

Knowledge and Attitude of Elementary School Health-Care Providers with Regard to Emergency Management of Traumatic Dental Injuries in Kashan City

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Abstract

Background and Objectives: Dental trauma is a common problem seen in children. Since schools are one of the main places where traumatic dental injuries (TDIs) occur, school health care providers have an important role to reduce the possible consequences. The study aimed at examining the awareness and attitudes of elementary school health-care providers about the emergency management of TDIs in children. **Methods:** This cross-sectional study was conducted on all health-care providers of elementary schools in Kashan, Iran. Data were collected using a four-part questionnaire. The collected data were analyzed using descriptive statistics (percentage, frequency, mean, and standard deviation) by the SPSS 26 software. **Results:** Regarding emergency management of traumatic dental injuries, the scores of health care providers' knowledge and health care providers' attitude were 65% and 86.5%, respectively. There was no statistically significant association between the level of knowledge and a length of service, gender, and the educational level. **Conclusions:** The elementary school health-care providers did not have a high level of awareness about how to deal with TDIs.

Keywords: Attitude, knowledge, tooth avulsion, tooth injuries, trauma

INTRODUCTION

Traumatic dental injuries (TDIs) in children are a significant oral health issue worldwide.^[1] The world TDI prevalence among 12-year-old children^[2] and the prevalence of TDIs in East Iranian school children^[3] have been reported 18.1% and 22.9%, respectively. The results of a similar study conducted in Hamedan showed that more than half of TDIs occur at schools.^[4]

Falls and collisions, sporting activities, violence, and traffic accidents are the main cause of TDIs.^[5] Traumatic injuries are an upsetting experience on a physical level which may also affect emotional and psychological levels.^[6] The physical impacts of TDIs may cause pain, loss of function, and it could adversely affect the developing occlusion and esthetics.^[7] The psychosocial impacts of a TDIs are unique to each patient,

influencing their treatment preferences, resilience, and ultimate recovery.^[8] Thus, these situations can have a negative impact on the life of children.

Although TDIs are not entirely preventable, there are some ways to minimize the risk. For young children, child-proofing home safety tips can be effective to decrease the risk of falls and injury. For older children who participate in sports, the use

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of protective gear-like mouth guards and helmets can minimize the risk of TDIs.^[9]

When a tooth is avulsed during trauma, tooth replantation is a technique by which a dentist or an informed and capable person can put a tooth back in its place. Today, it has been proven that the best primary treatment for an avulsed tooth is immediate replantation within 60 min after an injury. If school teachers cannot do replantation, the tooth should be kept in special solutions such as cold milk, normal saline, the patient's saliva, or egg white, and then, the patient should be immediately referred to a dentist.^[10-13] Therefore, the prognosis for success often depends on the rapidity of treatment, irrespective of whether the procedure is involving protecting a large area of exposed dentin or treating a vital pulp exposure.^[14]

As mentioned, one of the common places where TDIs occur is in school.^[14,15] Since teachers are frequently dealing with TDIs among children in schools, they are considered as the first immediate seniors for children when an accident occurs.^[16] Therefore, their knowledge about the emergency management of TDIs is a vital factor for the prognosis of injured teeth and in assisting the injured person to receive an immediately appropriate first-aid treatment.^[15]

Numerous studies have been conducted to determine the level of knowledge and attitude of school teachers that some of them are elementary school health-care providers (ESHCPs) regarding emergency management of TDIs in different countries, which shows the inadequacy of knowledge in this field.^[15,17-22] Furthermore, other studies have been conducted in different cities of Iran that show school teachers did not have sufficient knowledge about emergency management of TDIs.^[4,23-26]

According to the results of studies conducted in different cities of Iran and abroad which show the low level of knowledge of teachers and ESHCPs with regard to Emergency Management of TDIs and also the lack of research and statistical studies in this field in Kashan city, the authors decided to perform this research. Hence, this study aimed at evaluating the knowledge and attitude of ESHCPs in Kashan regarding an emergency management of TDIs using a four-part questionnaire.

METHODS

This cross-sectional study was conducted on 46 school health-care providers employed by the Kashan Education Department in 2020. The inclusion criteria were considered as part-time or full-time employment and willingness to cooperate and participate in the research. The exclusion criteria were considered as the incompleteness of the questionnaire. This study was adherent to the Strengthening the Reporting of Observational Studies in Epidemiology statement. The flowchart of the study steps is shown in Figure 1.

Data were collected using Porsline as an online survey because of school closures, due to the COVID-19 virus pandemic. Data collection occurred for 1 month starting from May 2020.

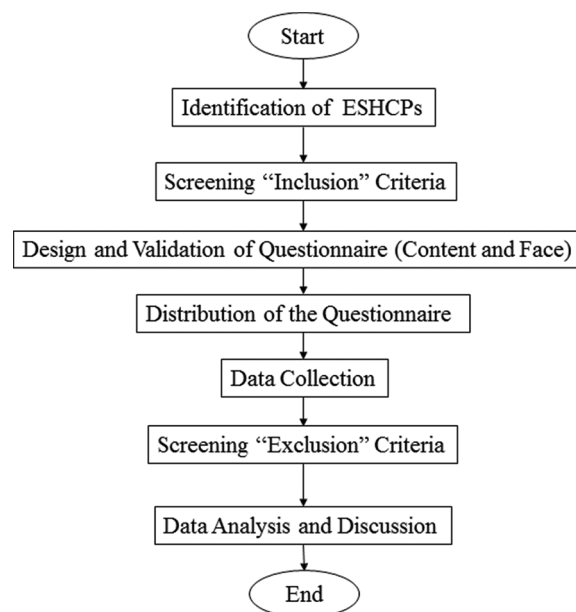


Figure 1: Flowchart of study steps

After obtaining the research ethical license by the Ethics Committee of Kashan University of Medical Sciences (IR.KAUMS.MEDNT.REC.1398.138), by referring to the Kashan Education Department, the list and phone number of individuals were extracted and the study objectives and individuals were described through phone and they were invited to cooperate in the study. Then, verbal consent was obtained from all participants. They were informed that they could withdraw from the study at any time. All questionnaires were anonymous and the participants were assured of the confidentiality of their information.

In this study, a researcher-made questionnaire was used. In order to develop the questionnaire, a review of previous studies^[1,4,14,18,23,27,28] and an evaluation of existing tools were conducted. The basic items of the questionnaire were extracted with the aim of assessing the current knowledge and attitude of ESHCPs regarding the emergency management of TDIs. To assess the content validity of the questionnaire, the opinions of five health education specialists with master's degrees and over along with five dental specialists were applied. To calculate the content validity index, relevance, clarity, and simplicity of all items were investigated using a 4-point Likert scale with 0.8 and more cutoff. The questionnaire was distributed to five random ESHCPs for face validation, and it was evaluated using a 5-point Likert scale.

The questionnaire consisted of four parts. The first part had seven questions about personal data included age, gender, educational level, history of job, dental trauma first-aid training background, having any experience of tooth injury in school, and a type of school where they work. The second part consisted of eight questions about the attitude of ESHCPs in the emergency management of TDIs. The third part contained 18 multiple-choice questions about the knowledge of ESHCPs about emergency management of TDIs. It consisted of two case scenarios and some general questions. The first case

consisted of questions regarding moderate trauma involving partial crown fracture and the second case comprised questions regarding tooth avulsion. The fourth part of the questionnaire included three questions about self-assessment and the source of information on ESHCPs regarding emergency management of TDIs in school.

Ultimately, there are two total scores, one of which indicates the knowledge and level of awareness of ESHCPs about TDIs, and the other shows their attitude toward gaining knowledge about TDIs, performing the assigned task, and their responsibility. For statistical analysis, answers to the 18 knowledge questions were collected as correct or incorrect, and each of the correct answers was given a score of 1, and the wrong answer a score of 0. Similarly, a score of 1 was assigned for a positive attitude and a score of 0 for a negative attitude with regard to the 8 questions of the attitude part.^[1,4,14,23,24] Therefore, in the knowledge section, the maximum score is 18 (the highest level of knowledge) and the minimum score is zero (the lowest level of knowledge). In the attitude section, the maximum score is 8 (the best attitude) and the minimum score is zero (the worst attitude).

Statistical analysis was performed by the SPSS software version 26 (IBM Corp, University of Chicago, Illinois, USA). Descriptive statistics included percentages, frequencies, mean and standard deviation were used. To compare between-group comparisons, after checking normality with the appropriate test, the independent *t*-test and one-way ANOVA were used and in cases, with skewed distributions, the nonparametric Mann–Whitney and Kruskal–Wallis tests were used. The level of significance was set at 0.05.

RESULTS

A total of 46 questionnaires were distributed and all the questionnaires were filled with 100% response rate. Of 46 participants, 58.7% (*n* = 27) were female and 41.3% (*n* = 19) were males. The age ranged from 25 to 58 years. Demographic data of the participants and their relationship with their level of knowledge and attitude are provided in Table 1.

The questionnaire consisted of four parts with Cronbach’s alpha 0.81. The first part includes seven questions about demographic data. The second part consists of eight questions about attitude. The third part contains 18 multiple-choice questions about the knowledge. The fourth part of the questionnaire considers three questions about self-assessment and the source of information on ESHCPs regarding emergency management of TDIs in school. Figure 2 shows the relationship among the mentioned parts. The demographic data is the baseline. Attitude and knowledge are considered as screen parameters. Thus, each arrow shows the relation between base/screen or screen/screen parameters.

The mean and standard deviation of the “attitude” part was 6.92 ± 1.2 out of 8 (86.5%). All of the ESHCPs believed

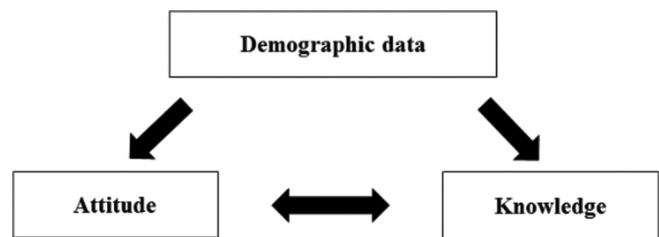


Figure 2: Diagram of relationship among the base and screen parameters

Table 1: Demographic data of the participants and their relationship with their level of knowledge and attitude

Variable	Demographic data		Knowledge		Attitude	
	Characteristic	<i>n</i> (%)	$\bar{X} \pm SD$	<i>P</i>	$\bar{X} \pm SD$	<i>P</i>
Age (years)	<30	14 (30.4)	13.2±3.1	0.045	7.5±0.9	0.046
	30-39	16 (34.8)	11±2.9		6.8±1.1	
	≥40	16 (34.8)	11.1±2		6.4±1.4	
Gender	Male	19 (41.3)	12±3.2	0.516	7.1±1	0.314
	Female	27 (58.7)	11.4±2.5		6.7±1.3	
Level of education	Diploma	12 (26.1)	12±2.9	0.799	6.9±1.3	0.618
	Bachelor’s degree	26 (56.5)	11.7±2.9		6.7±1.2	
	Master’s degree or higher	8 (17.4)	11.1±2.4		7.2±1	
Length of service	<5	18 (39.1)	12±3.6	0.224	7.2±1.2	0.279
	5-20	15 (32.6)	12.3±2.3		6.8±0.9	
	>20	13 (28.3)	10.5±1.8		6.5±1.5	
Dental trauma first aid training background	Yes	19 (41.3)	12.7±2.4	0.03	6.9±1.1	0.987
	No	27 (58.7)	11±2.9		6.9±1.3	
Experience of witnessing tooth injury in school	0	21 (45.6)	11.7±3.5	0.761	7±1.3	0.207
	<10	21 (45.6)	11.9±2.3		7±1	
	>10	4 (8.7)	10.5±1		5.75±1.7	
Type of school	Public	18 (39.1)	10.9±2.7	0.21	6.2±1.4	0.007
	Private	9 (19.6)	12.9±2.7		7.2±1	
	Other	19 (41.3)	11.8±2.9		7.4±0.8	

Significant differences are highlighted in bold text. SD: Standard deviation

that “time” is an important factor in saving a damaged tooth. Furthermore, “gaining skills” in emergency management of TDIs should be considered as an educational priority; thus, these two factors got the highest score 100% ($n = 46$). In contrast, the lowest score with 63% ($n = 29$) belonged to this item; “Due to some legal considerations, ESHCPs should refrain from interfering in the management of dental trauma.” More details are shown in Table 2.

The result of the third part of the questionnaire is indicated in Tables 3-5. The result of an imaginary case is presented in Table 3 as a mild TDI and also the result of an imaginary case regarding tooth avulsion has been shown in Table 4. Table 5 also shows the general questions about ESHCPs’ knowledge. The knowledge questions of the three cases consist of 18 questions. The mean and standard deviation of the knowledge score for all the ESHCPs were obtained 11.7 ± 2.8 out of 18 (65%). When it comes to genders, there was no significant difference between males and females. The age group <30 years experienced the highest score of knowledge compared with other groups ($P < 0.05$).

The last part of the questionnaire indicates the distribution of responses regarding “self-assessment and the source of information”. In this study, 89.1% ($n = 41$) of ESHCPs declared a lack of knowledge in the realm of emergency management of TDIs and expressed their desire to participate in any related workshops. Moreover, according to the participants’ answers, the majority order of collecting information about TDIs is as dentists >social networks (Telegram, Instagram, etc.) >retraining and workshops >and other people working in the health sector [Table 6].

DISCUSSION

In the present study, the participants’ knowledge score (65%) indicates the lack of awareness among ESHCPs concerning how to deal with emergency TDIs. This finding was similar to the other studies conducted by Nirwan *et al.*^[29] and Mehrabkhani *et al.*^[24] that reported scores of 67.1% and 53.3%, respectively. The similar results in these studies probably are due to a worldwide lack of instruction in TDIs, which shows the necessity for critical revision in instruction methods and opportunities.

Moreover, there was no significant relationship between the participants’ level of knowledge and their gender. Although Pithon *et al.* indicated female school teachers had more knowledge and this difference was statistically significant,^[30] in some other studies, no significant relationship was observed between the participants’ level of knowledge and their gender.^[4,17,29,31] In all of these studies, there was no significant difference in the number of responders based on their gender and also two genders had equal training opportunities. Therefore, if there are equal educational and employment opportunities for men and women, an equal level of knowledge and performance can be expected to face TDIs.

Table 2: Distribution of responses regarding attitude for management of traumatic dental injuries

Questions	Agree <i>n</i> (%)	Disagree <i>n</i> (%)
In the case of traumatic dental injuries, there are no legal considerations that will put health care providers in trouble	10 (21.7)	36 (78.3)
Time plays an important role in saving a damaged tooth	46 (100)	-
Gaining skills in emergency management of dental traumatic injuries should be considered as an educational priority for school health care providers	46 (100)	-
Dental traumatic management is not an emergency	4 (8.7)	42 (91.3)
Health care provider’s intervention in school dental injuries plays an important role in saving a damaged tooth	43 (93.5)	3 (6.5)
Emergency management of traumatic dental injuries is a highly specialized subject and requires specialized university education. So, there is no responsibility for school health care providers	15 (32.6)	31 (67.4)
Due to some legal considerations, school health care providers should refrain from interfering in the management of dental trauma	17 (37)	29 (63)
Short-term training can improve the knowledge and practice of school health care providers in the management of dental traumatic injuries	44 (95.7)	2 (4.3)

Positive attitude answers are highlighted in bold text

Table 3: Responses of elementary school health care providers regarding knowledge of mild traumatic dental injuries (case scenario 1)

Questions	Answers	<i>n</i> (%)
Case 1: The ball hit the face of a 9-year-old student and the front tooth of his upper jaw was broken		
A most likely the broken tooth is	Primary tooth (milk tooth)	17 (37)
	Permanent tooth	15 (32.6)
	Not sure	14 (30.4)
Your immediate emergency management in this condition is	Reassure the child and put her to rest	1 (2.2)
	Contact to his/her parents	21 (45.7)
	Find the fractured part of the teeth and send the child to the dentist immediately	24 (52.2)

Correct answers are highlighted in bold text

According to the findings of the present study, a higher level of knowledge was found among ESHCPs in the age group <30 years. Furthermore, the use of social networks to obtain information about the emergency management of TDIs among ESHCPs got the second rank after dentists. In this regard, Rouhani *et al.*^[26] also reported a significant association between knowledge and the age group and found that the most correct answers belonged to the 20-to-30-year age group. Considering the

Table 4: Responses of elementary school health-care providers regarding knowledge of tooth avulsion (case scenario 2)

Questions	Answers	n (%)
Case 2: A 12-year-old boy fell and after examination, the front tooth of her upper jaw was absent		
Your immediate emergency management in this condition is	Stop bleeding then refer to dentist	7 (15.2)
	Wash the avulsed tooth and put it back in its place and then refer to dentist	20 (43.5)
	Preserving the avulsed tooth in the child's oral environment and then refer to dentist	17 (37)
	Put the avulsed tooth in the paper and then refer to dentist	2 (4.3)
In case of traumatic dental injuries, which would be the first place you would contact?	General physician	0
	Pediatrician	2 (4.3)
	Hospital	3 (6.5)
	Medical school	1 (2.2)
	General dentist	24 (52.2)
	Pediatric dentist	15 (32.6)
	Endodontist	1 (2.2)
Inquiry into the history of tetanus vaccine in students is	Necessary	35 (76.1)
	Not necessary	11 (23.9)
What do you do if avulsed tooth is in a dirty environment?	Rinse it with tap water and return it to its place	32 (69.6)
	Rinse it with sponge and soap, then return it to its place	9 (19.5)
	Return it to its place without any special action	1 (2.2)
	Throw away the tooth	4 (8.7)
If you can not put the tooth in its place, in what environment you send it to the dentist?	Put it in ice	1 (2.2)
	Put it in liquid	22 (47.8)
	Inside the mouth in contact with saliva	10 (21.7)
	In the hand of the student	0
	Put it in a napkin	13 (28.3)
The optimal transfer environments for placing the extracted tooth in it and send it to the dentist?	Water	6 (13)
	Fresh milk	18 (39.1)
	Saliva	14 (30.4)
	Alcohol	2 (4.3)
	Normal saline	1 (2.2)
	Disinfectant solution	4 (8.7)
	Egg white	1 (2.2)
The best time to put the avulsed tooth back in its place is	Immediately	24 (52.2)
	Within 30 min	11 (76.1)
	Within that day	9 (19.6)
	Time does not matter	2 (4.3)

Correct answers are highlighted in bold text

more tendency of young people to use social networks, the higher level of awareness can be justified among ESHCPs <30 years.

Participants showed a high level of attitude regarding emergency management of TDIs. This result is comparatively higher than the other study conducted by Sharma *et al.*^[14] Unlike the current study in which 73.6 (n = 34) of individuals had a bachelor's degree or higher, the majority of participants in the Sharma *et al.* study had diploma degrees which could be the probable reason leading to lower attitude scores. It suggests having a higher degree could play a positive role in improving an individual's attitudes towards the emergency management of TDIs. Moreover, comparison of the age groups indicated that the individuals under the age of 30 had the highest attitude and, as mentioned, these individuals also had the highest level of knowledge. Therefore, raising the level of knowledge may improve the level of attitudes of individuals towards TDIs.

When ESHCPs were asked if you cannot put the avulsed tooth back in its place, in what environment you send it to the dentist, only 47.8% responded correctly in a liquid such as milk. In Mehrabkhani *et al.*^[24] study, only 33.1% selected milk as the best storage media for an avulsed tooth; In Blakytyn *et al.*^[32] study, 45.6% of the participants chose milk as a suitable media and in McIntyre study,^[33] 34% of the participants selected milk. Although the knowledge of our participants in this field does not seem to be sufficient, it is higher than other similar studies. In most of these studies, participants were school teachers but only a special part of the school teachers who were health care providers have been evaluated in this study. Given the connection of their work and study field to the management of traumatic injuries, a higher level of knowledge is probably not unexpected.

The majority of respondents (89.1%) expressed an interest to participate in retraining workshops about emergency

Table 5: Responses of elementary school health care providers regarding knowledge (general questions)

Questions	Answers	n (%)
For which group of teeth, dental trauma is more dangerous?	Primary teeth (milk tooth)	5 (10.9)
	Permanent teeth	28 (60.9)
	The same for both groups	13 (28.3)
A 10-year-old student lost consciousness during exercise due to falling. What is your action?	Trying to wake up the student and then send her/him home	1 (2.2)
	Immediate transfer of the child to the hospital	45 (97.8)
Do you know how the teeth are naturally placed in the jaw that does not come out of place when chewed?	Ligament	20 (43.5)
	Bone	16 (34.8)
	Arteries and nerves	10 (21.7)
Is it possible for an avulsed tooth having its function as it did before the injury by putting it back to its place?	No	5 (10.9)
	Yes	41 (89.1)
Should the primary (milk) tooth be put back in its place if it comes out of socket?	Yes	21 (45.7)
	No	25 (54.3)
Should the permanent tooth be put back in its place if it comes out of the socket?	Yes- as soon as possible	28 (60.9)
	Yes- after a period of time for initial repair and stop bleeding	16 (34.8)
	No - the best treatment is the use of implants	2 (4.3)
If we want to clean the contaminated tooth that has come out of its place, how should it be washed?	With water - keep the tooth from the crown, any manipulation of the root should be avoided	28 (60.9)
	Disinfectants- keep the tooth from the root, clean the root completely from debris and particles	9 (19.6)
	The person's own saliva - keep the tooth from the crown, clean the root completely from debris and particles	8 (17.4)
	Alcohol - it does not matter where the tooth is kept, it does not matter if the root is cleaned or not	1 (2.2)
Which areas are most at risk of injury?	Lips	5 (10.9)
	Upper anterior teeth	35 (76.1)
	Lower anterior teeth	5 (10.9)
	Posterior teeth	1 (2.2)
The lateral incisor of a 7-year-old child is fractured. Can you determine the type of tooth?	Primary tooth	24 (52.2)
	Permanent tooth	22 (47.8)

Table 6: Distribution of responses regarding self-assessment and the source of information

Questions	Answers	n (%)
Do you have enough knowledge in the field of emergency management of traumatic dental injuries?	Yes	5 (10.9)
	No	41 (89.1)
Would you like to participate in any training workshops on how to manage dental injuries?	Yes	41 (89.1)
	No	5 (10.9)
In which source do you often get your information on emergency management of dental injuries?	Media (television, newspapers, magazines, etc.)	6 (13)
	Social networks (Telegram, Instagram, etc.)	10 (21.7)
	Retraining and workshops	6 (13)
	Dentists	17 (37)
	Other people working in the health sector	7 (15.2)

management of TDIs. A similar finding was observed in some studies conducted by Al-Jundi *et al.*^[18] and Sharma *et al.*^[14] Since 89.1% of the participants also declared a lack of knowledge toward the emergency management of TDIs, the desirability to take training courses is compatible

with feeling the lack of information, which is shown in all studies.

Concerning the increasing use of social networks for getting information among people,^[34] it seems helpful to use this source for informing ESHCPs. Social networks can be effective for instruction by making animations, short educational videos, podcasts, etc., and transfer them to the target groups besides holding continuous retraining courses seems suitable. It is suggested that in future studies, the impact of using social networks to improve the knowledge of ESHCPs with regard to emergency management of TDIs be examined and studied.

Since in this study a researcher-made questionnaire was used, it was not possible to compare the results of this study results with those of other studies, as the main limitation. Moreover, the absence of control and experimental groups due to the COVID-19 virus pandemic was the other limitation of the current study, which led us to implement an online survey.

CONCLUSIONS

Findings of the present study show that the knowledge of ESHCPs about the emergency management of TDIs in Kashan does not adequately meet the professional demands. Thus, increasing the health care providers' knowledge using extra

dental trauma management courses is a must. Moreover, providing comprehensive and sufficient information has a positive effect on attitude and self-assessed competence. To achieve adequate awareness, the distribution of brochures, posters, and educational handouts in the schools can be helpful.

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Conflicts of interest

There are no conflicts of interest.

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