

Awareness of Dental Trauma Management among School Teachers in Dammam, Saudi Arabia

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Abstract

Background: Children and young adolescents commonly suffer traumatic dental injuries. Teachers are frequently first responders and responsible for the initial management of the injury; the prognosis of a traumatized tooth is dependent on the initial management.

Aim: To evaluate intermediate school teachers' level of knowledge and attitudes toward dental trauma.

Materials and Methods: This is a questionnaire-based cross-sectional study where all teachers from eight non-probability selected intermediate schools in Dammam, Saudi Arabia, were invited for participation. The questionnaire elicited data regarding demographics, teaching experience, knowledge and attitudes regarding dental trauma and its management.

Results: A total 398 of 433 invited teachers responded (92%). The male-to-female ratio was 2:1. Only 30% of the respondents had previously participated in first aid training; only 11% specifically also focused on dental traumas. Health-care providers represented the main source of knowledge regarding dental trauma. Bivariate analysis revealed that in terms of attitudes toward dental trauma, urgency of care for luxation injuries was significantly associated with teaching experience ($P = 0.042$), while the urgency of care for avulsed teeth was significantly associated with dental trauma experience ($P = 0.007$). The only significant association between teaching experience and knowledge about management of avulsed teeth was regarding which tooth should be replanted ($P = 0.041$).

Conclusions: School teachers in Dammam, Saudi Arabia, lack proper knowledge in dental emergency management. Educational training programs are needed to ensure that teaching staff have adequate knowledge to effectively manage dental traumas.

Keywords: Avulsion, dental trauma, dental care for children, knowledge, Saudi Arabia, school teacher

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Submitted: 27-Jun-2020 **Revised:** 13-Aug-2020 **Accepted:** 28-Sep-2020 **Published:** 17-Jan-2022

INTRODUCTION

Over the past few decades, Saudi Arabia has witnessed an increased focus on oral health and the social, psychological, and developmental consequences of untreated oral disease and injury.^[1] Inadequate oral health knowledge among

parents and children, and subsequently, lack of appropriate oral hygiene practices and poor knowledge regarding emergency procedures were identified as primary factors contributing to poor oral health among children and adolescents in Saudi Arabia.^[2-4]

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How to cite this article: Al-Khalifa KS, AlYousef Y. Awareness of dental trauma management among school teachers in Dammam, Saudi Arabia. Saudi J Med Med Sci 2022;10:49-55.

Access this article online	
Quick Response Code:	Website: www.sjmms.net
	DOI: 10.4103/sjmms.sjmms_306_20

Traumatic injury to the dentition remains a common oral health concern, especially among young adolescents.^[2,3] Many of these injuries occur as a result of falls sustained at schools or playgrounds.^[4,5] The incidence of dental traumatic injuries globally is around 5%, with one-third of these affecting primary teeth.^[5] In one study from southern Saudi Arabia, 88% of the teachers had encountered orofacial trauma among children during sporting activity in schools.^[6] In line with this, another study found that among 4–12-year-old children, one in three was diagnosed with dental trauma.^[3] Notably, complete tooth loss is one of the most common traumatic injuries in this age group.^[3,4,7]

The prognosis of a traumatized tooth is dependent on immediate and appropriate management procedures.^[5] Considering that the peak occurrence of dental trauma in this age group is during the day,^[8-10] parents at home and teachers at schools are often the first responders, and thus, responsible for the initial management of the injury. Unfortunately, studies worldwide have noted lack of knowledge among school teachers concerning the management of dental trauma.^[11-19]

In our review of the literature, no studies were found to have assessed the dental trauma knowledge of school teachers from the Eastern Province of Saudi Arabia.^[15,20-22] Therefore, to provide policymakers with appropriate data that can be used for future educational program decisions, this study was conducted to evaluate intermediate school teachers' knowledge levels and attitudes toward emergency management of dental trauma. In addition, the study aimed to identify factors affecting teachers' willingness to take on such responsibilities.

MATERIALS AND METHODS

Study design and participants

This cross-sectional study was conducted at intermediate schools in Dammam, Eastern Province, Saudi Arabia, between February and April 2019. The sample size was calculated considering a 95% confidence level, absolute precision of 5%, and an expected level of knowledge of 50%, which was observed in similar studies conducted on teachers in Saudi Arabia.^[14,15,21] The minimum required sample size was calculated (<http://www.stat.ubc.ca/~rollin/stats/ssize/b1.html>) to be 380.

The Directorate of Education (DoE) in the province was approached to select public schools in Dammam city for recruiting participants. Prior to conducting the survey, permission was sought from educational authorities of the participating schools. The DoE authorities selected eight

schools (four male schools and four female schools), and thus were non-probability selection. All teachers in these eight intermediate schools were invited to participate in the study.

Ethical approval was obtained from the Institutional Review Board of Imam Abdulrahman Bin Faisal University, Saudi Arabia. All participants signed terms of an informed written consent. In addition, the purpose and the methodology of the survey was explained to each participant, they were assured of data confidentiality/anonymity, and informed that participation was voluntary.

Study tool and administration

A self-administered survey in Arabic was distributed by the authors to all teachers at the selected schools between February and April 2019. The questionnaire was drafted and modified from previously validated surveys in similarly developing countries,^[14,18] and was first translated to Arabic and then back translated to ensure its validity. The final version of the questionnaire was pretested on 38 school teachers, who were not included in the final sample, and it was found to be suitable and well understood. In addition, the questionnaire was validated through intra-class correlation with a strong relation of 0.74.

Questions included in the final version were multiple choice questions based on the variables shown to be significant factors influencing the attitudes and behaviors related to dental trauma. In addition, variables considered pertinent and related to health-care and educational systems were also included. Thus, the questionnaire was divided into three parts. The first part elicited data regarding demographics, teaching experience, and employment responsibilities (administrative vs. teaching). The second part contained questions related to sources for dental trauma, and if the study participant experienced an incident of dental trauma whether in person, friends, or family or in the school setting. The final part elicited data regarding the knowledge and attitudes of the respondents toward the management of dental trauma.

Statistical analysis

The data were entered and organized in a database using SPSS version 20 (SPSS Inc., Chicago, IL, USA). Data cleaning/exploratory analysis was done to overcome any missing or nonresponse values. Nonresponse values were questions not answered or completed by the participants. Instead of eliminating the whole questionnaire by participants in case of nonresponse, questions were analyzed separately according to the complete response for those questions. This was done to gather as much useful information for each question and to not lose useful data.

The results were then expressed in frequency distribution tables. In addition, a Mann–Whitney *U*-test was used to evaluate the effect of duration of teaching on attitude and knowledge and Chi-square test was used to evaluate the effect of dental trauma experience on each attitude and knowledge question. Significant differences were considered at a *P* value of 0.05.

RESULTS

The questionnaire was distributed to a total of 433 teachers, of which 398 (92%) responded. Of these, two-thirds were male, and the years of teaching experience ranged from <1 year to 32 years (mean: 9.1 ± 5.8 years) [Table 1]. Regarding dental trauma knowledge, 62% of the respondents relied on their health-care provider and 72% on the media. Further, 63% had experienced dental trauma either themselves or through people they knew.

In terms of participants' attitudes toward dental trauma, 30% of the respondents reported that they attended a first aid course, one-third of which also included information on dealing with dental trauma. On questions specific to the priority for urgency of care for dental trauma, less than half of respondents correctly identified the timing urgency in cases of luxation, fracture, or avulsion. Timing urgency for these dental injuries is defined in the questionnaire as either immediately or within the first hours after trauma. In terms of enthusiasm and interest in taking courses focused on dealing with dental trauma in the future, 84% were “somewhat interested” or “very interested” in attending such courses [Table 2].

As for questions related to knowledge toward dental trauma, few respondents agreed that the oral cavity should be protected through protective gear/equipment such as helmets (13%), seat belts (19%), and/or mouth-guards (44%). In terms of management of tooth avulsion, 79% correctly identified that permanent teeth are to be replanted; 57% correctly stated that only the crown should be held during manipulation; and 60% correctly identified that water should be used to clean the tooth surface. One in three participant correctly identified both the most appropriate medium (saliva or milk) for keeping an avulsed permanent tooth as well as the timing for returning an avulsed permanent tooth (within the first hour of avulsion) [Table 2].

In terms of attitude toward urgency of dental care, teaching experience was found to have a significant association, specifically with regards to luxation injuries (*P* = 0.042). Similarly, dental trauma experience

Table 1: Demographic information regarding survey respondents

Variables	n (%)
Gender	
Male	270 (67)
Female	128 (33)
Teaching experience (years)	
Mean±SD	9.11±5.8
Range	1-32
Dental trauma experience	
No	147 (37)
Yes	251 (63)

SD – Standard deviation

Table 2: Results of the attitude and knowledge questions about dental trauma*

Attitude	n (%)
1. Previous first aid courses	
Yes	120 (30)
No	278 (70)
2. Previous dental trauma courses	
Yes	44 (11)
No	354 (89)
3. Priority for urgency of care for dental trauma	
Luxation	
Incorrect	237 (66)
Correct	123 (34)
Fracture	
Incorrect	189 (55)
Correct	156 (45)
Avulsion	
Incorrect	192 (57)
Correct	147 (43)
4. Enthusiasm and interest in future trauma courses	
Yes	252 (84)
No	48 (16)
Knowledge	n (%)
1. Protecting the oral cavity	
a. Wearing helmets	
Incorrect	261 (87)
Correct	39 (13)
b. Wearing seat belts	
Incorrect	243 (81)
Correct	57 (19)
c. Wearing mouth-guards	
Incorrect	183 (56)
Correct	144 (44)
2. Management of tooth avulsion	
a. Which teeth should be replanted	
Incorrect	93 (31)
Correct	207 (69)
b. How to correctly hold tooth	
Incorrect	117 (39)
Correct	183 (61)
c. How to clean tooth	
Incorrect	102 (33)
Correct	207 (67)
d. Timing of reimplantation in socket	
Incorrect	215 (70)
Correct	92 (30)
e. Storage medium	
Incorrect	230 (72)
Correct	90 (28)

*The responses rates may differ between sections due to a percentage of incomplete returned surveys

had a significant association with regards to avulsed teeth (*P* = 0.007) [Table 3].

In terms of knowledge, the only significant association between teaching experience and knowledge about management of avulsed teeth was in regards to which tooth should be replanted ($P = 0.041$). None of the dental trauma knowledge-related variables were significantly associated with dental trauma experience [Table 4].

DISCUSSION

To the best of the authors' knowledge, this is the first study from the Eastern Province of Saudi Arabia that has assessed the knowledge and attitudes of school teachers toward dental trauma management. Given the age and time spent by children in grade school, it is reasonable

to expect that these teachers would frequently encounter trauma situations,^[5] and thus may be expected to provide emergency management. However, our study found that only 11% and 63% of the respondents attended a course on traumatic dental emergencies and have experience with dental emergencies, respectively. Both experiences were shown to significantly affect attitudes toward dealing with dental trauma. This is compounded by an overall low level of knowledge on specific aspects related to dental first aid protocols.

Only 30% of the teachers in the current study previously attended a first aid course, which is higher than that reported in similar studies from Saudi Arabia,^[21,23] but

Table 3: Bivariate analysis of relationship of teaching and dental trauma experience with attitude about dental trauma*

Attitude	Teaching experience		Trauma experience		
	Mean±SD	P	Yes (%)	No (%)	P
1.Previous first aid courses					
Yes	10.79±5.89	0.387	78 (30)	180 (70)	0.889
No	10.5±4.98		48 (31)	105 (69)	
2.Previous dental trauma courses					
Yes	9.76±4.98	0.335	72 (28)	186 (72)	0.739
No	9.5±4.08		63 (41)	90 (59)	
3.Priority for urgency of care for dental trauma					
Luxation					
Incorrect	9.65±5.85	0.042**	150 (65)	84 (35)	0.518
Correct	9.6±6.3		75 (61)	48 (39)	
Fracture					
Incorrect	8.48±5.11	0.739	120 (65)	66 (35)	0.695
Correct	9.2±6.4		103 (66)	54 (34)	
Avulsion					
Incorrect	7.85±4.4	0.098	114 (60)	75 (40)	0.007**
Correct	10.18±6.99		102 (69)	45 (31)	
4.Enthusiasm and interest in future trauma courses					
Yes	9.275±5.994	0.894	165 (65)	90 (35)	0.646
No	8.49±4.15		87 (60)	57 (40)	

*The responses rates may differ between sections due to a percentage of incomplete returned surveys, **Significant at $P < 0.05$. SD – Standard deviation

Table 4: Bivariate analysis of relationship of teaching and dental trauma experience with knowledge about dental trauma*

Knowledge	Teaching experience		Trauma experience		
	Mean±SD	P	Yes (%)	No (%)	P
1. Protecting the oral cavity					
Incorrect	6.78±2.64	0.632	114 (62)	69 (38)	0.602
Correct	5.29±3.51		96 (65)	51 (35)	
2. Management of tooth avulsion					
a. Which teeth should be replanted					
Incorrect	6.88±3.8	0.041**	60 (55)	48 (45)	0.427
Correct	9.99±6.32		159 (68)	75 (32)	
b. How to correctly hold tooth					
Incorrect	8±4.565	0.741	90 (68)	42 (32)	0.659
Correct	9.31±6.600		114 (62)	69 (38)	
c. How to clean tooth					
Incorrect	7.93±5.514	0.196	84 (66)	42 (34)	0.527
Correct	9.66±6.183		135 (68)	63 (32)	
d. Timing of return					
Incorrect	8.63±4.857	0.113	165 (65)	87 (35)	0.799
Correct	10.73±6.756		72 (70)	42 (30)	
e. Storage medium					
Incorrect	9.25±4.6	0.176	162 (63)	96 (37)	0.771
Correct	10.6±7.155		75 (69)	33 (31)	

*The responses rates may differ between sections due to a percentage of incomplete returned surveys, **Significant at $P < 0.05$. SD – Standard deviation

considerably lower than that reported in countries such as the United Arab Emirates, Brazil, India, and Iran.^[13,14,17,24] Similarly, knowledge regarding dental trauma protocols and attitudes toward dealing with avulsed teeth in our study respondents was similar to those reported in other areas of Saudi Arabia,^[15,20,22] but much lower than that in communities of similar countries (45–80%).^[17,20,25]

These findings highlight the need for country-wide awareness campaign targeted at increasing the teachers knowledge and attitude toward dental traumas. Similarly, a uniformly mandated annual first aid course that focusing on medical and/or dental could be initiated. However, per a 2015 report by the International Federation of Red Cross and Red Crescent Societies, only few countries worldwide have such a mandate in place.^[26] Nonetheless, given that educational interventions can positively affect teachers' knowledge and attitudes, interventions such as mandated annual first aid courses should be considered.^[27]

The current study did not obtain additional information on the dental trauma courses taken by the teachers and if these were mandated or voluntary; this information would have helped deduce strategies for increasing attitudes and knowledge toward dental trauma. This is especially important considering that recent local and international studies have also reported discrepancies in the focus on dental trauma in educational courses for health-care professionals.^[28,29]

In our study, dental trauma experience among the surveyed teachers was considerably higher (63%) than what has been reported in other studies done in similar communities such as in Al Madinah (6.2%) and Riyadh (23%), Saudi Arabia, and Samsun (40%), Turkey.^[15,20,30] This could be related to an unsafe school environment or unsupervised sporting activities on school premises.^[15,25] Supervised school activities should include ensuring safe sporting areas and making use of safety sporting gear such as helmets and mouth-guards mandatory. For a more precise understanding, a study that determines the reasons for higher dental trauma experienced in the included schools should be conducted.

Given the minimal number of teachers reporting training in dental emergencies, it was interesting to note that nearly 60% correctly identified the requirement to hold the tooth by the crown and not the root; as well as the need to wash the root with tap water or saline immediately. Additionally, when asked whether re-implantation was for avulsed primary or permanent teeth, 79% of teacher respondents answered correctly. This was almost twice the percentage

reported in studies from Brazil, India (Punjab) and Saudi Arabia (Hail) (50%, 50% and 30% respectively).^[16,19,22]

Moreover, when questioned on the proper storage media for placing an avulsed tooth in, nearly one-third chose the correct answer. This appears to be much higher than that reported in other areas of Saudi Arabia or similar communities in other countries that showed percentages between 15% and 20%.^[20,22,31] Although, the percentage of correct answers varied, nevertheless these are in accordance with recommendations reported in the literature.^[32] On the other hand, dental trauma recommendations emphasize the immediate need to replant avulsed permanent teeth as the most crucial step in ensuring the best long-term prognosis.^[10] This study found that only 30% of the respondents correctly noted the urgency of tooth replantation. When given choices of varying timing; only 20 teachers (5%) chose "immediate replacement into the socket". This is an alarmingly low percentage when compared to international surveys on the same question.^[17,19,25,31] Further detailed studies should be undertaken to reveal the source and distribution method of this information to expand on recommended knowledge and precise emergency protocols in the future.

In this study, both teaching experience and dental trauma experience with luxation and avulsion were shown to significantly affect teachers' attitude toward prioritizing the urgency of care for dental trauma. In 2019, Altamimi *et al.*^[22] showed a similar relationship related to teaching experience but not to trauma experience. Given that teaching experience is a set value that cannot be manipulated, experience related to dental trauma may be improved through dental education and training courses practicing management of such situations. This further indicates initiation of specific mandates requiring updated certification in trauma management, including dental trauma management. The motivation to follow through with this is apparent in the fact that the majority of teachers (>60%) showed interest in learning more about first-aid measures. Collaborative actions between dentists and teachers are needed to develop appropriate hands-on continuing educational programs.

Several limitations were present in this study. Given the nature of this study, a percentage of returned surveys were incomplete; therefore, a difference in response rates between various questions was noted. In addition, the present study did not comprehensively pursue information regarding teachers' educational experiences. A study in the future should be conducted to expand on aspects related to these experiences and reasons for lack of uniformity

among school teachers, the type of dental trauma courses attended, whether courses were mandated or voluntary as well as the institutional source of these courses and their knowledge reference. Furthermore, further studies are needed to analyze the reasons for the higher dental trauma experience at schools in the Eastern Province of Saudi Arabia.

CONCLUSION

The study found that in Dammam, Saudi Arabia, school teachers lack knowledge on dental emergencies and their management. A high percentage of teachers favored attending a course on dental trauma management in the future, indicating that the policymakers should consider designing educational programs targeting teachers and school administrators.

Ethical considerations

The Institutional Review Board of Imam Abdulrahman Bin Faisal University approved the study (Ref no.: IRB-2020-02-199; dated: July 1, 2020). All participants signed terms of an informed written consent. The study adhered to the principles of the Declaration of Helsinki, 2013.

Data availability statement

The datasets generated and/or analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

Peer review

This article was peer-reviewed by three independent and anonymous reviewers.

Financial support and sponsorship

None

Conflicts of interest

There are no conflicts of interest.

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