

Knowledge and Sociodemographic Determinants of Emergency Management of Dental Avulsion among Parents in Kuwait: A Cross-Sectional Study

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Significance of the Study

- This study revealed poor parental knowledge regarding the management of dental avulsion. This could substantially affect the prognosis of an avulsed permanent tooth and could also pose economic and psychological burdens on the child and the parents.

Keywords

Parents' knowledge · Dental avulsion · Dental emergency

Abstract

Objectives: The aim of this study was to evaluate the knowledge of first aid measures for a permanent tooth avulsion among parents in Kuwait and to assess the effect of different sociodemographic characteristics. **Materials and Methods:** A cross-sectional study was conducted among 554 parents who visited 5 dental specialty centers in Kuwait. Parent sociodemographic data and responses to avulsion management questions were collected through a self-administered questionnaire. Descriptive and binary logistic regression analyses were used for data analysis. **Results:** In the 554 responses from patients, gaps were identified in the following areas: replantation (199, 35.9%), cleaning of the tooth (182, 32.9%), and transport media (84, 15.2%). Most parents demonstrated satisfactory knowledge levels regarding the urgency to seek professional help (391, 70.6%) and the first place of contact after the injury (525, 94.8%). Having previ-

ous information on emergency management of dental avulsion was a significant predictor of good knowledge (OR 2.138, 95% CI 1.347–3.395, $p = 0.001$). Of the 544 parents, 99 (17.8%) had received information on dental avulsion management: 30 (30.3%) from the Internet, 19 (19.2%) from books, 12 (12.1%) from television, 6 (6%) from smart phone applications, 2 (2%) from newspapers, and 30 (30.3%) from other sources. **Conclusion:** In this study, parents in Kuwait did not have adequate knowledge of emergency management for dental avulsion. Future educational campaigns on dental avulsion are urgently needed to educate parents.

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Published by S. Karger AG, Basel

Introduction

Dental avulsion is one of the most serious traumatic dental injuries that result in ischemic damage to the pulp and periodontal ligament tissues [1]. Tooth avulsion poses economic and psychological burdens, both on the child

and the parents [2, 3]. It also affects the psychological development of children and teenagers, which can be demonstrated by their conscious effort to avoid smiling [4]. In addition, the cost of dental treatment after tooth avulsion is high [2, 5, 6].

It was reported that recommended treatment for ensuring the viability of periodontal ligament cells was immediate replantation and minimizing the extraoral dry time of an avulsed tooth [7]. In many instances, an avulsed tooth cannot be replanted immediately; therefore, it should be stored in a suitable medium [7].

Previous epidemiological studies showed that the majority of dental injuries occur at home, and therefore the parents' knowledge of the emergency management of an avulsed tooth is essential for achieving a successful outcome [8]. However, poor parental knowledge of first aid measures for avulsed teeth were reported previously [1, 9–13], and a major weakness was detected in certain areas, such as appropriate storage media and storage time [9–13]. This is unfortunate because prompt and appropriate management at the site of the injury can significantly improve the prognosis of an avulsed permanent tooth [14].

Despite the crucial role played by the parents in the emergency management of dental avulsion, only one study was conducted in Kuwait in 2007 [1]. The International Association of Dental Traumatology (IADT), which is the professional organization in the field of traumatic dental injuries, released the IADR guidelines for the management of avulsed permanent teeth in 2012 [7]. Therefore, it is necessary to develop a questionnaire based on the current guidelines to include all the relevant items. The aim of this multicenter cross-sectional study were to assess the parental knowledge of first aid measures for permanent tooth avulsion among parents in Kuwait and to investigate the influence of different sociodemographic characteristics on the emergency management of dental avulsion.

Subjects and Methods

Study Design and Population

This population-based, multicenter cross-sectional study was conducted from August 2015 to February 2016. The Ministry of Health Ethics Clearance Committee approved the protocol of this study.

G*Power version 3.1.9.2 software was used to calculate the sample size. The effect size was calculated based on the study by Al-Jame et al. [1], in which 30% of parents could not demonstrate any knowledge of the emergency management of dental avulsion. Based on 80% power and a significance level of $\alpha = 0.05$, a mini-

um sample size of 501 subjects was needed to detect a change in proportion from 30 to 25% (effect size = -0.05). An additional 20% was added to the calculated sample size to compensate for possible drop out. Thus, a total sample size of 600 was selected. A total of 554 parents agreed to take part in the study. The age of the parents ranged from 20 to 75 years.

Parents in this study were recruited randomly from Kuwait's largest dental specialty centers: Bneid Al-Gar, Al-Amiri, Al-Farwaniya, Al-Jahra, and Al-Adan. Kuwait is divided into 6 administrative units (governorates): Capital, Hawalli, Ahmadi, Mubarak Al-Kabeer, Farwaniya, and Jahra. Every selected dental specialty center covers the dental needs of 1 administrative unit, with the exception of Al-Adan Dental Specialty Center, which receives patients from both Ahmadi and Mubarak Al-Kabeer administrative units.

One hundred questionnaires were given to each of the following dental specialty centers: Bneid Al-Gar, Al-Amiri, Al-Farwaniya, and Al-Jahra, while 200 questionnaires went to Al-Adan dental specialty center because it includes patients from 2 governorates. The inclusion criteria were: parents >18 years of age, competence in both spoken and written Arabic language, and agreement to participate in the study. Before distributing the questionnaires, the inclusion criteria were announced in each center. All potential parents in the waiting room and at the reception area of each center were approached directly by the authors (L.A., S.A.A., and S.A.) and were invited to participate in the study.

The information that would be gathered from the questionnaire and its importance in promoting awareness of the proper and urgent management of avulsion were explained to all eligible parents. Participation was voluntary and free of constraint or pressure. Written informed consent was obtained from the parents before proceeding with the study. To maintain the confidentiality of patient information, each questionnaire was given an identification number.

Study Questionnaire Content and Face Validity

A list of potential items was constructed based on a literature review of previously used questionnaires relating to the same topic [1, 4, 9–13, 15–17]. The included items, namely the replantation and proper handling of an avulsed permanent tooth, cleaning and transport media, and seeking professional help, were evaluated for their relevance to the study objectives by reviewing the current guidelines for first aid management of avulsed permanent teeth [7].

The questionnaire was pretested on 25 literate parents to evaluate comprehension, syntax, organization, grammar, appropriateness, and the logical sequence of the draft questionnaire. Based on this, some questions were rephrased and 2 pictures were added: an intraoral frontal picture showing the missing tooth and another showing the knocked-out tooth with labels that demonstrated the tooth parts, i.e., the crown and the root. Information gathered from this pilot study was excluded from the main study sample.

Data Collection Instrument

Data were collected through a self-administered questionnaire that was developed in Arabic, which is the official language of Kuwait. This was achieved through forward translation by L.A., who is a general dental practitioner familiar with the medical terms used and conversant in written Arabic. The developed questionnaire consisted of 3 distinct sections. First there was information

Table 1. Sociodemographic characteristics of the parents ($n = 554$)

	<i>n</i> (%)
Gender	
Male	224 (40.4)
Female	330 (59.6)
Age	
20–30 years	150 (27.1)
31–40 years	212 (38.3)
≥41 years	192 (34.7)
Residence	
Capital	108 (19.5)
Hawalli	66 (11.9)
Ahmadi	135 (24.4)
Mubarak Al-Kabeer	45 (8.1)
Farwaniya	104 (18.8)
Jahra	96 (17.3)
Educational level	
Primary	89 (16.1)
Secondary	203 (36.6)
Tertiary	262 (47.3)

about the parent's sociodemographic characteristics, such as gender, age, residence, and educational level. Parent age was categorized into "20–30," "31–40," and "≥41" years. Residence was categorized into "Capital," "Hawalli," "Ahmadi," "Mubarak Al-Kabeer," "Farwaniya," and "Jahra." Educational level was categorized into "primary" (compulsory schooling/below high school diploma), "secondary" (high school diploma), and "tertiary" (university degree or higher education). The next section assessed parental knowledge of the emergency management of dental avulsion, including questions covering the following areas: replantation, cleaning, transport media, and seeking professional help. To obtain this information, the parents were provided with an imaginary clinical scenario that stated: "You are in a football field and an 8-year-old boy fell down and knocked out his upper permanent front tooth." They were also shown an intraoral frontal picture with the missing tooth and another with a knocked-out tooth with labels demonstrating the tooth parts, i.e., the crown and the root. The final section covered previous knowledge of first aid measures for avulsed teeth and the source of information.

A simple scoring system was used to predict knowledge among parents in Kuwait. The questionnaire was graded based on answers to the second section. The questions were in multiple-choice format except for items 2, 3, and 8, which were binary questions. Parents were informed to respond to each question with 1 answer only. One point was earned for each correct answer, while wrong answers earned no points; the maximum possible score was 8 points. The total knowledge score of each parent was calculated by summing the number of correct answers.

Test-Retest Reliability

To examine the questionnaire reliability, a sample of 40 parents, i.e., 31 mothers and 9 fathers, completed the final format of the questionnaire twice with a 1-week interval. These questionnaires were excluded from the main study sample.

Statistical Analysis

Data analysis was performed using Statistical Package for Social Science software version 21.0 (SPSS Inc., Chicago, IL, USA). Test results of $p < 0.05$ were regarded as statistically significant. Data were descriptively analyzed using frequencies and percentages. Test-retest reliability was assessed using the kappa coefficient (as a measure of agreement between the responses of parents at times 1 and 2). The Landis and Koch criteria for interpreting agreement for categorical variables was used: ≥ 0.75 , excellent; $0.4-0.75$, fair to good; and < 0.4 , moderate or poor [18].

The dependent variable (total knowledge score) was divided into 2 groups (high or low) depending on the 50th centile value, i.e., the median, of the total knowledge score, i.e., "high" was above the median and "low" was below the median. All independent variables were included in the binary logistic regression model. The results of the binary logistic analysis were reported using adjusted odds ratios (OR) and 95% confidence intervals (CI).

Results

Participation Rate

The response rate was 91.5% (554/605). The median age of the parents was 38 years (IQR 14). Of the 554 parents, 330 (59.6%) were female, 262 (47.3%) had a university degree or higher education, and 135 (24.4%) resided in Ahmadi. The detailed sociodemographic characteristics of the parents are shown in Table 1.

Test-Retest Reliability

The test-retest reliability over a period of 1 week was fair to good for the overall score of the 8 items included in the second section (0.499 ; $p < 0.001$). Kappa values for items in the second section ranged from 0.721 ($p < 0.001$; item 2: "Attempt for self-replantation") to 0.356 ($p < 0.001$; item 7: "Urgency to seek professional help"; Table 2). Based on the values cited by Landis and Koch [19], the kappa coefficients obtained for individual items showed a fair-to-good ($0.4-0.75$) or moderate (< 0.4) degree of agreement. Hence, the questionnaire developed was a valid, reliable, and reproducible instrument, and was readily understood and accepted by the parents.

Knowledge of Emergency Management of Dental Avulsion

Of the 554 parents, 199 (35.9%) were aware that an avulsed permanent tooth could be repositioned back into its socket. About a third of parents ($n = 154$, 27.8%) responded that they would reposition the avulsed tooth by themselves, and 382 (69%) would pick up the avulsed permanent tooth by its crown. The awareness that an avulsed permanent tooth should be replanted immediately into its socket was present in 162 (29.2%) of the parents (Ta-

Table 2. Kappa coefficient (κ) for items assessing parental knowledge

Questions evaluating the knowledge of emergency management of dental avulsion		κ	<i>p</i> value
Q1	Possibility of replantation	0.662	<0.001
Q2	Attempt for self-replantation	0.721	<0.001
Q3	Avulsed permanent tooth handling	0.479	0.001
Q4	Urgency of replantation	0.558	<0.001
Q5	Appropriate cleaning media	0.621	<0.001
Q6	Appropriate transport media	0.511	<0.001
Q7	Urgency to seek professional help	0.356	<0.001
Q8	First place of contact following the injury	0.481	<0.001

ble 3, Q1–Q4). Only 182 (32.9%) identified correctly how to clean an avulsed permanent tooth prior to replantation, and 84 (15.2%) of them correctly identified the appropriate storage media for an avulsed tooth (Table 3, Q5–Q6). More than two-thirds of the parents ($n = 391$; 70.6%) would seek professional help immediately after dental avulsion, and the majority of them ($n = 525$; 94.8%) stated that they would seek dental attention following tooth avulsion, while 29 (5.2%) would seek medical help (Table 3, Q7–Q8).

The median total knowledge score of the parents was 3 (IQR 2) out of a maximum score of 8. A total of 267 (48.2%) of the parents demonstrated a high level of knowledge, while 287 (51.8%) demonstrated a low level of knowledge.

Logistic regression analysis revealed that previous exposure to information about the emergency management of dental avulsion was the only significant predictor for high knowledge (OR 2.138, 95% CI 1.347–3.395, $p = 0.001$; Table 4).

Assessment of prior knowledge of dental avulsion management revealed that 99 (17.8%) of the parents had received previous information on the emergency management of tooth avulsion: 30 (30.3%) gained the information from the internet, 19 (19.2%) from books, 12 (12.1%) from television, 6 (6%) from smart phone applications, 2 (2%) from newspapers, and 30 (30.3%) from other sources.

Discussion

In this study, responses indicated that parents in Kuwait lacked adequate knowledge for the emergency management of dental avulsion in the following areas: possibility of replantation, attempt at self-replantation, and

urgency of replantation. A poor level of knowledge was revealed in identifying suitable cleansing and transport media. Previous information on dental avulsion was the only significant predictor for adequate knowledge. No correlation was found between the participants' overall knowledge and educational level, probably due to non-inclusion of the management of acute dental trauma in school curricula. Hence, parents did not have the necessary knowledge required for handling dental emergencies.

The finding of a low overall knowledge of dental avulsion management among parents in Kuwait was similar to findings from other countries, such as Brazil, Jordan, and the UAE [13, 17, 19], in which a low level of knowledge was reported. This is unfortunate because prompt and appropriate management at the site of the injury could significantly alleviate the distress and improve the prognosis of an avulsed permanent tooth [14]. The percentage of participants who recommended immediately replanting an avulsed permanent tooth (29.2%) was lower than the 74.1% reported from a study in England [15]. This difference could be due to the participants included in the study by Addo et al. [15] being personnel working at emergency clinics, and therefore having a higher knowledge than the general population surveyed from Kuwait.

The finding that only 27.8% of the parents would reposition the avulsed permanent tooth by themselves is similar to rates reported previously: 27.6% in Chennai (India) [9], 31.8% in Haryana (India) [10], and 9.3% in Samsun (Turkey) [12]. However, a high level of knowledge regarding self-replantation was observed in a previous survey of parents and caretakers in India [11]. This might be attributed to the fact that the majority of participants had experienced previous dental trauma, and therefore might have received appropriate advice from the treating dentist. The majority of parents would pick up the avulsed permanent tooth by its crown [7], which is consistent with the current

Table 3. Knowledge of emergency management of dental avulsion

	<i>n</i> (%)
Q1 Possibility of replantation	
– Yes (correct answer)	199 (35.9)
– No	266 (48)
– Don't know	89 (16.1)
Q2 Attempt for self-replantation	
– Yes (correct answer)	154 (27.8)
– No	400 (72.2)
Q3 Avulsed permanent tooth handling	
– By its crown (correct answer)	382 (69)
– By its root	172 (31)
Q4 Urgency of replantation	
– Immediately (correct answer)	162 (29.2)
– Within 30 min	44 (7.9)
– Within a few hours	88 (15.9)
– Before the next day	66 (11.9)
– It is not urgent to put it back	194 (35)
Q5 Appropriate cleaning media	
– Scrub the tooth with toothbrush	40 (7.2)
– Cold tap water (correct answer)	182 (32.9)
– Wipe the tooth with alcohol wipe	57 (10.3)
– No need to clean it	95 (17.1)
– Don't know	180 (32.5)
Q6 Appropriate transport media	
– Milk or child's mouth if the child is not very young (correct answer)	84 (15.2)
– Paper tissue/plastic wrap	176 (31.8)
– Disinfecting solution (e.g., alcohol)	106 (19.1)
– Ice water	188 (33.9)
Q7 Urgency to seek professional help	
– Immediately (correct answer)	391 (70.6)
– Within 30 min	27 (4.9)
– Within a few hours	40 (7.2)
– Before the next day	48 (8.7)
– It is not urgent to seek professional help	48 (8.7)
Q8 First place of contact following the injury	
– Doctors	29 (5.2)
– Dentists (correct answer)	525 (94.8)

guidelines of the International Association of Dental Traumatology (IADT) and was also reported in a previous study [16]. The inability of almost two-thirds of parents in this study to identify suitable cleansing and transport media confirmed the findings of previous studies [9, 10, 12, 13]. The findings that most parents had satisfactory knowledge regarding the urgency to seek professional help, and would make an appropriate choice of first point of contact following the injury, were similar to those reported by Namdev et al. [10] and Santos et al. [13]. These

Table 4. Association between total knowledge score and independent variables: binary logistic regression

Independent variable	OR	95% CI	<i>p</i> value
Gender			
Male	0.837	0.585–1.199	0.333
Female	Ref.		
Age			
20–30 years	0.749	0.474–1.184	0.749
31–40 years	0.925	0.612–1.398	0.712
≥41 years	Ref.		
Residence			
Capital	1.028	0.505–2.096	0.938
Hawalli	1.554	0.711–3.398	0.270
Ahmadi	1.045	0.524–2.085	0.901
Mubarak Al-Kabeer	0.727	0.354–1.491	0.384
Farwaniya	0.619	0.296–1.295	0.203
Jahra	Ref.		
Educational level			
Primary	0.642	0.383–1.074	0.092
Secondary	0.791	0.538–1.162	0.232
Tertiary	Ref.		
Previous information			
Yes	2.138	1.347–3.395	0.001
No	Ref.		

OR, adjusted odds ratio; CI, confidence interval.

findings might be explained by the fact that emergency dental services in Kuwait are organized in such a way that they can be provided at any time.

In the present study, the majority of parents received health information from the Internet. The Internet has become a powerful platform for accelerating the flow of health information. However, many researchers have highlighted inadequate skills of the public in evaluating the quality of information on the Internet and in the ability to comprehend complex health-related information [20, 21]. The dental trauma smartphone application that is endorsed by and follows the current guidelines of the International Association of Dental Traumatology is a valuable educational tool. It is designed to provide parents, teachers, sport coaches, and others with effective first aid training in case of dental trauma. A recent study showed that the dental trauma app alone is an effective tool for providing knowledge to guide the public in managing dental avulsion, and it can be superior to the other educational interventions used [22]. Therefore, disseminating information on the emergency management of dental avulsion using the dental trauma app would be a valuable educational tool for parents, especially due to the immediate availability of such a tool at the place of injury.

Conclusion

This study showed that parents in Kuwait did not have adequate knowledge of the emergency management of dental avulsion because less than a third of the study participants had previously been exposed to information

on dental avulsion management. Hence, multidisciplinary approaches are needed to improve parent knowledge of the emergency management of dental avulsion. The management of acute dental trauma should therefore be incorporated early in school curricula.

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