

Immediate Management of Traumatic Tooth Avulsion among Secondary School Teachers in Port Harcourt

***Esther Ngozika OJULE, **Efetobo Victor ORIKPETE**

**Faculty of Dentistry, University of Port Harcourt, Port Harcourt, Port Harcourt*

***Department of Oral Pathology, Oral Medicine and Oral Radiology, University of Port Harcourt, Port Harcourt*

Correspondence

*Efetobo Victor Orikpete
Department of Oral Pathology, Oral Medicine and Oral Radiology
Faculty of Dentistry
College of Health Sciences
University of Port Harcourt
Port Harcourt, Rivers State, Nigeria.
Email: efezi2000@yahoo.com*

ABSTRACT

Background: Traumatic tooth avulsion (TTA) frequently occurs in schools, where teachers are often called upon to provide immediate care. The aim of this study was to determine the level of knowledge of Secondary School teachers in Obio-Akpor local government area on the immediate management of TTA, and to assess the relationship between sociodemographic variables and participants level of knowledge about the immediate management of TTA.

Methods: This was a descriptive cross-sectional study among secondary school teachers. A semi-structured self-administered questionnaire was used to obtain socio-demographic and other relevant information. Participant's level of knowledge on the immediate management of avulsed teeth was scored from 0 to 6, and categorized as poor, fair and good. Data was analysed using SPSS version 25. Chi square test was used to determine the association between participant's level of knowledge and sociodemographic variables. $p \leq 0.05$ was considered statistically significant.

Results: A total of 200 teachers correctly filled the questionnaire, most of whom were female (64.0%). Almost two-thirds (60.5%), of the study participants had prior knowledge about tooth avulsion. Most of the participants did not know how to correctly preserve or handle an avulsed tooth reimplantation. Overall, only 16.5% of the study participants had good knowledge about traumatic tooth avulsion and its immediate management. There was statistically significant association between respondents' knowledge and the number of years as a teacher.

Conclusion: The level of knowledge of secondary school teachers on the immediate management of traumatic tooth avulsion was inadequate. Those with ≤ 3 years teaching experience had relatively better knowledge on the immediate management of tooth avulsion.

Keywords: Traumatic tooth avulsion, Traumatic dental injury, Secondary school, Teachers

INTRODUCTION

The prevalence of traumatic dental injuries is on the rise, with as much as 20% of the permanent teeth of 7- to 11-year-olds having been involved in some type of traumatic accident (Chan et al., 1998), and approximately 30% to 50% of school-aged children having already sustained dental trauma (Mestrinho et al., 1998). Traumatic tooth avulsion (TTA) refers to the complete displacement

of a tooth from its socket. The maxillary incisors are most commonly affected, and causes of TTA include falls, assaults, sporting accidents and road traffic accidents (Adekoya-Sofowora et al., 2005).

Citation Ojule EN, Orikpete EV (2025). Immediate management of traumatic tooth avulsion among secondary school teachers in Port Harcourt. Nig J Dent Sci; 8(1):16-22.

School playgrounds are common locations where TTA occur due to sporting activities, with as much as 60% of TTA occurring in schools (Young et al., 2012). In Nigeria, the prevalence of traumatic dental injuries ranges from 10% to 30%, with a male dominance (Enabulele & Chukwumah, 2022), while the prevalence of traumatic tooth avulsion ranges from 7.5% to 13.9% (Eigbobbo & Etim, 2016; Eigbobbo & Orikpete, 2020).

The International Association of Dental Traumatology (IADT) recommends that first aid management for permanent tooth avulsion should start with patient reassurance (Huang et al., 2024; Flores et al., 2007). Thereafter, the tooth should be handled only by its crown without touching the root (Flores et al., 2007). The tooth is then washed under cold running water for 10 seconds before replacing it in the socket (Flores et al., 2007). Management of tooth avulsion should therefore be immediate, and emergency intervention and treatment planning should be done as soon as possible (within 30 minutes) to achieve a favourable prognosis. When a permanent tooth is avulsed, it should be reimplanted within 30 minutes, but avulsed primary teeth should not be reimplanted. It is important to preserve the viability of the periodontal ligament on the root surface of the tooth and to prevent dehydration of the tooth by placing it in an appropriate storage medium prior to reimplantation (Flores et al., 2007; Pujita et al., 2013).

Emergency management of TTA is not only the responsibility of dentists but also of lay people such as school teachers available at the site of the accident, who are often called upon to provide the first emergency care (Pujita et al., 2013; Al-Obaida, 2010; Altamimi et al., 2019). Children spend about 40% of their awake time in school (Gomes et al., 2014), and TTA frequently occurs in schools (Eigbobbo & Orikpete, 2020). Therefore, school teachers are likely to be among the first to see a child following a TTA, and should be knowledgeable about the immediate management of TTA to ensure good clinical outcomes (Panwar et al., 2018).

There is a paucity of related studies in this environment regarding knowledge of traumatic tooth avulsion and its immediate management. Among the few available studies, some were conducted among school children (Eigbobbo & Etim, 2016) while others involved primary school teachers (Amobi et al., 2020). Secondary school students are even more involved in sporting activities and interpersonal violence (Sánchez-Alcaraz et al., 2020). Therefore, TTA occurs frequently in secondary schools and teachers in

such schools may be the first care-givers on scene. Thus, there is need for them to have adequate knowledge on what to do in such situations. The aim of this study was to determine the level of knowledge of Secondary School teachers in Obio-Akpor local government area on the immediate management of TTA. This study also sought to determine the association between sociodemographic variables and participants level of knowledge about the management of TTA.

MATERIALS AND METHODS

This was a descriptive cross-sectional study conducted among secondary school teachers in Obio/Akpor Local Government Area of Rivers State, South-south Nigeria. The minimum sample size for this study was estimated as 107, 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 traumatic tooth avulsion – 7.5%^[6]; D is the maximum allowable error or the degree of accuracy desired, set at 0.05)

The list of secondary schools in Obio Akpor Local Government Area was obtained, and sampling was done using a multistage sampling technique. In the first stage, the schools were stratified into public and private secondary schools. Subsequently, four schools were selected from each stratum using a table of random numbers, giving a total of 8 schools. In each school, all the teachers who consented were enrolled into the study. Data collection was carried out over a two-month period (April 2024 - May 2024) using a self-administered semi-structured questionnaire that was adapted from that used in previous studies (Olatosi et al., 2013; Okoro, 2021)

The questionnaire consisted of two sections: A and B. Section A elicited socio-demographic information, while section B consisted of questions to determine knowledge and practices on the immediate management of avulsed teeth. The level of knowledge of the respondents on the immediate management of avulsed teeth was assessed using six questions. Each correct response was scored as 1, while incorrect responses were scored as 0, giving a maximum total score of 6. Participants' level of knowledge was graded as poor (score of 0 – 2), fair (score of 3 – 4) and good (score of 5 – 6).

The data collected was entered into a Microsoft Excel spreadsheet, and subsequently exported to Statistical Product and Service Solutions (SPSS) version 25 (IBM Corporation, SPSS Inc., Chicago, IL, USA) for analysis. Quantitative variable (age)

was expressed as mean \pm standard deviation, while qualitative variables were reported as frequencies and percentages. The association between socio-demographic variables (age, gender, educational qualification, type of school and number of years as a teacher) and participant's level of knowledge was determined using chi-square test. The level of significance was set at $p \leq 0.05$

RESULTS

Socio-demographic characteristics

A total of 215 questionnaires were distributed among secondary school teachers in Obio/akpor local government area, out of which 200 were correctly filled and returned, giving a response rate of 93%. The age of participants ranged from 20 years to 65 years, with a mean age of 38.4 ± 9.6 years, (Table 1) and there were more female teachers (128; 64.0%) than male teachers (72; 36.0%). Almost all the respondents (97%) had tertiary level of education, with the majority (141; 70.5%) holding a Bachelor's degree (B.Ed./BSc). (Figures 1 & 2) Majority of the respondents (117; 58.5%) were teachers in a government owned school. (Table 1)

Knowledge about traumatic tooth avulsion and its immediate management

Almost two-thirds (60.5%) of the study participants had prior knowledge about tooth

avulsion, even though most (63.5%) had not seen any student with an avulsed tooth. As much as 60% of the study participants knew that treatment of an avulsed tooth should commence immediately. However, most of them did not know how to correctly preserve an avulsed tooth before it is re-implanted. Only 20.5% of participants knew that an avulsed tooth should be handled by the crown. (Table 2) Overall, only 16.5% of the study participants had good knowledge about traumatic tooth avulsion and its immediate management. (Table 2).

Associations between sociodemographic variables and the level of knowledge about traumatic tooth avulsion and its immediate management

There was no statistically significant association between the respondents' level of knowledge about traumatic tooth avulsion and their age ($p = 0.301$), gender ($p = 0.306$), educational qualification ($p = 0.480$), and type of school taught in ($p = 0.270$). There was however statistically significant association between respondents' knowledge and the number of years as a teacher ($p = 0.009$). Teachers with ≤ 3 years teaching experience had better knowledge on the immediate management of tooth avulsion. (Table 3)

Table 1: Age Distribution of study participants by type of school

Age group (years)	Type of school (n ;%)		Total (n ;%)
	Public	Private	
20 – 39	27 (13.5)	21 (10.5)	48 (24.0)
30 – 39	28 (14.0)	31 (15.5)	59 (29.5)
40 – 49	42 (21.0)	19 (9.5)	61 (30.5)
50 – 59	16 (8.0)	11 (5.5)	27 (13.5)
60 – 69	4 (2.0)	1 (0.5)	5 (2.5)
Total	117 (58.5)	83 (41.5)	200 (100%)

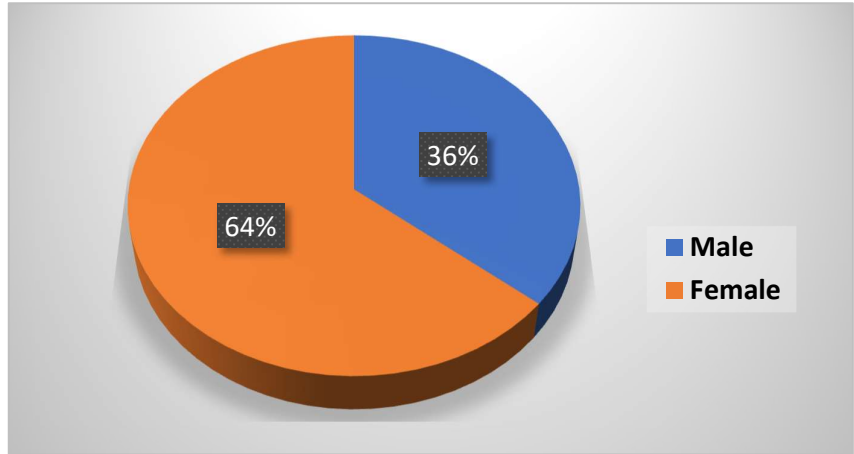


Figure 1: Gender distribution of respondents

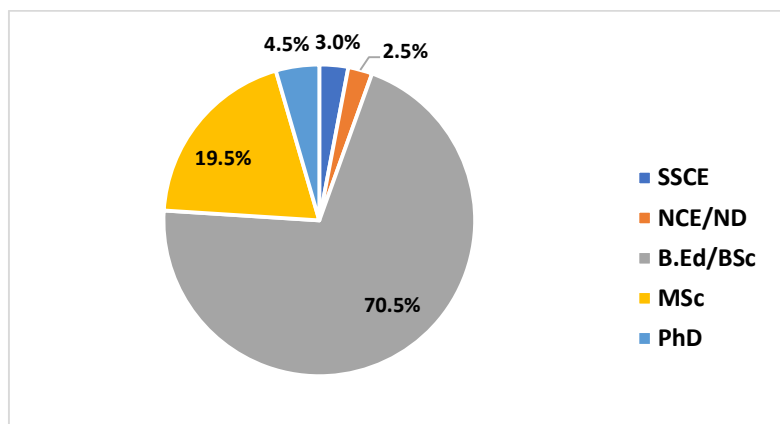


Figure 2: Level of Education of respondents

Table 2: Knowledge and practices of respondents concerning traumatic tooth avulsion

Questions/Responses	Frequency (%)
<i>Do you know about tooth avulsion (dislodgement of a tooth)?</i>	
No	39.5
Yes	60.5
<i>How should an avulsed tooth be treated?</i>	
Leave it on the ground at the site of injury	1.0
Throw the tooth away	19.0
Put the tooth back into the mouth	2.5
Take the tooth to a dentist	48.0
I don't know	29.5
<i>How soon after a tooth avulsion should treatment begin?</i>	
Treatment not necessary	1.5
Immediately	66.0
Within 30 minutes	3.5
After a few hours	2.5
Any time before the next day	5.5
I don't know	21.0
<i>How should an avulsed tooth should be preserved before professional treatment?</i>	
In the tooth socket	5.1
In the student's mouth	20.3
In water	5.1
In palm oil	0.5
In liquid milk	19.3
In a handkerchief	27.4
In Normal Saline (salt solution)	4.1
In the Student's saliva	13.2
In an antiseptic solution	11.7
In alcohol	
<i>What will you do if a student has an avulsed tooth?</i>	
Nothing	3.0
Send the child home	17.5
Send the child to the sick bay	12.0
Send the child to a chemist/patent medicine store	2.5
Send the child to a medical doctor	3.5
Send the child to a dentist	61.5
<i>Which part of an avulsed tooth should be handled?</i>	
The crown	20.5
The middle	7.0
The root	7.5
Anywhere	9.5
I don't know	55.5

Table 3: Association between teaching experience and participants' level of knowledge about avulsion

Teaching experience (years)	Level of knowledge (Frequency; %)			
	Poor	Fair	Good	Total
0 – 3	18 (34.6)	20 (38.5)	14 (26.9)	52 (26.0)
4 – 6	10 (28.6)	20 (57.1)	5 (14.3)	35 (17.5.0)
7 – 10	18 (40.9)	20 (45.5)	6 (13.6)	44 (22.0)
11 – 14	14 (31.8)	22 (50.0)	8 (18.2)	44 (22.0)
> 15	18 (72.0)	7 (28.0)	0 (0)	25 (12.5)
Total	78 (39.0%)	89 (44.5%)	33 (16.5%)	200 (100%)

$p = 0.009$

DISCUSSION

Traumatic tooth avulsion accounts for about 20.8% of traumatic dental injuries in Nigeria (Olatosi et al., 2013), and is a serious dental emergency that has a poor outcome if proper first-aid measures are not administered (Flores et al., 2007; Huang et al., 2024). This study sought to determine the level of knowledge on the immediate management of avulsed tooth by secondary school teachers in Obio/Akpor LGA in Port Harcourt. The study included both public and private school teachers to ensure representativeness. Our results showed that only 16.5% of the teachers had good knowledge about the immediate management of traumatic tooth avulsion.

In this study, majority of the teachers were within the age group 40-49 years, which is similar to that seen in previous Nigerian studies (Olatosi et al., 2013; Okoro, 2021).

There were more female teachers (64.0%) in this study. Almost identical values were reported by Olatosi (63.1%) and Okoro (64.2%). Studies from other parts of the world also noted more female teachers compared to male teachers (Hassan et al., 2018; Kurnaz et al., 2021).

The predominance of females in the education sector probably reflects that the fact that the profession is believed to be more feminine as females are thought to be more nurturing by nature (Meza-Mejia et al. 2023). Almost all the respondents (97%) had tertiary level of education, similar to previous Nigerian studies (Olatosi et al., 2013; Okoro, 2021). This is expected since having a tertiary qualification is a pre-requisite to teaching in a secondary school in Nigeria (Federal Ministry of Education, 2010).

Two-thirds of the study participants knew that treatment of an avulsed tooth should commence immediately. While this may seem good at first glance, in essence, it means that one-third of avulsed teeth in schools will ultimately be lost due to delays in commencing emergency treatment. This is less than what was reported by similar Nigerian studies (Olatosi et al., 2013; Okoro, 2021). Surprisingly, 1.5% of participants felt that

treatment of an avulsed tooth was not necessary. This is far less than that in a previous Nigerian study (Okoro, 2021) in which more than half of the participants reported that they would do nothing if a tooth was avulsed.

Ideally, an avulsed tooth should be reimplanted immediately, or within 30 minutes, for optimal outcome (Flores et al., 2007). The success of replanting an avulsed tooth depends mainly on two factors: the time it spends outside the mouth and the type of storage medium used. Studies have shown that immediate reimplantation is crucial for periodontal ligament regeneration (Flores et al., 2007; Huang et al., 2024). Majority of the teachers in this study will send a child with an avulsed tooth to a dentist. However, some schools may not have dental clinic in close proximity. In such cases, it is even more important for the teachers to be knowledgeable on the pre-hospital care for an avulsed tooth. Only 20.5% of teachers knew how to correctly handle an avulsed tooth; this is consistent with similar studies where a good number of teachers do not know how to handle an avulsed tooth (Okoro, 2021). Handling of an avulsed tooth by the root further compromises the integrity of the periodontal ligament cells, thereby decreasing the chances of success following reimplantation (Goswami et al., 2011). Therefore, correct handling of an avulsed teeth must be included in oral health talks on management of traumatic tooth avulsion. The majority of the teachers in this study will preserve an avulsed tooth using normal saline (27.4%), water (20.3%) or a handkerchief (19.3%). The use of handkerchief will cause desiccation of the periodontal ligament cells leading to death of the tooth, and this practice should be discouraged. Avulsed teeth should be preserved in a wet storage medium. Water is least favoured because its hypotonic environment can lead to rapid cell lysis and heightened inflammation (Poi et al., 2013). Hank's balanced salt solution (HBSS) is the storage medium of choice for avulsed teeth. HBSS is considered superior regarding cell viability and vitality preservation due to its non-toxicity, balanced pH, and osmolality that allows cell

growth (Sheth et al., 2020). However, it may not readily be available, and in such scenarios, milk and saline are suitable options (Huang et al., 2024). Overall, only 16.5% of the study participants had good knowledge about traumatic tooth avulsion and its immediate management. This is similar to other related studies where teachers have inadequate knowledge regarding immediate management of tooth avulsion (Adekoya-Sofowora et al., 2009; Olatosi et al., 2013; Awad et al., 2017; Huang et al., 2024), highlighting the need for more oral health enlightenment campaigns on the immediate management of traumatic dental injuries specifically targeting school teachers. This study found no statistically significant association between the respondents' level of knowledge about traumatic tooth avulsion and their age, gender, educational qualification and type of school taught in. Similar studies (Ayedun et al., 2020; Salarić et al., 2021) also found no statistically significant association between knowledge of school teachers and their sociodemographic work characteristics. However, in this study there was statistically significant association between respondent's knowledge and the number of years as a teacher ($p = 0.009$). Among the teachers ≤ 3 years teaching experience, 26.9% had good knowledge on the immediate management of tooth avulsion. In contrast, among those with ≥ 15 years teaching experience, 72.0% had poor knowledge about the immediate management of avulsed teeth, while none had good knowledge. The reason for this may be because younger teachers are more likely to be internet savvy, and thus more able to obtain relevant information from the internet (Fernandez-Cruz et al., 2016).

CONCLUSION

Majority of the school teachers in this study had inadequate knowledge of the immediate management of TTA. There was statistically significant association between knowledge and the number of years as a teacher; teachers with ≤ 3 years teaching experience had better knowledge on the immediate management of tooth avulsion.

RECOMMENDATIONS

There is need for more oral health enlightenment campaign on traumatic tooth avulsion and its management specifically targeting school teachers, as they are often first set of care givers when such accidents happen in school. Creating awareness through oral health educational tools such as posters, lectures, leaflets, and audio-visual will help to improve teachers' awareness regarding this topic.

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