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Prevalence of Untreated trauma to Anterior Permanent Teeth in 10-14 Year Old School Children in Benin-City

*Brenda I. MOHAMMED (BDS, FWACS), *Alice A. UMWENI (MSc, D. Ortho., R.C.S, FWACS)

*Department of Preventive Dentistry, University of Benin Teaching Hospital, Benin city, Edo State.

ABSTRACT

Objective: Traumatic dental injuries to the anterior permanent teeth are a common reason for dental clinic visits. This study aimed to determine the prevalence of untreated traumatic dental injuries, aetiology and risk factors for these injuries among 10-14 year old primary school children of Egor Local Government Area of Edo state.

Methods: One hundred and forty children who gave verbal assent and returned signed consent forms from parents out of 1016 children from six public primary schools in three randomly selected wards of the LGA constituted the study population. They were examined for fractured, missing due to trauma and discoloured permanent anterior teeth using Ellis and Davey (1970) classification index. Their lip profile and Angle's classification were also assessed. The data was collected via an interviewer administered questionnaire.

Results: The study population had 82 males (58.6%) and 58 females (41.4%). The 11 year old participants constituted the majority (25.75%). The most prevalent traumatic dental injuries were tooth fractures and constituted 47.1% of the total of TDI seen in this study. Ellis class II fractures were the most commonly reported. Males had a higher frequency of involvement when compared with females with a male to female ratio (M:F) of 1.4:1. Falls accounted for 47% of these reported injuries followed by road traffic accidents (14.3%) and assault (12.9%). The upper left central incisor was the commonly injured tooth (45.7%). Most of the participants (81.4%) had competent lip profile and 74.3% of them had Angle's Class I malocclusion. None of the children examined had visited the dental clinic for treatment following injury.

Conclusion: In conclusion, traumatic dental injuries still is a common public health problem. Awareness of treatment of these conditions is still low and oral health education on prevention and treatment of these injuries should be taught in schools.

Keywords: Dental trauma, School children, risk factors

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Correspondence

Dr. Brenda I. MOHAMMED
Department of Preventive Dentistry,
University of Benin Teaching Hospital, Benin
City, Edo State
Email: brenda.mohammed@uniben.edu

INTRODUCTION

Traumatic dental injuries (TDI) to the anterior permanent teeth are common clinical problems seen in the dental clinic and constitute a public health concern.^{1,2} These injuries result in fractures, luxations, discolorations and avulsion³

The maxillary central incisors are more at risk of injury due to their location in the frontal part of the face. Their early eruption and proclination seen in dento-skeletal malocclusions predispose these set of teeth to frequent trauma.⁴ The mandibular anterior teeth are often spared in direct trauma injuries as the mandible is set behind the maxilla and the teeth are not proclined like the maxillary incisors. The maxillary canines are the least injured in traumatic dental injuries to anterior teeth^{5,6}

Falls account for the majority of TDI^{6,7} Other

causes of TDI reported in literature include collisions, bicycle accidents, motor vehicular accidents, fights, assault⁵⁻⁸. Other aetiological factors implicated include drug-related injuries, special health care needs, child abuse and misuse of the teeth⁹. Risk factors implicated in TDI include being male, presence of increased overjet, obesity, special health care needs, hyperactivity⁶⁻¹¹

Treatment of these injuries is thus, desirable, to relieve pain, maintain aesthetics and preserve function. However, many go untreated.⁹ Falomo¹⁰ in his study reported that 0.7% of children with TDI to their anterior teeth received treatment while Ajayi et al.⁹ and Otuyemi and Adekoya-Sofowora¹¹ reported in their studies that none of the children with TDI in their studies had received any form of treatment. The reasons given for the lack of treatment included absence of pain, not been bothered about the cosmetic effect and also a lack of awareness of where to go for the treatment.^{9,11}

Early treatment of TDI cannot be overemphasised. It is necessary to avoid complications that may arise which include

discoloration of the tooth, loss of pulp vitality, sinus tract formation, abscesses and negative psychological effect on the children from the altered aesthetics.¹¹

The study thus, aimed to look at the prevalence of untreated traumatic dental injuries (TDI) in 10-14 year old children in public primary schools in Egor Local Government Area of Edo State. The distribution of these injuries by gender, aetiology and the type of tooth affected were also assessed.

MATERIALS AND METHODS

Approval for the study was got from the Ethics and Research committee of University of Benin Teaching Hospital and from Ministry of Education, Egor division, Edo state. Permission was gotten from the Head of selected schools and written informed consent was obtained from parents/guardians of pupils. Assent was also obtained from each pupil before they were examined.

This was a cross-sectional survey of 10-14 year old primary school pupils (n= 1016) of six randomly selected public primary schools in Egor LGA, Benin-city, Edo state. Data was collected using an interviewer administered questionnaire. The children were examined in their classes during break-time, using natural light in the brightest corner of the classroom. Sterile disposable latex

gloves and tongue depressors were used per child and disposed. Ellis and Davey classification of TDI¹² (1970) was used to classify children with TDI as evidenced by fractured, discoloured or missing anterior permanent teeth as a result of positive history of previous trauma.

The modified Ellis and Davey classification used in this study:

Class I – Enamel fracture

Class II – Enamel –dentine fracture

Class III – Enamel-dentine fracture involving the pulp

Class IV – Traumatized tooth that has become non-vital and discoloured

Class V – Avulsed tooth

Data was analysed using SPSS version 16. Results were presented as tables and pie charts. Chi-square and student t-test was done for clinical significance.

RESULTS

A total of 1016 children were examined for TDI. One hundred and seventy three were found with fractured, missing teeth due to trauma. Prevalence of TDI among this study population was 17%. One hundred and forty children completed treatment and follow-up and were included in the final study sample made up of 82 males and 58 females (Table 1).

Table 1: Age and gender distribution of participants

| Age (years) | Male n(%) | Female n (%) | Total n (%) | X ² | P-value |
|-------------|--------------|-----------------|----------------|----------------|---------|
| 10 | 14(10.0) | 12(8.6) | 26(18.6) | 6.97 | 0.14 |
| 11 | 24(17.1) | 12(8.6) | 36(25.7) | | |
| 12 | 12(8.6) | 16(11.4) | 28(20.0) | | |
| 13 | 18(12.9) | 6(4.2) | 24(17.1) | | |
| 14 | 14(10.0) | 12(8.6) | 26(18.6) | | |
| Total | 82(58.6) | 58(41.4) | 140(100.0) | | |

Table 2: Gender versus aetiology of TDI

| | Aetiology | | | | | | Total n(%) | X ² | P-value |
|--------|---------------|-------------|-----------------|----------------|-------------------|-----------------------|---------------|----------------|---------|
| | Falls n(%) | RTA n(%) | Assault n(%) | Fights n(%) | Collision n(%) | Don't know n(%) | | | |
| Gender | | | | | | | | | |
| Male | 40 | 6 | 16 | 10 | 2 | 8 | 82 | 16.2 | 0.006 |
| Female | 26 | 14 | 2 | 4 | 2 | 10 | 58 | | |
| Total | 66(47.1) | 20(14.3) | 18(12.9) | 14 (10.0) | 4 (2.8) | 18(12.9) | 140(100.0) | | |

The commonest cause of injuries recorded were due to falls (47.1%) followed by road traffic accidents (14.3%), then assault; 12.9%. The least cause of injuries recorded in this study was due to collisions (2.8%). TDI due to road traffic accidents occurred more in females than the male participants, however, more males than females reported injuries due to assault and fights. Results was statistically significant ($p < 0.05$) (Table 2). Fractures to dental hard tissues represented 94.3% of all injuries recorded while missing teeth represented 5.7%. No discoloured teeth were recorded in this study (Figure 1).

Majority of the participants (81.4%) had a competent lip profile pattern while 74.3% had Angle's class I malocclusion. 11.4% presented with incompetent lip profile and 7.2% had potentially competent lip profile pattern (Table 3)

Ellis class II injuries (Enamel-dentine fractures) were the more commonly reported (47.1%) followed by enamel only fractures (35.7%). Enamel only fractures was seen more in the female participants (18.6%) when compared to enamel-dentine fractures (14.3%). No class IV injuries were recorded in this study. (Table 3).

Table 3: Distribution of gender versus lip profile pattern, Angle's class of malocclusion and Ellis classification of injury among participants

| Lip profile | Male n(%) | Female n(%) | Total n(%) | P-value |
|-----------------------|-----------|-------------|------------|---------|
| Competent | 64(45.7) | 50(35.7) | 114(81.4) | 0.01 |
| Incompetent | 8(5.7) | 8(5.7) | 16(11.4) | |
| Potentially competent | 10(7.2) | 0(0.0) | 10(7.2) | |
| Total | 82(58.6) | 58(41.4) | 140(100.0) | |
| Angle's malocclusion | | | | 0.66 |
| Class I | 60(42.9) | 44(31.4) | 104(74.3) | |
| Class II | 16(11.4) | 12(8.6) | 28(20.0) | |
| Class III | 6(4.3) | 2(1.4) | 8(5.7) | |
| Total | 82(58.6) | 58(41.4) | 140(100.0) | |
| Ellis classification | | | | 0.06 |
| Class I | 24(17.1) | 26(18.5) | 50(35.6) | |
| Class II | 46(32.9) | 20(14.3) | 66(47.1) | |
| Class III | 9(6.5) | 9(6.4) | 18(12.9) | |
| Class IV | 0(0.0) | 0(0.0) | 0(0.0) | |
| Class V | 2(1.4) | 4(2.8) | 6(4.3) | |



Figure 1: Distribution of injuries

Table 4: Distribution of teeth injured by TDI among participants

| Tooth injured | Total n(%) |
|-----------------------------|-------------|
| Upper right central incisor | 82 (44.6) |
| Upper left central incisor | 84 (45.7) |
| Upper right lateral incisor | 6 (3.3) |
| Upper left lateral incisor | 6 (3.3) |
| Upper right canine | - |
| Upper left canine | - |
| Lower right central incisor | - |
| Lower left central incisor | - |
| Lower right lateral incisor | 2 (1.0) |
| Lower left lateral incisor | 4 (2.1) |
| Lower right canine | - |
| Lower left canine | - |
| Total | 184 (100.0) |

A total of 184 teeth were injured. The upper left central incisor was the most commonly injured tooth (45.7%), followed by the upper right central incisors (44.6%). The canines and lower central incisors were not involved in injuries recorded in this study population (Table 4).

DISCUSSION

The study examined 1016 primary school children aged 10-14 years old. One hundred and seventy-three were identified with TDI (prevalence of 17.0%) and invited to participate in the study. One hundred and forty of the children fulfilled the inclusion criteria and participated in the study. The prevalence of untreated trauma in this study is slightly less than the prevalence reported more than two decades ago in Benin-city.¹³ It is however, higher than that reported in earlier studies done in the South Western part of Nigeria.¹⁴ This difference reflects the differences in methodology, dentition studied and classification of TDI used in the various studies.¹⁵

The 11 year old children constituted a larger

percentage of the study participants. They had the highest percentage of TDI in this study. This was followed by that recorded on the 12 year old children. Traumatic dental injuries in the permanent dentition is said to occur more among the 10-12 year old children, who are considered to be a risk group because of their increased participation in sport activities.¹⁶⁻¹⁸ The results of the present study agreed with this.

TDI was seen in more males than females in this study. This also agreed with several studies in the literature.^{14-16,18} Male to female ratio of children affected with TDI is reported to be 2:1. The ratio of males to females with TDI in the present study was 1.4:1. This is comparable to results from a previous study.¹⁹

The majority of injuries recorded were due to falls. Aetiology of TDI due to falls is well documented in the literature.^{8,18,20-24} All the age groups represented had more injuries due to falls, with the 11 year olds recording a higher percentage. This is likely due to the fact that they constituted the highest percentage of study participants.

The second cause of TDI in this study was due to road traffic accidents and this was seen more in females than males. Road traffic accidents (RTA) was hitherto, an unpopular aetiological factor of TDI but now features prominently due to urbanization and technological development. Motorcycles are now a major and cheaper means of transportation in our environment.⁹ The reason more females reported TDI due to RTA may be because females run more domestic errand than the males, they get sent to the market more frequently and will likely take a quicker and cheaper means of transportation (motorcycles). This finding agrees with findings from previous studies where violence from sports or road traffic accidents was the second most common cause of TDI.^{3,19} This finding however, is in contrast to report documented by Ajayi et al. where RTA was the least cause of traumatic dental injuries.⁸

Assault was the third most common cause of the injuries recorded in the present study. This may be because the study participants were from public schools which are densely populated, teachers tend to be overwhelmed by the population thus a lot of bullying goes unnoticed as close monitoring is very difficult. More males also recorded injuries due to assault and fights. This is likely due to the facts that boys are generally more aggressive and tend to settle issues physically.²³

The commonest type of injury found in this study was Ellis class II type fractures, that is, enamel-dentine fractures. This is at variance with report of previous studies^{8,25-28} which reported enamel type

fractures. However, this result concurs with reports from previous studies.^{29,30} The upper left central incisor was the most commonly injured tooth which was also reported by Ajayi et al.⁸ but in contrast to findings by Jamil et al.³¹ who reported a predilection of TDI to the upper right central incisors.

Majority of the participants had class I molar relationships and competent lip coverage. These are well documented risk factors for trauma.³² This was not reflected in the present study.

None of the study participants had presented to a dental clinic following injury. This may be as a result of lack of awareness of where to go for treatment, unavailability of funds, fear and ignorance of dental treatment.¹⁰ It also reflects a lack of concern for altered aesthetics which may be underscored by the fact that the parents of these children consider the loss of aesthetic not a very serious problem.

CONCLUSION

The prevalence of untreated traumatic dental injuries is high and awareness of treatment of these injuries is very low as none of the participants had received treatment prior to the study. More females recorded injuries due to road traffic accidents. Also, lip profile and molar relationship did not seem a contributing factor to these injuries.

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