

Original Article

# A Cross-Sectional Survey to Assess Knowledge Among School Teachers in Shimla City About Emergency Management of Dental Trauma in School Children: A Crucial Aspect for Preventive Care

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## ABSTRACT

**Objectives:** To assess the knowledge among school teachers in Shimla city about emergency management of dental trauma in school children.

**Material and Methods:** A questionnaire-based cross-sectional study was conducted among 400 school teachers from both private and government schools. All the collected data was entered in the Microsoft Excel 2007 version and processed using the SPSS version 26 for the statistical analysis. Descriptive statistics and chi-square tests were used to evaluate the obtained data. The p-values of  $\leq 0.05$  and  $\leq 0.001$  were considered statistically significant and highly significant, respectively.

**Results:** The KSDT (Knowledge Score of Dental Trauma) of school teachers regarding emergency treatment procedures for dental injuries was  $3.06 \pm 1.25$  (38.37%) points.

**Conclusion:** School teachers in Shimla City have a low level of knowledge and appear to have not received formal basic training in oral health-related topics, such as basic first aid principles and prompt care in the event of a dental trauma, which will make it difficult to promote oral health effectively.

**Keywords:** Child, Dental trauma, Emergency management, Knowledge, School teacher

## INTRODUCTION

An impact injury to the teeth and other hard and soft tissue inside and outside of the oral cavity is referred to as traumatic dental injury (TDI).<sup>[1]</sup> Children are prone to traumatic injuries because of their endless energy, which keeps them involved in physical activities all the time.<sup>[2]</sup> Because of the financial impact, length of therapy, and nature of care, it is especially significant in terms of the burden on public health. For these younger age groups, treatment may differ from that of adults, mostly because of underdeveloped teeth and pubertal facial growth. As a result, TDIs are a significant pediatric issue for dental professionals as well as for parents and the public.<sup>[3]</sup>

Children spend over five hours a day in school, which equates to approximately one-third or one-quarter of the child's active school day.<sup>[4]</sup> Schools are a site where there is a noticeable risk of TDI, with estimates indicating that over 20% of pupils will experience a dental injury before graduating.<sup>[5]</sup> Dental trauma in schools can be caused by a single traumatic event like blunt force trauma to the lower third of the face, for example, in cases of sports injury, violence, collisions,

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and accidentally falling due to slips or trips<sup>[6]</sup> with sports injuries accounting for almost 60% of the TDI.<sup>[5]</sup> Out of the various dental injuries, the most frequent type of injury is enamel fracture,<sup>[7]</sup> whereas avulsion associated with trauma to alveolar bone due to its worst prognosis is the most serious type of TDI and results in greatest esthetic and functional impairment.<sup>[8]</sup>

TDI in a child can lead to pain, swelling and, irritability, difficulty in mastication and speaking.<sup>[9]</sup> The unesthetic appearance due to the loss of front teeth may have a psychological impact on the child, leading to absence from school or social events. It also lowers the self-esteem of the child and makes the child feel embarrassed when smiling or laughing.<sup>[10]</sup> Inadequate treatment for trauma can have disastrous long-term effects, including early tooth loss, pulpal death with abscess formation, and poor oral health due to misaligned or malformed teeth.<sup>[11]</sup>

The duration between the time of the accident and treatment, the rapid actions done by the person at the accident scene, and the treatment selected by a dentist are all factors that affect the prognosis of the injured tooth.<sup>[12]</sup> Given how much time kids spend in school, teachers are likely to see dental injuries. As a result, they are more likely to be involved in treating the injury and improving its prognosis, which requires specialized knowledge and abilities.<sup>[13]</sup> Therefore, it was deemed necessary to carry out this study to evaluate the knowledge of school teachers regarding the emergency management of dental trauma in school children of Shimla City via means of a closed-ended questionnaire.

## MATERIAL AND METHODS

A cross-sectional study was conducted among the school teachers from both private and government schools of Shimla City to assess their knowledge about emergency management of dental trauma in school children from May 2023 to October 2023. Ethical approval was obtained from the Institutional Ethical Committee with reference number HFW(GDC) B(12)50/2015-Voll-II-1017. Approval for the study was also obtained from the Director of Higher Education, Shimla, to get prior permission to visit the schools. A pilot study was conducted by randomly selecting one government and one private school to evaluate the feasibility of the questionnaire, and then the format was modified accordingly. The participants of the pilot study were not included in the main study.

Items to assess knowledge for inclusion in the questionnaire were identified after extensive literature research, and the questionnaire was drafted from a previous (validated) questionnaire by Ivanda *et al.* (2021).<sup>[14]</sup> Experts in the field of dentistry scrutinized the drafted version and reached a consensus over its final acceptability. A decent Cronbach's

alpha value of 0.72 was achieved for the questionnaire's reliability, indicating adequate reliability. In addition, the questionnaire was validated through intra-class correlation with a strong relation of 0.74. Three sections make up the questionnaire. The participants' key demographic information (gender, age, years of job experience, academic background, and school location) was provided in the first section of the questionnaire. The second section comprised questions regarding participants' self-perceived competence and experience like dental injury encounters, interest in attending the awareness program, and more. The final section of the questionnaire was made up of ten multiple-choice questions. Question 1 asked about the participant's perceived knowledge of dental trauma management, and questions 2–9 asked about dental injuries and their treatment; these questions served as the foundation for the knowledge assessment. Question 10 asked about the source of the participant's knowledge. Following that, a knowledge score of dental trauma (KSDT) was computed for each participant, with a maximum score of eight points; one point was awarded for each right response. Subsequently, the total knowledge was classified into Good: 6.4–8 points (80–100%), Fair: 4.8–6.3 points (60–79%), and Inadequate: <4.7 points (<60%).<sup>[14]</sup>

With a 95% confidence level, 5% absolute accuracy, and a 50% predicted level of knowledge, the sample size of 384 was determined. After accounting for a 5% non-response rate, the total sample size was rounded to 400. This study employed two stages of simple random selection, dividing all the government and private schools in Shimla City into 24 distinct school clusters. Out of these, four clusters were selected by simple random sampling (Bharari cluster, Lower Jakhu cluster, New Shimla cluster, and Totu cluster). From each cluster, two schools (one private and one government) were selected to obtain the desired sample size by simple random sampling to ensure that there was equal representation from all the selected clusters. Teachers who were unwell or on leave were not included in the study; only those who were present on the day of data collection and willing to participate were questioned for the survey, and informed consent was obtained from them.

The purpose and context of the study were explained to each participant. The school teachers received dental health education and a dental checkup as payment for their voluntary, anonymous participation. Teachers who needed comprehensive dental care were provided with treatment in the mobile dental clinic. Microsoft Excel 2007 was used to enter all of the acquired data, and SPSS version 26 was used to analyze it for statistical analysis. The acquired data were assessed using the chi-square test and descriptive statistics. A p-value of less than 0.05 was considered statistically

significant, while a p-value of less than 0.001 was considered highly significant.

## RESULTS

A total of 400 teachers from Shimla's government and private schools took part in the research; 166 of them worked in government schools, while private institutions employed the remaining 234. Table 1 displays the participants' demographic details. The sample comprised the majority of female teachers, that is, 65.8% (263), and the rest were male teachers, that is, 34.2% (137). The majority of the teachers (37.70%, 151) were between the age group of 41 and 50 years, and 26% (104) had less than five years of teaching experience.

Table 2 lists the knowledge of school teachers about TDI and its management. The mean KSDT was  $3.06 \pm 1.25$  (38.37%). Approximately 88% of participants had low knowledge, 12% had fair knowledge, and 0% had good knowledge; 228 teachers (56.9%) rated their understanding of TDI as average, while 66 teachers (16.7%) rated it as poor; 340 teachers (84.8%) would contact a dentist in an emergency dental trauma, while 60 teachers (15.2%) would contact a state dental college (6%) or a physician (9.2%). The majority of wrong responses were reported in questions about what to do immediately in the event of a fracture, luxation, or avulsion at the scene of an accident (84.5%, 75%, and 96.5%, respectively). Conversely, the question concerning the best time to seek medical attention for an avulsion received the largest percentage of accurate responses (51.25%). Just 15.25% of participants selected the proper transport media for an avulsed tooth, while 84.75% provided wrong answers. According to the majority of school teachers in the current survey (37.9%), their primary source of information about

**Table 1:** Demographic and professional characteristics of the participating teachers

| Characteristic              |                | Total (n = 400) |
|-----------------------------|----------------|-----------------|
| Gender                      | Male           | 137 (34.2)      |
|                             | Female         | 263 (65.8)      |
| Age group (years)           | 20–30          | 68 (17)         |
|                             | 31–40          | 111 (27.7)      |
|                             | 41–50          | 151 (37.7)      |
|                             | 51–60          | 70 (17.7)       |
|                             | >60            | 10 (2.5)        |
| Educational qualification   | Undergraduate  | 102 (25.4)      |
|                             | Postgraduation | 298 (74.6)      |
| Teaching experience (years) | <5             | 104 (26)        |
|                             | 5–10           | 91 (23)         |
|                             | 11–15          | 44 (11)         |
|                             | 16–20          | 74 (18)         |
|                             | 21–25          | 47 (12)         |
|                             | >25            | 40 (10)         |

Data are presented as whole numbers and percentages.

**Table 2:** Knowledge regarding traumatic dental injuries and their management

| Knowledge assessment   |                     | n (%)       |
|--|---------------------|-------------|
| Self-assessment of personal knowledge about traumatic tooth injuries         | Very poor           | 43 (10.7)   |
|  | Poor                | 66 (16.7)   |
|  | Average             | 228 (56.9)  |
|  | Good                | 44 (11)     |
|  | Very good           | 19 (4.7)    |
| Person to contact first in case of an emergency dental trauma situation      | Correct             | 340 (84.8)  |
|  | Incorrect           | 60 (15.2)   |
| Most commonly affected tooth by dental injury                                | Correct             | 236 (59)    |
|  | Incorrect           | 164 (41)    |
| Best immediate action in a fractured tooth                                   | Correct             | 62 (15.5)   |
|  | Incorrect           | 338 (84.5)  |
| Best immediate action in luxated tooth (displaced tooth)                     | Correct             | 100 (25)    |
|  | Incorrect           | 300 (75)    |
| Best immediate action in avulsed tooth (knocked-out tooth)                   | Correct             | 14 (3.5)    |
|  | Incorrect           | 386 (96.5)  |
| The ideal time to seek professional assistance in the case of tooth avulsion | Correct             | 205 (51.25) |
|  | Incorrect           | 195 (48.75) |
| Method of cleaning an avulsed tooth (knocked-out tooth)                      | Correct             | 212 (53)    |
|  | Incorrect           | 188 (47)    |
| Preferred transport media for an avulsed tooth (knocked-out tooth)           | Correct             | 61 (15.25)  |
|  | Incorrect           | 339 (84.75) |
| Participant's source of knowledge  | Article/Books       | 80 (20.3)   |
|  | Friends/Family      | 104 (25.9)  |
|  | Dentist             | 152 (37.9)  |
|  | Education programme | 21 (5.2)    |
|  | None                | 43 (10.7)   |

Data are presented as whole numbers and percentages.

emergency care for dental injuries is a dentist. Results showed that teachers between ages 41 and 50 years had significantly poor knowledge in comparison with the younger age group teachers ( $p = 0.017$ ), as shown in Table 3.

Table 4 presents an overview of the teachers' self-perceived competence and experience in relation to dental trauma. The results demonstrated that 358 (89.5%) teachers had not attended any previous course on TDI management, 89 (22.2%) teachers reported having seen dental trauma at work, and 63.3% (254) participants were interested in taking part in the education program.

## DISCUSSION

The American Academy of Paediatric Dentistry and the International Association of Dental Traumatology agree that if more people were aware of first aid procedures and the need to seek emergency care, the status of TDI would have been better.<sup>[15]</sup> Many nations have utilized school teachers as

**Table 3:** Participant's characteristics and level of knowledge

| Characteristic |       | Level of knowledge |            |             | p-value       |
|----------------|-------|--------------------|------------|-------------|---------------|
|                |       | Good               | Fair       | Poor        |               |
| Age (years)    | 20–30 | 0 (0)              | 8 (11.80)  | 60 (88.20)  | <b>0.017*</b> |
|                | 31–40 | 0 (0)              | 8 (7.20)   | 103 (92.80) |               |
|                | 41–50 | 0 (0)              | 16 (10.60) | 135 (89.40) |               |
|                | 51–60 | 0 (0)              | 16 (22.50) | 54 (77.50)  |               |

Data are presented as whole numbers and percentages. Statistical significance was tested by the Pearson chi-square test (\* and bold value indicates Significant at  $p \leq 0.05$ ).

**Table 4:** Teachers' self-perceived competence and experience with dental injuries

| Characteristic   |             | n (%)      |
|--|-------------|------------|
| Able enough to provide first aid to a child with dental trauma         | Yes         | 155 (38.6) |
|  | No          | 193 (48.4) |
|  | Do not know | 52 (13)    |
| Dental injuries management course during professional training         | Yes         | 33 (8.2)   |
|  | No          | 358 (89.6) |
|  | Do not know | 9 (2.2)    |
| Personally encountered dental trauma.                                  | Yes         | 89 (22.2)  |
|  | No          | 290 (72.6) |
|  | Do not know | 21 (5.2)   |
| Interested in future education programs about emergency TDI management | Yes         | 254 (63.3) |
|  | No          | 102 (25.7) |
|  | Do not know | 44 (11)    |

Data are presented as whole numbers and percentages, TDI: Traumatic Dental Injuries.

health education advocates by enhancing their understanding of oral health and illness in response to the World Health Organization's (WHO) 1978 guidelines.<sup>[16]</sup>

The KSDT of Shimla City school teachers regarding emergency treatment procedures in TDI was  $3.06 \pm 1.25$  (38.37%) points. This result is consistent with the study of Ivanda *et al.*<sup>[14]</sup> in Croatia, where the knowledge score was  $6.6 \pm 2.5$  points.

Inadequate knowledge about prompt action in an emergency following a tooth fracture, luxation (displaced tooth), or avulsion (knocked-out tooth) was found in this study, which was also confirmed by research done by Skeie MS *et al.*<sup>[17]</sup> in Norway, Vergotine RJ *et al.*<sup>[18]</sup> in the United States of America and Fux-Noy *et al.*<sup>[19]</sup> in Israel. For an avulsed tooth, the correct transport medium was selected by only 15.20% of participants; however, a majority of the participants in this study answered incorrectly about the appropriate transport media, and these results were similar to the findings of a survey conducted by Meer *et al.*<sup>[20]</sup> This study revealed that 51.25% of teachers were able to state that care should be sought within 30 minutes of avulsion injury. These findings are similar to the study conducted in India by Chandukutty *et al.*<sup>[21]</sup> The majority of the school teachers in the current survey said

that their source of knowledge about TDI management was their dentist. In 2022, the study of Al-Khalifa *et al.*<sup>[22]</sup> showed similar results related to the source of knowledge of school teachers regarding TDI management.

Compared to younger teachers, those between the ages of 41 and 50 years showed noticeably poor knowledge. This is consistent with research done in Saudi Arabia by Alsadhan *et al.*<sup>[23]</sup> The factor contributing to older teachers' potential lack of knowledge is the possibility that they had fewer interactions with TDI over their teaching careers, which also prevented them from learning as much as they could about first aid and the management of dental injuries.

In this study, teachers who felt they were insufficient to provide first aid in the event of a TDI had significantly poor knowledge about what should be done immediately, how urgently should be sought, and how to clean an avulsed tooth. These findings are consistent with another study by de Lima *et al.*<sup>[24]</sup> The reason for this might be that the teachers included in this research were conscious of their insufficient understanding of TDI and recognized the significance of strengthening it.

Most of the teachers in this study did not receive any training regarding TDI management during their teacher's training, similar to reports from Norway, Saudi Arabia, Brazil, India, and Colombia<sup>[17,20,24–26]</sup> whereas in England, Wales, and the United States, more than one-third of teachers received sufficient training regarding TDI management.<sup>[27,28]</sup> In this study, teachers who were not trained in TDI management during their professional education also have poor knowledge regarding the subject of TDI management in comparison with those who had been educated about TDI. Similar results were reported in the studies by Vergotine *et al.*<sup>[18]</sup> and Chan *et al.*<sup>[29]</sup> One obvious explanation for this discrepancy is that the school teacher's education about TDI and its emergency management through their professional training was minimal may be due to the fact that the subject topic was not included in their teacher's training program. Other theories include the possibility that teacher training is outdated or that it was not given enough consideration, or it could just be the case that if they had received any training at all, they have forgotten the details.

This study reveals that school teachers in Shimla City have insufficient knowledge regarding TDI management which strengthens the need for increasing the awareness among them. There are several strategies to raise teachers' knowledge of emergency care for dental trauma, including school-based training programs, discussion-based lectures, instructional posters, and informational brochures.<sup>[27,28,30]</sup>

This study also has several limitations. The capacity and willingness of school teachers to participate in the study determined their involvement. Furthermore, compared to



teachers who did not take part in the study, those who did may have been more interested in or worried about oral trauma and how it is managed. To increase the representativeness and generalisability of the results, a more systematic sampling strategy should be used in the future.

## CONCLUSION

This study sought to evaluate school teachers' knowledge of the emergency care of severe dental injuries in students and found that:

- KSDT of school teachers of Shimla City regarding emergency treatment procedures of dental injuries was  $3.06 \pm 1.25$  points (poor level of knowledge).
- Teachers aged between 41 and 50 years had significantly poor knowledge about TDI compared to younger ones.
- Teachers who considered themselves insufficiently educated to provide first aid in the case of a TDI had significantly poor knowledge.
- Teachers who were not trained in TDI management during their professional or academic education also did not have better knowledge of the subject.

The efficacy of school teachers' roles in promoting oral health would be hampered by their apparent lack of formal basic training and lack of awareness of oral health issues, such as basic first aid concepts and suitable urgent steps to take in case of dental injuries. This is especially true for Shimla City school teachers. Therefore, it is recommended to establish a partnership between dental clinics and hospitals with educational institutions like schools and facilitate the development of tailored education programs and dissemination of relevant information to teachers to raise their awareness about dental trauma management and to promote emergency preparedness for managing dental trauma. However, there are certain barriers, which include time constraints, competing priorities, lack of resources, and strict guidelines that may challenge teachers to participate in the program, which need to be eliminated for effective implementation of the education program.

## Ethical approval

This research/study was approved by the Institutional Review Board at Institutional Ethical Review Board H.P. Government Dental College and Hospital, Shimla-1, number HFW/(GDC) B(12)50/2015-Voll-II-1017, dated 04-05-2023.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

## Conflicts of interest

There are no conflicts of interest.

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## Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of AI-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

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