




## Improving dental emergency literacy for preschool teachers and parents

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### Abstract

Medical emergencies can occur in dentistry, including trauma to primary teeth. The global prevalence of dental trauma in children is 10-15%. Trauma to primary teeth can have severe medical, aesthetic, and psychological impacts. Parents and teachers at school are among the most important actors in providing emergency dental care for children. Therefore, providing information that increases parents' and teachers' knowledge about pediatric dental emergencies must be done so that appropriate management can be carried out. The method used was training on managing pediatric dental emergencies for parents and teachers at Whiz Kids Playschool Kindergarten. The evaluation showed increased participants' knowledge before (Range = 10-80, Mean = 47.2) and after (Range = 70-100, Mean = 87.0) the training. Thus, this training successfully increased parents' and teachers' knowledge of managing pediatric dental emergencies.

**Keywords:** Emergencies; Teeth; Children; Parents and teachers

## Peningkatan literasi kegawatdaruratan gigi anak bagi guru dan orang tua pra-sekolah

### Abstrak

Kegawatdaruratan medis dapat terjadi pada bidang kedokteran gigi, salah satunya trauma pada gigi sulung. Prevalensi trauma gigi pada anak secara global adalah sebesar 10-15%. Trauma gigi pada gigi sulung dapat berdampak serius pada segi medis, estetika, dan psikologis. Orang tua dan guru di sekolah merupakan salah satu aktor terpenting dalam memberikan penanganan kegawatdaruratan gigi anak. Oleh karena itu, pemberian informasi yang meningkatkan pengetahuan orang tua dan guru mengenai kegawatdaruratan gigi anak harus dilakukan agar dapat dilakukan penanganan yang tepat. Metode yang digunakan adalah pelatihan penanganan kegawatdaruratan gigi anak pada orang tua dan guru KB-TK Whiz Kids Playschool. Hasil evaluasi menunjukkan adanya peningkatan pengetahuan peserta sebelum (Range = 10-80, Mean = 47.2) dan sesudah (Range = 70-100, Mean = 87.0) pelatihan. Dengan demikian, pelatihan ini berhasil untuk meningkatkan pengetahuan orang tua dan guru terhadap tata laksana kegawatdaruratan gigi anak.

**Kata Kunci:** Kegawatdaruratan; Gigi; Anak; Orang tua dan guru

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# 1. Introduction

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Medical emergencies are sudden, critical situations demanding immediate intervention to preserve life and minimize the risk of mortality and disability. Within dentistry, traumatic dental injuries (TDIs), particularly to primary teeth, represent a significant concern (Patidar et al., 2021; Petti et al., 2018). Trauma to primary teeth carries substantial medical, aesthetic, and psychological implications. A primary concern is the potential for injury to the developing permanent successors (Ashrafullah et al., 2018), due to the close proximity between the primary tooth apex and the permanent tooth bud (Bardellini et al., 2017).

Globally, the prevalence of pediatric dental trauma ranges from 10% to 15%, with a higher incidence observed in boys aged 1-3 and 10-12 years and in girls aged 1-3 years. The 2-3-year age group is particularly vulnerable due to developing motor skills and increased risk of falls, often resulting in anterior tooth trauma (Nagarajappa et al., 2020). The highest prevalence of primary tooth injuries occurs in children under two years old, with the maxillary primary incisors being the most frequently affected (Dolic et al., 2024).

Damage to permanent successors from primary tooth trauma can occur through two primary mechanisms: direct physical injury to the permanent tooth bud from the primary root apex, and indirect injury resulting from pulpal necrosis and subsequent periapical infection in the primary tooth (Lin et al., 2016). The type and severity of developmental disturbances in permanent incisors are strongly correlated with the child's age at the time of injury, with younger children being more susceptible during critical developmental stages. Consequently, the most severe complications, often manifesting as alterations in crown morphology or mineralization, are observed when trauma occurs before the age of two (Koch et al., 2016).

The severity, treatment approach, prognosis, and urgency of dental trauma are influenced by several key factors, including the child's age, stage of dental development, direction and force of the trauma, and the time elapsed since the injury (Mitchell & Littlewood, 2019). Most pediatric dental injuries occur during play at home or school, so heightened awareness and preparedness among parents, children, and educators are crucial for effective emergency management (Némat et al., 2023; Tewari et al., 2019). Untreated dental trauma can lead to discoloration from crown fractures, increasing the risk of future infections and causing psychological distress. Various etiological factors contribute to anterior dental trauma, including traffic accidents, sports injuries, play-related incidents, criminal acts, child abuse, domestic accidents, workplace incidents, fights, and natural disasters.

Considering the pivotal role of parents in managing pediatric dental trauma, the authors initiated a dental health education program focused on emergency dental management for teachers and parents of students at Whiz Kids Play School in Surabaya. This initiative aligns with prior research highlighting the effectiveness of parental dental health education in preventing oral health issues (Namdev et al., 2014). Initial observations revealed a lack of prior training and knowledge among the school's teachers regarding the immediate management of dental emergencies in preschool children. Therefore, this program aims to enhance the knowledge and awareness of teachers and parents concerning pediatric dental emergency management, enabling them to provide essential first aid when such incidents occur.

## 2. Method

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This study employed a dental health education intervention conducted at Whiz Kids Playschool in July 2024. Initially, a pre-test and post-test design was used to evaluate children's knowledge of emergency dental management among teachers and parents of playgroup (Bahreman, 2013) and kindergarten (Khattari et al., 2023) children. The intervention involved training sessions on the management and initial response to pediatric dental emergencies. These sessions utilized lectures with engaging presentations delivered by experts. The training emphasized the management of fractured teeth and the avulsion of both permanent and primary teeth, incorporating simulations of educational materials with the aid of props. The program concluded with dental and oral health screenings for the children.

## 3. Results and Discussion

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### 3.1. Health education

Fifty-one teachers and parents attended the community service activity. The training, themed "Emergency Management of Dental Trauma in Children," aimed to enhance parental knowledge to prevent panic when a child's tooth is avulsed and to understand the necessary immediate actions. The program commenced with a pre-test administered to all participants to evaluate their baseline knowledge. The assessment consisted of eleven questions addressing:

- a. Identification of dental emergency conditions (using visual aids).
- b. Replantation potential of avulsed permanent teeth.
- c. Immediate steps for an avulsed permanent tooth.
- d. Proper handling of an avulsed permanent tooth.
- e. The very first action upon permanent tooth avulsion.
- f. Duration of cleaning an avulsed permanent tooth.
- g. Suitable storage media for an avulsed permanent tooth.
- h. The appropriate time to seek dental professional help after avulsion.
- i. The golden period for replanting an avulsed permanent tooth.
- j. The types of avulsed permanent teeth suitable for replantation.
- k. The typical age for the eruption of the first permanent tooth.

The second phase involved explaining the objectives and desired outcomes of the empowerment program. This empowerment initiative, comprising training on emergency management of pediatric dental trauma and oral health screenings for preschool students, engaged faculty and postgraduate students from the Pediatric Dentistry Specialist Program. The program spanned three days, divided into three large groups to accommodate school schedules and maximize effectiveness. This was followed by an educational session employing lectures and short educational videos on managing pediatric dental emergencies, as depicted in Figure 1. Training materials and demonstrations of emergency management included procedures for fractured or avulsed teeth resulting from falls (Alharbi et al., 2020; Jain et al., 2017; Khan et al., 2020). These interactive demonstrations and discussions lasted approximately two hours.



Figure 1. Parental and teacher education on dental emergency management, oral health education for preschool children, and dental examinations of preschool children (from left to right)

The final activity involved administering a post-test to the participants, who were divided into smaller groups. Subsequently, oral health examinations were conducted on kindergarten and pre-primary students at Whiz Kids Playschool Surabaya.

### 3.2. Evaluation of community service activities

The established success criterion was a significant difference between the participating parents' and teachers' pre-test and post-test scores. Descriptive statistics and paired samples t-tests were used to analyze the pre-test and post-test results. All 51 training participants completed both assessments. Table 1 compares the descriptive statistical analysis of the participants' pre-test and post-test results, indicating improved knowledge regarding pediatric dental emergencies. The data comparison revealed an increase in the minimum score from 10.0 in the pre-test to 70 in the post-test, and the maximum score increased from 80 in the pre-test to 100 in the post-test. Furthermore, the mean score significantly increased from 47.20 in the pre-test to 87.0 in the post-test.

Following normality testing, the data were found to be non-normally distributed (Table 2) and analyzed using the non-parametric Wilcoxon signed-rank test. The analysis presented in Table 3 showed that no participant had a lower post-test score than their pre-test score. Moreover, the Wilcoxon test yielded a statistically significant difference ( $p < .001$ ) between the pre- and post-training knowledge levels.

Table 1. Evaluation scores

	N	Minimum	Maximum	Mean	Std. Dev
Pre-test	51	10.00	80.00	47.2	16.74
Post-test	51	70.00	100.00	87.0	7.29

Table 2. Normality test

	Statistic	df	Sig.
Pre-test	.138	51	.016*
Post-test	.323	51	.000*

The increase in correct answers was primarily attributed to a significant improvement in participant knowledge regarding questions 2, 3, 4, 7, and 8. These questions addressed

the possibility of replanting avulsed permanent teeth, the immediate actions required upon avulsion, the correct way to handle a permanent tooth, appropriate storage media, and when to seek dental care after avulsion. These findings align with previous research employing similar educational interventions, demonstrating a significant increase in knowledge scores post-training ([Anggraini et al., 2023](#); [Murdiyanto et al., 2023](#)).

Table 3. Wilcoxon signed-rank test

	posttest - pretest
Z	-6.245
Asymp. Sig. (2-tailed)	.000*

\*p<.001

Based on [Tables 1 and 3](#), the training effectively achieved the program's objective of enhancing parents' and teachers' knowledge about pediatric dental trauma emergency management. The effectiveness of this program was likely enhanced by the chosen training methodology, particularly the simulation method, which fostered an engaging atmosphere and increased participant involvement and interaction, facilitating information exchange ([Aulia et al., 2019](#)).

According to Green's Precede-Proceed model, knowledge enables behavioral change ([Alber et al., 2021](#); [Green & Allegrante, 2020](#)). An individual's behavior is fundamentally influenced by their level of understanding regarding a particular issue. Knowledge, or the cognitive aspect, is crucial in shaping one's actions. When actions are rooted in knowledge, the resulting behavior tends to be more sustainable. Conversely, behaviors not based on knowledge and awareness are less likely to persist ([Hamid & Kuntari, 2022](#)). This program focused explicitly on dental trauma.

Parents and teachers must know about the prevention and emergency management of dental trauma in children to mitigate potential complications ([Al-Khalifa & AlYousef, 2022](#); [Cantile et al., 2025](#)). Since dental trauma in children can occur at school, providing such training to teachers is also urgently needed ([Sulistiani et al., 2024](#); [Tian et al., 2022](#)). Research indicates that most (95%) of teachers have never received first-aid training for dental trauma, and 35% have only acquired information through books and other media ([Namdev et al., 2014](#)). This lack of training is often because first aid for dental trauma is not a priority in school settings. In cases of avulsion, immediate tooth replantation or storage in an appropriate medium can significantly reduce complications such as ankylosis and root resorption ([Kadulkar et al., 2023](#); [Levin et al., 2020](#); [Sarao & Levin, 2023](#)).

Therefore, training on this topic is essential for parents and teachers, considering the critical time window for effective management and the potential risks of complications. A key strength of this activity is its responsiveness to the identified needs of the partner institution, providing essential training on pediatric dental emergency management, a topic previously unaddressed for both teachers and parents. The authors hope this program will empower parents and teachers to respond promptly and effectively when managing dental trauma cases in the children under their care.

## 4. Conclusion

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The community service training on managing pediatric dental emergencies demonstrably achieved its primary goal: significantly improving participant knowledge. The substantial increase in pre-test to post-test scores, corroborated by the statistically significant Wilcoxon test results, strongly supports this conclusion. Although the training effectively enhanced knowledge in this critical area, the limited number of participants suggests the potential for broader impact through future collaborations with other community partners. To further amplify the effectiveness and reach of this initiative, the development of an accessible guidebook for parents and students is recommended. This would facilitate the generalization of the training's positive outcomes and establish it as a widely applicable and effective intervention for improving knowledge in managing pediatric dental emergencies, paving the way for its widespread adoption once its efficacy is confirmed.

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## Author Contributions

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Program implementers: LM, AH, RD, RA, AA, ST; Article preparation: SC, MM, DP; Impact analysis: SC, MM; Presentation of the results: DP; Revised the article: LM.

## Conflict of Interest

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All authors declare that no financial or non-financial conflicts of interest are associated with this article.

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