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Research Article

An Assessment of Emergency Care Following Tooth Avulsion Among A Selected Population of Nigerian School Children

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Abstract

Aim: To assess the knowledge of school children on the first aid administered after traumatic tooth avulsion.

Methods: A structured questionnaire was used to obtain information from children of six primary and six secondary schools in Port Harcourt, Nigeria. Information elicited included respondents' socio-demographics, exposure to dental trauma and knowledge on emergency care for tooth avulsion. Data collected was analysed using SPSS Version 22 and level of significance was set at $p < 0.05$.

Results: There were 411pupils; 194 males and 217 females with a mean age of 12.5 (±2.6) years. One hundred and eighty-three (44.5%) had previous dental injuries. Three hundred and twenty-three (78.6%) would seek treatment in dental clinic after tooth avulsion. Only 16 (3.9%) would replace the tooth in its socket, 160 (38.9%) would take it to the dental clinic and 192 (46.7%) will throw the tooth on a roof top. Only 164 (39.9%) would seek immediate treatment. Twenty-two (5.4%) will use milk as storage/ transport media. There were statistically significant differences between

a) The males and females in their time for seeking treatment (p=0.01).

b) The public and private school pupils on where to go for treatment (p=0.013) and transport media use (p=0.00).

c) The primary and secondary school pupils on replantation of avulsed tooth (p=0.03) and transport media use (p=0.00).

Conclusion: Although majority knew who a dentist is, their knowledge of emergency care when avulsion occurs is low; they require oral health education to bridge the gap in their knowledge.

Keywords: Tooth avulsion; traumatic dental injuries; emergency care; Nigerian school children; tooth replantation; transport media

Introduction

The school is an educational institution for learning both within [1] and outside [2] the classrooms under the guidance of teachers [3]. However, recreation and sport activities [2-4] in schools when unsupervised may predispose school children to traumatic dental injuries (TDI). Such injuries occur more among males than females and more commonly in urban children than rural children [5-8]. Sixty percent of TDI have been reported to occur during sporting activities among school aged children [9,10]. Of these, tooth avulsion; the complete displacement of the tooth out of the alveolar socket, is the most severe type of TDI and it occurs in both the primary and permanent dentitions [11]. In the permanent dentition, it occurs commonly among children aged between 6-12 years, [5,8,11,12] during the period in the tooth eruption cycle when root formation is incomplete and the periodontal ligament surrounding erupting teeth are loosely structured and provide very minimal resistance to an extrusive force. Tooth avulsion has an incidence of between 0.5 to 16% [8-14] among children and an incidence of 20.8% was reported among Nigerian adolescents [15].

Tooth loss, as a result of trauma, in addition to being distressing has both functional and psychosocial consequences in the permanent dentition [9,11,16]. First aid carried out minimizes the negative emotional/social consequences and ensuing cost

of treatment that may result from premature tooth loss. Timely intervention at the site of the accident and immediate presentation to a dental clinic for professional care would result in a favourable outcome [7,10,16]. Replantation is the treatment option for avulsed permanent teeth and the treatment outcome is dependent on prompt and appropriate intervention at the site of the accident [3,17]. Other factors include short extra oral time, suitable transport media, immaturity of the root apex and patients' general health [16,18,19]. The first aid carried out at the time of injury includes replacing the tooth within the alveolar socket and immediate referral to the dental clinic [8,13] for replantation procedure. However, if the tooth cannot be replaced into its original position, a suitable storage and transport medium would help maintain the viability of the periodontal ligament cells while seeking prompt professional attention in the dental clinic. The transport and storage media include Hanks Balanced Salt Solution (HBSS), Eagle's medium, Normal saline, Via span, propolis, milk and coconut water [13,18,19]. The most recommended medium based on maintenance of PDL cell viability, availability, low cost and long shelf life is milk as reported in the reviews by Adnan et al. [18] and Udoye et al. [19]. Parents, teachers and students, especially, are almost always present where these injuries occur and need to be knowledgeable on what to do immediately it occurs. The knowledge of parents, [17,20] school teachers [3,9,10,20-23] and students [24,25] has been assessed in several studies both within and outside Nigeria. Most of these showed a poor awareness and low knowledge of first aid measures following tooth avulsion. Though the knowledge of students has been conducted in a study in Nigeria, it was done over a decade ago in another geopolitical region [24]. The aim of this study was to assess the level of knowledge of first aid administered following tooth avulsion among school children in the South-South geopolitical region in Nigeria.

Materials and Methods

Ethical clearance was obtained from the Research and Ethics Committee of the University of Port Harcourt Teaching Hospital. Consent was sought and obtained from the State Universal Basic Education Board and the proprietors of the private schools. Consent and assent were sought from the head teachers and pupils after being assured of confidentiality, respectively. Children aged 8 to 15 years were selected from six (three public and three private) primary and six (three public and three private) secondary schools using a multistage sampling technique. A structured questionnaire [24] was used to obtain information from each of the children. The information elicited were the socio-demographics such as age as at the last birthday and sex, other information were experience of exposure to dental trauma, response to past traumatic injuries, knowledge of the emergency treatment with particular focus on tooth avulsion and knowledge on the process of replantation. The information collected was entered into data spreadsheet and analyzed using the IBM Statistical Package for Social Sciences (SPSS) software, Version 22.0 (SPSS Inc., Chicago, IL, USA). Descriptive summary statistics was obtained for demographic variables and knowledge of emergency care. Pearson's chi square was used to assess the differences in knowledge between groups and statistical significance was set at $p<0.05$.

Results

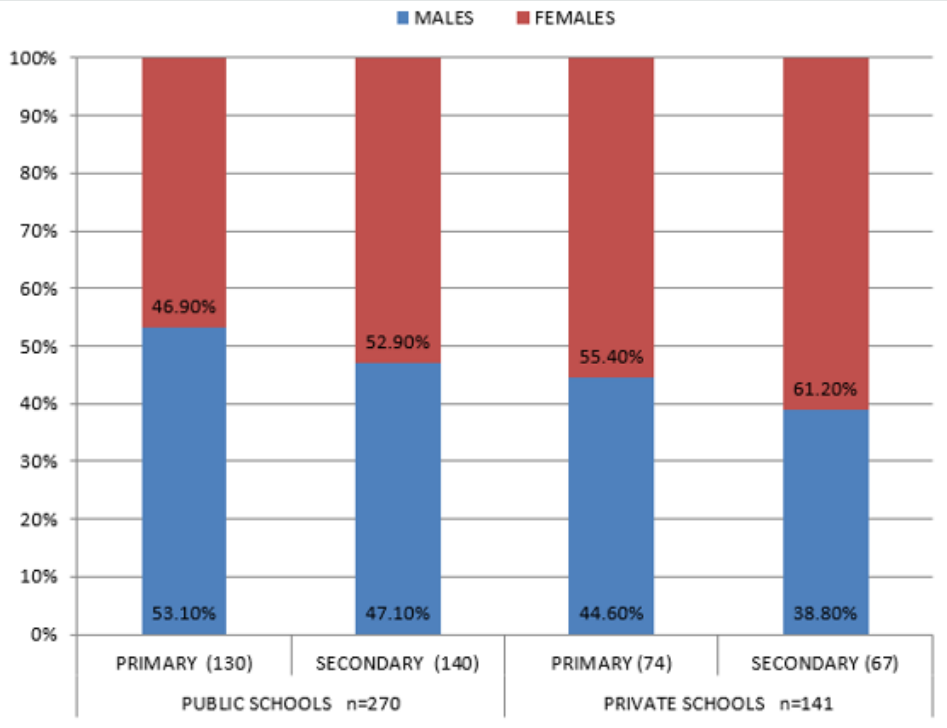

Figure 1: The distribution of the school pupils according to the type of schools, level of education and gender.

Four hundred and eleven students comprising 194 males and 217 females with a mean age of 12.5 (+2.6) participated in this study. Two hundred and four (49.6%) primary and 207 (50.4%) secondary school pupils participated in the study; 270 (65.7%) attended public schools while 141 (34.3%) attended private schools. Details in Figure 1. One hundred and eighty-three (44.5%) had history of previous dental injuries. Their responses to the questions on their knowledge of avulsion revealed that 323 (78.6%) would go to a dentist if they had tooth avulsion, 76 (18.5%) would see a medical doctor and 4 (1%) would go to the school clinic. Only 16 (3.9%) would replace the tooth in its socket. Although 164 (39.9%) would seek immediate treatment, 160 (38.9%) would take the tooth to the dentist. Two hundred and five (49.9%) would use normal saline as transport medium and only 22 (5.4%) would use milk. When avulsion occurs, 192 (46.7%) would throw it on roof top, while 160 (38.9%) would take the tooth to the dental clinic. Details in Table 1.

Table 1: The knowledge of the school pupils on traumatic dental emergencies (tooth avulsion).

Variables	n(%)
Previous dental injury	
Yes	183 (44.5)
No	228 (55.5)
Choice of where treatment	
Medical doctor/hospital	76 (18.5)
Dentist/dental clinic	323 (78.6)
School clinic	4 (1.0)
Patent medicine store/chemist	8 (1.9)
Urgency (Timing) in seeking treatment	
Immediately (within 15 minutes)	164 (39.9)
Within 30 mins	55 (13.4)
Within few hours	63 (15.3)
One day	33 (8.0)
Anytime	96 (23.4)
What would you do with an avulsed (knocked out) tooth	
Leave on the ground	20 (4.9)
Throw on the roof	192 (46.7)
Take it to the dentist	160 (38.9)
Don't know	39 (9.5)
Transport/storage media	
Tap water	73 (17.8)
Normal saline	205 (49.9)
Milk	22 (5.4)
Iced water	29 (7.9)
Antiseptic	78 (19.0)
Alcohol	4 (1.0)

Gender of the subjects

When the gender was considered equal proportion of males and females would seek treatment from a dental clinic (78%) and immediate treatment within 15 minutes (40%). Though 40% of males and females would seek treatment within 15 minutes of the injury, there were statistically significant differences between the males and females (p=0.01) in their timing for seeking treatment (Table 2).

Table 2: The relationship between the Gender and knowledge to the process of tooth replantation.

	Sex				Chi-Square, P-Value
	Males		Females		
	N	%	N	%	
Previous injury					
Yes	94	48.5	89	41	2.295, 0.078
No	100	51.5	128	59	
Choice of where to receive treatment					
Medical Doctor	13	6.7	17	7.8	1.870, 0.760
Dentist	152	78.4	171	78.8	
Hospital	23	11.9	23	10.6	
School Clinic	1	0.5	3	1.4	
Chemist	5	2.5	3	1.4	
Urgency to seek treatment					
Immediately (15 mins)	78	40.2	86	39.6	13.407, 0.01*
Within 30mins	24	12.4	31	14.3	
Within Few Hrs	24	12.4	39	18	
One Day After	25	12.9	8	3.7	
Anytime	43	22.2	53	24.4	
Will you replace tooth to its original position					
Yes	9	4.6	7	3.2	3.313, 0.191
No	170	87.6	182	83.9	
Not Sure	15	7.7	28	12.9	
What will you do to the tooth					
Leave on Ground	11	5.7	9	4.1	1.983, 0.576
Throw on Roof	92	47.4	100	46.1	
Take to Dentist	70	36.1	90	41.5	
Don't Know	21	10.8	18	8.3	
Transport Medium					
Tap Water	36	18.6	37	17.1	2.770, 0.735
Normal saline	99	51	106	48.8	
Milk	12	6.2	10	4.6	
Iced Water	10	5.2	19	8.8	
Antiseptic	35	18	43	19.8	
Alcohol	2	1	2	0.9	

*p<0.05 is statistically significant

Private and public schools

Following avulsion, 4.8%public and 2.1%private school pupils would attempt replacing the tooth within the tooth socket at the site of injury. Three hundred and twenty-three (78.6%) would go to a dental clinic for treatment, however only 164 (39.9%) would seek dental treatment immediately after the injury. More (51.1%) public

school pupils compared to 38%private pupils had cultural beliefs on throwing an avulsed tooth on roof tops (p=0.06). Twelve (4.4%) and 10 (7.1%) public and private school pupils, respectively would use milk as a transport medium while 63.8% private as against 42.6% public school pupils preferred normal saline as transport medium. There were statistically significant differences between the public and private school pupils on where to go for treatment (p=0.013) and transport media (p=0.00) following avulsion (Table 3).

Table 3: The relationship between the pupil's school type and the knowledge of the process of tooth replantation.

	Type of School				Chi-Square, P-Value
	Public		Private		
	N	%	N	%	
Previous Injury					
Yes	127	47	56	39.7	2.010, 0.156
No	143	53	85	60.3	
Choice of where to receive treatment					
Medical Doctor	24	8.9	6	4.3	12.742, 0.013*
Dentist	199	73.7	124	87.9	
Hospital	39	14.4	7	5	
School Clinic	3	1.1	1	0.7	
Chemist	5	1.9	3	2.1	
Urgency to seek treatment					
Immediately (15 minutes)	108	40	56	39.7	1.189, 0.880
Within 30mins	36	13.3	19	13.5	
Within Few Hrs	42	15.6	21	14.9	
One Day After	24	8.9	9	6.4	
Anytime	60	22.2	36	25.5	
Will you replace tooth to its original position					
Yes	13	4.8	3	2.1	1.909, 0.385
No	228	84.4	124	87.9	
Not Sure	29	10.7	14	9.9	
What will you do to the tooth					
Leave on Ground	13	4.8	7	5	7.343, 0.062
Throw on Roof	138	51.1	54	38.3	
Take to Dentist	93	34.4	67	47.5	
Don't Know	26	9.6	13	9.2	
Transport medium					
Tap Water	50	18.5	23	16.3	26.607, <0.001*
Normal saline	115	42.6	90	63.8	
Milk	12	4.4	10	7.1	
Iced Water	25	9.3	4	2.8	
Antiseptic	64	23.7	14	9.9	
Alcohol	4	1.5	0	0	

*p<0.05 is statistically significant

Level of education

Table 4 shows that 52.9% of primary school pupils and 44.9% secondary school pupils preferred normal saline while 7.4% of primary school pupils preferred milk compared to 3.4% secondary school pupils. There were statistically significant differences between the primary and secondary school pupils on replacing the avulsed tooth back to the sockets (p=0.03), transport media (p=0.00).

Table 4: The association between the type of school, knowledge of emergency dental care and the level of education of the pupils.

	Primary		Secondary		Chi-Square, P-Value
	N	%	N	%	
Types of School					
Public	130	63.7	140	67.6	0.696, 0.404
Private	74	36.3	67	32.4	
Previous Dental Injury					
Yes	89	43.6	94	45.4	0.132, 0.716
No	115	56.4	113	54.6	
Choice of where to receive treatment					
Medical Doctor	13	6.4	17	8.2	5.837, 0.212
Dentist	158	77.5	165	79.7	
Hospital	28	13.7	18	8.7	
School Clinic	3	1.5	1	0.5	
Chemist	2	1	6	2.9	
Urgency to seek treatment					
Immediately (15 mins)	76	37.3	88	42.5	5.986, 0.200
Within 30mins	27	13.2	28	13.5	
Within Few Hrs	35	17.2	28	13.5	
One Day After	22	10.8	11	5.3	
Anytime	44	21.6	52	25.1	
Will you replace tooth to its original position					
Yes	3	1.5	13	6.3	6.821, 0.033*
No	177	86.8	175	84.5	
Not Sure	24	11.8	19	9.2	
What will you do to the tooth					
Leave on Ground	11	5.4	9	4.3	1.993, 0.574
Throw on Roof	100	49	92	44.4	
Take to Dentist	77	37.7	83	40.1	
Don't Know	16	7.8	23	11.1	
Transport medium					
Tap Water	45	22.1	28	13.5	25.985, 0.000*
Normal saline	108	52.9	97	46.9	
Milk	15	7.4	7	3.4	
Iced Water	14	6.9	15	7.2	
Antiseptic	20	9.8	58	28	
Alcohol	2	1	2	1	

*p<0.05 is statistically significant

Discussion

Tooth avulsion is known to commonly occur among children in the mixed dentition phase hence the sample for this study was taken from among the school children. Though school children have teachers in the school premises, sometimes other pupils are the ones present when tooth avulsion occurs. The prognosis of treated avulsed tooth is dependent on prompt treatment which relies greatly on what is done at the site of the accident. Appropriate transport and storage media within the recommended period of storage will help maintain viability of the periodontal ligament cells, thus a favourable treatment outcome [18,19]. In this study 44.5% of the children had experienced dental trauma compared to 6-12.8% reported prevalence of TDI among the school aged children [15]. A good proportion (78.6%) of the participants would choose to receive treatment in a dental clinic. This demonstrates good awareness of whom a dentist is and understanding of the role a dentist plays in the healthcare. Such knowledge may have been fostered by series of outreaches and awareness programmes previously done in most of the schools [22]. However, there was a statistically significant difference in the level of knowledge between the private and public schools (p=0.013), the private school participants seem to know better. This finding is contrary to that reported in South Western Nigeria where the children preferred going to see a medical doctor thereby showing less awareness of the dentists' role [24].

It was observed that 53.3% would seek professional care within 30 minutes after tooth injury, 23% may not seek care based on their choice of seeking care at "anytime". This is a concern for a condition that requires urgent care and an off shoot of poor awareness of the importance of prompt treatment following dental trauma. The first aid measures at the site of injury include replacing the tooth in its original position [3,13] or placing in a suitable transport medium [13,18,19]. Only 16 (3.9%) would replace the tooth in its original position in the socket and there was statistically significant difference between the primary and secondary school pupils (p=0.03). This value is less than the 17.8% reported in the south west Nigeria [24]. When the gender and type of schools were considered there were no statistically significant differences between the males and females (p=0.19) and schools (p=0.39). There must be an understanding of tooth anatomy and most importantly there should be a formal teaching on what to do when tooth avulsion takes place. Though the most suitable transport medium listed was milk, [18,19] a good majority preferred normal saline, probably because normal saline appears more medicinal than milk. In this study it was observed that (46.7%) school children had a strong cultural belief on what should be done to a tooth that has been avulsed. This was shown by their response that they will throw the avulsed tooth on roof tops. This belief was commoner among pupils in public schools. The finding buttresses what was reported in a similar study in another geographical location within Nigeria with a different culture [24]. This belief stems from the myth that when a lizard sees an exfoliated tooth, that the succedaneous tooth would not erupt, so to prevent this from happening, the exfoliated teeth were thrown on roof tops away from the lizards [25]. The practice of throwing on roof tops has also been observed in some Asian countries like India, China, Japan, Korea, and Vietnam, although for different reasons [26]. The implication of this, is that the avulsed permanent tooth that would have had a chance of survival from replantation procedure in the dental clinic were being thrown away.

Conclusion

Traumatic dental injuries though a common occurrence amongst these school children (44.5%), their knowledge on first aid measures administered when tooth avulsion occurs before professional intervention is low. Although the children were aware of whom to see when they have dental injuries, the children still hold on to cultural beliefs which could be detrimental to the maintenance of the integrity of the dental arch hence oral health. These gaps in knowledge on first aid following tooth avulsion should be addressed by improving oral health education on traumatic dental injuries with emphasis on emergency care of tooth avulsion in schools. The curriculum on health education in schools should include oral care during dental emergencies.

Conflict of Interest

None of the authors have any conflicts of interest that should be disclosed.

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