JCDS JOURNAL of CONTEMPORARY DENTAL SCIENCES OPEN ACCESS

Original Article

Prevalence and Factors associated with Early Childhood Caries among Children Aged 4-5 Years Old in Rural Private Schools in Edo State, Nigeria

Osadolor OO[1*], Osadolor AJ[2]

AUTHOR'S AFFILIATIONS:

1. **Obehi .O Osadolor**
   Dental clinic, Government Hospital,
   Benin city, Edo state, Nigeria
2. **Aisosa .J Osadolor**
   Dental clinic, Government Hospital,
   Ekpoma, Edo state, Nigeria.

ARTICLE INFO.

Received: April 08, 2026
Accepted: May 13, 2026

Volume: Vol-14, Issue-2, July 2026
DOI: https://doi.org/10.3329/jcds.v14i2.89033

Publisher: Sapporo Dental College, Dhaka, Bangladesh
Web: www.sdch.edu.bd
E-mail: jcds.sdc@gmail.com

Scan QR code to access your article on JCDS BanglaJOL index.

Corresponding Author*

Corresponding author
Obehi ,O Osadolor
Dental clinic, Government Hospital,
Benin city, Edo state , Nigeria
E-mail: osadolorobehi@gmail.com

ABSTRACT:

Background: Early childhood caries and complications of untreated early childhood caries is of dental public health interest.

Objective: To determine the prevalence and factors associated with early childhood caries among 4 –5-year-old children attending private schools in rural communities in Esan central Local Government Area in Edo State, Nigeria.

Methods: A cross-sectional descriptive study was conducted among private schools in Esan central Local Government Area, Edo State, Nigeria. Socio-demographic data was obtained using questionnaire. Oral examination for the presence of early childhood caries was conducted using the dmft index. Tests of association between dependent variable and independent variables were conducted using Chi square/Fisher exact test. Risk indicator for early childhood caries was determined using multivariate logistic regression analysis and a model of $p<0.2$. Statistical analysis was done using SPSS Version 28. $p<0.05$ was considered statistically significant.

Results: A total of 206 school children participated in the study and 102 (49.5%) were males. The age range of the school children was 4 to 5 years with a mean age of 4.49± 0.50. The prevalence of early childhood caries was 7.8% with mean dmft of 0.10± 0.38. Early childhood caries occurrence was higher among 5-year-old, females, mandibular teeth and lower right second primary molar. Frequency of tooth-brushing was significantly associated with early childhood caries. Frequency of tooth-brushing was a risk indicator for early childhood caries.

Conclusion: The prevalence of early childhood caries was low. Frequency of tooth-brushing was significantly associated with early childhood caries. Interventions for untreated carious teeth are recommended.

.

KEYWORDS: *Children, Caries, Childhood, Oral health*

INTRODUCTION

Early childhood caries can occur among children in rural and remote communities. It can affect all socio-economic class of children under six years of age [1] and it is of dental public health interest. Early childhood caries is dental caries affecting the primary teeth of children under 6 years of age and the prevalence and incidence of early childhood caries can vary [1-2] from one community, location, province and country to another. Untreated early childhood caries over a period of time can be associated with pain, swelling, difficulty in chewing/ reduced nutrition,[3] loss of play time among children and early tooth loss. The prevalence of early childhood caries was 76.0% in a hospital-based study in Saudi Arabia, [4] 59.6% [5] among children in Ecuador and 31.6% among Indonesian children. [1] A previous study in Nigeria reported a prevalence of 23.5% [6] among children aged 3-5 years old in Ibadan, South west Nigeria, another study in Nigeria reported a prevalence of 15.8% [7] among urban school children in Egor Local Government Area in Edo state, South-south Nigeria. Studies in rural areas on early childhood caries among children can provide information for planning oral health intervention activities for children with high early childhood caries experience and high level of untreated early childhood caries. The aim of this study is to determine the prevalence and factors associated with early childhood caries among 4–5-year-old children attending private schools in rural communities in Esan central Local Government Area in Edo State, South-south Nigeria.

METHODS

A cross-sectional descriptive study among private school children was conducted in Esan central Local Government Area in Edo State, South-south Nigeria. Edo state has eighteen Local Government Areas (LGAs).

Ethical clearance for this study was sought and obtained from Health Research Ethics committee, Edo State Ministry of Health. Informed consent was obtained from the parents of the school children. School children aged 4-5-year-old attending private schools in Esan central Local Government Area participated in this study. The private schools were selected randomly among the Universal Basic Education Commission (UBEC) list [8] of private schools in rural communities in Esan central Local Government Area in Edo State, Nigeria. The study participants were selected using pre-defined inclusion and exclusion criteria.

Sample size was calculated using [9]

$N = \frac{Z^2pq}{d2}$

N = sample size

p = prevalence

q= 1.0-p

Prevalence of early childhood caries was 14.2%[3] from a previous study in Osun state, Nigeria

Z = 1.96

p = 14.2% (0.142)

q = 1- 0.142 = 0.858

d = 0.05

$n= \frac{(1.96)^2(0.142)\ (0.858)}{(0.05)^2}$ = 187.2 approximately 187

10% of non- responders = 18.7

187 + 19 = 206; two hundred and six children were selected for this study

Socio-demographic data (age, sex, frequency of tooth brushing, use of fluoride containing toothpaste) were obtained using questionnaire which were filled by the parents, guardians or family members of the study participants. Oral examination for the presence of early childhood caries was conducted using the dmft index [10]. Oral hygiene status was assessed using simplified oral hygiene index as used in a previous study, [11] the index teeth were labial surfaces of 54, 61, and 64, lingual surfaces of 82, 75, and 85 and only debris on the teeth were assessed. [11]

The school children were examined while seated in their classroom chair using natural daylight and sterile oral examination tool. A recording clerk was used for recording oral examination findings. Privacy and confidentiality were ensured during data collection. Data were entered unto SPSS and statistical analysis was done using Statistical Package for Social Sciences (SPSS) Version 28. Descriptive analysis was conducted to determine the prevalence of early childhood caries among private-school children in the rural communities. Tests of association between dependent variable (presence of early childhood caries) and the independent variables (age, sex, frequency of tooth-brushing, oral hygiene status and use of fluoride containing toothpaste) were conducted using Chi square/fisher exact test. P values < 0.05 were considered statistically significant. Frequency distribution, percentage, mean and standard deviation were calculated. Risk indicators for early childhood caries among children attending private schools in rural communities were determined using multivariate logistic regression analysis and a model of P < 0.2. [12] Inferential analysis to determine the predictor of early childhood caries was done using logistic regression analysis (binary logistic regression analysis). Independent variables with p value<0.2 during the bivariate analysis were entered into multivariable analysis (binary logistic regression analysis). Crude odd ratio (COR) and adjusted odd ratio (AOR) were assessed to identify the risk indicator for early childhood caries. The independent variables of the regression model were frequency of tooth-brushing and use of fluoride containing toothpaste.

RESULTS

A total of 206 private school children participated in the study and 102 (49.5%) were males. The age range of the private school children was 4 to 5 years with a mean age of 4.49± 0.50. Table 1 shows the prevalence of early childhood caries was 7.8% with mean dmft of 0.10± 0.38. Early childhood caries occurrence was higher among 5-year-old and females. Early childhood caries was higher in mandibular teeth and lower right second primary molar. All the carious teeth were untreated and the restorative index was 0.0%.

Table 1: Prevalence of early childhood caries among the study participants N=206.

Variable	Caries present n (%)	Caries absent n (%)	Total n (%)
Age(years)			
4	7(6.6)	99(93.4)	*106(100.0)*
5	9(9.0)	91(91.0)	100(100.0)
Sex			
Male	6(5.9)	96(94.1)	102(100.0)
Female	10(9.6)	94(90.4)	104(100.0)
Total	16(7.8)	190(92.2)	206(100.0)

Table 2 shows there was no statistically significant association between oral hygiene status (p = 0.776), age (p= 0.607), sex (p = 0.436), use of fluoride containing toothpaste (p= 0.172) and early childhood caries. There was statistically significant association between frequency of tooth-brushing (p= 0.004) and early childhood caries experience.

Table 2: Association between age, sex, frequency of toothbrushing, oral hygiene status, use of fluoride containing toothpaste and early childhood caries among the study participants N=206

Variable	p-value
Age (years)	0.607*
Sex	0.436*
Frequency of tooth brushing	0.004”
Use of fluoride containing toothpaste	0.172”
Oral hygiene status	0.776*

*: Chi-square test”: Fisher’s exact test

Table 3 shows that the frequency of tooth-brushing was a risk indicator for early childhood caries in the study population, and school children whose teeth were brushed once daily by their parents, caregivers, guardians and/or family members have increased odd of having early childhood caries. COR (95% CI) 10.222(2.537-41.181), AOR: 9.549 (2.332-39.104), p= 0.002) CI: Confidence interval, COR: Crude Odd Ratio, AOR: Adjusted Odd Ratio

Table 3: Multivariate logistic regression analysis of risk factor associated with early childhood caries among the study participants N=206

Variable	Caries present n (%)	Caries absent n (%)	COR (95% CI)	AOR (95% CI)	p-value
Frequency of tooth-brushing					
Once daily	12(6.1)	184(93.9)	10.222 (2.537-41.181)	9.549 (2.332-39.104)	0.002
Twice daily	4(40.0)	6(60.0)	-	-	

DISCUSSION

Epidemiological studies in Nigeria had reported variation [13] in the prevalence of early childhood caries from one community, state and geo-political zone to another. [2,13] There are various predisposing and associated factors [2,14] for early childhood caries. This study provides information on the prevalence and factors associated with early childhood caries in a representative sample of 4- to 5-year-old private school children in selected rural communities in Esan central Local Government Area in Edo State, South-south Nigeria. In this study, the prevalence of early childhood caries was less than previous study of 15.8% among 3–5-year-old urban school children in Egor Local Government Area, [7] Edo state, south-south Nigeria and 14.2% [3] among children in Ile-ife, Osun state, south west Nigeria. This finding could be as a result of the variation in the frequency of intake of cariogenic diet and sugar containing drinks among the study participants. The finding in this study was close to previous study of 8.0% [15] and 7.3% [16] among children in Ile-ife, Osun state, south west Nigeria, and higher than another study of 3.2% [17] among children in Kano State, North-west Nigeria. This variation in study findings could be as a result of differences in dietary and oral hygiene practices among the study participants. Early childhood caries was seen more in females in this study and was consistent with previous studies [6-7,17] and different from other studies. [1,5] All the carious teeth seen in this study were untreated and the restorative index was 0.0%.

Age was not significantly associated with early childhood caries in this study, it was contrary to reports of other studies. [6,17] Early childhood caries was higher among 5-year-old children in this study. There was no statistically significant association between oral hygiene status , sex, use of fluoride containing toothpaste and early childhood caries, the finding was in agreement with previous studies [7,17]. There was statistically significant association between frequency of tooth-brushing and early childhood caries experience, the finding was in agreement with previous study [1] and frequency of tooth-brushing was a risk indicator for early childhood caries in the study population. Children whose teeth were brushed once daily by their parents, guardians, caregivers and/or family members have increased odd of having early childhood caries. Four to five-year-old children have not developed fine motor skills to brush their teeth effectively. Early childhood caries was higher among mandibular teeth and consistent with previous study [6]. This finding could be as result of the effect of gravity. Radiographs (bitewing radiographs) were not be used to detect interproximal caries in this study and the study was conducted in selected private schools in rural areas of Esan central Local Government Area in Edo State, South-south Nigeria. The findings of this study might not represent children attending public schools and children not attending any school in the rural communities.

CONCLUSION

The prevalence of early childhood caries was 7.8%. Frequency of tooth-brushing was significantly associated with early childhood caries in this study. Oral health education and interventions for untreated carious teeth are recommended.

Acknowledgments

Authors acknowledge all head and teachers of selected school that assisted during data collection.

FUNDING: This research received no external funding.

CONFLICT OF INTEREST: The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT: The data presented in this study are available on reasonable request from the corresponding author

REFERENCES

1. Syafriza D. Early childhood caries prevalence and oral hygiene behavior of children under 2 y.o (9 months observation). *JDS*. 2020;5(2):61–65. DOI: https://doi.org/10.24815/jds.v5i2.20014
2. Osadolor OO, Osadolor AJ. Early childhood caries among pre-school children in rural areas. *Ibom Medical Journal*. 2024;17(2):187–191. DOI: https://doi.org/10.61386/imj.v7i2.421
3. Okafor CA, Oziegbe EO, Foláyan MO. Dietary diversity and food groups associated with early childhood caries in a suburban community in Nigeria. *BMC Oral Health*. 2026;26:150. PMID: 41310625; PMCID: PMC12829035. DOI: https://doi.org/10.1186/s12903-025-06897-0
4. Thirunavukkarasu A, Alaqidi SF. Early Childhood Caries—Prevalence, Associated Factors, and Severity: A Hospital-Based Study in Riyadh, Saudi Arabia. *Healthcare*. 2024;12:1376. PMID: 39057519; PMCID: PMC11276339. DOI: https://doi.org/10.3390/healthcare12141376
5. Acuna et al. Prevalence of Early Childhood Caries in Children Aged 1 to 5 Years in the City of Quito, Ecuador. *The Open Dentistry Journal*. 2019;13:242–248. DOI: https://doi.org/10.2174/1874210601913010242
6. Iyun OI, Denloye OO, Bankole OO, Popoola BO. Prevalence and pattern of early childhood caries in Ibadan, Nigeria. *Afr J Med Med Sci*. 2014;43:239–244.
7. Orhorhoro EE, Chukwumah NM. Effects of restriction of school time snacking on prevalence of early childhood caries. *Nig J Dent Res*. 2025;10(1):7–12. DOI: https://doi.org/10.4314/njdr.v10i1.2
8. Universal Basic-Education-School-List. Accessed 2 December 2025. Available from: https://ubec.gov.ng/wp-content/uploads/2024/04/2022-Basic-Education-School-List.xlsx
9. Araoye MO. *Research Methodology with Statistics for Health and Social Sciences*. Ilorin: Nathadex Publisher; 2004.
10. World Health Organization. *Oral Health Survey: Basic Methods*. 5th ed. Geneva: WHO; 2013:13–47.
11. Gandhi JM, Gurunathan D, Doraikannan S, Balasubramaniam A. Oral health status for primary dentition—A pilot study. *J Indian Soc Pedod Prev Dent*. 2021;39:369–372. PMID: 35102959. DOI: https://doi.org/10.4103/jisppd.jisppd_155_21
12. Altman DG. *Practical Statistics for Medical Research*. London: Chapman and Hall; 1999.
13. Okolo CC et al. A systematic review and meta-analysis on the epidemiology of early childhood caries in Nigeria. *Discover Public Health*. 2024;21:193. DOI: https://doi.org/10.1186/s12982-024-00324-5
14. Osadolor OO, Osadolor AJ, Amobi E. Dental caries among children in Africa slum. *Nepal Mediciti Medical Journal*. 2025;6(1):33–35.

15. Foláyan MO, Abeldaño Zuñiga RA, Alade OT, Bernard OT, Arowolo O, Aliyu TK, et al. Jẹdíjẹdí, free sugar consumption and early childhood caries experience in Ile-Ife, Nigeria: a cultural dimension to dental caries risk. *Front Oral Health*. 2025;6:1608125.
16. Foláyan MO, Zuñiga RAA, Mohebbi SZ, Khami MR. Association between early childhood caries and parental educational status among children in Ile-Ife, Nigeria. *Front Oral Health*. 2025;6:1581589.
17. Oziegbe EO, Schepartz LA. Parity, Maternal Child Oral Interactions and Early Childhood Caries (ECC) among Northern Nigerian Hausa children. *Dent Res Oral Health*. 2023;6:28–39.

HOW TO CITE
Osadolor OO, Osadolor AJ. Prevalence and factors associated with early childhood caries among children aged 4-5 year old in rural communities in Edo state , Nigeria. J. Contemp. Dent. Sci. [Internet]. [cited 2026 Jul. 13];14(2):5-8. Available from:
https://www.banglajol.info/index.php/JCDS/article/view/89033

JCDS -ISSN: 2305-9664