



## Prevalence and predisposing factors of traumatic dental injury among children attending a tertiary hospital in Nigeria

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### ABSTRACT

**Background** Traumatic dental injury (TDI) may lead to restriction in biting, changes in physical appearance, abnormal swallowing habits and speech defects, and management can be distressing and tragic for the child and parents, and often difficult for the dentist.

**Aim** The aim of this study was to determine the prevalence and the predisposing factors of traumatic dental injuries (TDI)

**Methods** A cross-sectional study was carried out on 1202 children aged 1-16 years that attended the dental clinic of the University of Abuja Teaching Hospital over a period of one year. Data collection was carried out by the use of a questionnaire and clinical examination of all maxillary and mandibular teeth from canine to canine for traumatic injury. Data analysis was done using Statistical Package for Social Sciences (SPSS Version 23),

**Results** The prevalence of TDI was 9.5%. Falls were the most prevalent cause of TDI (56.0%) and the maxillary central incisors were most frequently affected (79.7%). Most TDI occurred among the children of mothers with tertiary education (54.4%), and mostly among the children of civil servant mothers, (39.5%). Trauma was not related to lip coverage, but more TDI were observed among children with abnormal overjet. However the difference was not statistically significant.

**Conclusion** Although the prevalence of TDI was relatively low, there is still need for collaboration between the dentists and orthodontists on educational and health promotion strategies and early orthodontic treatment to prevent TDI.

**Keywords:** Traumatic dental injuries, prevalence, lip coverage, overjet.

### I. INTRODUCTION

Traumatic dental injury (TDI) is an unpleasant and upsetting experience that affects the teeth and when this occurs in children, the management is distressing and tragic for the child and parent and often difficult for the dentist.<sup>1,2,3,4</sup> Traumatic injuries to anterior teeth may lead to

restriction in biting, changes in physical appearance, abnormal swallowing habits and speech defects.

Studies from various parts of the world show that the prevalence of TDI varies from 2.4% - 58%.<sup>5,6,7,8</sup> Male are generally more affected than female and the upper anterior teeth are mostly involved being in such position that makes them most vulnerable to traumatic injuries.<sup>9</sup>

Falls of various types, violence, road traffic accidents, increase levels of children participation in sport activities have been well documented in literature as the most common causes of TDI while increased overjet, protrusion of upper incisor teeth, open bite, epilepsy, and incompetent lip coverage have been associated with increased prevalence of TDI<sup>10,11,12,13</sup>. However, there have been conflicting reports on the effects of socioeconomic factors on the prevalence of TDI. While some authors reported a higher prevalence of TDI among lower socioeconomic population, others associated a higher prevalence with high socioeconomic class<sup>14,15,16,17</sup>.

Many studies have been conducted on traumatic dental injuries among various target groups and populations in Nigeria, but only few have considered the effects of socioeconomic and predisposing factors on TDI and most of these studies are limited to the southern parts of the country. This study aimed to determine the prevalence of TDI and the predisposing factors among the children attending the University of Abuja Teaching Hospital, Gwagwalada, Federal Capital Territory, North Central Nigeria.

### II. MATERIALS AND METHODS

This was a descriptive cross-sectional study of all consecutive patients aged 1-16 years that presented in the Dental and Maxillofacial Surgery clinic of UATH Gwagwalada with TDI to anterior teeth within the study period of one year. Gwagwalada is one of the six (6) area councils in Abuja, the Federal Capital Territory of Nigeria. The University of Abuja Teaching Hospital (UATH) is a tertiary health facility in Gwagwalada



that serves as a referral center for patients in Abuja and neighboring states of Nasarawa, Niger, Kaduna and Kogi. Consecutive paediatric patients who met the inclusion criteria were recruited for the study and data collection was carried out by the use of a questionnaire and clinical examination of all maxillary and mandibular teeth from canine to canine for traumatic injury. The data obtained included age, sex, cause of dental trauma, number of teeth affected, type of tooth, type of tooth trauma and level of education of mother and mother's occupation.

The clinical examination was performed after the return of the questionnaires. Examinations were performed by a single dentist with the patient on the dental chair in a relax position under natural light. The examination instruments and materials used were sterile dental mirrors, gloves, graduated periodontal probes, cotton rolls and gauze pad. Graduated periodontal probes were used to measure the size of overjet which was measured with the teeth in centric occlusion as the distance from the labio-incisal edge of the most prominent maxillary incisor to the labial surface of the corresponding mandibular incisor. The overjet finding was grouped into two categories: normal (3.0 mm or less) and abnormal (greater than 3.0 mm) based on a Nigerian study<sup>13</sup>. Lip coverage was recorded on visual inspection as adequate if lips cover the maxillary incisors at rest position, and inadequate if two-thirds of the crown height is exposed and visible. This was assessed while patient was not conscious of being observed. Traumatized teeth were then classified using Garcia-Godoy's classification.<sup>18</sup> Informed consent was obtained from parent/guardian of children and approval was obtained from the Ethics Committee of the University of Abuja Teaching Hospital. Data analysis was done using Statistical Package for Social Sciences (SPSS Version 23),

### III. RESULTS

The prevalence of TDI was 9.5% (114 out of 1202 children examined), higher in males (11.7%) than in female (7.5%), with no statistically significant difference between gender. Most trauma occurred in children less than 10 years with 36.0% and 35.1% occurring among the age groups of 1-5 and 11-15 years respectively. The most frequently affected teeth were the maxillary central incisors (79.7%), followed by maxillary lateral incisors (14.2%) and mandibular central incisors (5.0%) with most TDI cases (64%) involving a single tooth. Falls were the most prevalent cause of TDI responsible for 56.0% of cases, followed by violence/assault 16.7%, and collision with objects

13.2%. Most injuries presented as enamel fracture and enamel-dentine fracture without pulp exposure accounting for 50% of all TDI

Most TDI occurred among the children of mothers with tertiary education 62 (54.4%), followed by secondary education, 26 (22.8%), (Table 1) and mostly among the children of civil servant mothers, 45, (39.5%), (Table 2) Trauma was not related to lip coverage (Table 3), but more TDI were observed among children with abnormal overjet (Table 4). However the difference was not statistically significant.

### IV. DISCUSSION

The prevalence of TDI in the present study was 9.5%. This figure was less than those of other studies carried out in Brazil and Iran which reported prevalence of 35.9% and 27.6% respectively but higher than those in Turkey and Spain with prevalence of 4.9% and 6% respectively<sup>19,20,21,22</sup>. The observed prevalence of TDI in the current study also corroborates other Nigerian studies.<sup>10,13</sup> Most TDI patients present in the hospital only when there are symptoms like pain, swelling and tooth sensitivity. The lower prevalence observed in the present study is therefore expected of a hospital – based study.

The general agreement in literature is that boys suffer more TDI than girls<sup>1,23,24</sup>. However, the ratio of 1.2: 1 is at variance with the 2:1 reported in a Southern Nigeria and 4:1 reported in Chennai study<sup>25,26</sup>. The fact that girls are getting more inclined towards vigorous activities and a decline in the restricted behavior enforced on girls could explain the findings in the present study.

The present study observed higher prevalence of TDI (36.0% and 35.1%) among the 1-5 and 11–15 years age groups respectively. This was consistent with the reports from similar studies from South Africa and Brazil, which reported a peak at 4-5 and 3-4 years respectively<sup>27,28</sup> Although TDI could occur at any age, they are more often seen during the developmental period of 2 – 4 years. During this period, children learn to walk and run. At this stage, their coordination and judgment are poorly developed making falls more common.<sup>23,29</sup> As children gain confidence and coordination, the incidence of TDI decreases and then rises again during the active age range of 9 – 15 years. This rise has been attributed to bicycle riding, as well as playground and sports accidents.<sup>19,23</sup>

The maxillary central incisors were found to be the most affected by TDI in the present study constituting 79.7% of cases. This finding corroborates reports of several other studies in



Nigeria and internationally.<sup>24,25,28,29</sup> The prominent and vulnerable position of the maxillary incisors have been blamed for their frequent involvement in fractures.<sup>1,24,25</sup>

Several factors have been considered to study the influence of socioeconomic status on TDI. Such factors include the number of people in the household, family income, house ownership, parents/caregivers' schooling and occupation.<sup>30,31,32,33</sup> However, the association between TDI and socioeconomic factors has been inconsistent. In this study, the majority of TDI occurred among children of mothers with tertiary education and mostly civil servants that could be related to high socioeconomic status. Children from higher socioeconomic status have been found to have access to bicycle hence fall more than the children from low economic status.<sup>33</sup> The higher prevalence of TDI could also be because such mothers were hardly at home to monitor their children<sup>15</sup> but more dentally aware to bring their children for treatment<sup>15,33</sup>.

Previous studies have reported an association between inadequate lip coverage and increased TDIs<sup>13,34,35</sup>. Contrary to this general agreement in literature, most of the TDIs encountered in the present study occurred in children with adequate lip coverage. However, this present study agreed with the report of Hunter et al making it necessary to further investigate the association<sup>36</sup>.

A strong association between the prevalence of TDI and increased overjet had been reported in literature<sup>13,32</sup>. About two thirds of the children with TDI in this study had abnormal overjet. However the difference was not statistically significant. This agreed with another previous study that found no association between these factors<sup>37</sup> Although the difference in prevalence was not significant, there is still need for collaboration between the dentists and orthodontists on educational and health promotion strategies and early orthodontic treatment to prevent TDI.

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**Tables**

**Table 1: Distribution of traumatized anterior teeth in relation to mothers' educational level**

LEVEL OF EDUCATION	N	%
No formal education	18	15.8
Primary	8	7.0
Secondary	26	22.8
Tertiary	62	54.4
<b>Total</b>	<b>114</b>	<b>100.0</b>

**Table 2: Distribution of traumatized anterior teeth in relation to mother's occupation**

Mother's occupation	Males		Females		Total	
	N	%	N	%	N	%
Artisan	8	12.7	8	15.6	16	14.0
Civil Servant	24	38.1	21	41.2	45	39.5
Cleaner	3	4.8	0	0.0	3	2.6
Farmer	1	1.6	1	2.0	2	1.8
Housewife	7	11.1	10	19.6	17	15.0
Self Employed	13	20.6	7	13.7	20	17.5
Trading	3	4.8	1	2.0	4	3.5
Unemployed	4	6.3	3	5.9	7	6.1
<b>Total</b>	<b>63</b>	<b>100.0</b>	<b>51</b>	<b>100.0</b>	<b>114</b>	<b>100.0</b>

**Table 3 Distribution of TDI in relation to Lip coverage**

Gender	Lip Coverage		Total
	Adequate	Inadequate	
Male	37(58.7%)	26(41.3%)	63(100.0%)
Female	33(64.7%)	18(35.3%)	51(100.0%)
<b>Total</b>	<b>70(61.4%)</b>	<b>44(38.6%)</b>	<b>114(100%)</b>

( $X^2 = 0.42$ , p value =0.516)

**Table 4: Distribution of TDI in relation to Overjet**

Gender	Overjet		Total
	Normal	Abnormal	
Males	21(33.3%)	42(66.7%)	63(100.0)
Females	24(47.1%)	27(52.9%)	51(100.0)
<b>Total</b>	<b>45(39.6%)</b>	<b>69(60.4%)</b>	<b>114(100.0%)</b>

$X^2 = 2.22$  P=0.1360