

Full Length Research Paper

Traumatic dental injuries among a selected population of adolescents in Southern Nigeria

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This work aims to determine the causes, scene and types of traumatic dental injuries (TDIs) among adolescents, and to compare the findings in males with those in females. Information was elicited from a selected population of junior secondary school students by means of a close-ended, structured, self-administered questionnaire. Information elicited included age, gender, previous experience of trauma to the oral cavity/dentition, cause(s) of injury, scene of injury, type of injury sustained, the number of teeth involved and previous dental visits. Data were analyzed using SPSS version 20. There were 200 participants, comprising 98 (49%) males and 102 (51%) females. Falls were the most common (40.1%) cause of traumatic dental injuries. There was no significant association between gender and cause of injury ($p=0.604$). Majority (56.3%) of the injuries occurred at home; though males sustained more injuries in schools, injuries in females were sustained mostly at home. The most common type of TDI reported was luxation (49.5%). Injury related to one tooth was most (62.3%) frequently experienced. Most traumatic dental injuries in the adolescents were caused by falls and they occurred mostly at home among the females, while those in males were more frequent in schools. The commonest type of TDI was luxation injuries.

Key words: Traumatic dental injuries, adolescents, Port-Harcourt, fall, luxation, Nigeria.

INTRODUCTION

Traumatic dental injuries (TDIs) are impact injuries to teeth and the supporting tissues. They are often unavoidable occurrences since no individual is ever at zero risk, but some may be preventable (Lam, 2016). TDIs have become of dental public health interest

because of their increasing prevalence, complicated and sometimes expensive treatment, as well as their impact on the economy and quality of life of affected individuals (Enabulele et al., 2016; Lam, 2016; Andersson, 2013; Taiwo and Jalo, 2011; Glendor, 2008). The prevalence of

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TDIs worldwide have varied greatly, from as low as 4.1% in Malaysia to as high as 58.6% in Brazil (Glendor, 2008; Marcenes et al., 2001; Nik-Hussein et al., 2001). Studies from Nigeria have also shown variation in prevalence; Adekoya-Sofowora reported a prevalence of 9.1% among 13-15-year-old, and 12.8% among 12-year old, whereas Taiwo found a prevalence of 15.2% in 12-year old (Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009; Adekoya-Sofowora et al., 2004). Enabulele on the other hand found a prevalence of 6.96% in adults (Enabulele et al., 2016). Such variation can be attributed to the influence of the type of population studied, geographical location, age group as well as differences in diagnostic criteria, behavioural and cultural diversities (Zaleckiene et al., 2014; Faus-Damiá et al., 2011; Bendo et al., 2009). Males are more frequently affected than females, and the maxillary anterior teeth especially the central incisors are most often involved. Single tooth injuries have also been reported to be more prevalent than multiple teeth injuries (Anderson, 2013; Malikaew et al., 2006).

A wide spectrum of TDIs has been reported, including crown fractures, crown fractures with pulpal exposure, avulsion, root fractures amongst others. In most studies, fractures involving the enamel alone or enamel and dentine without pulpal involvement were the most prevalent TDIs (Osadolor, 2019; Ogordi et al., 2019; Eigbobo et al., 2016; Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009; Adekoya-Sofowora et al., 2004). Root fractures are relatively uncommon, with studies either reporting no cases of root fractures among TDIs, or a prevalence ranging from 1.2 to 7.0% (Abbott, 2019).

Common causes of TDIs include falls, collisions (with objects, surfaces or other people), violence, sports related accidents, road traffic accidents and misuse of teeth e.g. opening of bottle covers using the teeth (Eigbobo and Etim, 2016; Zaleckiene et al., 2014; Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009). In childhood, most TDIs are usually the result of falls as children develop motor functions and learn to walk. In adolescents, with an increase in sporting activities and interpersonal conflicts, the major causes of TDIs are violence and sports related accidents, whereas in adults, road traffic accidents play a more prominent role (Enabulele et al., 2016; Lam, 2016; Anderson, 2013). Previous Nigerian studies have all reported falls to be the most common cause of TDIs with frequencies ranging from 26.4 to 34.3% in adults (Osadolor, 2019; Enabulele et al., 2016; Ajayi et al., 2012) and 42.6 to 64.2% in adolescents (Ogordi et al., 2019; Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009; Adekoya-Sofowora et al., 2004). Studies from other parts of the world have also found falls to be the commonest cause of TDIs (Naidoo et al., 2009; Soriano et al., 2007).

The adolescent population is an important population to study with regards to TDIs. Much health-related

behaviour such as crime, smoking and alcohol use develop during adolescence. These, in addition to an increase in sporting activities, may increase the risk of a TDI occurring and such injuries have been shown to peak in adolescence (David et al., 2009; Glendor et al., 2007). A better understanding of the causes of TDIs, especially in such a high-risk population like adolescents will go a long way in creating awareness amongst the populace, and in formulating preventive measures to help reduce the burden of the condition.

In Nigeria, many studies (Ogordi et al., 2019; Osadolor, 2019; Eigbobo et al., 2016; Enabulele et al., 2016; Ajayi et al., 2012; Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009) have been carried out on traumatic dental injuries, but few of them have been restricted to adolescents. Many of the studies in adolescents have focused on a specific age rather than broader period of adolescence (Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009). Moreover, the bulk of these studies have been from the South-west zone, with paucity of similar studies from the South-south Geo-political zone. Furthermore, available studies have not adequately compared the causes, scene and types of TDIs between males and females. Therefore, the aim of this study is to determine the causes, scene and types of traumatic dental injuries among 12-15-year-old adolescents in secondary schools in Port Harcourt, South-south Nigeria, and to compare the findings in males with those in females. The null hypothesis for this study states that there is no difference in the pattern (causes, scene and types) of traumatic dental injuries between male and female adolescents in secondary schools in Port Harcourt. The alternate hypothesis states that there is a difference in the pattern (causes, scene and types) of traumatic dental injuries between male and female adolescents in secondary schools in Port Harcourt.

MATERIALS AND METHODS

This is a cross-sectional study carried out among 12-15-year old adolescents in junior secondary schools in Obio-Akpor Local Government Area (LGA), Port Harcourt, Rivers state, Nigeria. A list of twenty (20) secondary schools in the LGA and approval to carry out the study was obtained from the Rivers State Universal Basic Education Board, and the names of the schools were then listed in alphabetical order. The minimum sample size was calculated using the formula,

$$N = Z^2 \times P(1-P) / D^2,$$

Where: N is the minimum sample size; Z is the standard score for a given confidence level, usually set at 1.96 which corresponds to 95% confidence level; P is the estimated prevalence of TDIs obtained from a previous study = 9.1% (Adekoya-Sofowora et al., 2004); D is the maximum allowable error or the degree of accuracy desired, set at 0.05.

The minimum sample size calculated using the above formula was 127. However, a total of 200 participants were selected

systematically as follows. Four schools were selected from the list of 20 schools. This was done using systematic random sampling, by selecting every fifth school, after selection of the first school using simple random sampling technique. In each school, all the junior secondary school students between the ages of 12-15 years were selected, and numbers were assigned to them. A table of random numbers was then used to select fifty participants from each of the schools, giving a total number of two hundred participants.

Information was elicited from the students by means of a close-ended, structured, self-administered questionnaire. Information elicited included age, gender, previous experience of trauma to the oral cavity/dentition, cause(s) of injury, scene of injury, type of injury sustained, the number of teeth that were injured and history of visitation to the dental clinic. Data were analyzed using SPSS version 20 (IBM corp., USA). Tests of association between variables were done using Pearson's chi square, with p-values of ≤ 0.05 considered statistically significant.

RESULTS

There were two hundred participants in the study, comprising 98 (49%) males and 102 (51%) females. Falls were the most common cause of traumatic dental injuries overall (40.1%), and were also the leading cause in both genders. There was no significant association between gender and cause of injury ($p = 0.604$). Overall, majority of the injuries occurred at home (56.3%). However, while males suffered more injuries in school, injuries in females happened mostly at home. This was statistically significant ($p = 0.006$). The most common type of TDI reported was luxation (49.5%). Table 1 shows the injury characteristics in both genders. Injury related to one tooth was most (62.3%) frequently experienced. Of the total number of participants who had suffered a TDI, only 33.7% had ever visited a dental clinic, and 2.5% did so on account of the injury.

DISCUSSION

Traumatic dental injuries have become a dental public health concern for several reasons, including their rising prevalence, impact on the economy as well as their impact on the quality of life of sufferers. This study found that the majority (40.1%) of TDIs were caused by falls. Previous Nigerian studies have all reported falls to be the most common cause of TDIs in both adults (Osadolor, 2019; Enabulele et al., 2016; Ajayi et al., 2012) and adolescents (Ogordi et al., 2019; Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009, 2004). The falls have been attributed to accidents while running or playing, and poor nighttime visibility occasioned by epileptic electric power supply has been suggested to contribute to this (Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009). Studies from other parts of the world have also found falls to be the commonest cause of TDIs (Naidoo et al., 2009; Soriano et al., 2007). Falls were the commonest cause of

TDI in both males and females; similar to reports in the literature (Ogordi et al., 2019; Enabulele et al., 2016; Adekoya-Sofowora et al., 2009; Adekoya-Sofowora et al., 2004).

Most TDIs (56.3%) in this study occurred at home. A similar finding has been reported by many authors (Eigbobo et al., 2016; Adekoya-Sofowora et al., 2009; Naidoo et al., 2009; Soriano et al., 2007). Ogordietal.on the other hand found the school environment to be the most common place for TDIs (Ogordi et al., 2019). This study further analyzed the scene of the injury in both males and females, and found statistically significant differences. While most TDIs in males occurred in school, those in females occurred mostly at home. Therefore, the null hypothesis on the scene of TDIs was rejected. A similar finding was reported by Rajab (2003), whereas other authors did not find differences in the scene of injury between males and females (Adekoya-Sofowora et al., 2009). Many studies however did not compare the scene of injuries among males and females. This difference in the scene of injury between genders is because males are more likely to engage in physical outdoor sporting activities, and the playground at school offers a suitable environment for such activities. Thus, it is important to create safer environments in schools, especially the playgrounds. Schools with supportive social and physical environments, have fewer occurrences of TDIs (Naidoo et al., 2009). The use of mouthguards targeting boys involved in sporting activities is encouraged, to reduce the risk of TDIs. According to Soriano, personalized mouthguards would reduce the risk of sports-related TDIs by 80%, whereas, lack of its use will increase the risk by 60-fold (Soriano et al., 2007). Strategies aimed at reducing the occurrence of TDIs in the home environment are also important, and these should involve parents (Naidoo, 2009). Enlightenment campaigns providing accurate information on the common causes of TDIs as well as possible preventive measures could be one such strategy.

The most common type of TDI encountered in this study was luxation injuries (49.5%). This contrasts with most reports in the literature in which enamel fractures or enamel and dentin fractures were the most common (Ogordi et al., 2019; Eigbobo and Etim, 2016; Taiwo and Jalo, 2011; Adekoya-Sofowora et al., 2009; Naidoo et al., 2009; Soriano et al., 2007). This present study was self-reported, whereas other similar studies involved oral examination for TDIs. Since some teeth can recover fully from luxation injuries after some time, it is not possible to accurately diagnose such through an oral examination once sufficient time has elapsed (Enabulele et al., 2016). Thus, there is a chance of under-estimating luxation injuries. This study did not find significant differences in the type of TDI between males and females. It was also observed that only 2.5% of those with TDIs sought professional care after such injuries. This may have been

Table 1. Characteristics of the traumatic dental injury vs. gender.

| Injury characteristic | Frequency | | |
|--------------------------------|-----------|--------|------------------|
| | Male | Female | Total (%) |
| Cause of injury | | | p=0.604 |
| Fall | 32 | 43 | 75 (40.1) |
| Play | 30 | 29 | 59 (31.6) |
| Fight | 16 | 11 | 27 (14.4) |
| Sports | 10 | 8 | 18 (9.6) |
| Collision | 4 | 4 | 8 (4.3) |
| Scene of injury | | | p=0.006 |
| Home | 39 | 64 | 103 (56.3) |
| School | 41 | 24 | 65 (35.5) |
| Road | 5 | 6 | 11 (6.0) |
| Church | 1 | 0 | 1 (0.5) |
| Others | 3 | 0 | 3 (1.6) |
| Type of injury | | | p = 0.929 |
| Luxation | 27 | 23 | 50 (49.5) |
| Crown fracture | 19 | 18 | 37 (36.6) |
| Avulsion | 8 | 6 | 14 (13.9) |
| Number of teeth injured | | | p = 0.247 |
| One | 53 | 46 | 99 (62.3) |
| Two | 18 | 22 | 40 (25.2) |
| Three | 5 | 6 | 11 (6.9) |
| Four | 4 | 1 | 5 (3.1) |
| Five | 1 | 2 | 3 (1.9) |
| Six | 0 | 0 | 0 (0.0) |
| Seven | 1 | 0 | 1 (0.6) |

as a result of poor awareness, poor motivation or under-estimation of the injuries. Injuries involving a single tooth (62.3%) were the most frequent in this study. This is similar to existing reports in the literature (Naidoo et al., 2009).

Conclusion

This study found that most cases of traumatic dental injuries in adolescents in Port Harcourt were caused by falls. Injuries in females occurred mostly at home, while those in males were more frequent in schools. The commonest type of TDI was luxation injuries. They had a poor health-seeking behaviour.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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