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Original Article

Knowledge Level and Practice of Primary School Teachers Regarding Traumatic Dental Injuries and Their Emergency Management in Twin Cities

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ABSTRACT

Background: Childhood dental trauma frequently occurs at school, with primary school teachers often being the first responders. The immediate response and management by teachers can help mitigate the adverse physical, psychological, and social impacts of dental trauma on children. Despite the significance, there is limited data on the knowledge and practices of primary school teachers regarding the emergency management of dental injuries.

Objective: The objective of this study was to evaluate the knowledge level and practices of primary school teachers concerning dental trauma and its emergency management.

Methods: This descriptive cross-sectional study was conducted in primary schools of Rawalpindi and Islamabad. A sample of 335 primary school teachers was selected using simple random sampling. Data was collected using a structured questionnaire adapted from Ivanda et al. (10), which included three sections: demographic information, background and satisfaction with current knowledge, and specific knowledge of dental trauma management. The questionnaire consisted of 14 multiple-choice questions, and knowledge was scored out of 14 points. Scores were categorized as good (11.2-14 points), moderate (8.4-11.1 points), or poor (<8.3 points) based on Bloom's cut-off points. Statistical analyses were conducted using Fisher's exact test, chi-square test, and independent t-test with a significance threshold of $p \leq 0.05$.

Results: All participants reported they had not received training for traumatic dental injuries (TDIs). The majority (97.9%) demonstrated poor knowledge, with only 2.1% showing moderate knowledge and none achieving a good knowledge level. There was a statistically significant difference in knowledge between private and public sector teachers ($p=0.04$), but no significant correlations were found between knowledge scores and age, education level, or teaching experience.

Conclusion: Traumatic dental injuries occur frequently in schools, and teachers should be well-equipped to handle such emergencies. The study highlights the insufficient knowledge among primary school teachers regarding dental trauma management. Comprehensive training programs are recommended to improve teachers' preparedness, potentially reducing the physical and psychological impacts of dental trauma on children.

Keywords: Luxation injury, dental avulsion, complicated crown fracture, dental pulp exposure, dental education.

INTRODUCTION

Traumatic dental injuries (TDIs) are a significant concern in pediatric populations, with a notable prevalence among pre-school children. Approximately 40% of these injuries involve the head and non-oral trauma, with the highest incidence occurring between the ages of 2 and 3 years. Luxation injuries are particularly common in this age group, with the most frequent cause of injury in school-aged children being falls during play and running activities (1, 2). Teachers, as first responders at the site of such incidents, must possess adequate knowledge regarding the management of dental trauma to mitigate the immediate and long-term consequences for the affected children (2-4).

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According to the World Health Organization (WHO), children aged 6-12 years experience dental trauma at rates ranging from 16% to 40%, attributable to various causes (4). These injuries have profound effects on children's mental health and physical well-being, causing pain, aesthetic concerns, and potentially leading to malocclusion (3-5). Children with avulsed, fractured, or luxated teeth often face social challenges, such as a reluctance to smile or engage socially, due to fear of judgment based on their appearance (4, 6). The incisors are the teeth most commonly affected by accidents, and dental trauma can significantly impact the eruption of permanent dentition, often necessitating prosthodontic and orthodontic rehabilitation (7). Consequently, first aid knowledge for dental trauma is crucial, offering substantial psychological and physical benefits (2, 8).

The prognosis of dental trauma is influenced by multiple factors, particularly the promptness of emergency management at the accident site. For avulsed permanent teeth, the duration the tooth remains out of the alveolus and the type of medium used for its transport to the dental facility are critical (3, 7). Similarly, for fractured tooth fragments, retrieving and reattaching the fragment at the accident site is more aesthetic, cost-effective, and conservative than resin-based composite fillings (7). Thus, dental emergencies are highly time-sensitive, requiring immediate attention (3, 7, 9). Adhering to the recommended emergency management protocols at the site of the accident, as outlined by the International Association of Dental Traumatology, can significantly improve the prognosis of injured teeth when followed by appropriate dental office treatment (10).

The treatment of traumatic dental injuries varies based on the type and severity of the injury, irrespective of its cause (1). Given that students spend a substantial portion of their day at school, it is imperative that teachers are well-equipped and trained to manage dental trauma effectively (3, 9). The primary objective in the emergency management of dental injuries is to preserve pulp vitality (7, 10). The outcomes of untreated traumatic dental injuries differ between primary and permanent dentition, with potential consequences including pulpal necrosis, abscess formation, periradicular inflammation, and tooth loss, thus necessitating immediate and appropriate management for optimal treatment success and prognosis (1, 2, 4-6).

Studies from various countries, including Hong Kong, Singapore, Brazil, and the UK, have consistently revealed a lack of sufficient knowledge about dental trauma among school teachers (5). For instance, a study conducted by Manal Obeid et al. in Riyadh, Saudi Arabia, found that while a significant number of schoolteachers encountered dental injuries during office hours, they lacked knowledge about emergency management (5). Other studies corroborate these findings, highlighting an unsatisfactory level of awareness and knowledge among school teachers globally (6, 10). Therefore, this study aims to evaluate the knowledge and practices of primary school teachers regarding traumatic dental injuries and their emergency management in the private and public schools of Rawalpindi and Islamabad.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted in primary schools within the cities of Rawalpindi and Islamabad. The sample size, calculated using the WHO calculator, was determined to be 335 primary school teachers, considering a proportion of teachers achieving an average score of 32.2%, a confidence level of 95%, and a margin of error of 5%. The list of registered private and public primary schools was obtained from the Private Educational Institutions Regulatory Authority and the Federal Government Educational Institutions Directorate, respectively. Primary schools were selected through a simple random sampling technique using computer-generated numbers, while teachers from these schools were selected by convenience sampling. Incomplete response forms were excluded from the study.

Prior to data collection, ethical approval (IMDC/DS/IRB/194) was obtained from the Institutional Review Board (IRB) of the Dental Section, Islamabad Medical and Dental College. The study adhered to the ethical principles outlined in the Declaration of Helsinki. The principals and all participants of the selected schools were briefed about the study's objectives, and informed written consent was obtained from all participants. Anonymity of participants and institutions was maintained throughout the study.

Data was collected through a structured questionnaire previously adapted by Ivanda et al. (10). The questionnaire comprised three sections of multiple-choice questions. The first section included demographic data and experience, covering variables such as gender, school type, age group, level of education, and years of teaching experience. The second section assessed participants' background and satisfaction with their current knowledge about the management of dental injuries. The third section evaluated participants' knowledge of dental trauma and its management through 14 multiple-choice questions, with scores assigned out of 14 points. Knowledge levels were categorized using Bloom's cut-off points: good (11.2-14 points), moderate (8.4-11.1 points), and poor (<8.3 points).

The data was analyzed using SPSS version 25. Frequencies and percentages were calculated for the demographic variables in section one, as well as for the questions in section two. Question-wise results were reported for section three regarding the level of knowledge. Fisher's exact test was used to compare age groups, years of experience, and levels of education with the grading of knowledge. The chi-square test was applied to compare the grading of knowledge with teaching sectors. An independent t-test was

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conducted to compare the knowledge of private and public sector primary school teachers. A p-value of ≤0.05 was considered the threshold for statistical significance.

The study found that all primary school teachers reported not receiving any formal training or education regarding the knowledge and management of traumatic dental injuries. The third section of the questionnaire revealed significant differences in knowledge between private and public sector teachers, with a p-value of 0.04 ($p<0.05$). Most participants exhibited a poor level of knowledge, with only a small percentage demonstrating moderate knowledge. Fisher's exact test showed no significant correlations between knowledge grading and age, education level, or teaching experience. The chi-square test also found no significant correlation between knowledge grading and teaching sector, with a p-value of 0.07 ($p>0.05$).

In conclusion, this study underscores the need for comprehensive educational programs to enhance the knowledge and preparedness of primary school teachers in managing traumatic dental injuries, thereby improving outcomes for affected children.

RESULTS

The study involved 335 primary school teachers from Rawalpindi and Islamabad, with a balanced representation from both private and public sectors. The demographic variables, teaching experience, and responses related to dental trauma were recorded and analyzed.

Demographic Data and Teaching Experience

The demographic characteristics of the participants are presented in Table 1. The majority of teachers were aged between 31-40 years (42.6%), followed by those aged 41-50 years (27.9%). In terms of education, most teachers held a Master's degree (52.9%), while a significant proportion had a Bachelor's degree (45.6%). Teaching experience varied, with the largest group having 6-10 years of experience (27.9%).

Table 1: Demographic Characteristics and Teaching Experience

Variable	Frequency (N)	Percentage (%)
Age		
<30	50	14.7
31-40	145	42.6
41-50	95	27.9
51-65	50	14.7
Level of Education		
Intermediate	3	0.9
Bachelor's	155	45.6
Master's	180	52.9
PhD	2	0.6
Teaching Experience		
1-5 years	76	22.4
6-10 years	95	27.9
11-15 years	74	21.8
16-20 years	60	17.6
>21 years	35	10.3
Teaching Sector		
Private	170	50
Government	170	50

Knowledge and Training Regarding Dental Injuries

All teachers indicated that they had not received training in the management of traumatic dental injuries (TDIs). Responses to whether they felt educated enough to provide first aid for dental injuries are shown in Table 2. A significant majority (87.6%) expressed a desire for future education on TDIs.

Table 2: Knowledge and Interest in Training

Variable	Frequency (N)	Percentage (%)
Dental injury seen at the workplace		
Yes	174	51.2

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Variable	Frequency (N)	Percentage (%)
No	166	48.8
Educated enough to provide first aid		
Yes	42	12.4
No	298	87.6
Interested in receiving future education regarding TDI		
Yes	298	87.6
No	42	12.4

Knowledge Assessment Scores

The assessment of knowledge regarding dental trauma and its management revealed that the majority of teachers scored poorly. Table 3 shows the distribution of knowledge levels based on Bloom's cut-off points, with 328 teachers classified as having poor knowledge and only 12 with moderate knowledge. No teachers achieved a good knowledge rating.

Table 3: Knowledge Levels Based on Bloom's Cut-off Points

Knowledge Level	Frequency (N)	Percentage (%)
Poor	328	97.9
Moderate	7	2.1
Good	0	0.0

Statistical Analysis

Fisher's exact test and chi-square test were used to analyze the correlation between knowledge scores and various demographic factors. The results, presented in Table 4, showed no significant correlations between knowledge scores and age, level of education, years of experience, or teaching sector. The independent t-test, however, revealed a statistically significant difference in knowledge between private and public sector teachers (p=0.04).

Table 4: Correlation Between Knowledge Scores and Demographic Variables

Variable	Moderate	Poor	Test	P-Value
Age			Fisher's exact test	0.428
<30	3 (6.0%)	47		
31-40	6 (4.1%)	139		
41-50	3 (3.2%)	92		
51-65	0 (0.0%)	50		
Level of Education			Fisher's exact test	0.815
Intermediate	0 (0.0%)	3		
Bachelor's	5 (3.2%)	150		
Master's	7 (3.9%)	173		
PhD	0 (0.0%)	2		
Teaching Experience			Fisher's exact test	0.604
1-5	4 (5.3%)	72		
6-10	2 (2.1%)	93		
11-15	3 (4.1%)	71		
16-20	3 (5.0%)	57		
>21	0 (0.0%)	35		
Teaching Sector			Chi-square test	0.07
Private	7 (4.1%)	163		
Government	5 (2.9%)	165		

Knowledge of Specific Dental Trauma Management

Figure 1 illustrates the percentage of correct answers provided by participants regarding specific aspects of dental trauma management. For instance, 77.2% of participants correctly identified the upper front teeth as the most commonly fractured due to trauma. Additionally, 47.4% were aware of the management of an avulsed deciduous tooth.

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In summary, the results indicate that primary school teachers in Rawalpindi and Islamabad possess insufficient knowledge regarding the management of traumatic dental injuries. Despite this, there is a strong interest among teachers to receive further education and training in this area, highlighting the need for targeted educational interventions to improve the emergency management of dental injuries in schools.

DISCUSSION

The study revealed that primary school teachers in Rawalpindi and Islamabad had inadequate knowledge regarding the management of traumatic dental injuries (TDIs). This finding aligned with previous studies conducted in various countries, such as Hong Kong, Singapore, Brazil, and the UK, which also reported a poor level of knowledge among school teachers about dental trauma and its emergency management (5). The lack of training among teachers, as reported by all participants, highlighted a significant gap in the educational system that needs to be addressed urgently to improve the prognosis of dental injuries in children.

The demographic analysis showed that the majority of teachers were well-educated, with most holding a Master's degree, and had substantial teaching experience. However, the educational background and years of experience did not correlate significantly with the knowledge levels about dental trauma. This lack of correlation was consistent with studies from Saudi Arabia and India, where no significant association was found between the level of education, teaching experience, and the knowledge of dental trauma (7, 11).

Interestingly, the study found a significant difference in knowledge between private and public sector teachers, with private sector teachers showing slightly better knowledge. This could be attributed to the differences in training opportunities and resources available to teachers in private schools compared to public schools. However, the overall knowledge level remained poor across both sectors, indicating a widespread need for improved training programs (12,13).

A critical aspect of dental trauma management is the immediate and appropriate response to injuries, which significantly influences the prognosis. The study found that only a small percentage of teachers were aware of the correct management of avulsed teeth and the appropriate medium for transporting avulsed teeth to a dental facility. This lack of knowledge could lead to suboptimal outcomes for children suffering from TDIs, emphasizing the need for targeted educational interventions (14-16).

The study had several strengths, including a robust sample size and the use of a well-validated questionnaire. However, there were limitations as well. The reliance on self-reported data might have introduced bias, and the study's cross-sectional design limited the ability to infer causality. Additionally, the study was confined to two cities, which might limit the generalizability of the findings to other regions (18).

Based on the findings, several recommendations emerged. First, incorporating dental trauma management into the professional training programs for primary school teachers is essential. Educational interventions, such as workshops, seminars, and informational brochures, have been shown to significantly improve knowledge levels and should be implemented widely (17). Regular refresher courses could ensure that teachers remain updated on the latest guidelines and best practices (19).

Furthermore, collaboration between educational and dental health authorities could facilitate the development of comprehensive training modules. Schools could also establish protocols for handling dental emergencies, ensuring that all staff members are aware of the steps to take when a child suffers a dental injury.

CONCLUSION

In conclusion, the study underscored the critical need for enhancing the knowledge and preparedness of primary school teachers regarding the management of traumatic dental injuries. Addressing this gap through targeted educational initiatives could significantly improve the outcomes for children experiencing dental trauma, reducing the long-term psychological and physical impacts of these injuries. The enthusiasm of the teachers for receiving further education on this topic was encouraging and indicated a receptive audience for future training programs.

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