Knowledge and Attitudes of Elementary Schoolteachers on Dental Trauma and its Management in Yazd, Iran

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KEY WORDS
Dental Trauma; Avulsion; Child; School teachers; Attitude; Knowledge;

ABSTRACT
Statement of the Problem: School is one of the places with the greatest prevalence of occurrence of traumatic dental injuries.

Purpose: The aim of this study was to assess the knowledge levels and attitudes of elementary school teachers towards dental trauma and its management.

Materials and Method: In this cross-sectional study, 281 elementary school teachers were selected through cluster sampling to answer the prepared questionnaire. The data obtained from the questionnaires were analyzed in SPSS software by using ANOVA test and t-test. p Value<0.05 was considered to be significant.

Results: The total knowledge and attitude were low and normal, respectively. No previous exposure to or close observation of a dental trauma was reported by 61.2% of teachers; while, 12.5% were trained on dental traumas first aid management. There was statistically significant relationship between the teacher’s knowledge and previous first aids training.

Conclusion: The knowledge of schoolteachers on emergency management of dental trauma is poor. Therefore, it seems to be helpful to consider the management of dental injuries especially avulsed teeth as a part of teachers’ education.

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Introduction
Dental trauma is very common in childhood. Based on epidemiologic studies, 50% of children experience dental trauma [1-4] and about 35% of children and adults experience trauma to permanent teeth. [5-7] Accordingly, the prevalence of dental trauma ranges from 4.9% to 37% in different countries. [8-9] Progressive increase of prevalence of dental trauma necessitates comprehensive education about such injuries. [5, 10-11] Dental trauma usually accompanies injuries of lips, gingiva, tongue, and jaws which may lead to serious physiological, psychological, and financial adverse outcomes that negatively influence the quality of life. It is also estimated that 16% of dental traumas negatively alter the facial development and appearance of children. [12]

Regardless of age and gender, dental injuries are one of the most painful injuries due to the highly sensitive orodental tissues. [1-2, 13] According to the American Academy of Pediatric Dentistry (AAPD), one of the most prevalent dental injuries is tooth avulsion, which is accounted for 0.5-16% of all traumatic dental injuries in childhood. The maxillary anterior teeth are the most common avulsed teeth, especially those that are protruded. [14] Falling is the main reason of such trauma. [15] Dental trauma usually occurs at home or at school. It is shown that trauma in school account for half of total dental trauma. [16-20] Furthermore, according to Marcense et al. [10] one fifth of schoolchildren experiences dental trauma. Therefore, teachers’ awareness in management of such situations including the storage
media, tetanus vaccine, and other first aid measures can be of vital significance for both saving the teeth and maintaining the child’s general health.

Many studies assessed the teachers’ knowledge of first aid measures. However, it has not been well investigated in developing countries including Iran. Judy et al. [17] found that awareness of teachers was 1%. Moreover, Chan et al., [18] Sae-Lim and Lim [19] reported the awareness of 17.5% and 71%, respectively. Many similar studies showed the lack of sufficient awareness and the need for further education in teachers. [21-25] Two comparable studies were conducted in Iran, reporting the awareness of Iranian teachers in an Iranian urban area, [20] and lack of enough awareness of teachers in Tehran. [26] However, no Iranian study demonstrated whether teachers in Yazd are knowledgeable enough to manage an emergency case of dental trauma. Therefore, the aim of this study was to assess the knowledge level and attitudes of elementary schoolteachers towards dental trauma and its management in Yazd, Iran.

Materials and Method
In this descriptive cross-sectional study, cluster sampling was used to recruit 281 elementary school teachers from 22 schools (11 girls’ school and 11 boys’ school) in Yazd, Iran. The informed consent was obtained at enrollment. The ethical approval was obtained from the Ethics Committee of the Dental Research Center at Shahid Sadoughi University of Medical Sciences (Yazd, Iran).

Validity of the questionnaire was approved by the Institutional Review Board (IRB). In order to confirm the reliability of the questionnaire, a pilot study was carried out on 20 subjects who were not included in the study. The data collected from the pilot study was analyzed by using SPSS software. The reliability coefficient (Cronbach alpha) was 0.83, indicating an acceptable reliability. The standardized questionnaire was completed by teachers in schools. All the present teachers at the time of the study were included. Those reluctant to participate, and incomplete questionnaires were excluded from the study. Part 1 included demographic questions. (Table 1) Part 2 contained nine questions on teachers’ attitude. (Table 2) In part three, trauma cases were presented with nine related questions. (Table 3) Part 4 contained three questions on self-assessment of teachers about their ability of emergency management of dental trauma. (Table 4) The questions were partially obtained from Caglar et al.’s study. [24]

| Table 1: Part 1- Demographic characteristics of respondents |
|-----------------------------------------------------------|
| Demographic Information | N (%) |
|--------------------------|-------|
| Gender |       |
| Female | 176 (62.6%) |
| Male | 105 (37.4%) |
| Age |       |
| 24-34 | 117 (41.6%) |
| 35-39 | 81 (28.8%) |
| 40-59 | 83 (29.6%) |
| Education |       |
| High school diploma | 56 (19%) |
| Bachelor’s degree | 217 (77.2%) |
| Master’s degree | 8 (2%) |
| Field of education |       |
| Experimental sciences | 98 (34.9%) |
| Mathematics | 55 (19.6%) |
| Human sciences | 114 (40.6%) |
| Arts | 14 (5%) |
| Received first aid education |       |
| Yes | 144 (51.2%) |
| No | 137 (48.8%) |
| Received dental traumas education |       |
| Yes | 35 (12.5%) |
| No | 246 (87.6%) |
| Dental trauma experience around |       |
| Yes | 172 (61.2%) |

In order to calculate the knowledge score, the correct answers and incorrect answers counted 1 and 0 point, respectively. Therefore, the score range was between 0 and 15. The knowledge scores more than 10.5 was considered as good, between 7.5 and 10.5 as medium, and less than seven as low. The same was applied to calculate the attitude score; and the range was between 9 and 45. The scores >36 was considered as good, 27-36 as normal, and lower than 28 as low level of attitude.

The data were analyzed by using SPSS software, version 17 (SPSS® Inc.) T-test and ANOVA were employed as appropriated. p< 0.05 was considered to be statistically significant.

Results
This study was done on 281 teachers including 176 females and 105 males. Table 1 represents the results of the first part of the questionnaire (demographic data). Nearly half of the participants had passed first aid training courses. However, only 35 teachers were trained in first aids of dental trauma. Moreover, 61.2% of participants had not encountered any dental trauma case previ-
Table 2: Part 2- teachers’ attitude

| Question                                                                 | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|-------------------------------------------------------------------------|-------------------|----------|---------|-------|----------------|
| Teachers are not responsible for dental traumas in school.              | Strongly disagree | 61(21.7%)| 110(39.1%) | 65(23.1%) | 35(12.5%) | 10(3.6) |
| Having knowledge of dental trauma emergency management can improve the prognosis of treatment. | Strongly disagree | 2(0.7%) | 22(7.8%) | 31(11%) | 139(49.5%) | 87(31%) |
| The avulsed tooth will surely be missed. Therefore, no treatment is necessary. | Strongly disagree | 93(33.1%) | 106(37.7%) | 3(18.9%) | 24(8.5%) | 5(1.8%) |
| Emergency management of dental trauma should be emphasized in training of teachers. | Strongly disagree | 11(3.9%) | 14(5%) | 42(14.9%) | 14(54.8%) | 60(21.4%) |
| Dental trauma is not an emergency.                                      | Strongly disagree | 3(1.1%) | 22(7.8%) | 34(12.1%) | 124(44.1%) | 96(34.2%) |
| Teachers’ intervention in dental injuries occurred in school may have a crucial role in survival of teeth. | Strongly disagree | 3(1.1%) | 15(5.3%) | 44(15.7%) | 157(55.9%) | 62(22.1%) |
| Treatment of dental trauma is a professional job and therefore needs special training. | Strongly disagree | 2(0.7%) | 3(1.1%) | 27(9.6%) | 140(49.8%) | 109(38.8%) |

Table 3 shows the teachers’ assessment of their dental trauma management abilities.

...ously. Table 2 shows the results obtained from the second part of the questionnaire (teachers’ attitude). More than 60% of teachers believed themselves to be responsible for dental injuries in school. About 70% stated that being knowledgeable in emergency management of dental trauma could improve the prognosis of traumatized teeth.

According to the results of T-test and ANOVA statistical tests, there was no significant relationship between knowledge as well as attitude and demographic data, education, and the field of study \((p < 0.05)\). (Tables 5-8) However, the relationship between teachers’ Knowledge and first aid/dental emergencies education was observed to be statistically significant. (Tables 9 and 10) Furthermore, the mean knowledge score of teachers in boys’ school was significantly more than girls’ school. (Table 11)

No significant relationship existed between the attitude scores and teachers’ education, gender, first aid training, and being in a boys or girls school \((p > 0.05)\). (Tables 6, 8, and 11) Table 3 shows the teachers’ assessment of their dental trauma management abilities.
**Table 3: Part 3 - teachers’ knowledge (correct answers are italicized).**

| Questions                                                                 | n (%)      |
|---------------------------------------------------------------------------|------------|
| Case 1: A 9-year-old student was hit in the face while playing soccer during school hours. His upper front tooth was broken. However, there was not any other damage. |            |
| Q1. What kind of tooth is the damaged tooth?                              |            |
| a. Deciduous                                                             | 55(19.6%)  |
| b. Permanent                                                              | 158(56.2%) |
| c. Do not know                                                            | 68(24.2%)  |
| Q2. Which action is the best solution?                                    |            |
| a. Appraising the child and continue the class.                          | 14(5%)     |
| b. Calling parents and ask them to visit a dentist.                      | 123(43.8%) |
| c. Searching for the tooth fragment and send the child to the dentist.   | 108(38.4%) |
| d. Would not know how to act.                                            | 30(10.7%)  |
| Case 2: During school hours, a 12 year-old girl fell from stairs and hit in the mouth. The upper teeth are not visible, and there is bleeding in the mouth. |            |
| Q3. What should you do?                                                  |            |
| a. Stop bleeding by getting her to bit on a handkerchief.                 | 89(31.7%)  |
| b. Look for the tooth, wash it, and replace it.                          | 21(7.5%)   |
| c. Ask her to hold the tooth in mouth and take her immediately to the dentist. | 78(27.8%)  |
| d. Put the tooth in an envelope and take the girl to the dentist after school. | 30(10.7%)  |
| e. Would not know how to act.                                            | 63(22.4%)  |
| Q4. Where is the first place that you would seek treatment?              |            |
| a. General physician                                                     | 7(2.5%)    |
| b. Pediatric physician                                                   | 9(3.2%)    |
| c. Hospital                                                              | 41(14.6%)  |
| d. Dental school                                                          | 35(12.5%)  |
| e. General dentist                                                        | 61(21.7%)  |
| f. Pediatric Dentist                                                      | 92(32.7%)  |
| g. Endodontist                                                            | 26(9.3%)   |
| h. General dentist                                                        | 10(3.6%)   |
| Q5. Do you ask if the child had received tetanus vaccine?                 |            |
| a. Yes                                                                    | 189(67.3%) |
| b. No                                                                    | 92(32.7%)  |
| Q6. What would you do if the tooth fell on the dirty ground?              |            |
| a. Rinse the tooth under tap water and replace it into the socket.        | 47(16.7%)  |
| b. Remove the dirt by soap and sponge and then replace it into the socket. | 62(22.1%)  |
| c. Replace it into the socket without cleaning it.                       | 8(2.8%)    |
| d. Discard the tooth.                                                     | 29(10.3%)  |
| e. Would not know how to act.                                            | 135(48%)   |
| Q7. How would you transport the tooth to the dentist, if you could not replant the tooth? |            |
| a. Ice                                                                    | 27(9.6%)   |
| b. A liquid                                                               | 75(26.7%)  |
| c. The child’s mouth                                                      | 19(6.8%)   |
| d. The child’s hand                                                       | 20(7%)     |
| e. Paper tissue                                                           | 84(29.9%)  |
| f. Would not know                                                         | 74(26.3%)  |
| Q8. What liquid would you use to transport the tooth to the dentist?      |            |
| a. Tap water                                                              | 56(19.9%)  |
| b. Fresh milk                                                            | 50(17.8%)  |
| c. Saliva of the child                                                    | 33(11.7%)  |
| d. Alcohol                                                               | 17(6%)     |
| e. Normal saline                                                          | 58(20.6%)  |
| f. Antiseptic solution                                                    | 67(23.8%)  |
| Q9. When is the best time to replant the tooth, if the tooth is avulsed?  |            |
| a. Immediately                                                            | 95(33.8%)  |
| b. Within 30 minutes after stopping the bleeding                          | 47(16.7%)  |
| c. Before the next day                                                    | 18(6.4%)   |
| d. Time is not important                                                  | 12(4.3%)   |
| e. Would not know                                                         | 109(38.8%) |

**Table 4: Part 4 - The teachers’ self-assessment**

| Question                                                                 | Answer | n (%)      |
|---------------------------------------------------------------------------|--------|------------|
| Q1. Do you think your knowledge on dental emergencies and its treatments is enough? | Yes    | 15 (5.3%)  |
| No                                                                        | 266(94.7%) |
| Q2. Do you need more education on dental emergencies and its treatments? | Yes    | 266 (94.7%)  |
| No                                                                        | 15 (5.3%) |
| Q3. Can you react properly in the limited time if you encounter dental injuries in a student? | Yes    | 97 (34.5%)  |
| No                                                                        | 184(65.5%) |

**Table 5: Comparison of knowledge and attitude score of different age groups (p = 0.453 and 0.631, respectively).**

| Age (years) | Number | Mean Knowledge score (SD) | Mean Attitude Score (SD) |
|-------------|--------|----------------------------|--------------------------|
| 24-34       | 117    | 4.67 (1.82)                | 30.58 (3.91)             |
| 25-39       | 81     | 4.40 (1.78)                | 30.86 (2.68)             |
| 40-59       | 83     | 4.38 (1.9)                 | 30.44 (2.89)             |
| Total       | 281    | 4.51 (1.83)                | 30.62 (2.83)             |
seriously dental injuries, the best treatment in the field of accident is to replant the tooth immediately; if not possible, it should be saved in a suitable liquid medium as milk. However, deciduous teeth should not be replanted. [2]

The results of the current study revealed that nearly half of participants felt responsible for dental trauma occurring in their schools, and they thought the prognosis of the injured tooth would be better if they properly intervene. Furthermore, more than 70% of participants agreed that they should get dental emergencies training.

In this study, the total knowledge score of teachers on management of dental trauma was relatively low, which was consistent with those of the previously published studies by Mohandas and Chandan, [16] Blakynry et al., [22] and Al-jundi et al., [27] who reported the knowledge level of teachers to be 30%. Comparable findings were announced by Iranian studies, as well. [26, 28]

Based on the present findings, 61% of teachers had experienced dental trauma in their students, showing the high prevalence of such accidents. It was noted that the teachers’ knowledge level was significantly related to their previous training of dental emergency management. Although this was supported by Sae-Lim et al., [19] some studies found no statistically significant relationship between the previous training and the present knowledge. [16, 18, 22, 26] This is suggestive of the necessity of continuous education of teachers on dental emergency management.

The current investigation detected no significant relationship between the demographic characteristics and teachers’ knowledge, which was in line with the findings of previous studies. [18, 27]

In the case of a fractured tooth, only 38% of participants stated that they would look for the tooth fragment and would send the child to the dentist; this indicates the need for more teachers’ training. Moreover, only 7.5% of teachers claimed that they would replant the avulsed tooth by themselves. Similarly, Raoof et al. [28] reported that about 23% of teachers in their study thought that they could do the replantation.

When immediate replantation is not possible, an appropriate storage medium is needed to save the vitality of periodontal ligament cells, since drying leads

### Table 6: Comparison of different educational levels regarding their knowledge and attitude scores (p= 0.243 and 0.457, respectively).

| Educational level             | Number | Mean knowledge score (SD) | Mean attitude score (SD) |
|-------------------------------|--------|---------------------------|--------------------------|
| High school diploma           | 56     | 4.075(2.04)               | 30.75(2.91)              |
| Bachelor’s degree             | 217    | 4.64(1.8)                 | 30.76(2.99)              |
| Master’s degree and higher    | 8      | 4.25(2.12)                | 30.12(2.23)              |
| Total                         | 281    | 4.1(1.83)                 | 30.62(2.83)              |

### Table 7: Comparison of the knowledge score among different fields of education (p= 0.546).

| Field of education             | Number | Mean knowledge score (SD) |
|-------------------------------|--------|---------------------------|
| Experimental sciences         | 98     | 4.68 (1.75)               |
| Mathematics                   | 55     | 4.23 (2.02)               |
| Human sciences                | 114    | 4.50 (1.85)               |
| Arts                          | 14     | 4.42 (1.45)               |
| Total                         | 281    | 4.51 (1.83)               |

### Table 8: Comparison of knowledge scores between males and females (p= 0.082).

| Gender | Number | Mean knowledge score (SD) |
|--------|--------|---------------------------|
| Female | 176    | 4.65 (1.51)               |
| Male   | 105    | 4.26 (1.67)               |
| Total  | 281    | 4.51 (1.83)               |

### Table 9: Comparison of knowledge scores between teachers with and without previous first aid education (p= 0.032).

| Previous first aid education | Number | Mean knowledge score (SD) |
|-------------------------------|--------|---------------------------|
| Yes                           | 137    | 4.75 (1.87)               |
| No                            | 144    | 4.28 (1.76)               |
| Total                         | 281    | 4.51 (1.83)               |

### Table 10: The relationship between the teachers’ knowledge scores and previous dental emergencies management education (p= 0.005).

| Previous dental emergencies management education | Number | Mean knowledge score (SD) |
|--------------------------------------------------|--------|---------------------------|
| Yes                                               | 35     | 5.31 (1.84)               |
| No                                                | 246    | 4.39 (1.80)               |
| Total                                             | 281    | 4.51 (1.83)               |

### Table 11: Comparison of teachers’ knowledge score and attitude in boys’ and girls’ school (p= 0.008 and p= 0.161, respectively).

| Previous dental emergencies management education | Number | Mean knowledge score (SD) | Mean attitude score (SD) |
|--------------------------------------------------|--------|---------------------------|--------------------------|
| Yes                                               | 35     | 4.22 (1.67)               | 30.86 (2.62)             |
| No                                                | 246    | 4.80 (1.95)               | 30.39 (3.03)             |
| Total                                             | 281    | 4.51 (1.83)               | 30.62 (2.83)             |

### Discussion

Dental trauma requires immediate appropriate actions in order to minimize further complications. According to the International Association of Traumatology, in cases of permanent tooth avulsion which is one of the most
to loss of normal morphology and metabolism of these cells. [29-32] Despite the fact that the best option as the transportation media is simply milk, [1] only 18% of teachers were aware of that; showing the necessity of further education. The insufficiency of Iranian teachers’ knowledge about the proper storage media was also reported by Raoof et al. [28] It is noteworthy that only 33.8% of teachers stated the correct timing for replantation.

The best way to clean the avulsed tooth is washing it by tap water; yet, this question received relatively low rate of correct answer (17%). While this was consistent with the results of Mohandas et al., [16] it contrasted other previous reports which mentioned that almost half of teachers knew about the necessity of washing the teeth. [20, 22, 33]

More than 94% of participants thought that their knowledge was insufficient, and they were interested in learning more. Current results also revealed the teachers’ knowledge in boys’ school to be significantly higher than that in girls’ school, which might be indicative of higher prevalence of accidents and trauma in boys’ school.

Conclusion
This study showed that the total present knowledge of Yazd school teachers on dental emergency management is low, and their attitude to these situations is relatively normal. Since, a noticeable count of dental trauma occurs in the school environment, the reaction of teachers would be of considerable importance in children health. Therefore, there is an urgent need to improve the dental awareness of school teachers.

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Conflict of Interest
Authors have no conflicts of interest to declare.

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