

Full Length Research Paper

Traumatic dental injury in primary teeth: Knowledge and management in Brazilian preschool teachers

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Knowledge about the importance of primary teeth and correct attitudes in dental trauma emergency procedures can lead to adequate care, improving the prognosis and avoiding serious consequences for the child primary and permanent dentition. The aim this study was to evaluate the knowledge and behavior in a group of Brazilian preschool teachers, relative to dental trauma in primary teeth. In this cross-sectional study, preschool teachers from 32 public kindergartens answered a questionnaire to characterize their knowledge and behaviors about trauma to primary teeth and the relationship to educational level, work experience, experience with dental trauma and first aid training (Fisher exact test, $p < 0.05$). Of the 213 teachers, 93.9% had no knowledge about dental trauma. Only 23% of the professionals had received any first aid training and 16.3% of these had touched on the topic of dental trauma. No relationship was observed between professional experience and first aid training and the behavior of preschool teachers faced with dental trauma. In terms of educational level there was relationship only with respect to the time to seek treatment ($p = 0.02$). Comparisons between dental trauma experience and the behavior of the preschool teachers was significant to procedures for a primary tooth fracture ($p = 0.02$). The knowledge of this group of preschool teachers is not adequate and this lack of preparation prevents the correct procedures from being followed when an accident occurs, thus leaving the management of such accidents to be guided by beliefs.

Key words: Teachers, questionnaire survey, traumatic dental occlusion, deciduous teeth, cross-sectional study.

INTRODUCTION

Traumatic dental injury together with caries and oral cancer are among the major public health problems worldwide (Petersen et al., 2005). In some cases, traumatic dental injuries can cause irreversible losses, both at the time of the accident and during the course of treatment. Traumatic dental injury is considered a health

problem not only as pathology but also in terms of the psychosocial aspects, that is, it can cause a large impact on the quality of life of children (Cortes et al., 2002; Antunes et al., 2012, 2013).

There is a high prevalence of dental trauma to primary dentition (Jesus et al., 2010). This occurs mainly in the

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age range from 18 months to 3 years (Ben-Bassat et al., 1985; Andreasen and Borum, 1998; Kramer et al., 2003). This period, when traumatic injuries are more frequent, coincides with preschool when children usually have an exaggerated curiosity. It is also associated with the period when the child starts walking, but lacks sufficient balance and motor coordination to prevent accidents; thus these children are highly susceptible to traumatic injuries (Gottrup et al., 2007).

Epidemiological studies have shown that, multiple dentoalveolar trauma occurred at school (Ravn, 1974; Stockwell, 1988). At school, children are often pushed against one another or against an object. Also at school, children are kept confined in relatively small spaces for long periods of time, increasing the possibilities of accidents (Ravn, 1974).

Prompt and proper management of traumatic dental injuries is essential in order to reduce the impact on the oral health and quality of life of these children, especially since the most commonly affected teeth are the maxillary incisors (Cortes et al., 2002). Injuries to primary dentition can also cause serious harm to the permanent dentition (Ben-Bassat et al., 1985; Andreasen and Borum, 1998; Gottrup et al., 2007). Therefore, knowledge concerning the correct procedures to be carried out by lay people in these emergency situations is of extreme importance for a favorable prognosis. Failures in initial first-aid are related to the limited or inadequate knowledge as well as the lack of guidance and preparation of the general population, and consequently may result in the loss of the injured tooth as well as in sequelae.

In order to improve oral health, dentists, families and schools must unite in an educational program to promote social change through the implementation of new habits. It is important to assess the knowledge and perceptions of the parents/guardians, the children and the school staff concerning oral health (Antunes et al., 2008). And since dental trauma is a matter concerning perfect oral health, the assessment of preschool teachers' knowledge and behaviors when faced with a dentoalveolar trauma to the primary dentition is extremely relevant.

MATERIALS AND METHODS

Ethical aspects

This study was approved by the Ethics Committee on Local Research (number 02458512.2.0000.5243). A letter was sent to preschool teachers explaining the aim, characteristics and importance of the study, and asking for their participation. Teachers who agreed to participate signed a consent form. They also received the questionnaire to complete and return.

Type of study

This cross-sectional study was conducted in Nova Friburgo in Southwest Brazil. It has a population of 182,082 people. Nova Friburgo is predominantly urban (87%) and occupies an area of

933.414 km² divided into eight districts.

Sample

The study sample consisted of preschool teachers in public kindergartens of Nova Friburgo. In Brazil, children attend preschool from the early age of 1 year old to 6 years old, which coincide with the period of primary dentition.

All the 36 public kindergartens in Nova Friburgo were invited to participate in this study. However, two were inactive and two declined to participate. The remaining 32 kindergartens received 425 questionnaires and 213 were returned (a 50.1% response rate).

The sample was selected from all preschool teachers working in the public kindergartens in the city of Nova Friburgo, Rio de Janeiro, Brazil. The exclusion criteria were: 1) preschool teachers who did not accept to participate in the study; 2) teachers on leave or vacation; 3) public kindergartens that refused to participate in the study; and 4) improperly filled out questionnaires.

Data collection

The tool used in this study was a self-administered questionnaire completed by the preschool teachers from August to December, 2013. This questionnaire was based on preexisting mode (Sae-Lim and Lim, 2001), as there is no standard questionnaire validated for such purpose. This questionnaire was adapted and applied. Prior to the main study, the questionnaire was evaluated for ease of comprehension in a pre-test made by ten teachers and pre-tested again one month later. These ten teachers were not included in the final sample. The brief pilot was employed outside the study area. This led to a number of minor modifications of wording.

The questionnaire was divided into 3 parts: Part I consisted of general information, including age, gender, educational level, and work experience. Part II included questions about basic knowledge of dental trauma, experience with trauma, knowledge about deciduous dentition, and first aid training. Part III included questions about notions of management of dental trauma in deciduous dentition including basic emergency procedures, experience with each situation of dental trauma, and knowledge of handling accidental situations.

Data analysis

The answers from Parts I and II were counted and the percentages for each question were calculated. The responses about attitudes toward to management of the dental trauma (Part III) were grouped as previously described by Sae-Lim and Lim (2001) into: 1) "correct" (answers corresponding to a correct management of the dental trauma) or 2) "incorrect" (answers corresponding to an incorrect management of the dental trauma).

The Statistical Package for the Social Sciences version 16.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data statistically. Frequencies were obtained and chi square test was applied to evaluate the association between behavior in face of different situations of traumatic dental injuries to the primary dentition and the level of education, professional experience, experience with dental trauma and first aid training. A 95% level of significance ($p < 0.05$) was considered for the analyses.

RESULTS

All the participants were female and most (39%) were aged between 40 and 49 years old. Nearly half of them

Table 1. Characterization of the participants (n=213).

Age (years)	N	%
20 to 29	1	0.5
30 to 39	46	21.6
40 to 49	83	39.0
50 or over	46	21.6
Not given	37	17.4
Gender		
Female	213	100
Professional experience		
<10 years	102	47.9
>10 years	99	46.5
Not given	12	5.6
Educational level		
<16 years of study	105	49.3
>16 years of study	100	46.9
Not given	8	3.8

(47.9%) had less than 10 years of professional experience and 45.9% had more than 16 years of education, which in Brazil corresponds to a completed university course (Table 1).

Among these participants, 17.4% had already seen dental trauma among students. However, 93.9% of these teachers reported that they had no knowledge about traumatic dental injuries. When asked whether they had received any kind of first aid training during their school or university education, majority (76.5%) said they had not. For those who had received first aid training, only 16.3% had touched the topic of dental trauma. Thus, 91.5% of the participants felt they were not prepared to give the appropriate assistance; however, 93.9% demonstrated that they were willing to learn (Table 2).

Majority (61.0%) reported that dental trauma would be dangerous to both dentitions, while only 3.3% considered that dental trauma to primary dentition would be the most dangerous. Knowledge about the types of dentition is considered a basic item since the immediate management (first aid) of trauma to primary teeth differs from management of trauma to permanent teeth. To assess knowledge about the types of dentition, hypothetical cases of dental trauma in children from 8 to 13 years old were presented. According to 85.9 and 56.8% of the teachers, a tooth involved in a dental trauma of an 8 and 13 year-old-child, respectively, would probably be a permanent tooth (Table 3).

In Table 4, no association was observed between the behaviors of preschool teachers faced with dental trauma and their professional experience and first aid training. Regarding the level of education there was an association

only with the time to seek treatment ($p = 0.02$). The professionals who had less than 16 years of education showed a higher rate of correct answers than those who had more than 16 years of education. Comparing the experience in dental trauma with the behavior of the teachers, there was a statistical significance only in the procedures for a case of a primary tooth fracture ($p = 0.02$).

DISCUSSION

Lack of correct first aid procedures to trauma in primary teeth can cause injuries itself and also bring about irreversible harm to the permanent dentition. Most dental injuries affecting children at preschool age are overlooked, despite the high prevalence. This fact can be related to the belief that the primary teeth are only temporary. The knowledge about the importance of primary teeth and correct attitudes in emergency procedures of dental trauma can lead to adequate care, improving the prognosis and avoiding serious consequences for the child primary and permanent dentition.

According to Andreasen et al. (2009), dental trauma has epidemiological importance for public health, since it is very common in children and adolescents, and occurs in 2 out of every 3 children before adulthood. However, less than 1% of these traumas are reported, which is completely out of proportion to the dimensions of the issue and therefore is considered by these authors as an 'orphan topic' within pediatric dentistry. Also there is a considerable lack of research papers, in the literature, evaluating knowledge management and behavior of teachers concerning trauma to primary dentition.

A search in the literature on the said topic found 7 publications with a focus on "preschool teacher" and "primary school" (Sae-Lim and Lim, 2001; Tzigkounakis and Merglová, 2008; Al-Obaida, 2010; Nemitandani et al., 2011; Arikan and Sönmez, 2012; Young et al., 2012, 2013). However, only the studies by Sae-Lim and Lim (2001), Nemitandani et al. (2011) and Young et al. (2012, 2013), presented questions that focused on the management of trauma to the primary dentition as proposed by our article. Tzigkounakis and Merglová (2008) discussed avulsion of permanent teeth and Arikan and Sönmez (2012) evaluated the situation in relation to permanent dentition before and after distributing leaflets. Although Al-Obaida (2010) used the questionnaire from Sae-Lim and Lim (2001), they did not address primary dentition.

Trauma management in permanent dentition is extremely relevant for the prognosis of traumatic injury. However, the management of primary dentition trauma is rarely evaluated. Therefore, there is a need for further data on primary tooth trauma management which makes the present study extremely relevant. The authors suggest that there should be further research on the subject and that management procedures of primary dentition

Table 2. Knowledge and attitudes to dental trauma.

Do you have any knowledge of dental trauma?	N	%
Yes	8	3.8
No	195	93.0
No reply	10	4.7
Did you have any first aid training during school or university education?		
Yes	49	23.0
No	163	76.5
No reply	1	0.5
If yes, did the course address the topic of "dental trauma"?		
Yes	8	16.3
No	39	79.5
No reply	2	4
Would you like to learn about dental trauma?		
Yes	200	93.9
No	10	4.7
No reply	3	1.4
Have you witnessed trauma? (N = 213)		
Yes	37	17.4
No	174	81.7
No reply	2	0.9
Do you feel prepared to assist a child with dental trauma?		
Yes	10	4.7
No	195	91.5
No reply	8	3.8

Table 3. Knowledge of the tooth involved in a situation of a dental trauma in children 8 to 13 years (N = 213).

For which kind of teeth do you think a dental trauma is more dangerous?	N	%
Primary	7	3.3
Permanent	67	31.5
Both	130	61.0
No reply	9	4.2
If an 8-year-old girl banged her "front teeth" during recess, which teeth would probably be involved?		
Permanent	183	85.9
Primary	1	0.5
Do not know	13	6.1
No reply	16	7.5
If a 13-year-old girl banged her "front teeth" during recess, which tooth would probably be involved?		
Permanent	121	56.8
Primary	40	18.8
Do not know	35	16.4
No reply	17	8.0

Table 4. Attitudes to dental trauma considering level of education, work experience, experience of trauma and first aid training.

Parameter	Educational level (Years)		p-value	Professional experience (Years)		p-value	Traumatic injury experience		p-value	1st Aid training		p-value
	<16	≥16		<10	≥10		Yes	No		Yes	No	
Procedure in case of trauma to the face (inspection of the oral cavity)												
Correct	88	86	0.54	84	95	0.70	32	147	1.00	45	134	0.11
Incorrect	16	14		17	16		5	27		4	29	
Procedure in case of injury to soft tissue												
Correct	28	23	0.62	23	30	0.42	7	45	0.40	8	45	0.13
Incorrect	74	73		77	74		30	121		40	111	
Procedure in case of primary tooth fracture												
Correct	41	44	0.77	39	48	0.47	22	65	0.02	24	63	0.16
Incorrect	53	50		54	53		13	93		20	87	
Procedure in case of avulsion of primary tooth												
Correct	16	15	1.00	10	21	0.07	8	22	0.19	11	20	0.06
Incorrect	80	76		83	79		26	136		32	130	
The time to seek treatment												
Correct	90	73	0.02	83	85	0.46	31	136	1.00	34	134	0.12
Incorrect	12	23		15	21		6	30		12	24	

Chi square test, $p < 0.05$ for statistical significance.

trauma should be disseminated to lay people.

Although the present research has shown that 91.5% of the participants have no knowledge concerning trauma to primary dentition, many (93.9%) demonstrated their interest in learning about this subject. This is an important positive factor in our sample especially since dental trauma is considered a public health problem, and these participants are receptive and eager to receive and disseminate information. Schools are seen as suitable places to develop health programs as they bring together children who are at a suitable age to learn preventive measures. The main trainers of such knowledge are the teachers in the preschools, who therefore become the key strategic partners, acting as vectors for the dissemination of knowledge on this issue.

Healthcare professionals and educators have not taken up the commitment and responsibility to develop overall health, and have left oral health as an exclusive task for dentists, when actually there should be an interaction between the health and education areas to promote the well-being of the population. As said by Rayner (1970), oral health is a socioeconomic, political and an educational issue to be assumed by family, health teams, school and teachers in the classrooms, thus providing ongoing learning. A lack of knowledge of issues related to oral health leads to inadequate implementation of health policies, which in consequence do not achieve the expected goals, and in many cases, prevent educational

campaigns from bringing benefits to some communities.

The dentist also has an educational role to play in society, not only to inform, but mainly to show to the preschool teachers how important it is for them to learn to keep their own good health and to create suitable conditions for their students learning. The present research was carried out with these goals in mind.

Thus, an important point of this study is the fact that few teachers reported witnessing dental traumas on the school premises. This is because many of them only consider a dental trauma a fractured tooth or the loss of a tooth. They do not take into account the other types of dental trauma such as concussion and subluxation because they do not cause immediate visible consequences and therefore go “unnoticed” by the teachers.

Another point evaluated was the first aid training that teachers had or had not received, including dental trauma. Only 23% said they had received first aid training. This is in accordance with other studies, which confirmed that only a small percentage (11.5%) had received training (Nemutandani et al., 2011). The limited knowledge on the subject and the lack of training often do not match the level of accurate replies in certain issues, since the actions were not dependent on having received professional training in some management situations (e.g., inspection of the oral cavity and attitude of not repositioning the primary tooth). This also indicates that this level of accuracy can be justified by deduction.

Another finding that reinforces this conclusion is the level of success rooted in beliefs. For example, when asked in which type of tooth would dental trauma be the most dangerous, a large portion of the respondents answered correctly. However, the replies for statements such as "trauma to a permanent tooth is more important because it has roots and a primary tooth does not" or "a primary tooth has no function" or "a primary tooth will be substituted soon and therefore does not require treatment" did not match, showing once again that the correctness of the answers was due to deduction.

The evaluation of the different dentitions showed that a part of the preschool teachers were not able to distinguish between primary and permanent teeth, as observed by Young et al. (2012).

Many of the participants correctly stated that patients with dental trauma should seek immediate care, corroborating the findings of Young et al. (2012) as well as the attitude of inspecting the oral cavity. However, when evaluating the conduct of the teachers concerning soft tissue trauma, tooth fracture and dislocation (avulsion), most of the professionals had incorrect attitudes in the 3 situations. This confirms the lack of preparation of these professionals to handle trauma to primary teeth.

Regarding the level of education and experience of the participants, the present study showed a good level of education and professional experience (more than 10 years). However, these two factors did not count when deciding on the initial management of dental trauma as was also observed by Sae-Lim and Lim (2001). Even the few teachers who had experience with dental trauma and first aid training showed no knowledge of the right procedures. These analyses confirm that this group of professionals needs further instruction in health care.

Thus, based on these results, it is concluded that programs in health education focused on traumatic dental injuries in the form of lectures and trainings, to give greater insight into how best to prevent and manage situations of dental trauma should be prepared. Since the shortcomings of this group of professionals are known, the training should be made specific. For example, first, a basic knowledge concerning the distinction of dentitions needs to be approached, because a specific management for each dentition is required.

Another important point is how to identify the different types of dental trauma, especially those with less immediate impact that often go unnoticed and end up not receiving the necessary attention relative to the consequences they can cause. In addition, basic information such as how to preserve a tooth fragment, time to seek treatment and where to go in the case of dental trauma, are critical for a good prognosis of any case.

The reply rate in this study was 51%, which was higher than the 20.5% of Young et al. (2012) but lower than the 74% of Tzigkounakis and Merglová (2008). However, this sample was representative as it was composed of 32 of

the 36 preschools in the municipality of Nova Friburgo and they have similar socioeconomic characteristics. So from the point of view of applying the results of our research to the community in the municipality of Nova Friburgo, Rio de Janeiro, Brazil, we can affirm that its representativeness actually denotes what is happening to the studied population: most of these public kindergarten professionals had not received the kind of information necessary to deal with dental traumas and the deficiencies in their knowledge and attitudes were due to lack of guidance from health professionals.

Conclusion

The knowledge of the preschool teachers evaluated here is not suitable and that this lack of preparation prevents the adoption of correct measures and results in management of trauma cases being based on beliefs.

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