

Dental anomalies among Adolescents Aged 14-16 Year Old in Rural Communities in Edo State, Nigeria

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ABSTRACT

Background: Dental anomalies can occur among children in rural communities. The aim of the study is to determine the prevalence, types of dental anomalies and association of age, sex and socio-economic status with dental anomalies among adolescents aged 14-16 year old in rural communities in Edo state, Nigeria

Materials and methods: A cross-sectional study among 14-16 years old was conducted in public schools selected in Esan Central and Ughumwonde Local Government Area of Edo State. Ethical clearance 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 and assent was obtained from the school children. Socio-demographic data was obtained using questionnaire. Tests of association between dependent variable and independent variables were conducted using Chi square/ Fisher exact test. Statistical analysis was done using SPSS Version 28. $p < 0.05$ were accepted as being statistically significant.

Results: A total of 244 adolescents were examined and 119 (48.8%) were males. The prevalence of dental anomalies was 7.4%. Dental anomalies were higher among males and 15 years old. The types of dental anomalies seen were enamel hypoplasia/opacity, tetracycline staining and dental fluorosis. There was no statistically significant association between sex ($p = 0.628$) age ($p = 0.121$) socio-economic status ($p = 0.054$) and dental anomalies.

Conclusion: The prevalence of dental anomalies was 7.4%. Enamel hypoplasia was the most common dental anomaly seen. Oral health education with anticipatory guidance and a visit to dental clinic for clinical management is recommended.

KEY WORDS

Adolescents; Anomalies; Community; Rural; Teeth.

INTRODUCTION

Dental anomalies or changes in the shape, size, number, structure, root formation and position of the tooth can occur during sensitive stages of tooth formation as a result of genetic, epigenetic or environmental factors.¹⁻⁴

⁴ Dental anomalies can affect a single tooth in isolated/non-syndromic case or multiple teeth in syndromic case.³⁻⁴ Dental anomalies can affect

aesthetics, speech and oral health-related quality of life.⁴ Epidemiological studies on developmental dental anomalies from different geographical location using clinical and radiographical diagnostic criteria, reported a prevalence of 68.9% among patients examined in a hospital based study in Turkey.⁴⁻⁵ Other hospital based studies reported 55.0% in Iraq, 25.4% among 5-12 year old children in Saudi Arabia, 23.4% among 2-14 year old children in Mexico, 20.9% among 8-12 year old children examined in Rome and 14.7% in United Arab Emirates.^{6,2,7,3} In Nigeria, a rural community based study reported 2.2 % among 12 to 13 year old Nigerian school children in Enugu, South east Nigeria.⁴ Community based studies on dental/teeth anomalies among Nigerian children in rural environments can serve as baseline for planning oral health intervention programmes for children with dental/teeth anomalies and it will also add to the existing literature. The aim of this study is to determine the prevalence, types of dental anomalies and association of age, sex and socio-economic status with dental anomalies among adolescents aged 14-16 year old in rural communities in Edo state, South south Nigeria.

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MATERIALS AND METHODS

A cross-sectional study among 14-16 years old was conducted in four public secondary schools and two technical colleges selected in Esan Central and Uhumwonde Local Government Area of Edo State during the year 2025. Ethical clearance was sought and obtained from Health Research Ethics committee, Edo State Ministry of Health. Permission was sought and obtained from State Secondary Education Board and Board for Technical and Vocational Education, Edo State. Informed consent was obtained from the parents of the school children and assent was obtained from the school children. The school children were randomly selected in each school by picking of numbered ballot papers. The sample size for this study was 244.

Data collection was done in the year 2025 using pre-defined inclusion and exclusion criteria. Socio-demographic data (Age, sex, socio-economic status) was obtained using questionnaire. Socio-economic status designation combines father's occupation with the mother's level of education.⁴ The inclusion criteria were children aged 14–16 years old, attending public technical college and public secondary school in selected rural communities in Esan Central and Uhumwonde Local Government Area in Edo State and school children whose parents have given consent to participate in the study, while the exclusion criteria were those whose parents did not give consent to participate in the study or were absent from the school at the time of data collection. Participants were examined while seated in their classroom chair using natural daylight. Oral examination for the presence of dental/teeth anomalies was done clinically by inspection and radiographs were not used.⁴ Data were entered into SPSS and the statistical analysis was done using Statistical Package for Social Sciences (SPSS) Version 28. Descriptive statistics was conducted to determine the prevalence of dental anomalies among the public school children in the selected rural communities. Tests of association between dependent variables (Presence of dental anomalies) and the independent variables (Socio-economic status, age and sex) was conducted using Chi square/ Fisher's exact test. p values < 0.05 were accepted as being statistically significant.

RESULTS

A total of 244 adolescents participated in this study and 119 (48.8%) were males. The age range of the children was 14 to 16 years with mean age of 15.1 ± 0.8 . Table I shows the prevalence of dental anomalies was 7.4%. Dental anomalies were higher among males, 15 years

old and school children from middle socioeconomic status. Table II shows the types of dental anomalies seen were hypoplastic enamel/enamel opacity, tetracycline staining and dental fluorosis. Table III shows there was no statistically significant association between sex ($p = 0.628$) age ($p = 0.121$), socioeconomic status ($p = 0.054$) and dental anomalies.

Table I Profile of the study participants

Variables	Dental anomaly present	Dental anomaly absent	Total
	n = 18	n = 226	n = 244
	(7.4%)	(92.6%)	(100.0%)
Age			
14	2(2.9)	67(97.1)	69(100.0)
15	10(11.8)	75(88.2)	85(100.0)
16	6(6.7)	84(93.3)	90(100.0)
Gender			
Male	10(8.4)	109(91.6)	119(100.0)
Female	8(6.4)	117(93.6)	125(100.0)
Socio-economic status			
Low	13(6.1)	201(93.9)	214(100.0)
Middle	5(16.7)	25(83.3)	30(100.0)

Table II Prevalence of types of dental anomalies in the permanent dentition (n=244)

Dental anomalies	Frequency, n(%)
Enamel hypoplasia	13(5.3)
Tetracycline staining	4(1.7)
Dental fluorosis	1(0.4)
No anomaly	226(92.6)

Table III Association between age, sex, socio-economic status and dental anomalies among the study participants (n=244)

Variable	p-value
Age (Years)	0.121 ^{**}
Sex	0.628 ^{**}
Socio-economic status	0.054 [*]

*: Fisher's exact test **: chi-square test.

DISCUSSION

Environmental factors like early administration of tetracycline medication to young children, early exposure to high fluoride concentration and infections during the prenatal and postnatal developmental period can affect tooth formation.² The size and number of teeth are regulated by the interaction of WNT, SHH, FGF and BMP signaling.¹⁰ Sonic Hedgehog (SHH) regulates the formation of dentine, enamel, cementum

and the surrounding periodontal structure while WNT signalling regulates various processes involved in tooth formation, including tooth bud initiation, tooth-root development and tooth crown morphogenesis during the morpho-differentiation or histo-differentiation stages of tooth development.¹⁰ This study provides information on the prevalence, types of dental anomalies and association of age, sex and socio-economic status with dental anomalies in a representative sample of 14 to 16 years old in selected rural communities in Edo State, South-South Nigeria.

The prevalence of dental anomalies in this study was higher than previous Nigerian study of 2.2% among 12-13 year old children in Enugu, South-East Nigeria and 4.2% among 12-15 year old children in Ibadan and Ile-ife, South-West Nigeria.^{4,11} This finding could be as a result of differences in study location, genetic, systemic and environmental influences on the formation of dental anomalies. The prevalence of dental anomalies was less than findings in previous hospital based study in Nigeria, Rome, Mexico and Saudi Arabia.^{8,9,7,2,6} This could be as a result of the method of detection of dental anomalies/use of radiographic investigation in the hospital and recruitment of study participants in the hospital. The development of the teeth is a complex and regulated process and the occurrence and types of developmental dental/teeth anomalies in a study population can be influenced by genetic, systemic and environmental factors. In this study, the types of dental/teeth anomalies seen were hypoplastic enamel/enamel opacity, tetracycline staining of teeth and dental fluorosis and it was in agreement with previous study.¹²

Dental fluorosis occurs from excessive/high systemic fluoride intake during critical period of tooth development around early childhood, leading to enamel/intrinsic discolouration and structural defects.¹² Tetracycline staining occurs due to the early ingestion of tetracycline antibiotics among children less than 8 years, leading to intrinsic discoloration of the enamel and dentine. Tetracycline chelates with the calcium ions on the surface of the hydroxyl apatite crystals to form a stable orthophosphate complex in the teeth with a yellowish or brown-gray appearance. Minocycline antibiotics can also cause tooth defect when taken during childhood. There is need for more awareness among parents and health practitioners of the side effects on teeth of tetracycline and minocycline antibiotics among children less than 8 years old in remote, rural and underserved communities. Enamel hypoplasia/opacity, tetracycline staining of teeth and dental fluorosis can be of aesthetic concerns among

adolescents. Enamel hypoplasia/opacity was the common presentation seen in this study and this finding was similar to reports from previous Nigerian studies.^{4,9,11-12} This was a public school based study in selected rural communities within the selected Local Government Areas and radiograph was not used for clinical evaluation. The findings in this study might not represent adolescents attending private schools in the communities and out of school children (Adolescents not attending any school) in the communities.

CONCLUSION

The prevalence of dental anomalies was 7.4%. Enamel hypoplasia, tetracycline staining and dental fluorosis were seen among the study participants. Oral health education with anticipatory guidance and a visit to dental clinic for clinical management is recommended.

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DISCLOSURE

Both the authors declared no competing interests.

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