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Knowledge and awareness level of parents regarding the management of traumatized immature permanent incisors for children in Saudi Arabia

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ABSTRACT

Background: Young children commonly suffer from traumatic dental injuries (TDIs), crown fractures; root fractures and luxation injuries are popular types of TDIs. In immature permanent teeth injury, protecting the pulp is extremely valuable as it could keep the root development and apex formation growing. This research objective to assess the knowledge and awareness level among parents' management towards traumatized immature permanent incisors for children in KSA. *Methodology:* This was an observational study carried out in KSA. Based on a self-administrated questionnaire among Saudi populations was used as a study tool. The authors will collect the information using social media channels through Google forms. The sample dimensions were estimated that a minimum sample size of 384 using the Qualtrics calculator with a confidence level of 95%. *Results:* The survey involved 790 responders, with 75.6% being female and 24.4% being male. 35.8% of participants were between the ages of 31 and 40. Following dental trauma, 81% of participants would visit a dental clinic, 9.6% would visit a hospital emergency department and 2.2% would visit a primary care physician. 42.9% of study participants had a low level of awareness of emergent dental-trauma management, 46.7% had a moderate level of knowledge and 10.4% had a high level of awareness. *Conclusion:* According to the current research, the general Saudi-public has a low degree of knowledge and awareness of the emergent management of dental trauma. A significant association between knowledge score and educational level, residence region and occupation were found.

Keywords: Dental trauma, fractures, management, immature permanent teeth

1. INTRODUCTION

Young children commonly suffer from traumatic dental injuries (TDIs) (Aren et al., 2018) and this has long-term negative impacts (Levin et al., 2020). Crown

fractures, root fractures and luxation injuries are popular types of TDIs (Bukhary, 2020). In immature permanent teeth injury, protecting the pulp is extremely valuable as the root development and apex formation could continue growing because of its healing capacity after traumatic pulp exposure (Bourguignon et al., 2020; Levin et al., 2020). Among different types of physical injuries, 5% are estimated to be in the oral region (Goswami and Aggarwal, 2021), these injuries may be classified according to the severity from simple to more complex (Shehri et al., 2021), preschool and primary school children commonly encounter this type of trauma (Salarić et al., 2021) with maxillary central incisors being the most affected teeth (Abdelmalak et al., 2021).

Any dental trauma requires immediate intervention because any delay in treatment increases the risk of devitalization of the tooth or bone resorption. Both parents and teachers lack dental awareness regarding how to deal with traumatic dental injuries (Author et al., 2020). Al-Sehaibany et al., (2018) detected that most of the school staff members have never participated in TDIs training sessions or had any prior information regarding TDIs. The enamel chip is the most common dental trauma that happens at home. It affects the maxillary central incisors, the (canines and lateral-incisors) come next (Nourwali et al., 2019).

Furthermore, the rate of pulp necrosis is 54% when treatment is not performed, while it decreases with appropriate management to 8% only. As well as in the case of an immature permanent tooth, the ability of healing increases after TDIs (Tian et al., 2022). Due to an increase in traffic accidents, contact sports, bicycle riding and falls, the prevalence of dental injuries has increased during the past few years (Alluqmani and Omar, 2018). The injury to upper or lower anterior teeth leads to poor aesthetics and a loss of function, which negatively affects the children's quality of life on a medical, social and psychological level (Zafar et al., 2018).

In Saudi Arabia, Al-Sehaibany et al., (2018) stated that Saudi mothers are unaware of identifying the correct de-notation involved in dental-trauma, whether the tooth implicated is primary or permanent and the significance of preserving the fractured tooth fragment. However, like the majority of previous studies, it consisted of an extensive portion related to avulsion as part of assessing knowledge regarding the proper management of TDIs (Świątkowska et al., 2018).

Therefore, this study aimed to estimate the knowledge and understanding of parents and caregivers regarding the management of dental-traumatic injuries in Saudi Arabia. This study aims to assess the knowledge and awareness level among parents' management towards traumatized immature permanent incisors for children in KSA.

2. MATERIALS AND METHODS

Study design

This is an observational cross-sectional study that was conducted in the-kingdom of Saudi-Arabia based on a self-administrated questionnaire among Saudi populations. This study was conducted between July 2022 and November 2022.

Inclusion and Exclusion criteria

The study's population will consist of Saudi parents' males and females, whose ages range from 18-65 years old, from all five regions of the kingdom of Saudi Arabia, who experienced dental injuries in children and individuals who will agree to participate in this study. On the other hand, in adolescents younger than 18 years old and older than 65 years old Saudi parents' males and females, the individuals who will disagree to participate in the study were excluded.

Sample size

The sample dimensions were estimated that a minimum sample size of 384 using the Qualtrics calculator with a confidence level of 95%. The Sample size was estimated using the formula: $n= P (1-P) * Z\alpha^2 / d^2$ with a confidence level of 95%;

n: Calculated sample size

Z: The z-value for the selected level of confidence (1- a) = 1.96.

P: An estimated prevalence of knowledge

Q: (1 – 0.50) = 50%, i.e., 0.50

D: The maximum acceptable error = 0.05.

So, the calculated minimum sample size was:

$n = (1.96)^2 X 0.50 X 0.50/ (0.05)^2 = 384.$

Method for data collection and instrument

The questionnaire was distributed on 20 individuals and asked to fill it. This was done to test the simplicity of the questionnaire and the feasibility of the study. Data of the pilot study was excluded from the final data of the study.

Those who will agree to participate in the study will provide an online informed consent and will receive a 3 part self-administered questionnaire in Arabic language, most questions was in a multiple-choice format that was used as a study tool. Authors will collect the information using social media channels through Google forms.

The first part will contain questions regarding demographic data such as (age, gender, place of residency, village or city, educational background and occupation).

The second part is sixteen multiple-choice questions with one correct answer on dental trauma management. The sum of correct answers was considered as the total knowledge of the respondents on the topic of dental injury management with a possible maximum score of sixteen. As in Table 1, according to Bloom's cut-off ranking, participants' overall knowledge was classified as good if the score was between 80% and 100% (13-16 points), moderate if the score was between 60% and 79% (10-12 points) and poor if the score was less than 60% (0-9 points).

Table 1 Knowledge classification score

Scoring cut-off points (out of 16)	Scoring cut-off % (out of 100)	Classification score
13	81.25	Good knowledge
10	62.5	Moderate knowledge
9	56.25	Poor knowledge

A correct or yes answer was given a 1 score, whereas a 0 score was given for a wrong answer. Our survey will have items related to assessing the participants' knowledge toward emergency management of dental fractures injuries, subluxation and avulsion in children of immature permanent anterior, such as how they are assessing their knowledge of differentiating between permanent and deciduous teeth and personal knowledge about traumatic-dental-injuries of immature permanent anterior with choices from very poor to very good, the most commonly affected tooth by dental injuries in children, fractured-subluxated tooth meaning, as well as will ask if the broken piece of the tooth is important or not, also about the best time and immediate action after dental trauma, along with the pulp vitality protection information, in addition, the best treatment if the immature permanent tooth was intruded or extruded. The avulsion questions such as what the proper time is if a permanent tooth has been extracted, to seek professional assistance, **a**bout the suitable storage medium for storing and preserving an avulsed tooth, about dealing with an avulsed tooth covered with dirt and the last question in this part is: How would you hold the knocked-out tooth?

The final part of the questionnaire analyzes the aware of emergency management of dental trauma among parents by the questions: Have you ever been trained or informed about dental injuries and their management? Have you ever personally experienced a traumatic tooth injury with a child? Moreover, we will ask them about satisfaction with their knowledge and awareness and if it is compulsory to have an educational program on dental trauma management, also question about the proper place to deal with dental injuries like a crown fracture or if the child had slight mobility related to upper immature incisors. In addition, in a case scenario of a 9-year-old child who fell and the upper front tooth was knocked out, what was the immediate action, about the awareness of splinting after repositioning a tooth in the correct place and special diet recommendations, about the necessity of endo treatment after the tooth is repositioned in the correct place, as well as the awareness level of attending follow-up appointments if the dentist recommended it.

Similarly, on the knowledge scoring scale bloom's cut-off ranking, eleven multiple-choice questions with one correct or Yes/No answer to measure the level of awareness. The score of (9-11 points) represents highly aware, (7-8 points) represents moderately aware, while a poorly aware score is (0-6 points) (Table 2).

Table 2 Awareness classification score

Scoring cut-off (out of 11)	Scoring cut-off (out of 100) %	Classification score
9	81.8	Highly aware
7	63.6	Moderately aware
6	54.5	Poorly aware

Pilot test

The questionnaire was distributed on above 15 individuals and asked to fill it. This was done to measure the understanding of the questionnaire and the feasibility of the study. The final data of the study doesn't include the pilot data of the study.

Analyzes and entry method

And about our entry method, data was entered using the Windows software "Microsoft Office Excel Software" (2016). The data was transmitted to version 20 (IBM SPSS Statistics for Windows, version 23.) of the Social Science Software Statistics Package (SPSS). The statistical analysis is required for (Armonk, NY: IBM Corp).

3. RESULTS

The study included 790 participants, 75.6% of participants were females and 24.4% were males. 35.8% of participants aged between 31- 40 years old, 27.7% aged 18- 30 years old and 22.3% aged 21- 50 years old. 64.6% of study participants had university degree and 21.8% had secondary school degree. 88.2% of study participants live in a city while 11.8% live in a village. As for job, 26.1% of participant work in education sector, 12.9% in health sector and 10.6% have office job (Table 3).

Table 3 Socio-demographic characteristics of participants (n=790)

Parameter		No.	%
Age	18 - 30	219	27.7
	31 - 40	283	35.8
	41 - 50	176	22.3
	51 - 60	94	11.9
	More than 60	18	2.3
Gender	Male	193	24.4
	Female	597	75.6
Educational level	Uneducated	3	.4
	Primary	14	1.8
	Intermediate	30	3.8
	Secondary	172	21.8
	University	512	64.8
	Postgraduate	59	7.5
Region	Eastern province	208	26.3
	Middle region	171	21.6
	Northern province	84	10.6
	Southern province	116	14.7
	Western province	211	26.7
Living place	City	697	88.2
	Village	93	11.8
Occupation	Office work	84	10.6
	Educational/Teacher	206	26.1
	Engineer	26	3.3
	Health care practitioner	102	12.9
	Sports coach	1	0.1
	Trades worker	14	1.8
	Other	357	45.2

As in Table 4, 38.9% of participants rated their knowledge of distinction of permanent teeth from primary teeth as average, 21.1% good and 17% very good. Also, 31.8% of participants rated their knowledge about traumatic dental injuries of immature permanent front teeth as average, 26.3% poor and 15.2% good. After dental trauma, 81% of participants would go to dental clinic, 9.6% go to emergency room in a hospital and 2.2% go to GP in primary health care center.

Table 4 Participants' knowledge of dental trauma management (n=790)

Parameter		No.	%
Personal assessment knowledge of the distinction of permanent teeth from primary teeth	Very poor	77	9.7
	Poor	113	14.3
	Average	307	38.9
	Good	159	20.1
	Very good	134	17.0
Personal assessment of knowledge about traumatic-dental-injuries of immature permanent front teeth	Very poor	155	19.6
	Poor	208	26.3
	Average	251	31.8
	Good	120	15.2
	Very good	56	7.1
Most susceptible teeth to dental injuries	Mandibular anterior teeth	66	8.4
	Maxillary anterior teeth	624	79.0
	Maxillary canines	18	2.3
	I do not know	82	10.4
Proper time to treat an immature permanent anterior injury	After bleeding	45	5.7
	Any time according the child desire	34	4.3
	If the child feels pain	103	13.0
	Immediately	398	50.4
	Upon 24 hours	24	3.0
	I do not know	186	23.5
After dental trauma, go to	Dental clinic	640	81.0
	Emergency room in hospital	76	9.6
	General medical practitioner	17	2.2
	Home /Self -treat	15	1.9
	I do not know	42	5.3

As in Figure 1, most study participants (79%) choose maxillary anterior teeth as most susceptible teeth to dental injuries and only 2.3% chose canine. Most study participants (89.1%) had poor knowledge, 10.5% had moderate knowledge and only 0.4% had good knowledge (Figure 2).

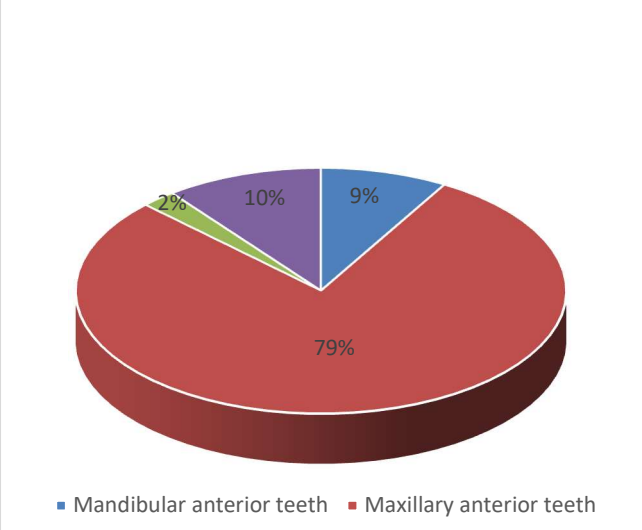

Figure 1 Participants' knowledge of most susceptible teeth to dental injuries

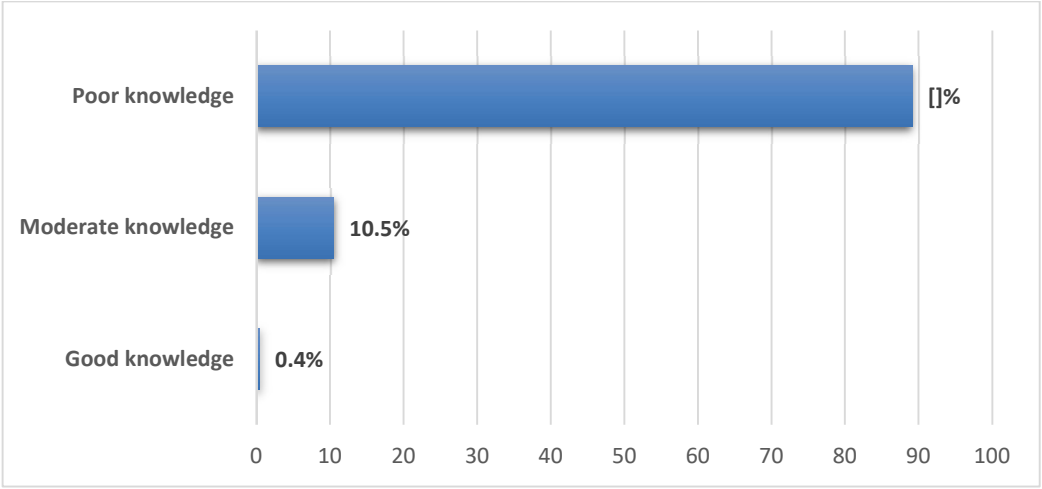

Figure 2 Knowledge scores of dental trauma management

As in Figure 3, 42.9% of study participants had poor awareness score of emergencies manage of dental trauma, 46.7% had moderate awareness and 10.4% had good awareness. Table 5 shows a significant association between knowledge score and educational level, residence region and occupation (P< 0.05).

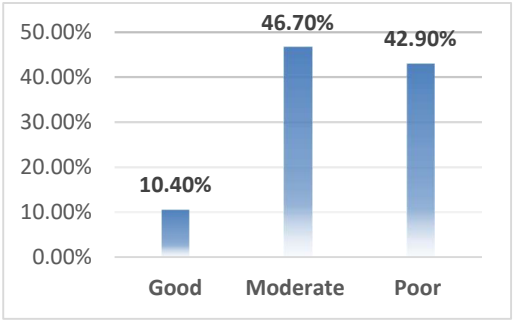

Figure 3 Awareness scores of emergency manage of dental-trauma among parents' score

Table 5 Association between socio-demographic characters of participants with their knowledge scores (n=790)

		Knowledge score			Total (N=790)	P value
		Poor	Moderate	Good		
Age	18 - 30	193	25	1	219	0.756
		27.4%	30.1%	33.3%	27.7%	
	31 - 40	256	26	1	283	
		36.4%	31.3%	33.3%	35.8%	
	41 - 50	160	15	1	176	
		22.7%	18.1%	33.3%	22.3%	
	51 - 60	79	15	0	94	
		11.2%	18.1%	0.0%	11.9%	
	More than 60	16	2	0	18	
		2.3%	2.4%	0.0%	2.3%	
Gender	Male	177	16	0	193	0.308
		25.1%	19.3%	0.0%	24.4%	
	Female	527	67	3	597	
		74.9%	80.7%	100.0%	75.6%	
Educational level	Uneducated	3	0	0	3	0.002
		0.4%	0.0%	0.0%	0.4%	
	Primary	14	0	0	14	

		2.0%	0.0%	0.0%	1.8%	
	Intermediate	30	0	0	30	
		4.3%	0.0%	0.0%	3.8%	
	Secondary	164	8	0	172	
		23.3%	9.6%	0.0%	21.8%	
	University	449	61	2	512	
		63.8%	73.5%	66.7%	64.8%	
	Postgraduate	44	14	1	59	
		6.3%	16.9%	33.3%	7.5%	
Region	Northern province	73	10	1	84	0.010
		10.4%	12.0%	33.3%	10.6%	
	Eastern province	173	34	1	208	
		24.6%	41.0%	33.3%	26.3%	
	Middle region	149	21	1	171	
		21.2%	25.3%	33.3%	21.6%	
	Southern province	110	6	0	116	
		15.6%	7.2%	0.0%	14.7%	
	Western province	199	12	0	211	
		28.3%	14.5%	0.0%	26.7%	
Living place	City	618	76	3	697	0.491
		87.8%	91.6%	100.0%	88.2%	
	Village	86	7	0	93	
		12.2%	8.4%	0.0%	11.8%	
Occupation	Administration/ office work	77	6	1	84	0.001
		10.9%	7.2%	33.3%	10.6%	
	Educational/ Teacher	181	24	1	206	
		25.7%	28.9%	33.3%	26.1%	
	Engineer	25	1	0	26	
		3.6%	1.2%	0.0%	3.3%	
	Health care practitioner	71	30	1	102	
		10.1%	36.1%	33.3%	12.9%	
	Sports coach	1	0	0	1	
		0.1%	0.0%	0.0%	0.1%	
	Trades worker	12	2	0	14	
		1.7%	2.4%	0.0%	1.8%	
	Other	337	20	0	357	
		47.9%	24.1%	0.0%	45.2%	

4. DISCUSSION

Traumatic dental injuries are a global issue for dental health that can happen at any time in life. Depending on the precise traumatic damage suffered, a variety of interventions and treatment options are available. However, every traumatic injury is a unique case that necessitates a distinct diagnosis and course of treatment (Antipovienė et al., 2021).

One out of every two kids, often between the ages of 8 and 12, has a dental injury, according to the international association of dental traumatology. The idea is that in the majority of dental trauma situations, prompt and suitable treatment can decrease its effects on oral health and aesthetics. The most frequent side effects of TDIs include crown or root fracture, luxation injuries, avulsion and wounds to the soft tissues, gingiva and dental pulp in addition to fractures of the alveolar bone (Antipovienė et al., 2021).

According to reports, both primary and permanent dentitions are primarily damaged by severe dental injuries to the anterior teeth, particularly the maxillary central and lateral incisors. With the exception of some trauma events like traffic accidents, violence

and sports injuries, which cause many tooth damages, trauma dental injuries often only impact one tooth (Antipovienė et al., 2021; Goswami and Aggarwal, 2021).

A correct judgment cannot be made in the absence of accurate information. This inability to make sound decisions frequently results in low adherence, if not outright rejection, of preventive health treatments. The international association of dental-traumatology (IADT) recommends prompt tooth replantation in cases of permanent tooth avulsion as a significant dental injury. The tooth should be located, washed for almost ten seconds under cold running water and then repositioned. The avulsed tooth should be preserved in a suitable liquid medium, such as milk, if replantation is not an option, in order to maintain the tooth cells' ability to adhere to one another and to remain alive. Additionally, the tooth might be delivered to the mouth while remaining inside the lip or cheek. The fact that water is an inappropriate medium must be emphasized (Andersson et al., 2017).

In our study, most study participants (89.1%) had poor knowledge, 10.5% had moderate knowledge and only 0.4% had good knowledge. The findings of earlier studies Al-Asfour and Andersson, (2008), Al-Sehaibany et al., (2018), Kebriaei et al., (2020) and Pani et al., (2016) are consistent with the reported lack of awareness among moms in this study. The therapy of dental trauma injuries was not sufficiently understood by mothers in another study. Nearly one-third of the overall knowledge score was represented by the individuals' mean knowledge score (mean score 3.43 out of a maximum of 10). The mean rating for their self-reported performance was a moderate 3.38 out of a possible 7 (Momeni et al., 2022). According to Kaul et al., (2016) in Kolkata and Ozer et al., (2012) in Turkey, parents' general awareness of emergency trauma management is not acceptable. Kebriaei et al., (2020) reported the findings are consistent with the current study. Regardless of nationality, mothers lack adequate understanding about oral trauma. This result was comparable to a qualitative study that revealed Iranian mothers' general lack of awareness of traumatic oral injuries (Momeni et al., 2017). The variability in the samples' makeup can be used to explain why different studies' conclusions differ. The findings of the current study and other comparable studies all point to mothers' lack of knowledge regarding dental trauma and it is acknowledged that mothers' knowledge can be improved by supplying information in this area in a variety of educational formats.

After dental trauma, 81% of our study participants would go to dental clinic, 9.6% go to emergency room in a hospital and 2.2% go to GP in primary healthcare center. The primary point of contact for the care of a TDI was typically a medical professional, according to a prior study, rather than a dentist. These findings are consistent with Bazina et al., (2020) shown that just 20% of coaches would go to a dentist following a TDI as opposed to 49% who chose to consult a doctor. As opposed to the research mentioned above, a study by Quaranta et al., (2016) revealed that about 85% of the individuals chose to seek dental assistance after a TDI. Given this, it may be useful to investigate if parents can recognize TDIs as this may affect their decision to seek dental care. Medical professionals could lack the necessary training, assurance, or equipment to handle oral trauma. Parents and coaches should be aware of the constraints placed on medical professionals in treating these conditions and should know the proper dental emergency protocols to follow (AlGhamdi et al., 2016).

In research by Al-Sehaibany et al., (2018), many Saudi mothers (41.6%) recommended that the kid be taken to the dentist right away and that the avulsed tooth be protected in a suitable medium. Less than 30 minutes is the ideal window for urgent permanent tooth replacement in order to prevent periodontal membrane damage and root surface dryness (Andersson et al., 2017). In a different survey, 41% of mothers selected the right response. 30% of participants had said instantly and 10% had said within 30 minutes. These findings are consistent with the earlier research on Egyptian parents who selected the "at any moment" response. In other words, they neglected to take into account the need for replantation over time (Abdellatif and Hegazy, 2011).

In our study, there was a significant association between knowledge score and educational level, residence region and occupation. A previous study reported that level of education and occupation of mothers has a beneficial influence on their knowledge. Self-reported performance and mothers' educational levels were related (Momeni et al., 2022). According to Razeghi et al., (2020), there was no correlation between parental knowledge and their employment level. Higher educated mothers had more knowledge. This result supports earlier research Al-Jundi, (2006), Jabarifar et al., (2011), Kebriaei et al., (2020) and Pani et al., (2016) that showed schooling was a strong predictor of knowledge. In contrast to other studies Hashim, (2012), Hegde et al., (2010), Santos et al., (2009) and Shahnaseri et al., (2011) reported in a descriptive-analytical study conducted in Isfahan in 2017 that there was a direct correlation between parents' knowledge and their children's schooling.

Education will undoubtedly increase moms' awareness of dental trauma first-aid and their general capacity to manage emergencies. It appears that moms' lack of knowledge on how to manage and treat dental traumatic injuries has a negative impact on their performance, making them feel unable to do so. Solving problems is one of the most crucial abilities in health promotion since it makes capacity-building strategies sustainable. Future oral health initiatives should emphasize improving people's abilities to overcome personal obstacles to attaining ideal oral health.

Parents of young patients should receive instructions on how to take care of an injured tooth or teeth for best recovery, prevent additional injury by avoiding contact sports, practice meticulous oral hygiene and rinse with an antibacterial solution, among other things.

5. CONCLUSION

The current study reveals that the general Saudi public has a low level of knowledge and awareness of the emergent care of dental trauma. Oral health education should work to remove obstacles to providing daily oral health care in the community, especially for mothers, by enhancing knowledge, attitudes and performance. It is important to support policies and initiatives that promote protective and healthful behaviors.

Recommendations

We recommend that further educational campaigns should be inaugurated to raise Awareness and knowledge about traumatic-dental-injuries management among parents in Saudi Arabia.

Ethical approval

The research proposal was approved by the Regional Research and Ethics committee of King Abdulaziz University, with letter number (099-09-22).

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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