

Parental Knowledge of Pre-Hospital Management of Avulsed Permanent Tooth in Children at Kath

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Abstract

BACKGROUND: Permanent tooth avulsion is one of the severe forms of dental traumatic injuries. The immediate action taken at the site of the accident is crucial to the prognosis of the tooth. Replantation is considered as the treatment of choice. **OBJECTIVE:** The study was undertaken to assess the knowledge of parents who accompany their children to the pediatric dental clinic, KATH on the pre-hospital management of avulsed permanent tooth in children. **METHODS:** A researcher administered structured questionnaire was used to collect data on the knowledge of pre-hospital management of avulsed permanent tooth from 83 parents who accompanied their wards to the pediatric dental clinic at KATH. **RESULTS:** A total of 83 parents were involved in the study. 30 (36%) were males while 53 (64%) were females. The majority of the parents (57%) were either university trained or had attended college of education. Only 32 parents (39%) were aware of the possibility of replantation. Majority of the parents chose non-physiologic media as the transport media of choice and only 10% would attempt self-replantation before seeking professional help. 76 parents (92%) had no previous education on pre-hospital management of avulsed tooth. **CONCLUSION:** The results obtained from this study indicate that parental knowledge on pre-hospital management of avulsed permanent tooth is low hence the need for massive public educational campaigns.

Keywords

Parental Knowledge, Tooth Avulsion, Pre-Hospital Management, Permanent Tooth

1. Background and Introduction

Tooth avulsion refers to the complete dislodgment of a tooth from its socket, causing damage to the supporting structures [1]. Maxillary central incisors are commonly affected by avulsion [1]. Each year, over five million teeth are avulsed in children and adults, leading to significant esthetic, functional, mental, and financial problems (Knocked Out Teeth, n.d.; [2]). Dental trauma affects 20% to 30% of permanent dentition worldwide, with a higher incidence among children aged 8 to 12 years [3]. Dental avulsion is the fourth most common type of dental trauma and one of the most serious forms of dental injury [4] [5].

Studies have found that dental injuries often occur at home, making parents the first to witness such incidents [6]. The prognosis of an avulsed tooth largely depends on the immediate pre-hospital management. The International Association of Dental Traumatology recommends picking up the tooth by the crown and replanting it immediately if possible. If immediate replantation is not feasible, the tooth should be stored in a suitable storage medium, such as milk, Hanks' balanced saline solution (HBSS), saliva, or saline. A good prognosis is associated with an extraoral dry time of less than 60 minutes [5]. Traumatic dental injuries, including dental avulsion, commonly occur at home, and parents are typically the first to encounter the child after such an injury [6]. However, there is limited research on parental knowledge of pre-hospital management of avulsed permanent teeth in Ghana. This study aims to address this gap in the literature.

2. Study Objective and Research Questions

2.1. Main Objective

To assess the knowledge of parents who accompany their children to the pediatric dental clinic, KATH on the pre-hospital management of avulsed permanent tooth in children.

2.2. Specific Objectives

- 1) To ascertain if parents are aware of replantation of avulsed permanent tooth.
- 2) To ascertain how parents would manage an avulsed permanent tooth before seeking professional help.
- 3) To know if parents have ever received any form of education on pre-hospital management of avulsed tooth.

3. Literature Review

3.1. Etiology and Prevalence of Tooth Avulsion

Traumatic dental injuries of which tooth avulsion is an example are caused mainly by falls, collisions and intentional hits by someone. Most of these injuries occur at home, school and the playground [6]. The prevalence of tooth avulsion

is 3.0 per thousand children in the United Kingdom according to a study by O'Brien *et al.* [7], 5.83 per thousand children in south India according to a study by Ankola *et al.* [8] and 7.75% in Brazil by Mesquita *et al.* [9]. Tooth avulsion is common among 7 to 9-year-olds, with males being three times more affected than females [10]. The maxillary incisors are the most frequently avulsed teeth in both deciduous and permanent dentition [11]. The prognosis of an avulsed tooth depends on pre-hospital management. The International Association of Dental Traumatology provides guidelines for tooth avulsion management. The tooth should be picked up by the crown, rinsed gently if dirty, and replanted immediately. If immediate replantation is not possible, the tooth should be stored in a suitable medium such as milk, HBSS, saliva, or saline. Professional dental care should be sought immediately [5].

Studies conducted in various regions have shown varying levels of awareness among parents regarding tooth replantation. In Bhopal, India, a study found that a higher proportion of parents were aware of tooth replantation [12], while a survey in Imphal, India reported that 59.8% of parents knew about it [13]. In contrast, a study in Davangere, India revealed a lack of awareness among parents from both urban and rural areas [14], and a study in Chennai, India showed that a lesser percentage of parents believed in tooth replantation [10]. Similarly, studies in Saudi Arabia by AlGhamdi [15] and Nigeria by Olatosi *et al.* [16] indicated low awareness among parents.

3.2. Knowledge and Education on Pre-Hospital Management of Avulsed Tooth

Various studies conducted in different regions of India, Saudi Arabia, Turkey, Egypt, and Nigeria have revealed the diverse preferences of parents regarding the storage and cleaning media for avulsed teeth, as well as their timing for seeking professional help. In Davangere, India, rural parents preferred paper as a storage medium, while urban parents preferred water, ice, or antiseptic, with milk being least preferred. Cleaning preferences varied, with few urban parents choosing water, while the majority preferred brushing or saltwater [14]. A study in Bhopal, India, found that parents preferred water or saline over milk and HBSS as a transport medium and showed a preference for immediate or within-one-hour professional help. The choice of cleaning media leaned towards saline over [12]. Similarly, a study in Chennai, India, showed that parents preferred ice, paper or handkerchief, and saline solution as storage media, with water and saline being the top cleaning choices [10]. In Imphal, India, disinfecting solution and dry transport were preferred, while water and saline were the preferred cleaning media [13]. In Saudi Arabia, milk was least preferred as a transport medium, tap water was favoured for cleaning, and opinions varied regarding the optimal time to seek professional help [15]. A survey in Samsun, Turkey, revealed a preference for non-physiologic storage media and uncertainty regarding the cleaning process [17]. In Egypt, cotton was favoured over milk as a transport medium, and opinions varied regarding replantation timing and cleaning methods [18].

In Nigeria, preferences for storage media varied, with a low preference for milk, and immediate professional help was the favoured choice [16] [19].

Several studies conducted in India, Egypt, and Nigeria have highlighted the lack of parental education regarding the pre-hospital management of avulsed tooth injuries. In Davangere and Bhopal, India, a high percentage of parents had not received any form of education on this topic. Similarly, studies in Egypt and Nigeria reported a lack of information among parents regarding tooth avulsion management. The findings indicate a significant knowledge gap among parents in these regions [10] [12] [13] [14] [16] [18] [19].

4. Methodology

4.1. Study Area, Design, Sample Size

This study was conducted at the Komfo Anokye Teaching Hospital. The Komfo Anokye Teaching Hospital is located in Kumasi, the regional capital of Ashanti Region. It is a 1200 bed facility and due to its geographical location is accessible to a wide variety of people. It receives direct referrals from 12 out of the 16 administrative regions in Ghana. These 12 administrative regions are the Ashanti, Bono, Bono East, Ahafo, Western North, Savannah, Northern, North East, Upper East, Upper West and some part of Central and Eastern regions. It also receives referrals from neighboring countries such as Ivory Coast and Burkina Faso [20]. The Pediatric department is one of the four main departments of the oral health directorate [20].

This was a quantitative cross-sectional descriptive study. A convenience sampling method was used. From records available at the pediatric dental clinic, KATH, an average of about 7 new cases are seen each day. Data was collected within a period of four weeks from March to April 2022. Recruitment of participants took place at the pediatric unit of the Oral Health Department via convenience sampling of parents.

With the use of the Cochran's formula for sample size with regards to small populations, a sample size of 83 was obtained.

$$n = (z^2 pq) / e^2$$

where n = sample size;

z = statistic of level of 95% confidence = 1.96;

p = variability/standard deviation = 0.5;

q = $(1 - p)$;

e = absolute precision of 5%;

Hence

$$n = (1.96^2 \times 0.5 \times (1 - 0.5)) / 0.05^2 = 0.9604 / 0.0025 = 384.16 \approx 384$$

Small sample size calculation;

$$n = n_0 / (1 + (n_0 - 1) / N)$$

where n = sample size from a population with known size;

n_0 = Cochran's sample size recommendation = 384;

N = Population size.

$$n = 384 / \left(1 + (384 - 1) / 105\right) = 384 / 4.6476190476 = 82.62295082 \approx 83$$

Therefore $n = 83$.

4.2. Inclusion and Exclusion Criteria

All parents who accompanied their children to the pediatric dental clinic and who consented to the study.

Exclusion was made for parents who refused to partake in the study.

4.3. Data Collection

A questionnaire with the following parameters; demographics, awareness about tooth replantation, knowledge on pre-hospital management of tooth avulsion and education on the pre-hospital management of tooth avulsion was administered. This questionnaire is author developed. Validity and reliability of the questionnaire was tested via peer engagement and pilot testing of questionnaire one month prior to the study using 15 persons who fall within the inclusion criterion. The purpose of the research was explained to the respondents and their consent was sought after anonymity was ensured. Parameters of the questionnaire were explained to the respondents. Questionnaires were distributed and collected solely by the investigator.

4.4. Data Processing and Analysis

The statistical package for social science (SPSS) software version 26.0 was used for the processing, analysis and management of data. Data analysis involved frequency generation and percentages and results will be presented in the forms of tables, figures and quantitative statistical values.

4.5. Ethical Considerations

Ethical approval was obtained from the committee on human research, publications and ethics of Kwame Nkrumah University of Science and Technology, School of Medicine and Dentistry and the Komfo Anokye Teaching Hospital. Consent was sought from the participants.

5. Results

5.1. Demographic Data of Participants

This present study revealed that, of the 83 participants. The majority representing 45 parents were aged 35 to 45. This was followed by those aged 18 - 24, 25 - 34 and above 45 were 6, 17, and 14 respectively (see **Figure 1**). Only 1 parent was below 18 years. Of the participants, 64% were females while 36% were males. 26 participants representing the majority had 3 children. This was closely followed by those with 2, 4 and 1 representing 23, 17 and 13 participants

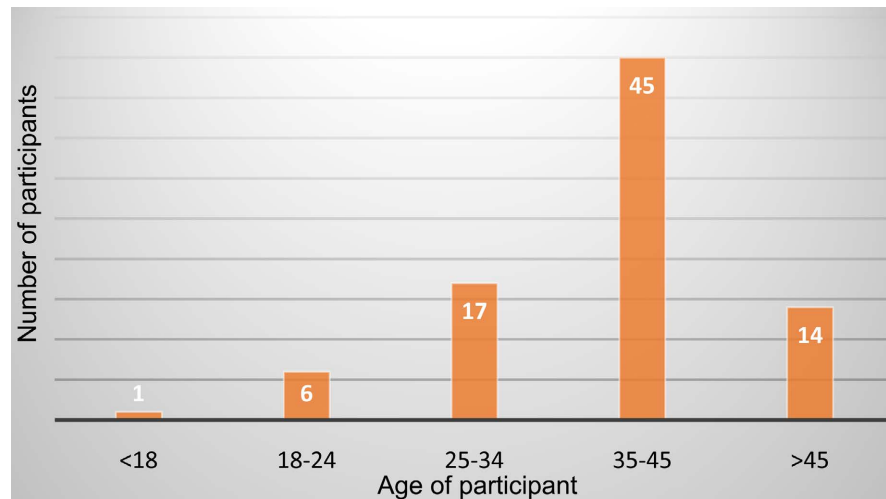


Figure 1. Age of participants.

respectively. Only 4 participants had 5 or more children. Majority of the parents who participated representing 57% had completed either university or college of education. Participants whose level of education was up to JSS/JHS accounted for 20% while those who completed SSS/SHS accounted for 17%.

5.2. Awareness about Replantation of Avulsed Permanent Tooth

Only 32 participants representing 39% were aware that an avulsed permanent tooth could be replanted. 61% did not know that an avulsed tooth could be replanted as shown in **Figure 2**.

5.3. Knowledge on Pre-Hospital Management of Avulsed Permanent Tooth

With regards to searching for an avulsed tooth, only 45% of the participants would do so. Only 30% of the parents who participated would keep an avulsed tooth if found while the remainder does not see the need to do so. Only 11 participants would pick an avulsed tooth by the crown only. 21 participants representing 25.3% would either pick an avulsed tooth by either the crown or root while only 2 participants representing 2.4% would pick the tooth by the root only. However, 49 participants representing 59% did not know how to pick an avulsed tooth (**Table 1**).

23 participants would clean an avulsed tooth under running water, 16 would wash with salt water, 8 would clean with a brush and 3 would wash with milk. 46 of participants did not know how to clean an avulsed tooth (**Figure 3**).

Only 10% of the respondents would replant an avulsed tooth immediately before seeking professional care. Majority of the parents representing 69% would take an avulsed tooth together with the child to the dentist while 17% did not know what to do.

With regards to transport media, it was revealed that 31 (37.3%) of the parents preferred non-physiologic media such as tissue, 15 participants chose plastic bag

(18.1%), 12 (14.5) chose handkerchief, 10 (12%) participants chose gauze, 9 (10.8%) participants chose paper, and 5(6%) participants chose disinfectant. Only a few participants chose physiologic media such as milk 4 (4.8%), saliva 2 (2.4%) and saline 12 (14.5%). A greater percentage of participants 46 (41%) did not know the transport media to use if they found an avulsed tooth (see **Figure 4**).

Majority of the parents representing 49.4% would seek professional care immediately or within an hour of incidence. 18.1% of the parents did not know when to seek professional help while the remainder would either seek help within a few hours, at least before the next day or when there is pain (**Table 2**).

5.4. Education on Pre-Hospital Management of Avulsed Tooth

92% of the participants had not received any education on the pre-hospital management of an avulsion tooth injury (**Figure 5**).

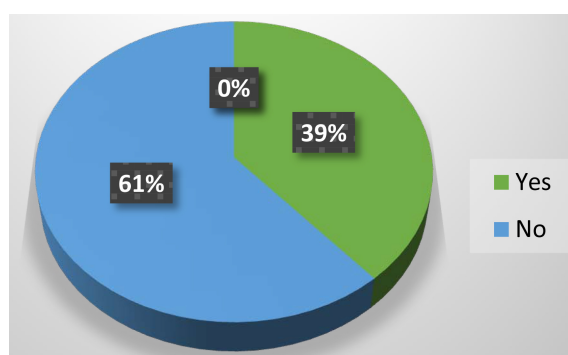


Figure 2. Participants awareness about replantation of avulsed permanent tooth.

Table 1. How would you pick an avulsed tooth if found?

	Frequency	Percentage (%)
By the crown only	11	13.3
By the root only	2	2.4
By either the crown or root	21	25.3
I don't know	49	59.0

Table 2. How soon do you think it is appropriate to seek professional help for an avulsed tooth?

	Frequency	Percentage (%)
Immediately/Within an hour	41	49.4
Within a few hours	9	10.8
At least before the next day	7	8.4
When there is Pain	11	13.3
I don't know	15	18.1

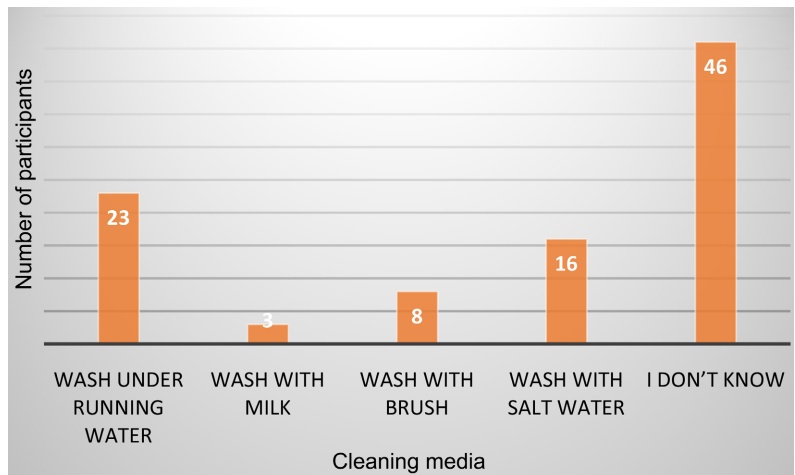


Figure 3. How would you clean an avulsed tooth if dirty?

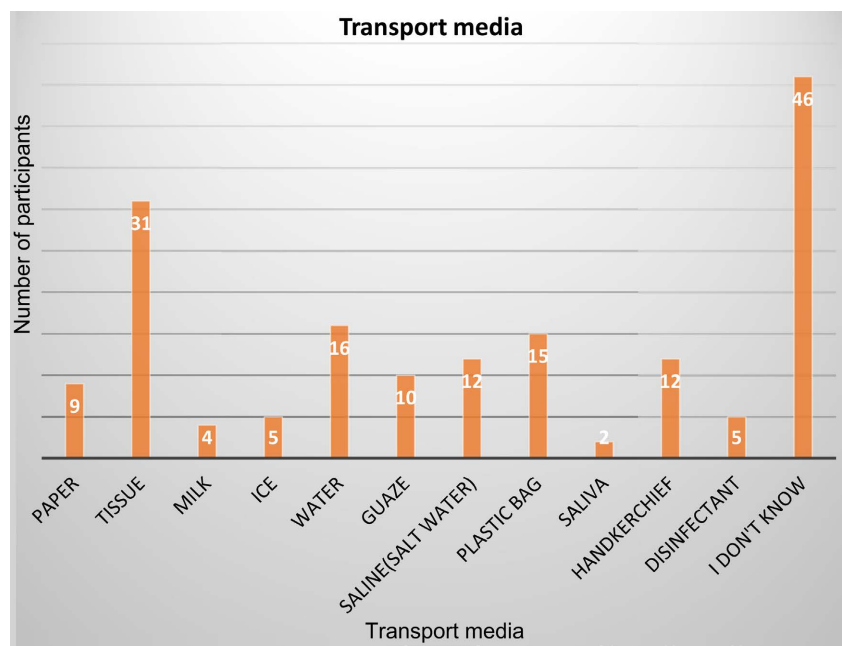


Figure 4. How should the avulsed tooth be kept when going to the dentist?

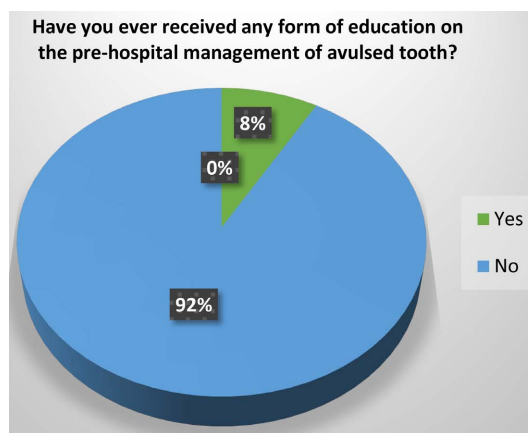


Figure 5. Previous education on the pre-hospital management of avulsed tooth.

6. Discussion

6.1. Demographic Characteristics

The assessment focused on parental proficiency in the pre-hospital management of avulsed permanent teeth in children. A total of 83 individuals participated in the study, primarily falling within the age bracket of 35 to 44, with only one participant below 18 years old. Notably, the majority of participants (63.9%) were female, aligning with similar studies conducted in Brazil, Kuwait, and Turkey. This gender distribution suggests the societal influence on traditional gender roles, potentially influencing the greater participation of mothers in such investigations.

In terms of family dynamics, most participants had one to four children. Additionally, a substantial portion (57%) had received higher education at the university or training college level. This observation underscores a positive correlation between higher educational attainment and enhanced oral health knowledge, as evidenced by previous research [17] [21] [22]. This connection highlights the potential impact of education in fostering a deeper understanding of pre-hospital dental care, a crucial aspect of ensuring the well-being of children with avulsed permanent teeth.

6.2. Awareness about Replantation of Avulsed Permanent Tooth

This current study revealed that about two-thirds of the participants did not know about the possibility of replantation of an avulsed permanent tooth. This is similar to studies done in Chennai, India [14], Saudi Arabi [15], and Nigeria [16] where a greater percentage of the participants were also not aware of the possibility of replantation of an avulsed tooth. However, this finding contrasts with studies done by Jain *et al.* in 2017 [12], Bhopal, and Ningthouiam [13] in India where a greater percentage of the participants were aware that avulsed permanent tooth could be replanted. This finding may be attributed to the lack of dental educational programs in the Ashanti region and the country at large.

6.3. Knowledge on Pre-Hospital Management of Avulsed Permanent Tooth

This study evaluated parental understanding of the pre-hospital treatment of avulsed permanent teeth in children. The studies found deficiencies in parental awareness and knowledge surrounding tooth avulsion. Around 50% of parents would not actively look for a knocked-out tooth, and about 66% would not preserve the tooth if they did find it. This suggests a lack of understanding of the potential for tooth reattachment. Furthermore, a significant proportion of parents lacked knowledge on the appropriate course of action for a completely dislodged tooth, with only a minority being aware of the need of picking it up by the crown. This conclusion may be attributed to a lack of awareness regarding the significance of maintaining the vitality of the periodontal ligament. The user's text is simply "[18]".

Approximately 50% of the parents lacked knowledge regarding the appropriate cleaning techniques for an avulsed tooth. The majority of those who chose a cleaning method opted for washing under running water, with saline, brushing, and milk being the subsequent choices in descending order of frequency. The numbers are 15, 10, and 13. The choice of water and saline is in accordance with the accessibility and conventional principles of cleaning methods. Furthermore, a substantial majority of participants (90.4%) would refrain from attempting to reattach a forcibly removed tooth before getting assistance from a professional. This behavior can be related to the fear of exacerbating the injury or a lack of awareness of the potential for successful reattachment [12] [18]. Most parents lacked knowledge on how to carry an avulsed tooth. Non-physiological materials such as tissues, plastic bags, handkerchiefs, gauze, and ice were favored above physiological alternatives such as milk, saliva, or saline [10] [12] [13] [14] [15]. Regarding the pursuit of expert assistance, over fifty percent of the respondents would promptly seek medical attention or within sixty minutes following the occurrence of the injury. Some individuals would promptly seek assistance within a few hours, prior to the following day, or upon experiencing discomfort [15]. The inclination to seek medical attention promptly may be motivated by the occurrence of blood and discomfort linked to avulsion injuries.

6.4. Education on Pre-Hospital Management of Avulsed Tooth

Findings of this study unveiled that a significant majority (92%) of the participants lacked any type of pre-hospital education regarding the management of avulsed teeth. This high percentage is consistent with research conducted by Jain *et al.* [12], Shashikiran *et al.* [14], Loo *et al.* [10], Ningthoujam *et al.* [13], Abdellatif and Hegazy [18], Olatosi *et al.* [16]; [19] in Davangere, India, Bhopal, India, and Imphal, India, respectively. Five of the seven participants who possessed prior education on the subject cited a health professional or dentist as their source. This demonstrates unequivocally that dental public health education is poorly received in Ghana, Africa, and Asia. Inadequate access to dental facilities and a scarcity of dental health personnel in the nation may also contribute to this result. Additionally, insufficient dental public health education could potentially play a role.

7. Conclusion

The findings of this study indicate that the majority of parents are unaware of the possibility of replanting a permanently avulsed tooth. Furthermore, our society suffers from a deficiency in parental understanding regarding the pre-hospital therapy of avulsion tooth injuries. Consequently, most parents are unable to effectively handle avulsion tooth damage prior to getting assistance from a specialist. Furthermore, it is worth mentioning that the majority of parents have not received any type of instruction regarding the pre-hospital management of tooth avulsion.

8. Limitation

The smaller sample size used for the current study may have hampered the accurate estimation of the parental knowledge of pre-hospital management of avulsed permanent tooth in children. The possible factors that could affect the parents' knowledge/awareness of pre-hospital management for avulsed teeth could be explored in this paper

9. Recommendation

Based on the findings of this study, it is recommended that formal educational programs are organized periodically for parents with the aim of educating them about the pre-hospital management of tooth avulsion. The mass media should also be employed to promote oral health on the subject matter. There is also a need to train more community dentist and general dental practitioners who would be instrumental in the execution of these educational programs.

https://www.bahrainmedicalbulletin.com/SEPT_2020/SEPT2020_TOOTH.pdf

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

A QUESTIONNAIRE ON PARENTAL KNOWLEDGE OF PRE-HOSPITAL MANAGEMENT OF AVULSED PERMANENT TOOTH IN CHILDREN AT KATH.

Please note that confidentiality and privacy are ensured. Also, data collected from this questionnaire will only be used for the purposes of research. Thank you.

Please answer by ticking the spaces provided.

Definition of Terms:

An Avulsed tooth is a tooth that has been completely knocked out from your mouth. That is, no part of the tooth remains in the mouth if it is avulsed.

Permanent teeth are the teeth that replaces the milk or baby teeth.

DEMOGRAPHICS

1) Age

- a) Below 18 []
- b) 18 - 24 []
- c) 25 - 34 []
- d) 35 - 44 []
- e) Above 45 []

2) Gender

- a) Male []
- b) Female []

3) Number of children

- 1 [] 2 [] 3 [] 4 [] 5 or Above []

4) Level of Education

- a) JHS (JSS) or Below []
- b) SHS (SSS) []
- c) University/college of education []
- d) Others, Specify

AWARENESS ON TOOTH REPLANTATION

5) Are you aware that an avulsed permanent tooth can be replanted/put back in place?

- a) Yes []
- b) No []

KNOWLEDGE ON PRE-HOSPITAL MANAGEMENT OF TOOTH

AVULSION

6) Will you search for an avulsed tooth?

- a) Yes []
- b) No []

7) Will you keep an avulsed tooth if found?

- a) Yes []
- b) No []

8) How would you pick an avulsed tooth if found?

- a) By the Crown only []

- b) By the Root only []
- c) By either the Crown or Root []
- d) I Don't Know []

9) How would you clean an avulsed tooth if dirty. (*Tick all that apply*)

- a) Wash under running water []
- b) Wash with milk []
- c) Wash with brush []
- d) Wash with salt water []
- e) I Don't Know []

10) Would you replant an avulsed tooth immediately before seeking professional care?

- a) Yes []
- b) No []

11) Should an avulsed tooth be taken to the dentist along with the child

- a) Yes []
- b) No []
- c) I Don't Know []

12) How should the avulsed tooth be kept when going to the dentist?

(Tick all that apply)

- a) Paper []
- b) Tissue []
- c) Milk []
- d) Ice []
- e) Water []
- f) Gauze []
- g) Saline (Salt water) []
- h) Plastic Bag []
- i) Saliva []
- j) Handkerchief []
- k) Disinfectant []
- l) I Don't Know []

13) How soon do you think it is appropriate to seek professional help for an avulsed tooth?

- a) Immediately/within an hour []
- b) Within a few hours []
- c) At Least before the next day []
- d) When there is pain []
- e) I Don't know []

EDUCATION ON PRE-HOSPITAL MANAGEMENT OF AVULSED TOOTH

14) Have you ever received any form of education on the pre-hospital management of avulsed tooth?

- a) Yes []
- b) No []

15) If yes, how did you receive the information?

- a) TV/radio []
- b) Social media []
- c) Dentist/health professional []
- d) A friend/relative []
- e) Others, specify.....[]