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Traumatic Dental Injury among Rural School Children in Nigeria

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ABSTRACT:

Background: *Traumatic dental injury is a condition of dental public health interest as it can affect quality of life of children with affected teeth*

Objective: *To determine the prevalence, place of injury, causes of injury and pattern of presentation of traumatic dental injury among rural public school children aged 12 – 15 years in four south-eastern Nigerian communities.*

Methodology: *A cross sectional descriptive study of 12-15 years old school children was done in rural public schools selected in Nkanu–West and Udi local Government Area of Enugu State. Statistical analysis was done using SPSS Version 25. P values < 0.05 were accepted as being statistically significant.*

Results: *One hundred and twenty nine (47.4%) males, one hundred and forty three (52.6%) females were seen and examined. The mean age of the children was 13.5 ± 1.1 years. The prevalence of traumatic dental injury was 3.7%. Traumatic dental injury occurred as a result of fall, mostly at home and no gender difference between males and females was seen. Enamel with dentine fracture was the most common presentation with single tooth fracture presentation higher than multiple teeth fracture.*

Conclusion: *The prevalence of traumatic dental injury was low. Traumatic dental injury occurred as a result of fall, mostly at home and uncomplicated crown fracture was the presentation seen. A visit to dental clinic for clinical assessment and treatment is recommended.*

Keywords: *Adolescents, Community, Rural, Teeth, Trauma.*

1. INTRODUCTION

Traumatic dental injuries (TDIs) are injuries to the teeth and the supporting tissues because of impact [1]. Anterior teeth like incisors and canines play a role in aesthetics [2], speech and functional activities [2] like biting. The possible causes [1-5] of traumatic dental injuries are falls, collisions with inanimate objects, surfaces or other people, violence, sports related accidents, road traffic accidents, misuse of teeth like opening of bottle covers using the teeth or opening of metal corked bottle with teeth, bone cracking, bicycle accident, assaults and non-accidental injuries. School, home, street and playing sites or playgrounds are places [3] where the traumatic dental injuries to permanent teeth can occur among children/ adolescents. The prevalence of traumatic dental injury is 3.1% [4] among 8-14 years old school children in Zambia, 13.6% among 11-14 years old Egyptian children [5] and 20.2% among 12-15 years old Nigerian [2] children. Epidemiological studies on traumatic dental injury among adolescents in underserved or un-served rural areas will add to the existing literature. The aim of this study is to determine the prevalence, place of injury, causes of injury and pattern of presentation of traumatic dental injury among 12 – 15 years old school children attending public technical college and public secondary school in four rural communities in south-east Nigeria.

2. METHODS

A cross-sectional descriptive study was done in Nkanu west and Udi local government areas in Enugu state, respectively. Enugu state is in southeastern region in Nigeria, with seventeen Local Government Areas (LGAs). School children aged 12-15 years attending rural public technical college and public secondary school in Nkanu-West local Government Area and Udi Local Government Area, respectively, participated in this study. Ethical clearance for this study was sought and obtained from Health Research Ethics Committee, University of Nigeria Teaching Hospital. Informed consent was obtained from the parents of the school children and assent was obtained from the school children. Two public secondary schools were selected from

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Nkanu west local government area, while one technical college and one public secondary school were selected from Udi local government area, respectively. The school children were randomly selected in each school.

The sample size for this study was calculated using the formula for cross-sectional study:

$$N = \frac{Z^2pq[6]}{d^2}$$

N = sample size
p = prevalence
q= 1.0-p
The sample size was calculated using the following values:
Prevalence of traumatic dental injury is 20.2. % from a previous study in Nigeria [2],
Confidence interval 95% (z = 1.96),
d= Margin of Error tolerated, 5% (0.05)
p= 0.202
q= 1.0-p = 0.798
z = 1.96
d= 0.05

$$N = \frac{1.96x1.96x\ 0.202\ x0.798 = 247.7}{0.0025}$$

248 approximately

10% of non- responders = 24

248 + 24 = 272; Two hundred and seventy-two children were selected.

Data collection was done in May, 2024. Socio-demographic data (age, sex, socio-economic status) was obtained using semi-structured questionnaire. Socio-economic status was determined by criteria used in a previous study [7] and socio-economic status designation combines father's occupation with the mother's level of education [7]. Oral examination for the presence or absence of traumatic dental injury was done by a single examiner according to Garcia-Godoy [8] classification of traumatic dental injury. The inclusion criteria were children aged 12–15 years old, attending public technical college and public secondary school in selected rural communities and whose parents have given consent to participate in the study, while the exclusion criteria were those whose parents have not given consent to participate in the study, and those who have not given assent to participate in the study or were absent from the school at the time of study. The students were examined while seated in their classroom chair using natural daylight and pulp sensibility/vitality test was not done during data collection in the selected schools.

Data were entered unto SPSS and statistical analysis was done using Statistical Package for Social Sciences (SPSS) Version 25. Descriptive analysis was conducted to determine the prevalence of traumatic dental injury among public-school children in the rural communities. Tests of association between dependent variables (presence of traumatic dental injury) and the independent variables (socio-economic status, age and sex) were conducted using Fisher's exact test. Inferential analysis to determine predictors of traumatic dental injury was done using logistic regression analysis (binary logistic regression analysis). The independent variables of the regression model were age, socio-economic status and sex. P values < 0.05 are accepted as being statistically significant.

3. RESULTS

Table 1 shows that 129 (47.4%) males, one hundred and forty-three (52.6%) females participate in this study. The age range of the children was 12 to 15 years with mean age of 13.5 ± 1.1 years. The prevalence of traumatic dental injury was 3.7%. Traumatic dental injury occurred because of fall and mostly at home. Table 2 shows that enamel with dentine fracture was seen more at presentation followed by enamel fracture. The maxillary central incisor were the teeth affected/ involved with traumatic dental injury and it occurs more on the right side of the maxillary dental arch. Single tooth fracture presentation was higher than multiple teeth fracture, and one of the affected teeth was discoloured. None of the adolescents with traumatic dental injury has incompetent lip or anterior open bite. Traumatic dental injury was higher among 12 years old children. There was no gender difference among adolescent affected by traumatic dental injury. There was no statistically significant association between sex (P = 1.00), age (P= 0.32) and traumatic dental injury. There was statistically significant association between socio-economic status and traumatic dental injury (P = 0.04).

Table 1: Profile of the study participants

Variables	TDI present n = 10 (3.7%)	TDI absent n = 262 (96.3%)	Total N = 272 (100%)	p value
Age				
12	5	61	66	P= 0.32
13	2	65	67	
14	2	69	71	
15	1	67	68	
Sex				
Male	5	124	129	P=1.00
Female	5	138	143	

Socio-economic status				
Low	6	227	233	P=0.04
Middle	4	35	39	

Table 2: Place of injury, cause of injury, pattern of presentation, tooth and dental arch involved among children with traumatic dental injury to permanent anterior teeth

Variable	Frequency%
Place of injury	
Home	9(90.0)
School	0(0.0)
Street	1(10.0)
Cause of injury	
Fall	10(100.0)
RTA	0(0.0)
NAI	0(0.0)
Others	0(0.0)
Pattern of presentation	
Enamel fracture	4(40.0)
Enamel dentine fracture	6(60.0)
Tooth involved	
Central incisor	10(100.0)
Lateral incisor	0(0.0)
Canine	0(0.0)
Arch involved	
Maxillary teeth	13(100.0)
Mandibular teeth	0(0.0)
Quadrant involved	
Right	7(70.0)
Left	0(0.0)
Both	3(30.0)

4. DISCUSSION

Traumatic dental injury is one of the reasons for presentation of children to dental clinic. Predisposing factors of traumatic dental injury could be related to the person's anatomic features such as increased overjet, anterior open bite, inadequate lip coverage of the upper anterior teeth/incompetent lips. It affects the quality of life [2,5,9] of children with affected teeth. The prevalence of traumatic dental injury in this study is less than 6.6% [10] among 10-12 years old children in Kano, Northwest Nigeria, 14.6% [11] among 12-21 years old school children, 15.2% [12] among 12 years old school children in Northern Nigeria and 20.2% [2] among 12-15 years school children in Ibadan, Southwest Nigeria. The variation in the prevalence of traumatic dental injury of this study, with previous Nigerian studies could be as a result of differences in geographical location of the study participants [1], socio-economic status of the study participants, socio-cultural diversities and the presence or absence of predisposing factors for traumatic dental injury among the study participants. Comparing with previous studies from other countries, the finding of this study is also less than 13.6% among 11-14 years old Egyptian children [5] and 13.7% among 11-15 years old children in Pakistan [13]. This finding could be as a result of the level of misuse of teeth like opening of bottle covers using the teeth, socio-cultural diversities, presence or absence of proclined incisors, anterior open bite, increased overjet, incompetent lips, and differences in adventurous and risk taking [15] behaviours among the study participants. The finding of this study is close to a previous study of 3.1% among 8-14 years old children in Zambia [4] and 4.6% among 8-12 years old children in Turkey [14]. This could be as a result of the level of participation in outdoor and sporting activities and geographical location of the study participants.

The cause of traumatic dental injury among the study participants was fall and the place of injury was home [1-2] followed by street in this study. The falls could be accidental, and as a result of poor night time visibility [1] due to irregular electric power supply especially in most rural areas. Single tooth injury was seen more than multiple teeth injury, this was similar to report of previous study [1-2]. Enamel with dentine fracture was seen more than enamel fractures as reported in previous studies [10,16] but different from other studies with more enamel fractures [2,4,11-14]. This difference could be as a result of the amount of impacts on the teeth when traumatic dental injury occurred. Maxillary central incisors are the only teeth affected by traumatic dental injury and it was more on the right side of the maxillary dental arch. There is no gender difference among adolescent affected by traumatic dental injury in this study, and none of them has visited a dental clinic for radiographical and clinical assessment, or treatment at the time of data collection.

This study is a public school based study in selected rural communities within the selected local government areas. The findings of this study might not represent adolescents attending private schools in the community, adolescents in communities within the selected local government areas that were not visited, adolescents not present at school during the days of data collection, and out of school children (adolescents not attending any school) in the (visited and non-visited) community. There could be marked or slight variation in the prevalence, place of injury, causes

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of injury and pattern of presentation of traumatic dental injury among adolescents in the selected rural communities when participants are selected from both public and private schools or seen during a household survey in the rural communities.

5. CONCLUSION

The prevalence of traumatic dental injury was low in this study. Traumatic dental injury occurs because of fall, mostly at home and uncomplicated crown fracture is the presentation. A visit to the dental clinic for clinical assessment and management is recommended.

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Conflicts of interest
There are no conflicts of interest.

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