

RESEARCH

Evaluation of Knowledge and Awareness of Parents About Emergency Management of Traumatic Dental Injuries

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ABSTRACT

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Background: Parent's knowledge of appropriate first-aid treatment for traumatic dental injuries (TDI) can play an important role in improving prognosis. The purpose of this study is to evaluate the awareness and knowledge of parents' living in Kocaeli, Turkey about TDIs.

Methods: The study was conducted with 237 parents of children aged 6-12 years who applied to the Pediatric Dentistry Clinic for routine dental examinations. Parents' awareness regarding TDIs was assessed using a questionnaire both prior to and 1 month after providing education using a leaflet that included information on the emergency management of actual trauma cases. The questionnaire consisted of 2 parts: Part 1 collected demographic information and information regarding previous experiences of dental trauma, and Part 2 included 12 questions designed to evaluate the level of awareness regarding dental trauma. Data obtained from the questionnaires were statistically analyzed using Kruskal Wallis H, Mann Whitney U, Wilcoxon, Mc Nemar and Chi-square tests.

Results: Parents scores on the questionnaires increased significantly ($P < .05$) from rather low scores (mean: 4.6) prior to education to rather high scores (mean: 9.1) after education. In addition, for each question, the number of correct answers also increased significantly after education ($P < .05$).

Conclusion: The results of this study showed parents had insufficient awareness regarding traumatic dental injuries, but educating them with a leaflet that included real trauma cases during a dental visit had a great impact in terms of improving their awareness about TDIs.

KEYWORDS

Traumatic Dental Injuries, Children, Information Leaflets,

INTRODUCTION

Unlike many traumatic injuries, traumatic dental injuries (TDIs) tend to be irreversible in nature. This fact, along with the fact that they often occur in young children who are still undergoing growth and development, and the fact that their treatment is relatively expensive and of a long duration, make TDIs a serious public health problem.¹⁻²

Traumatic dental injury may affect primary and

ÖZ

Travmatik Diş Yaralanmalarının Acil Durum Yönetimi ile İlgili Ebeveynlerin Bilgisi Ve Farkındalıkı

Amaç: Ebeveynlerin travmatik diş yaralanmaları (TDY) için uygun ilk yardım bilgisi, tedavi прогнозunda önemli bir rol oynamabilmektedir. Bu çalışmanın amacı; Kocaeli, Türkiye'de yaşayan ebeveynlerin TDY hakkındaki farkındalık ve bilgi düzeylerini değerlendirmektir.

Gereç ve Yöntemler: Araştırma, rutin diş muayeneleri için çocuk diş hekimliği kliniğine başvuran 6-12 yaş arası 237 çocuğun ebeveynleri ile gerçekleştirildi. Ebeveynlerin TDY'lara ilişkin farkındalığı, gerçek travma vakalarının acil durum yönetimi hakkında bilgi içeren broşür ile eğitim verildikten önce ve 1 ay sonra anket formu kullanılarak değerlendirildi. 2 bölümden oluşan anket formunun birinci bölümde; demografik bilgi ve diş travması ile ilgili önceki deneyimlerle ilgili bilgi toplarken, ikinci bölümde diş travması ile ilgili farkındalık düzeyini değerlendirmek için tasarlanmış 12 soru bulunmaktadır. Anketlerden elde edilen veriler istatistiksel olarak Kruskal Wallis H, Mann Whitney U, Wilcoxon, Mc Nemar ve Ki-kare testleri kullanılarak analiz edildi.

Bulgular: Anketlerdeki ebeveyn puanları, eğitim öncesi oldukça düşük puanlardan (ortalama: 4.6) eğitimden sonra oldukça yüksek puanlara (ortalama: 9.1) ölçüde yükselmiştir ($P < .05$). Ayrıca, her soru için doğru cevapların sayısı eğitimden sonra da ölçüde artmıştır ($P < .05$).

Sonuç: Bu çalışmanın sonuçları, ebeveynlerin travmatik diş yaralanmaları konusunda yeterli farkındalığa sahip olmadıklarını, ancak diş ziyareti sırasında gerçek travma vakalarını içeren bir broşürle eğitimlerinin, TDY'lar hakkındaki farkındalıklarını artırmada büyük etkisi olduğunu göstermiştir.

ANAHTAR KELİMELER

Travmatik Diş Yaralanmaları, Çocuk, Bilgilendirme Broşürleri, Ebeveynlerin Rolü, Travma Bilinci

permanent teeth and may range from a simple enamel chip to extensive maxillofacial trauma². Facial trauma that results in fractured, displaced, or lost teeth can have significant negative effects on function, esthetics, and psycho-logical well being³. Prognosis depends not only on the type of injury, but also on its management. Most TDIs require emergency treatment to reduce future complications⁴. Studies have shown that nearly 20%-30% of school children experience TDIs to a permanent tooth⁵. However, an epidemiological

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study by Lam et al.⁶ reported that only one-third of patients who experienced TDI presented for treatment within 24 h of injury, while the remainder delayed seeking treatment for up to 1 year; Olivera et al.⁷ found that only 7.1% of all children who experienced dental trauma had dental treatment for their traumatized teeth; and Taiwo and Jalo⁸ in an epidemiological study found none of the students who had experienced TDI received any dental treatment for the trauma. Moreover, the literature includes numerous case reports of advanced complications caused by delays in obtaining appropriate management in a timely manner.^{9,10}

Although no study has been conducted to identify specific reasons for the delays in treatment, in most cases, this has been attributed to a lack of knowledge or awareness among the individuals present at the time of an accident and those providing immediate first-aid regarding the importance of obtaining immediate professional dental care for traumatized teeth.⁹⁻¹² This lack of awareness has been substantiated by studies demonstrating a low level of knowledge about TDIs among teachers and parents, the adults who are most likely to be present or nearby when a child experiences such an injury.^{7,9,13-15} As Dua and Sharma³ note, parents have a great responsibility in ensuring that children receive appropriate treatment for TDIs 52% of which were reported to occur at home. Practitioners also have a responsibility, not only in terms of providing appropriate management of children with TDIs, but also in terms of increasing parental awareness about TDIs in order to promote better outcomes. A visit to the dental clinic for a routine dental examination can be an opportunity to both evaluate and increase the level of parental knowledge on TDIs by providing correct information and relieving parents of misconceptions.¹⁶

Although various studies have evaluated parents' knowledge levels regarding traumatic injuries^{13,15,17}, only two studies in the literature have evaluated the effects of education (using a simple leaflet) on parents^{18,19}, and these only looked at knowledge related to avulsion. To our knowledge, no study has evaluated the effect of education on parents' general knowledge of TDIs. Therefore, this study aimed to evaluate the awareness and knowledge of parents' about TDIs.

MATERIALS AND METHODS

The protocol for this cross-sectional study was approved by the Ethics Committee of Kocaeli University and the study was conducted in full accordance with the World Medical Association Declaration of Helsinki. The study was conducted with 237 parents of children aged 6-12 years who were brought by their parents to the Pediatric Dentistry Clinic for a routine dental examination. The criterion for inclusion was being the parent of a child aged 6-12 years undergoing a routine dental examination. Exclusion criteria were being the parent who seeking treatment for a TDI.

All participants gave their informed written consent to take part in a survey on dental health knowledge without being given any specific details of the survey. The survey questionnaire was prepared based on previous reports in the literature examining parental attitudes and awareness regarding TDI management^{14,20}. The questionnaire was divided into 2 parts. Part-1 collected demographic information (age, gender, education level, owned children) as well as information on parents' previous experience with dental trauma and whether or not they had previously participated in an educational program or received information from any source about TDI, and Part-2 consisted of 12 questions that directly addressed parents' awareness of dental trauma management (Table 1). Each question had 1 ideal answer, which was scored as 1 point, indicating sufficient knowledge. All other answers were scored as 0 points, indicating insufficient knowledge. Accordingly, possible scores ranged from 0 to 12 for a parent.

Table 1.

Questionnaire distributed to the parents as translated into English

QUESTIONS	ANSWERS
Question 1: Have you heard of mouth guards used to prevent traumatic injuries to the teeth?	1. Yes* 2. No
Question 2: Do you recommend your child/children to wear mouth guards while playing games?	1. Yes* 2. No 3. Not sure what to do
Question 3: If your child has a tooth injury while playing what do you do?	1. Visit a dentist* 2. Calm down and rest the child 3. Not sure what to do
Question 4: If your child has the dental injury with loss of consciousness, what do you do?	1. Wake up the child and rest him/her 2. Apply to hospital 3. Not sure what to do
Question 5: Do you know whether the fractured tooth fragment can be saved?	1. Yes* 2. No 3. Not sure what to do
Question 6: How urgent do you feel that a dentist's opinion is needed?	1. Immediately* 2. In a few hours 3. In 30 minutes 4. Before the next day 5. Not sure what to do
Question 7: At the time of trauma if the tooth is completely out of the mouth what do you do?	1. Replace it back or carry the tooth in a solution to the dentist immediately* 2. Arrest the bleeding and discard the avulsed tooth 3. Not sure what to do
Question 8: What would you do if the 'knocked out' tooth was covered with dirt?	1. Rinse with tap water* 2. Clear the tooth to remove the dirt with handkerchief 3. Would do nothing 4. Not sure what to do
Question 9: How do you keep avulsed teeth in your hands?	1. Root 2. Crown(visible part inside the mouth)* 3. Not sure what to do
Question 10: In case you are carrying a tooth to a dentist how would you do it?	1. Handkerchief 2. Cold milk 3. Water 4. Salin 5. Not sure what to do
Question 11: Which of the below do you think is the ideal time for replacing the tooth?	1. Immediately* 2. In 1 hour 3. In 2 hours 4. The next day, the child calmed down 5. Not sure what to do
Question 12: Do you think that tetanus vaccine is needed?	1. Yes* 2. No 3. Not sure what to do

*Correct answers of the questions

The questionnaire was piloted on 15 dentistry students and 15 parents prior to the actual study in order to evaluate the questionnaire for clarity and comprehensibility. In addition, 15 parents responded to the same questionnaire again after one month to determine if their responses would change without

receiving any education. Answers from the first and second questionnaire implementations were compared using Kappa values (κ) of >0.81 , $0.80-0.61$, $0.60-0.41$, $0.40-0.21$, and <0.20 to denote perfect, substantial, moderate, fair, and slight agreement, respectively. Kappa values showed that answers were in perfect agreement, indicating that parents did not increase their knowledge of TDIs after one month. The parents who participated in this pilot study were not included in the actual study.

In the actual study, questionnaires were implemented during interviews with a pediatric dentist. Following the first implementation, parents were given education on TDIs using a leaflet prepared by the staff of the Kocaeli University Faculty of Dentistry's Pediatric Dentistry Clinic. The same experienced pediatric dentist spent 1-2 minutes with parents reviewing the leaflet, which was prepared in Turkish and included color photographs of actual traumatic injury cases (lateral luxations, crown fractures, root fractures, and avulsions of permanent teeth) managed in the clinic accompanied by simple explanations of the appropriate emergency management procedures, as described by Andreasen et al.²¹ Questionnaires were implemented again one-month later²² to assess the awareness of the parents after education with a leaflet. Statistical analysis of the questionnaire data was performed using the commercially available software program SPSS 20.00(SPSS, Chicago, IL). Kruskal Wallis H, Mann Whitney U, Wilcoxon signed-rank test, Mc Nemar, and Chi-square tests were used for sample comparisons. The level of significance was set at $p=0.05$.

RESULTS

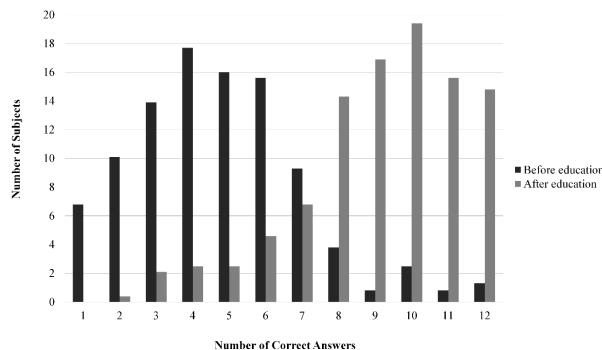
A total of 237 parents participated in this survey. Of these, 44.3%(n=105) were male and 55.7%(n=132) were female. The mean age of parents was 41 ± 3.30 . The majority of parents (62.4%) had two children. Regarding education levels, 45.9% of parents had less than a high-school education. While 18.1% of parents had a child who had previously had a TDI, only 7.6% had received information about dental trauma prior to this study (Table 2).

Table 2.

Distribution of the subjects according to demographic variables

GENDER	male	105 (44.3%)
	female	132 (55.7%)
EDUCATION LEVEL	<high school	109 (45.9%)
	high school	80 (33.7%)
	university	48 (20.2%)
NUMBER OF OWNED CHILDREN	1 child	23 (9.7%)
	2 children	148 (62.4%)
	3 children / over	64 (27%)
PREVIOUS TRAUMA EXPERIENCE	yes	43 (18.1%)
	no	194 (81.9%)
RECEIVED INFORMATION BEFORE	yes	24 (10.1%)
	no	213 (89.9%)
AGE (mean±sd)		41±3.30

Prior to receiving education, parents had a mean total score of 4.6. After education, this score increased significantly to 9.1 (Wilcoxon signed-rank Test, $P<.05$). Figure 1 shows the distribution of parents by the number of correct answers before and after education. No significant differences in scores were observed by gender, level of education, or number of children either before or after education ($p>.05$) (Table 3). Rates of correct answers for all questions increased significantly after education ($P<.05$) (Table 4).

**Figure 1**

Distribution of parents according to the number of correct answers before and after education.

Table 3.

The scores of parents according to general and demographic characteristics

GENDER	male	Pre-ed.	Mean ± std	Median	Min	Max	P values	
							Pre-Ed	Aft-Ed
GENDER	male	Pre-ed.	4,73±2,26	4	1	11	.761*	.331*
		Aft-ed	8,88±2,40	9	2	12		
	female	Pre-ed.	4,60±2,41	5	0	12		
		Aft-ed	9,35±2,07	10	2	12		
EDUCATION	<high school	Pre-ed.	4,22±2,08	4	0	10	.293**	.396**
		Aft-ed	8,90±2,27	9	2	12		
	high school	Pre-ed.	4,97±2,49	5	0	12		
		Aft-ed	9,5±1,98	10	1	12		
	university	Pre-ed.	5,12±2,53	5	1	12		
		Aft-ed	9,1±2,46	10	3	12		
NUMBER OF CHILDREN	1 child	Pre-ed.	4,91±2,06	5	1	11	.606**	.218**
		Aft-ed	8,95±1,94	9	4	12		
	2 children	Pre-ed.	4,73±2,58	4	0	12		
		Aft-ed	9,36±2,13	10	3	12		
	3 children/ over	Pre-ed.	4,40±1,78	4	1	8		
		Aft-ed	8,71±2,50	9	2	12		

*Kruskal Wallis H Test, **Mann Whitney U Test
Pre-ed = Before education, Aft-ed = After Education

$P>.05$ No statically significant difference

Pre-ed = Before education, Aft-

Table 4.

Distribution of correct answer rate belonged to each question before and after education

Question No	Before education	After education	P values
1st	13.1%	64.1%	.000*
2nd	11%	48.1%	.000*
3rd	46.8%	82.3%	.000*
4th	57.4%	88.2%	.000*
5th	44.7%	88.1%	.000*
6th	60.3%	88.2%	.000*
7th	24.9%	62%	.000*
8th	54.9%	81.4%	.000*
9th	46.4%	0,81	.000*
10th	18.1%	71%	.000*
11th	67.1%	80.6%	.000*
12th	22.8%	75.1%	.000*

* = Statistically significant difference ($P<.05$) Chi-square Test

Prior to education, parents who had previously encountered TDIs had significantly higher total scores (mean: 5.34) than those who had not encountered TDIs (mean: 4.51) ($p=.002$). Similarly, prior to education, parents who had previously received information about dental trauma had significantly higher total scores (mean: 7.70) than those who had not previously received information about dental trauma (mean: 4.31). By contrast, after being exposed to the educational leaflet, the difference between these groups was statistically insignificant (Table 5).

Table 5.

Trauma knowledge scores of subjects with/without trauma experience and receiving /not receiving information before the study

Have you received information about emergency management of dental trauma?	n (%)	mean ± std. dev.		P values	
		Pre-ed	Aft-ed	Pre-ed	Aft-ed
Yes	24 (10.1%)	7,70±3,09	8,87±2,59	0.000*	0.665
No	213 (89.9%)	4,31±1,98	9,17±2,19		
Have you had an experience with traumatic dental injuries?	n (%)	mean ± std. dev.		P values	
		Pre-ed	Aft-ed	Pre-ed	Aft-ed
Yes	43 (18.1%)	5,34±2,19	9,60±1,70	0.002*	0.517
No	194 (81.9%)	4,51±2,35	9,04±2,32		

Pre-ed = Before education, Aft-ed = After Education,

* = Statistically significant difference ($P < .05$), Mann -Whitney U test

DISCUSSION

The present study showed that educating parents through a leaflet containing information and photos of actual trauma cases significantly increased their awareness of TDIs. A number of studies have evaluated the level of parental awareness with respect to dental trauma and its emergency management and have suggested education as a means of increasing this awareness.^{13,14,17,20} However, only a few studies have investigated how parents' awareness can be increased to ensure a sufficiently informed community.^{19,23}

In line with previous studies^{13,14,17,20}, this study found parents' initial level of awareness about TDIs was low but increased significantly after education. While the mean number of correct answers was 4.6 (out of 12 questions) before education, this increased to 9.1 after education. Al-Asfour and Andersson¹⁸ found that parents who were given an educational leaflet had greater knowledge about avulsion than parents who were not given the leaflet. Similarly, Ghaderi et al.¹⁹ compared the knowledge of parents who were given/or were not given a leaflet (plus professional assistance) on avulsion and found that parents who were given the leaflet answered 86% of questions on avulsion correctly compared to 18.7% of parents who were not given the leaflet. When the results of these earlier studies are considered together with those of the present study, it can be concluded that educating parents using a brochure/leaflet is a suitable way to increase their awareness about TDIs.

However, caution needs to be taken when comparing the results among studies for a number of reasons. First, while Al-Asfour and Andersson²³ and Ghaderi's¹⁹ studies compared the knowledge of two different groups of parents—one that was given an educational leaflet and another group that was not given the leaflet—our study compared the responses of the same group of parents before and after education in order to remove any bias—a method that was also used in another study by Al-Asfour et al.²³ to evaluate the role of education in increasing teachers' knowledge regarding TDIs.

Second, Al-Asfour and Andersson¹⁸ and Ghaderi's¹⁹ studies evaluated knowledge of avulsion only, whereas our study evaluated knowledge of avulsion and other traumatic injuries, in light of an earlier study that reported crown fractures to be the most frequent type of TDI and that failure to receive appropriate and timely treatment for even small crown fractures could have negative outcomes^{11,24}. Finally, the leaflets used in Al-Asfour¹⁸ and Ghaderi's¹⁹ studies included schematic color drawings, whereas the leaflet used in the present study was prepared using color photographs of actual trauma cases that had been managed in our clinic in order to increase parents' attention.

In the present study, before parents were given the information leaflet, those who had previous experience with a TDI scored significantly higher on the questionnaire than those parents who had no experience with a TDI, and parents who had previously received information about emergency management of TDIs scored significantly higher on the questionnaire than those parents who had not been given information about emergency management of TDIs. Similarly, a study by Arikan and Sönmez²² found that teachers who had experience with traumatic dental injuries before education had significantly greater knowledge about TDIs than teachers who had no experience with such injuries, but that after education, the difference in knowledge between the two groups of teachers was eliminated. However, in contrast to our study findings, Vergotine and Koober¹⁶ reported no association between parents' knowledge of and personal experience with TDIs. The difference in findings may be due to the fact that Vergotine and Koober¹⁶ only evaluated parents' knowledge of avulsion, whereas our study and that of Arikan and Sönmez²² evaluated knowledge of TDI in general.

With regard to when to seek treatment for a traumatic injury, Namdev et al.²⁵ reported that 64.4% of parents said they would seek professional help immediately if their child had a traumatic injury, while Quaranta et al.²⁶ reported that only 41% of parents said that they would take their child to a dentist within 30 minutes following an injury. In the present study, prior to education, 60.3% of parents said they would take their children to a dentist immediately after a dental injury, but after education, this rate increased to 88.2%. Also, the present study found that only 44.4% of parents knew that it was important not to discard the broken tooth fragment before education, but this rate increased to 88.1% after education. Arikan and Sönmez²² measured the level of teachers' knowledge about dental trauma through photographs of cases. They found that the percent of teachers stating they would send a child to a dentist immediately following a traumatic incident increased significantly from 54.7% before leaflet distribution to 70.7% after leaflet distribution.

In addition, the percent of teachers saying they would try to find the broken part of a tooth increased significantly from 55.3% before leaflet distribution to 73.6% after leaflet distribution. Despite the fact that the present study and the study by Arıkan and Sönmez²² were performed on different groups (parents/teachers), the similarity in findings before and after education between both studies may be due to the fact that the knowledge of people live in the same society may have similar knowledge related to dental trauma because of an interaction of people. In addition, the similar increase in the knowledge rates of parents and teachers may be explained by the fact that the leaflets used in both studies contained real cases that could attract the attention of both study groups and make it easy for them to learn and to remember the proper responses to TDIs.

The majority of studies have found use of a mouthguard to be the most effective method of preventing TDIs²⁷⁻²⁹. Nowadays, mouthguards are easily obtainable and widely used in the sporting community; however, the rate of usage in Turkey is low. In one study, Özbay et al.³⁰ found that only 15.6% of handball players knew that a mouthguard could help reduce the risk of dental injury, and none of the players actually wore one themselves. These results indicate a serious need for education to increase awareness about the benefits of wearing mouthguards. In the present study, prior to education, only 13.1% of parents said they knew about the role of mouthguards in preventing TDIs, and most of them did not instruct their children to wear mouthguards. These results did not differ by education level, gender, or number of children. In contrast to our study, Hegde et al.²⁰ reported that 54.5% of mothers were aware that TDIs could be prevented through the use of a mouthguard. The relatively high rate was attributed to the fact that the survey was conducted in a relatively developed area with a well-educated population. In our study, after parents were educated using the leaflet, parents' awareness of the importance of mouthguards increased significantly from 13.1% to 64.1%, but the rate of parents stating they would recommend a mouthguard for their children only increased from 11% to 48%. This suggests that the leaflet, while helpful, was insufficient and that parents need more detailed education about the use of mouthguards. This could be achieved through alternative methods of education, such as a lecture focusing only on the use of mouthguards, or a detailed letter on the subject sent directly to parents.

In the present study, parent's knowledge of the appropriate first-aid treatment for avulsion, including the ideal time for replacing the tooth and appropriate storage and transportation medium, were evaluated before and after education. The results showed that the awareness of parents was quite low, which was in line with a previous study conducted with parents^{14,17-19}. Before education, only 24.9% of parents were able to

identify the correct procedure, namely immediately replacing the tooth in the mouth or carrying it in a solution to the dentist, whereas 67.5% said they did not know what to do and 7.6% said they would throw away the tooth. After education, 62% of parents were able to respond correctly. A study by Santos et al.¹⁴ reported that only 3% of parents knew that milk is the best storage medium for an avulsed tooth, whereas Hegde et al.²⁰ reported this rate to be 11.2%. In the present study, prior to education, 18.1% of parents state they would place an avulsed tooth in milk, whereas the remainder said they would use either saline (18.6%), water (26.6%) or a handkerchief (28.7%); after the education, 71% of parents identified milk as the preferred storage medium.

The findings of this study clearly indicate that the emergency management of dental trauma can be improved through information and education programs targeting the general population. In addition to educational campaigns, preventive programs and feedback to determine the specific areas of public ignorance and misconceptions that need to be addressed are also important. As suggested by the literature¹⁸, the present study obtained this feedback by using a questionnaire to identify parents' awareness before and after they were given 1-2 min training with a leaflet. No other study in the literature used the same group of parents to evaluate the difference in awareness before and after education, although 2 studies were conducted with teachers in this manner^{22,23}. This methodology may give rise to the question as to whether the higher number of correct answers observed after education was a result of the education provided, or merely of repeating the same questionnaire, or of some other factor (e.g. obtaining information from the internet in the interval between questionnaires). In order to eliminate such possibilities, study participants were not told that they would be required to complete the questionnaire again after they received the leaflet; indeed, a pilot study showed that individuals who were asked to complete the questionnaire twice with a 1-month interval, but who were not given the information leaflet, gave almost identical answers on both questionnaires, showing no improvement in knowledge about TDIs. Moreover, it must be noted that studies using two different groups may not be able to control for bias related to the intensity of involvement of some participants with traumatic injuries, TDIs, or trauma-related education.

CONCLUSION

The results of this study showed parents had insufficient awareness regarding traumatic dental injuries, but educating them with a leaflet that included real trauma cases during a dental visit had a great impact in terms of improving their awareness about TDIs. However, additional long-term comparative studies are needed to determine which methods of education can have the greatest impact in terms of improving public awareness about TDIs.

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