







Knowledge and Attitude of Brazilian Elementary School Teachers Towards Dental Trauma

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ABSTRACT

Objective: To evaluate both knowledge and attitude of public elementary school teachers in Alfenas, Minas Gerais, Brazil, towards Traumatic Dental Injuries (TDIs). **Material and Methods:** Four hundred and seventy-one teachers from 10 schools were invited to participate in the research. Two hundred and twelve were accepted, being randomly selected to answer semi-structured questionnaires. Statistical tests Chi-Square and Fisher's Exact Test were also used for the other variables at a significance level of 5% ($p < 0.05$). **Results:** 212 teachers answered; 34% had first-aid training in college or even voluntarily (22.6%), but only 7.1% had taken training about TDIs. Only 7.5% were satisfied with the knowledge about TDIs, and 12.3% felt prepared to face it. About 10.8% had seen any type of TDI; 53.3% would report to the headmaster and 8% to the school dentist in a TDI event. The teachers' first attitude towards TDIs would be contacting the child's parents (63.2% and 58.5%, respectively). About 47.2% would handle the tooth properly (by the crown). Nearly 90.1% would carry out a permanent tooth dental reimplant, which would be conducted immediately (71.2%). About 36.3% of the teachers storage the avulsed tooth in a liquid: milk (46.7%) and saline solution (24.7%). The dry media mentioned were paper (18.9%) and gauze or cotton (15.1%). Most of the teachers (96.2%) stated that they would like to receive information on TDI. **Conclusion:** Elementary school teachers in Alfenas have partial knowledge about traumatic dental injuries.

Keywords: Education; Tooth Avulsion; Health Knowledge, Attitudes, Practice.

Introduction

Dental traumatic injuries (TDIs) have become a relevant public health issue [1-4], not only for their relatively high prevalence [2] but also due to the strong impact on children's daily activities [1-3], such as running, sport practicing and bicycle riding [5,6]. Epidemiologic studies on dental trauma demonstrate that most of the accidents involving children occur at home [1], at school [1,7,8], and on the street [1]. Approximately 50% of children had experienced TDIs before finishing school [9]. Based on this high percentage of TDIs, it should be emphasized that school environment plays an important and crescent role in health promotion, prevention of diseases and accidents among children and teenagers.

It is known observer that 16% of dental lesions in children lead to dental loss [10], resulting in facial development alterations, as well as psychological alterations, among other complications [11,12]. For this reason, the quality of emergency procedures may directly affect a better prognosis for the treatment of dental avulsion [10,12-14].

Parents and teachers are the two groups, which most commonly lookout children [15-20]. It is thus extremely relevant that school staff is skilled, mainly teachers, through educational and preventive activities when facing emergency situations involving TDIs. Thus, this present study aimed to evaluate the knowledge and attitude of public elementary school teachers towards the occurrence of traumatic dental lesions through a questionnaire.

Material and Methods

Study Design and Sample

The target audience included in the survey were teachers from elementary public schools in Alfenas, Minas Gerais, Brazil, regularly working in schools registered by the National Institute of Educational Studies and Research Anísio Teixeira and who signed the free and informed consent form. Teachers who did not meet any of the criteria mentioned above were excluded.

The probabilistic sample consisted of a random selection of 10 schools (out of 20 schools). A confidence level of 95% and an accuracy level of 5% were used to calculate the sample. The minimum sample size required was 212 teachers. An unknown prevalence of the phenomenon investigated in each study ($p = 50\%$) was used, as this is the value that allowed the greater variation. The instrument used was a questionnaire based on and modified according to previously conducted studies [8,17,21,22], which contained both objective and subjective questions to assess knowledge and attitude involving TDIs.

The present study followed the STROBE Statement guidelines [23,24]. The period of recruitment and analysis of the participants' data was between May to November 2019. The participants interviewed had received no information material before data collection.

Data Analysis

Statistical analysis was performed by statistical software SAS® (SAS Inst., Cary, EUA) version 9.1.3, 2007, through logistic regression, considering that the group of the following variables: form of tooth handling, medium and storage site of dental element, and time of reimplant, formed the variable knowledge about dental reimplant. In addition, Chi-Square and Fisher's Exact tests were also used for the other variables at a significance level of 5% ($p < 0.05$).

Ethical Clearance

The present study was approved by the Committee of Ethics in Human Research (Process 0142010). All of the participants read and signed up the Informed Consent Term before the study was conducted.

Results

Table 1 shows the results related to personal and professional features of the interviewed teachers. Of a total of 471 invited teachers, 212 responded to the questionnaire (45%). Only 34% confirmed to have received first-aid training during their college course and 22.6% had taken it in an extra-curricular schedule. Among these professionals, only 7 (7.1%) were given training involving dental trauma content. In total, 34.4% of the teachers had received information related to fracture, while 27.4% to dental avulsion.

It was evidenced that few professionals (7.5%) were satisfied with the knowledge about dental trauma and only 12.3% felt prepared to act in case of TDIs. It was possible to observe that 23 teachers (10.8%) had seen some type of TDI within school environment and that 43.5% of these had been through this experience only once. Considering the first approach within the school, with relation to a TDI, 53.3% would ask for the headmaster's help, 23.6% to the supervisor, and 8% to the school dentist.

Among the prevalent answers, that the first attitude of the teachers towards a dental fracture would be contacting the child's parents (63.2%) or even take the student to a Dental School (13.7%), whereas towards dental avulsion, they would contact the child's parents (58,5%) or even take the student to the nearest dentist from school (15.6%).

Table 1. Personal and professional features of the teachers interviewed.

Variables	N	(%)
Sex		
Male	15	7.1
Female	197	92.9
Professional Experience		
Less than 1 Year to 5 Years	54	25.5
6 to 10 Years	40	18.8
11 to 15 Years	33	15.6
16 to 20 Years	32	15.1
21 to 25 Years	31	14.6
26 to 30 Years	14	6.6
Over 30 Years	8	3.8
Education Level		
College Education	198	93.4
No College Education	14	6.6
Have you ever had first-aid training in college?		
Yes	72	34.0
No	140	66.0
Have you ever had first-aid training voluntarily?		
Yes	48	22.6
No	164	77.4
Training on Dental Emergencies		
Yes	7	7.1
No	92	92.9
Have you carried out or would you carry out oral examination in cases of dental trauma?		
Yes	55	25.9
No	157	74.1
No. of TDIs cases actually seen		
Zero Cases	189	89.2
1-2 Cases	19	9.0
3-4 Cases	2	0.9
5 Cases	2	0.9

To whom would ask for help, inside school, towards a TDIs?

Headmaster	113	53.3
Supervisor	50	23.6
Coordinator	16	7.5
School Dentist	17	8.0
School Staff Colleague	11	5.2
Nobody	5	2.4

Concerning the procedure in case of avulsion, 47.2% would take the tooth by the crown, 2.4% would take it by the root, 5.2% would not take the tooth, and 45.2% would not know what to do. Most of the teachers (90.1%) confirmed that dental reimplant could be performed in cases of dental avulsion and that it should be carried out immediately (up to 30 minutes) (71.2%) or between 30 and 60 minutes (10.0%) to achieve a good prognosis (Figure 1).

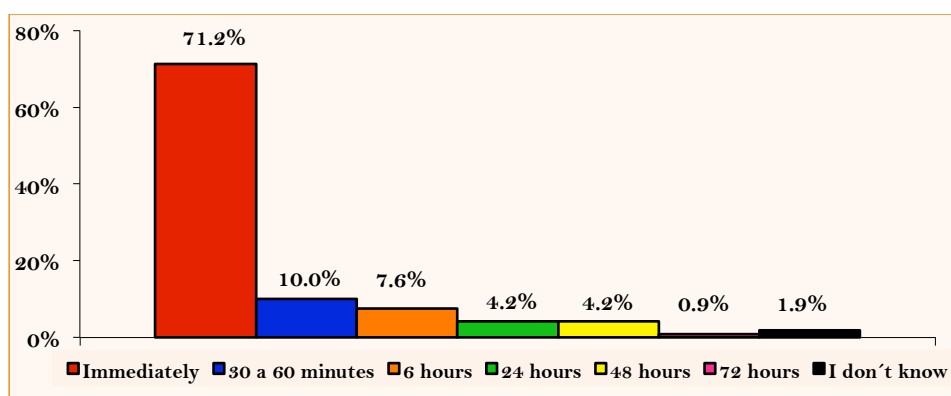


Figure 1. Percentage distribution of teachers according to the time for dental reimplant.

When asked about the need to perform dental reimplant in primary teeth, 29.7% were positive about this approach, but only 20.6% of them would carry out reimplant. Concerning permanent teeth, 91.5% stated the need to perform reimplant, although only 22.7% would actually carry it out.

It was observed that 36.3% of the teachers would store the avulsed tooth in a liquid medium, 18.9% in paper, and 15.1% in either gauze or cotton (Figure 2). Regarding the most frequently mentioned liquid, 46.7% checked fresh milk, 24.7% saline solution, and 24.7% water (Figure 3).

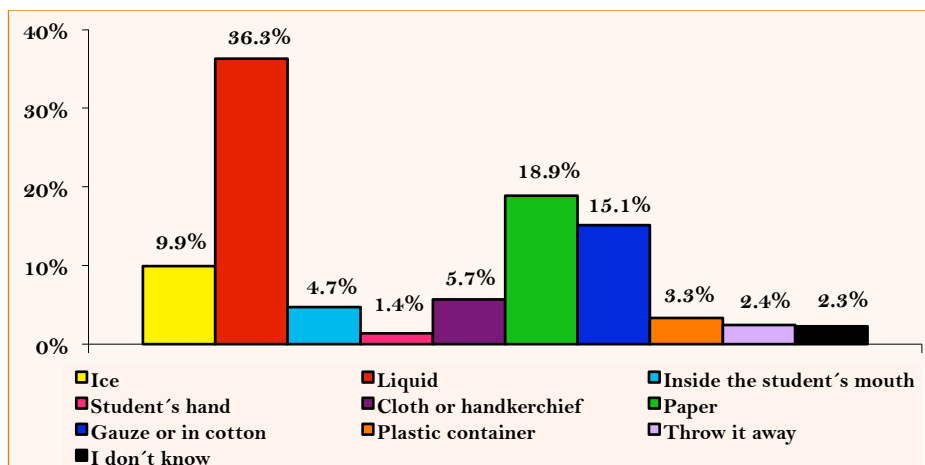


Figure 2. Percentage distribution of teachers according to the storage media for avulsed teeth.

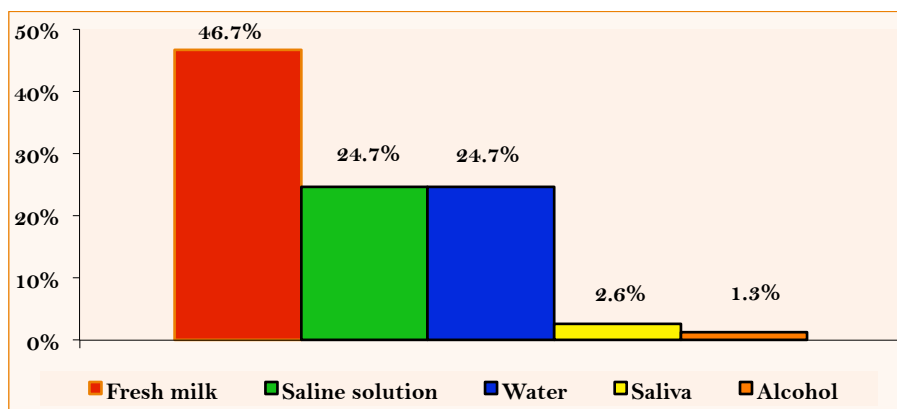


Figure 3. Percentage distribution of teachers according to the liquid storage media for avulsed teeth.

It was related to the personal evaluation about the need for training in first-aid procedures for dental trauma, and most of them (96.2%) confirmed that they would like to acquire specific information. Furthermore, there was a statistically significant association in observing that those teachers who were given first-aid training during college education were satisfied with the knowledge achieved about TDIs ($p=0.0394$). Considering the professionals who have taken first-aid training voluntarily, they carried out, or would, oral examination in case of fall or collision ($p=0.0236$) and had received information on how to proceed towards fracture ($p=0.0374$) and dental avulsion ($p=0.0421$). As for the teachers who have taken first-aid training comprehending the content related to dental trauma, it was possible to observe that they felt more well-prepared to help a student presenting dental trauma ($p=0.0005$) as well as to carry out oral examination in case of fall or collision ($p=0.0226$), since they had been given information on how to proceed towards fracture ($p=0.0023$) and dental avulsion ($p=0.0046$). Those professionals, specifically, were satisfied with the knowledge they had about TDIs ($p=0.0220$).

In logistic regression model, only variable “Have you ever had first-aid training voluntarily?” kept estimate $\beta = -1.29$, evidencing that, although some professionals had sought for that training, there was a probability of 1.2 less to have acquired the necessary knowledge about dental reimplant.

In Table 2, it is possible to evaluate the results related to specific features concerning knowledge and attitude towards TDIs.

Table 2. Specific knowledge of the teachers about TDIs.

Variables	N	(%)
Are you satisfied with your knowledge about dental trauma?		
Yes	16	7.5
No	196	92.5
Do you feel prepared to assist a student experiencing dental trauma?		
Yes	26	12.3
No	186	87.7
Would you consider possible to reimplant an avulsed tooth?		
Yes	191	90.1
No	18	8.5
I don't know	3	1.4
Can you distinguish a primary (deciduous) tooth from a permanent one?		
Yes	101	47.6
No	111	52.4
Do you think primary teeth have to be reimplanted?		
Yes	63	29.7
No	149	70.3

If so, would you carry out a primary tooth reimplant?		
Yes	13	20.6
No	50	79.4
Do you think permanent teeth have to be reimplanted?		
Yes	194	91.5
No	18	8.5
If so, would you carry out a permanent tooth reimplant?		
Yes	44	22.7
No	150	77.3
Attitude towards dental fracture occurrence		
Contact parents	134	63.2
Take the child to the nearest dentist from school	28	13.2
Take the child to a Dental School	29	13.7
Take the child to a specialist in dental trauma	4	1.9
Take the child to the hospital	2	0.9
Call the firemen	1	0.5
Others	14	6.6
Attitude towards dental avulsion occurrence		
Contact parents	124	58.5
Take the child to the nearest dentist from school	33	15.6
Take the child to a Dental School	31	14.6
Take the child to a specialist in dental trauma	8	3.8
Take the child to the hospital	2	0.9
Call the firemen	1	0.5
Others	13	6.1
How would you react towards an avulsed tooth?		
Would take the tooth by the crown	100	47.2
Would take the tooth by the root	5	2.4
Would not take the tooth	11	5.2
I don't know	96	45.2
Would you like to receive information on dental trauma?		
Yes	204	96.2
No	8	3.8

Discussion

The research conducted on educational public sector teachers in Alfenas, Brazil, showed a low percentage of professionals who were given first-aid training either during their college education or voluntarily. This corroborates with data obtained by Al-Jundi et al. [21], who have also presented a low training in contrast with several other studies in the literature [8,21,25], which demonstrated a great number of teachers that received this kind of training in Hong Kong and England.

Considering the overall participants, few professionals were given training on dental trauma. Similar to the results obtained in this study, several other papers [8,21,22,26-31] showed that teachers did not know about dental emergency training. In the present study, as well as in the one conducted by Blakytyn et al. [12] it was not possible to observe a statistically significant difference between teachers who took first-aid training or not comparing the number of correct answers related to the occurrence of TDIs. It was only possible to confirm that professionals who had this kind of training during their college education were satisfied with the knowledge acquired about TDIs. Based on these results, the present study agrees with others authors [8,32] with regard to the need for inserting a TDIs content in the disciplines taught to pedagogy and physical education students, since the few teachers who were given first-aid training with dental trauma approach stated that it was performed during their college education.

The educational level of the sample group studied had no statistically significant influence on the knowledge and correct attitudes towards a TDI. However, Feldens et al. [33], in a study conducted with 405

teachers in Canoas, South of Brazil, identified that the educational level positively impacted the knowledge of topics specifically related to the health area, including dental trauma. Similar results, although less intense, were reported for teachers in Singapore [17,33].

The time of professional experience in the present study did not interfere directly in statistically significant results regarding knowledge towards dental trauma occurrence. The same was observed in a similar study [21] involving teachers in Jordan. Nevertheless, Feldens et al. [33] achieved controversial results when observed that professional experience contributed to the teachers' knowledge about dental trauma.

In addition, 34.4% of the teachers stated that they had been given any kind of information related to fracture and 27.4% on dental avulsion. These data are important when informing educators about the need to localize the fragment of a "broken" tooth [27,34] and thus try to restore its original anatomy with as little a loss of dental structure. This must also be performed immediately when considering an avulsed tooth reimplant [27,34]. However, according to many studies [5,6,9,10,21,27,30], teachers of elementary schools are not properly informed on how to carry out the first aid in TDIs cases, which justifies the fact that only 25.9% of the people interviewed in the present study would perform oral examination of a student experiencing dental trauma.

With regard to TDIs occurrence in school environment, only 10.8% of the teachers experienced such situation, most of them had seen it once to twice. The same data could be observed in other studies [5,6,22,29], which have also presented low percentages of TDIs occurrence at school [20]. Feldens et al. [33] confirmed that former experience had not improved the knowledge about TDIs, although Al-Jundi et al. [21] had observed a positive effect on the teachers' sensitivity towards a dental trauma occurrence when formerly experiencing such situation.

When questioned about the first attitude towards dental fracture and avulsion, most interviewed teachers stated that they would contact the child's parents. However, other studies evidenced that 83% of the teachers would take the child immediately to the dentist and then contact the parents [10], would take the child to the dentist (96.7%) [5] or would take the child to a hospital emergency room instead of calling the child's parents or legal guardian or performing tooth reimplantation (70%) [29].

In relation to the types of dentitions, only 47.6% of the teachers were able to distinguish them, whereas, in another study [12], most of them would recognize such differences. In the present study, it was possible to observe that only 29.7% of the interviewed teachers were positive to immediate reimplant of avulsed primary teeth and 91.5% about permanent teeth. On the other hand, Blakytny et al. [12] observed that 19% of the professionals considered the need to reimplant primary teeth. Nevertheless, when asked about performing the reimplant, only 20.6% of the teachers in Alfenas stated that they would carry out primary teeth reimplant and 22.7% would do so with permanent teeth; this fact is probably related to the insecurity and fear of the technical execution of the procedures. These data were similar to the results obtained by Blakytny et al. [12], where 25.5% of the teachers would carry out dental reimplant and Haragushiku et al. [29], where 98% of private school teachers and 96% of public school teachers did not consider themselves capable of redeploing an avulsed tooth. This fact was to be expected because lay people (teachers and parents) do not know the correct attitude to be taken towards an avulsed tooth [16].

The time elapsed from dental trauma and dental care significantly influences the treatment prognosis and, due to this, it must be conducted in the first thirty minutes after the avulsion [34,35]. This fact is extremely relevant, for periodontal ligament cells lose their vitality as times goes by [34]. Regarding this question, most of the professionals interviewed in the present study considered that reimplant could be carried

out in cases of dental avulsion and that it must be performed immediately to achieve a good prognosis. Another study showed similar results: 79.5% of the interviewed people would conduct immediate reimplant [27]. Another relevant factor in the tooth reimplant prognosis is the form of handling of the avulsed tooth and the procedures related to reimplant, e.g., avoid touching and/or scraping periodontal ligament, for its removal may result in dental ankylosis [34]. These considerations are partially similar to the reports found in the present study since part of the teachers interviewed reported they would take the tooth by the crown or would not know what to do.

The storage medium is also a relevant element in TDIs. Teeth stored in a dry medium promptly lose periodontal ligament vitality, and therefore, they should be stored in an aqueous medium or saliva [34]. Milk is a good medium to store the avulsed tooth, followed by saliva, saline solution and Hanks balance solution [36,37]. In the present study, the lack of these information was observed since only 36.3% of the professionals would store avulsed teeth in a liquid medium and, among those, 46.7% would use milk, saline solution (24.7%), water (24.7%) and saliva (2.6%). The other teachers answered incorrectly when they stated that would store the avulsed tooth in other media. This lack of knowledge was also observed in other studies [5,21,29], which highlights the need to improve knowledge about how teachers would react to an avulsed tooth, including TDIs topics in their curricula.

It was also observed that the professionals interviewed were aware of the lack of knowledge with relation to the topic approached and that only 12.3% of them felt prepared to proceed when experiencing TDIs. Hence, most of them stated that it would be necessary to have specific information about dental trauma. The same situation can be observed in the studies conducted in Cardiff, United Kingdom [12], Jordan [21], Southern Europe [27] and Singapore [30], which concluded that not only the level of knowledge about TDIs was primitive and inappropriate but also that teachers would like to achieve more information about the subject. In Brazil, others studies have also found similar results [5,32,33].







Regarding the number of incorrect answers from professionals about TDIs, and considering that the school is an adequate social environment for the development of oral health promotion activities involving students, teachers, parents and community members, it is extremely relevant that the teacher constantly seeks knowledge on the subject, as it is the greatest link between the school and the family, to transform this environment into a place to support health [33,38]. In this context, it is suggested that training courses be developed, promoting wide access to teachers who wish to update themselves to favor the best prognosis in cases of TDIs. In addition, educational measures and materials aimed at training can be carried out, as well as studies that can follow the evolution of educators' knowledge, always detecting the occurrence of difficulties on the part of these professionals.

Other ways would be developed through educational and preventive campaigns about TDIs aiming to stimulate favorable changes in the population's behavior towards basic care required in cases of dental trauma, mainly in terms of emergencies that affect both prognosis and quality of the procedures [8,16,30]. Although this study has limitations such as sample size and response rate, the results showed that elementary school teachers in Alfenas, Minas Gerais, Brazil, have partial knowledge about TDIs. This information shows the need to inform and train teachers and the entire school staff about the correct procedures towards TDIs, since these professionals are daily in permanent contact with children and their parents, and could help prevent and significantly reduce those injuries.

Conclusion

Although a portion of elementary school teachers in Alfenas, Brazil, received some information about TDIs, they presented partial knowledge on the subject, indicating the need for continuing education to improve their knowledge on how they would react in the face of an avulsed tooth.

Authors' Contributions

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NAS		https://orcid.org/0000-0001-9608-1631	Conceptualization, Methodology, Formal Analysis, Writing - Review and Editing and Supervision.

All authors declare that they contributed to critical review of intellectual content and approval of the final version to be published.

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None.

Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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