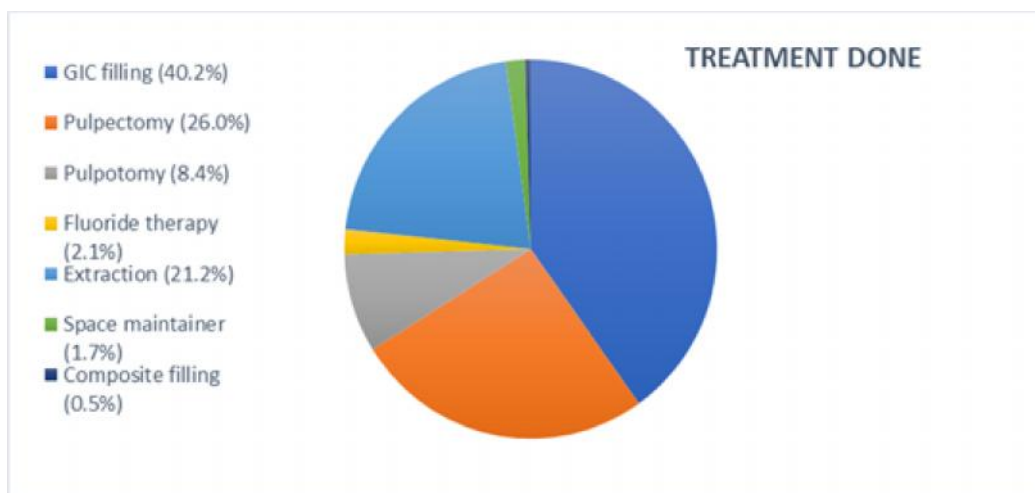
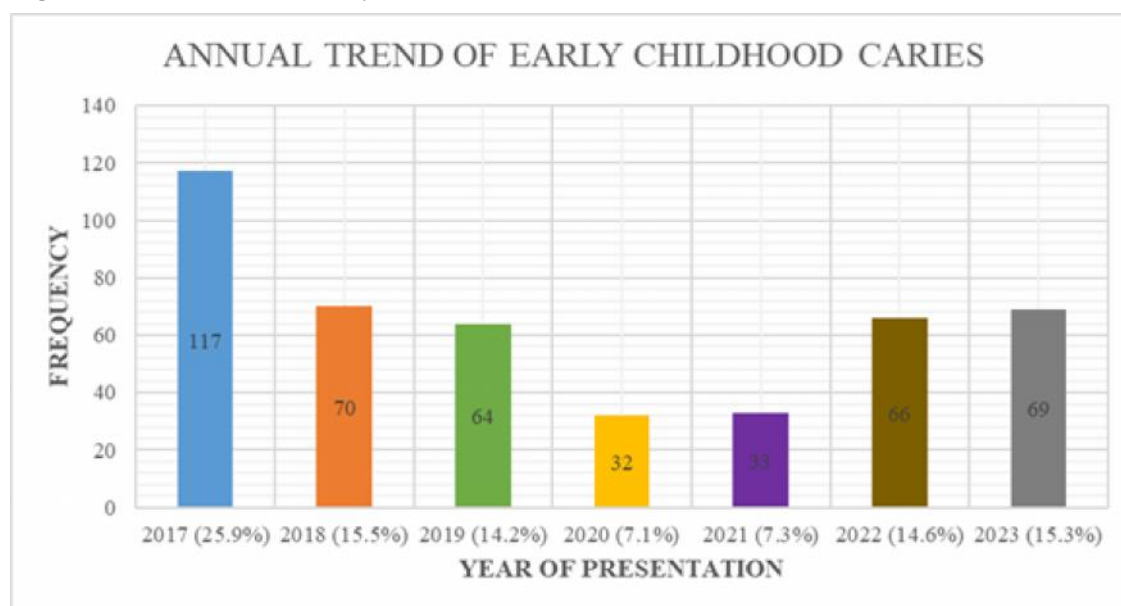
Figure 2: Treatment carried out on the patients

Figure 3: Annual trend of early childhood caries



Also, on the association between sex and the affected teeth, only the canines and tooth 85 (in males) were statistically significant at a p -value of 0.02 and 0.04 (Table 3).

Discussion

The prevalence of ECC in this present study was 7.7%. This is lower compared to the findings of some previous studies carried out in different Nigerian cities like Lagos, Ibadan and Port Harcourt.^{5,6,10,11} This may be a result of an increase in the rate of oral health education given at the dental clinics in recent times to patients while awaiting treatment. However, it is higher than the findings of Folayan *et al.*⁷ in a study carried out among some children in a suburban population in Nigeria. It is also markedly higher than the findings of Oziegbe and Schepartz⁹, carried out among Northern Nigerian Hausa children. Differences in location, suburban and urban centres, may be responsible for the variation in the prevalence.

More females were attended to during the study period compared to males. The sex prevalence in this young age group attending dental clinic has also been observed in several studies.^{12,13,14} More of the girls were affected by early childhood caries than the boys. This is in agreement with the findings of Folayan *et al.*⁸ where 66.7% of those with ECC were females and 33.3% were males. It is also similar to that of Olatosi *et al.*⁵ which was done among preschool children referred to a tertiary care institution. It is believed that females tend to have higher caries prevalence because their teeth erupt earlier than the males, so they are exposed to cariogenic environment earlier.¹⁵ On the other hand,

another study established that 54.8% of those with ECC were males, though not statistically significant.¹⁶

In this present study, ECC presentation was at its lowest in the years 2020 and 2021. This may be related to the lockdown that took place during the COVID-19 pandemic which might have prevented parents from presenting their children at the dental clinic for dental diseases, including ECC. This is similar to a previous study by Moharrami *et al.*¹⁷ where it was observed that the frequency of dental visits during COVID-19 pandemic was reduced, specifically during the lockdown due to many factors which include the fear of exposure in dental settings, warnings that dentists should keep their offices closed except for urgent and emergency procedures, patients' inability to visit dental clinics due to ban on public transportation for safety concerns, avoidance of aerosol-generating procedures, and the fact that all patients needed to be screened for symptoms of COVID-19 where those with symptoms and no emergent oral health care needs had their treatments postponed. In a study carried out in Nigeria during the period, it was observed that there was a substantial 66% decline in the number of patients attending the clinic.¹⁸ Adeyemo *et al.*¹⁹ in Nigeria attributed reduction to the apprehension of contracting COVID-19 in dental environments, while Morita *et al.*²⁰ in Japan attributed it to a notable increase in dental expenses per treatment. This trend was also reported in Cyprus and Iraq, where there was a 41.3% decrease in national visits and a 2.4 times reduction of dental appointments in 2020 as compared to 2019, respectively.^{21,22}

The age with the highest presentation was 5 years (36.6%), while age one had the lowest presentation (1.8%). This is in agreement with the findings of Olatosi *et al.*⁵ It is believed to be a result of the increasing number of erupted primary teeth, being present in the oral environment as the years increase. Furthermore, as children increase in age, there is a likelihood of changes in their dietary habits from healthy meals prepared at home to junk snacks easily available in the school environment, which may increase their chances of developing dental caries.²³

This study revealed that lower primary second molars were the most affected teeth by caries. A study by Eigbobo and Etim¹⁰ and Omotuyole *et al.*²⁴ reported lower molars as most affected by dental caries, with the lower right first primary molar more affected, followed by the lower right second primary molar. Also, Popoola *et al.*²⁵ in the pattern and surface prevalence of dental caries on posterior teeth of children in a Nigerian Teaching Hospital, found that mandibular primary teeth were more affected than the maxillary, and the second molars were more affected than the first. A common finding in these studies is that the teeth most commonly affected by dental caries are the lower molars, which are believed to be related to the presence of deep grooves, pits, and fissures, especially on the second primary molars.²⁶ Glass Ionomer Cement (GIC) restoration was the commonest type of treatment done (40.2%). This is because the majority (50.3%) of the children in this present study presented in the clinic at the simple cavitation stage without complications or the sequelae of early childhood caries. Glass ionomer cement becomes the ideal restorative materials at this stage because it requires minimal tooth preparation that will not involve hand handpiece that may affect the cooperation of the children due to their young age. Also, it is one of the cheapest restorative materials that can be used in our environment because it has been observed that parents sometimes do not bring their children for appointments due to the cost of treatment.⁵ Some previous studies on early childhood caries recommended the use of Atraumatic Restorative Treatment (ART) materials that utilizes Glass Ionomer Cement (GIC) because of its simplicity and effectiveness in developing nations, especially in environments with poor or inadequate electricity supply.^{27,28}

Limitation

This was a retrospective study, as data was obtained from the patient's case notes at the medical records unit. Some records had incomplete data and the inability to reach some of these patients added to the limitation.

CONCLUSION

The prevalence of ECC in this study was 7.7%, reflecting an improvement in the prevalence of early childhood caries in the Lagos environment. The presentation was at its lowest in the years 2020 and 2021. Also, it appears that there were early presentations of cases, leading to Glass Ionomer Cement being the highest form of treatment.

Conflict of interest

The authors declare that they have no conflict of interest.

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