

Parental knowledge, attitude and practice regarding paediatric dental trauma. A systematic review



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Abstract

Aim Dental trauma is one of the major oral health problems faced during the developmental ages. Most of the traumatic events occur at home; therefore, parents are frequently required to provide appropriate first aid measures. This systematic review aimed to synthesize the available evidence parents have regarding the topic of dental trauma, with a focus on their level of knowledge, attitude, and practice.

Methods The systematic review was performed according to PRISMA guidelines. The research question was structured using the PICO framework (PROSPERO ID: CRD42023397318).

Results Thirty-one studies have been selected. All selected reports have provided data about parents' knowledge of traumatic dental injuries in paediatric age. In general, all the studies reported a lack of awareness, knowledge and skills in managing dental trauma. Regarding attitude, a high percentage of parents acknowledged that they did not have the necessary information to handle an event correctly. Regarding practice, parents would be more concerned about a trauma to a permanent tooth rather than to a deciduous tooth.

Conclusions Parents' knowledge about dental trauma management is quite limited, and this has a negative impact on the long-term prognosis of traumatised teeth. It is crucial to increase parents' knowledge and awareness about the importance of dental traumas in paediatric age.

Introduction

Traumatic dental injuries (TDIs) are frequent in childhood, occurring in 15–30% of children [Andrade et al., 2010]. The incidence of TDIs in the primary dentition has been reported to vary between 31% and 40% among males and between 16% and 30% among females; in the permanent dentition, the incidence varies between 12% and 33% among males and between 4% and 19% among females [Andreasen and Andreasen, 1990]. Male subjects exhibit a higher frequency of dental and alveolar traumas compared to their female counterparts, with an incidence ratio of 3:2. This difference gradually decreases after the age of 10, nearly disappearing in adulthood, due to the increasing involvement of girls in

KEYWORDS Attitude, knowledge, practice, parents, dental trauma.

traditionally male-dominated sports, such as soccer, extreme and acrobatic sports [Andreasen and Andreasen, 1990].

TDIs affect the upper front teeth in 80–90% of cases, in particular the central incisor. The lateral incisors are affected in 10–18% of cases, while the lower incisors or the lateral-posterior groups are involved in the remaining 2–4% [Andreasen and Andreasen, 1990; Shulman and Jill, 2004].

The etiology of TDIs includes oral, dentofacial and systemic risk factors, such as dental caries, enamel hypoplasia, fluorosis, endodontic therapies, increased overjet, inadequate lip coverage [Shulman and Jill, 2004; Bausse et al., 2004; Bani et al., 2015], anterior open bite, systemic diseases (e.g., epilepsy, cerebral palsy) [Glendor, 2009].

Most dental and alveolar traumas occur as a result of domestic accidents (40%), road accidents (25–30%), or sports-related incidents (20–25%). Only a minority of cases, 5–10%, is caused by intentional injuries, assaults, or work-related accidents [Glendor, 2009; Von Arx, 1993; Paglia, 2018].

Dental treatments after dental trauma aim to restore the functionality and aesthetics of the stomatognathic system and prevent long-term complications, such as pain and infections. However, these treatments often involve long and complex procedures, such as replantation and endodontic therapy of the affected teeth, which require the intervention of skilled operators and a very intense collaboration from child and their family, for which it is difficult to predict the long-term prognosis [Pisano et al., 2022]. In cases of dental trauma, therefore, regular follow-up appointments are necessary to monitor the outcome of the therapy and diagnose any potential complications precociously [Glendor, 2009; Von Arx, 1993].

Trauma of primary teeth can result in pain, pulp necrosis, pulp obliteration, internal or external root resorption and can affect the development of the permanent dentition: the most common effect on the permanent successors is enamel hypoplasia, together with crown dilaceration, root malformation and odontoma-like teeth [Von Arx, 1993]. Long-term complications

of traumatic events that affect permanent teeth include discoloration of the crown; pulp necrosis, with consequent abscesses and periapical inflammatory processes; ankylosis, generally following intrusive luxations and late replantations; infraocclusion of the tooth, as a consequence of ankylosis; root resorption, caused by damage to the periodontal ligament; resorption of the alveolar bone and loss of bone structure [Von Arx, 1993; Ilma de Souza Cortes et al., 2002]. Moreover, maxillary central incisors are the most important teeth for aesthetics, phonetics, mastication, psychological and mental wellbeing [Ilma de Souza Cortes et al., 2002]. Early loss or untreated fractures of these elements in developmental age can lead to phonetic problems, compromised aesthetics, lower self-esteem and reduced confidence [Ilma de Souza Cortes et al., 2002; Al-Jundi, 2002].

The success of TDIs treatment is multifactorial and can be influenced by the severity of the traumatic event, the child's maturity level and ability to cope with the emergency and the timeliness of treatments. As most TDIs occur at home [Al-Jundi, 2002], parents are frequently required to provide prompt and appropriate action to avoid long-term complications of traumatic injuries. A high percentage of children with dental trauma present late for treatment, possibly because of lack of awareness and knowledge among related adults, resulting in unfavorable long-term prognosis [Murali et al., 2014]. As such, there is a greater need to increase awareness among parents, teachers, educators, and all individuals who may be involved in providing initial assistance to a child, focusing on a greater understanding of first aid measures to be implemented in cases of dento-alveolar traumas. Increased knowledge of first aid maneuvers and preventive measures can make a difference in ensuring prompt and appropriate intervention in cases of dental traumas, thereby reducing complications and improving the long-term prognosis for the affected children [Ilma de Souza Cortes et al., 2002; Murali et al., 2014].

Since dental traumas represent one of the primary oral health issues in pediatric age, the scientific literature has shown significant interest in this topic over the years. Numerous studies have been published with the aim of assessing the knowledge, attitudes, and perceptions of the population towards dental traumas. The main categories analysed were teachers, parents, sports instructors, and healthcare professionals, as they are the ones most frequently involved in providing primary emergency care in case of trauma [Murali et al., 2014; Re et al., 2014].

Since parents play a crucial role in the prompt management of dental traumas, and their awareness regarding the importance of traumatic events is decisive for their prevention, it is essential to investigate the current state of parents' knowledge concerning this topic. Understanding the level of knowledge and awareness among parents can help identify areas where education and intervention is needed to enhance their preparedness in handling dental traumas. This will ultimately contribute to better outcomes for children who experience dental traumas and aid in preventing such incidents in the future.

The purpose of this systematic review was to assess, analysing the existing studies, the level of parental knowledge, attitude and practice regarding dental traumas.

Materials And Methods

The systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement with the use of PICO (Population, Intervention, Comparison, Outcome) tools [Liberati et al., 2009;

Methley et al., 2014] to formulate the research question 'What are parental knowledge, attitude and practice (KAP) on TDIs in paediatric age in questionnaire-based investigations?'

The protocol for this review was registered on PROSPERO on February 2023 (ID: CRD42023397318).

Eligibility criteria

The review comprised qualitative, quantitative and mixed-method studies in English language. Questionnaire-based surveys assessing the current parental knowledge and/or attitude and/or practice on traumatic dental injuries in pediatric age have been considered. Studies investigating the parental knowledge and/or attitudes and/or practices towards other oral health related topics, studies investigating the knowledge and/or attitudes and/or practice on TDIs of other categories and non-questionnaire-based survey have been excluded.

Search strategy

The literature search covered data up to March 2023 (included) and was performed using broad Medical Subject Headings (MeSH) terms and the following key words, in multiple combinations: 'traumatic dental injuries', 'knowledge', 'attitude', 'practice', 'awareness'. The search equations used with MeSH were '("Tooth Injuries"[Mesh]) AND "Health Knowledge, Attitudes, Practice"[Mesh]'. The data were obtained using the MEDLINE (PubMed) search engine and Scopus. The reference lists of the retrieved articles were also checked for additional studies.

Study selection

After screening out duplicate articles, two investigators (C.T. and L.S.) independently examined articles by their title and abstract, according to pre-established criteria.

Full texts of all relevant and potentially relevant studies, appearing to meet the inclusion criteria, (Table 1) were screened. Furthermore, when the title and abstract were insufficient to judge whether to exclude an article, the researchers would make the choice after reading the full text. Any disagreement between researchers was solved through evidence-based discussion and the involvement of a third researcher (Q.M.).

Data extraction and data synthesis

After agreeing on the full-text eligible articles, the information collection sheet was completed, and included: author's name, year of publication, design of the study, geographic location, duration, sample size, parental demographic characteristics (gender, age, educational level, employment and/or socioeconomic status). Furthermore, all the TDI-related topics explored in the questionnaire-based surveys, classified in the three distinct domains (knowledge, attitude, practice), were summarised.

Quality assessment

The quality of the studies was evaluated by the same two independent authors using The Risk Of Bias In Non-randomised Studies – of Interventions (ROBINS-I) tool [Sterne et al., 2016].

Results

PubMed and Scopus research produced 1426 abstracts. After removing duplicates, 1328 articles were recorded, 1299 of which were excluded during the screening of the titles and abstract. An additional manual search was made, during which the literature contained in the selected articles was analysed and six

additional articles were selected for review. Thirty-five publications were accepted for full-text analysis, of which four studies were excluded because they were out of scope (Supplementary materials). Finally, considering the eligibility criteria, 31 articles were selected for review [Murali et al., 2014; Quaranta et al., 2014; Quaranta et al., 2016; Świątkowska et al., 2018; Santos et al., 2009; Cosme-Silva et al., 2017; Cosme-Silva et al., 2018; Oliveira et al., 2007; Vergotine and Koerber, 2010; Namdev et al., 2014; Yassen et al., 2013; Ahmed et al., 2020; Al-Jundi, 2006; Hegde et al., 2010; Hashim, 2012; Nagaveni, 2005; Jain et al., 2017; Loo et al., 2014; Nikam et al., 2014; Alyahya et al., 2018; Kebriaei et al., 2020; AlGhamdi et al., 2016; Al-Sehaibany et al., 2016; Kaul et al., 2016; Al-Jame et al., 2007; Ozer et al., 2012; Ningthoujam et al., 2019; Alzahrani and Almaqboul, 2019; Tian et al., 2022; Raphael and Gregory, 1990; Abdellatif and Hegazy, 2011]. The PRISMA flow diagram was shown in Figure 1. Table 2 shows the principal features of the 31 articles included in the review. All the included studies were designed as cross-sectional type. In relation to geographic location, three studies were conducted in Europe [Quaranta et al., 2014; Quaranta et al., 2016; Świątkowska et al., 2018], five in America [Santos et al., 2009; Cosme-Silva et al., 2017; Cosme-Silva et al., 2018; Oliveira et al., 2007; Vergotine and Koerber, 2010], twenty in Asia [Murali et al., 2014; Namdev et al., 2014; Yassen et al., 2013; Ahmed et al., 2020; Al-Jundi, 2006; Hegde et al., 2010; Hashim, 2012; Nagaveni, 2005; Jain et al., 2017; Loo et al., 2014; Nikam et al., 2014; Alyahya et al., 2018; Kebriaei et al., 2020; AlGhamdi et al., 2016; Al-Sehaibany et al., 2018; Kaul et al., 2016; Al-Jame et al., 2007; Ozer et al., 2012; Ningthoujam et al., 2019; Alzahrani and Almaqboul, 2019], two in Australia [Tian et al., 2022; Raphael and Gregory, 1990] and one in Egypt [Abdellatif and Hegazy, 2011].

Table 3 shows the main characteristics of the studied population. The questionnaire-based investigations were filled out by parents of children in developmental ages, attending private and public schools and Pediatric Dentistry Departments worldwide. The sample size varied from 63 to 3367 participants (mean value: 875.4).

All the TDI-related items explored in the questionnaire-based surveys, classified in the three distinct domains (knowledge, attitude and practice), were shown in table 4, along with the number of studies in which each item has been reported, since not all items were analysed in all studies.

The knowledge related items included statements about the meaning of dental trauma, previous experience of TDIs, the first place of contact in case of trauma, the prevention of TDIs during sport activity, the parts of the face most susceptible to trauma, the need of the tetanus vaccine in case of trauma in dirty places, the correct identification of the traumatised tooth, and the correct management in case of dental fracture or avulsion. The attitude related items investigated parents' self-assessed knowledge in TDIs management, satisfaction with self-assessed knowledge, the sources of knowledge about TDIs, the awareness of the importance of educational program regarding the management of TDIs, the awareness of the need to attend educational programs on management of TDIs, and the awareness of the availability of during/after working hour emergency service. The practice related items investigated the importance of a dental trauma in primary teeth for its consequences on permanent teeth.

The risk of bias assessment detected a serious risk in all the articles selected for review (Table 5).

The summary of the main outcomes of the selected studies, classified in the three distinct domains (knowledge, attitude and

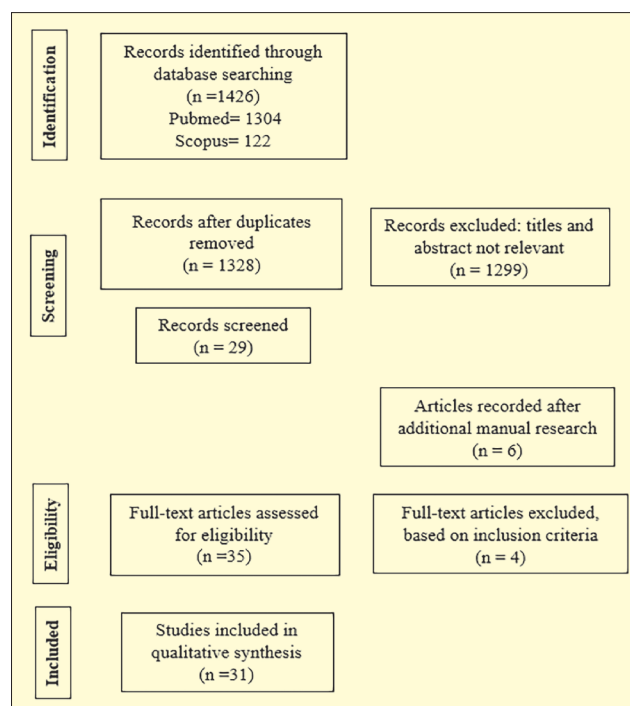


FIG. 1 PRISMA flow diagram.

practice), is reported in Tables 6-7.

Knowledge

All selected reports have provided data about parents' knowledge of traumatic dental injuries in pediatric age. In general, all the studies reported a lack of awareness, knowledge and skills in managing a dental trauma. Of all types of injuries, parental knowledge of managing avulsion of the permanent teeth was poorest, followed by management of injuries of primary tooth and management of fractures and subluxation of permanent tooth [Alzahrani and Almaqboul, 2019].

Among the selected studies, only two have investigated parents' knowledge of the meaning of dental trauma, and they found that, on average, 77.6% of parents was aware of the meaning of dental trauma [Quaranta et al., 2014; Quaranta et al., 2016]. The majority of the selected studies (77.4%) investigated the previous experience of dental traumas, and, on average, 40.4% of parents reported witnessing a dental trauma one or more times. Regarding the most suitable professional figure to manage dental trauma, on average, 61.5% of parents stated that they would turn to a dentist after a traumatic event, 10.3% to a pediatrician or family doctor, 20.1% to the emergency room and 18.3% to a dental school.

Only four studies have investigated parents' knowledge about the prevention of TDIs during sports activities [Quaranta et al., 2014; Quaranta et al., 2016; Namdev et al., 2014; Al-Jundi, 2006], and three of these have shown that parents were aware that the use of mouthguards can reduce the incidence of trauma during sports practice (51.6%-62.9%) [Quaranta et al., 2014; Quaranta et al., 2016; Al-Jundi, 2006].

Only one study has investigated parents' knowledge regarding the teeth most susceptible to trauma, and more than half of the parents responded correctly, indicating the upper central incisors as the facial part most affected during TDIs [Alyahya et al., 2018]. In 25.8% of the studies, the parents' ability to identify a traumatised tooth was investigated, and, on average, 44.9% of

		Inclusion Criteria	Exclusion Criteria
P	Population	Parents of patients in developmental age	Other categories
I	Intervention	Questionnaire-based investigations evaluating parental KAP on traumatic dental injuries in pediatric age	Questionnaire-based investigations evaluating parental KAP towards other oral health related topics Non-questionnaire-based investigations
C	Comparison	Comparison of KAP on TDIs among parents, if applicable	
O	Outcome	Outcomes reported by authors on parental KAP on traumatic dental injuries in pediatric age	Outcomes reported by authors on parental KAP not related to traumatic dental injuries in pediatric age

TABLE 1 Inclusion and exclusion criteria according to PICO tool.

Authors/Year	Design of the study	Location	Duration
Quaranta et al., 2014	Cross-sectional survey	Italy	January - May, 2013
Quaranta et al., 2016	Cross-sectional survey	Italy	N.D.
Świątkowska et al., 2018	Cross-sectional survey	Poland	May, 2014 - February, 2015
Santos et al., 2009	Cross-sectional survey	Brazil	March - June, 2006
Cosme-Silva et al., 2017	Cross-sectional survey	Brazil	N.D.
Cosme-Silva et al., 2018	Cross-sectional survey	Brazil	N.D.
Oliveira et al., 2007	Cross-sectional survey	Brazil	N.D.
Vergotine and Koerber, 2010	Cross-sectional survey	Wisconsin, USA	N.D.
Namdev et al., 2014	Cross-sectional survey	India	N.D.
Yassen et al., 2013	Cross-sectional survey	Iraq	January - March, 2012
Ahmed et al., 2020	Cross-sectional survey	Saudi Arabia	N.D.
Al-Jundi, 2006	Cross-sectional survey	Jordan	July - September, 2003
Hegde et al., 2010	Cross-sectional survey	India	N.D.
Hashim, 2012	Cross-sectional survey	United Arab Emirates	January - February, 2011
Nagaveni, 2005	Cross-sectional survey	India	N.D.
Jain et al., 2017	Cross-sectional survey	India	January - May, 2016
Loo et al., 2014	Cross-sectional survey	India	May, 2011 - May, 2012
Nikam et al., 2014	Cross-sectional survey	India	N.D.
Alyahya et al., 2018	Cross-sectional survey	Kuwait	August, 2015 - February, 2016
Kebriaei et al., 2020	Cross-sectional survey	Iran	N.D.
Alghamdi et al., 2016	Cross-sectional survey	Saudi Arabia	N.D.
Al-Sehaibany et al., 2018	Cross-sectional survey	Saudi Arabia	July, 2016 - June, 2017
Murali et al., 2014	Cross-sectional survey	India	December, 2012 - February, 2013
Kaul et al., 2016	Cross-sectional survey	India	N.D.
Al-Jame et al., 2007	Cross-sectional survey	Kuwait	N.D.
Ozer et al., 2012	Cross-sectional survey	Turkey	N.D.
Ningthoujam et al., 2019	Cross-sectional survey	India	September - November, 2016
Alzahrani and Almaqboul, 2019	Cross-sectional survey	Saudi Arabia	N.D.
Tian et al., 2022	Cross-sectional survey	Australia	November, 2020 - January, 2021
Raphael and Gregory, 1990	Cross-sectional survey	Australia	N.D.
Abdellatif and Hegazy, 2011	Cross-sectional survey	Egypt	N.D.

TABLE 2 Characteristics of the included studies.

N.D.: not declared.

them reported being able to distinguish between a deciduous (baby) tooth and a permanent tooth [Vergotine and Koerber, 2010; Namdev et al., 2014; Yassen et al., 2013; Ahmed et al., 2020; Hegde et al., 2010; Alyahya et al., 2018; AlGhamdi et al., 2016; Al-Sehaibany et al., 2018]. All the selected studies investigated parents' knowledge regarding the proper and timely management of dental trauma and the first aid measures to be adopted to improve the long-term prognosis of a traumatised

tooth. Overall, all the studies reported inadequate parental knowledge concerning dental trauma management and a lack of necessary information to effectively handle a TDI. Indeed, in all the studies, a rather low percentage of the interviewed subjects declared knowing how to manage bleeding in the traumatised area or loss of consciousness or being capable of handling tooth fractures or avulsion. Finally, only one article investigated parents' knowledge regarding possible complications

Authors/Year	Sample size	Gender	Age (years)	Educational level	Employment and/or Socioeconomic status
Quaranta et al., 2014	900	M: 23% F: 77%	<20: 1% 20-29: 5% 30-39: 49% 40-49: 43% ≥50: 2%	Primary school: 11% Middle school: 42% High school: 38% University: 9%	Housewives: 55% Employed: 32% Unemployed: 13%
Quaranta et al., 2016	2775	M: 23.7% F: 76.3%	20-29: 4.7% 30-39: 44.0% 40-49: 47.2% ≥50: 4.1%	Primary school: 3.8% Middle school: 34.1% High school: 44.8% University: 17.3%	Housewives: 37.5% Employed: 49.0% Unemployed: 13.5%
Świątkowska et al., 2018	741	M: 24% F: 76%	Male mean age: 37.14 ± 8.71 Female mean age: 37.88 ± 8.02	Primary: 4.3% Secondary: 26.5% Vocational: 17.5% Bachelors: 12% Masters: 39.7%	Employed: 79.2% Unemployed: 20.8%
Santos et al., 2009	107	M: 7.5% F: 92.5%	Mean: 37.66 ± 11.20 <25: 10.3% 25-50: 77.6% >50: 12.1%	Primary: 50.5% High school: 39.8% Higher education: 9.7%	Very low: 23.4% Low: 35.5% Middle: 16.8% High: 24.3%
Cosme-Silva et al., 2017	179	N.D.	Public schools: 37.08 ± 8.99 Private schools: 35.33 ± 8.02	Public schools Primary: 45.98% Middle school: 39.08% Higher education: 11.49% Private schools Primary: 1.01% Middle school: 25.27% Higher education: 68.13%	N.D.
Cosme-Silva et al., 2018	802	N.D.	Mean: 34.3 ± 8.48	N.D.	N.D.
Oliveira et al., 2007	242	M: 0% F: 100%	N.D.	N.D.	N.D.
Vergotine and Koerber, 2010	467	M: 10% F: 90%	N.D.	High school or less: 57% More than high school: 43%	N.D.
Namdev et al., 2014	1500	N.D.	<30: 34.8% >30: 65.2%	Below graduate: 54.3% Above graduate: 45.7%	N.D.
Yassen et al., 2013	231	M: 0% F: 100%	Mean: 34.5 ± 9.4 <25: 17% 25-34: 35% 35-44: 30% ≥45: 18%	Less than high school: 77% High school: 10% College: 13%	Employed: 10% Unemployed: 90%
Ahmed et al., 2020	1201	M: 72.6% F: 27.4%	<20: 11% 20-39: 57% 40-49: 20.3% ≥50: 11.7%	Primary school: 1% Middle school: 4% High school: 27% College degree: 68.4%	N.D.
Al-Jundi, 2006	2215	M: 0% F: 100%	<20: 19.8% 20-29: 40.1% 30-39: 31.9% 40-49: 8% >50: 0.18%	Primary: 17.9% Middle school: 18.1% Diploma: 33% University: 30% Higher education: 1%	Low: 25% Middle: 55% High: 20%
Hegde et al., 2010	500	M: 0% F: 100%	N.D.	Illiterate: 2.0% High school: 43.6% University: 54.4%	Employed: 40% Unemployed: 60%
Hashim, 2012	700	M: 0% F: 100%	<20: 4.1% 20-29: 65.1% 30-39: 20.3% 40-49: 8.3% ≥50: 2.2%	High school: 17.2% Diploma: 11.8% University: 69.4% Higher education: 1.6%	N.D.
Nagaveni, 2005	2000	N.D.	N.D.	N.D.	Rural area: 50% Urban area: 50%
Jain et al., 2017	550	M: 65.6% F: 34.4%	N.D.	Illiterate: 10.5% Elementary: 40.9% Secondary: 28.2% University: 20.4%	Rural area: 54.2% Urban area: 45.8%
Loo et al., 2014	529	M: 45.6% F: 54.4%	N.D.	Illiterate: 7.2% Elementary: 40.1% Secondary: 32.7% University: 20.0%	Rural area: 35.2% Urban area: 64.8%
Nikam et al., 2014	200	N.D.	N.D.	N.D.	N.D.
Alyahya et al., 2018	554	M: 40.4% F: 59.6%	20-30: 27.1% 31-40: 38.3% ≥41: 34.7%	Primary: 16.1% Secondary: 36.6% Tertiary: 47.3%	N.D.
Kebraei et al., 2020	300	M: 24.7% F: 75.3%	22-29: 24.6% 30-34: 41.2% 35-54: 34.1%	Not educated: 11.5% Middle school: 15.2% High school: 51% University: 22.3%	Housewife: 67.9% Clerk: 11.1% Worker: 8.1% Businessman: 11.8% Retired: 0.7% Unemployed: 0.3%

Alghamdi et al., 2016	274	N.D.	N.D.	N.D.	N.D.
Al-Sehaibany et al., 2018	3367	M: 0% F: 100%	<25: 38.9% 25-35: 41.7% 36-45: 14.3% >45: 5.1%	High school: 28.3% College: 67.9% Higher education: 3.8%	Unemployed: 74.3% Government job: 16.2% Private job: 9.5%
Murali et al., 2014	150	M: 0% F: 100%	21-30: 51.3% 31-40: 35.3% 41-50: 10% 51-60: 3.3%	Illiterate: 18% Primary education: 16% Middle school: 13.3% High school: 8.7% Degree: 43.3% Professional degree: 0.7%	Rural: 53.3% Semiurban: 43.3% Urban: 3.3%
Kaul et al., 2016	2000	M: 49% F: 51%	<30: 34.4% >30: 65.6%	Below graduate: 71.9% Above graduate: 28.1%	Rural area: 43.3% Urban area: 56.7%
Al-Jame et al., 2007	63	M: 35% F: 65%	Mean age: 34.5 ± 6.2	Below high school: 21% Above high school: 79%	N.D.
Ozer et al., 2012	289	M: 30.4% F: 69.6%	<20: 0.3% 20-29: 10.4% 30-39: 64.4% 40-49: 21.8% ≥50: 3.1%	None/primary school: 54% High school/above: 46%	N.D.
Ningthoujam et al., 2019	777	M: 61.4% F: 38.6%	N.D.	Elementary school: 8.9% Higher secondary: 27.4% Above higher secondary: 63.7%	Rural area: 42.5% Urban area: 57.5%
Alzahrani and Almaqboul, 2019	263	M: 13.7% F: 86.3%	≤20: 6.5% 20-30: 28.1% 30-40: 30.8% 40-50: 24.7% ≥50: 9.9%	High school or less: 26.2% Undergraduate: 60.8% Postgraduate: 12.9%	N.D.
Tian et al., 2022	233	M: 25.6% F: 56.9%	N.D.	High school/below: 12.8% Diploma: 11.4% Degree, masters: 70.6%	Educational: 8.0% Health care: 14.6% Office work: 46.2% Trades worker: 10.8% Others: 19.8%
Raphael and Gregory, 1990	2043	N.D.	N.D.	N.D.	N.D.
Abdellatif and Hegazy, 2011	985	N.D.	N.D.	University graduated: 53.8% Technical school graduated: 46.2%	N.D.

N.D.: not declared.

TABLE 3 Demographic characteristics of the studied population.

of a traumatic event, and a significant percentage of parents were aware that dental trauma could lead to discoloration (40%) and pain (79%) of the traumatised tooth [Quaranta et al., 2016].

Attitude

Attitude was reported in 18 studies (58%). Six items were identified: "self-assess knowledge in TDIs management" [Yassen et al., 2013; Al-Jundi, 2006; Hashim, 2012; AlGhamdi et al., 2016; Al-Sehaibany et al., 2018; Ozer et al., 2012; Alzahrani and Almaqboul, 2019; Tian et al., 2022], "satisfaction with self-assessed knowledge" [Namdev et al., 2014; Yassen et al., 2013; Kaul et al., 2016], "source of previous information about TDIs" [Quaranta et al., 2014; Świątkowska et al., 2018; Santos et al., 2009; Nagaveni, 2005; Jain et al., 2017; Loo et al., 2014; Alyahya et al., 2018; Kebriaei et al., 2020; AlGhamdi et al., 2016; Al-Sehaibany et al., 2018; Kaul et al., 2016; Al-Jame et al., 2007; Ozer et al., 2012; Ningthoujam et al., 2019; Alzahrani and Almaqboul, 2019; Tian et al., 2022; Raphael and Gregory, 1990; Abdellatif and Hegazy, 2011], "importance of educational program regarding management of TDIs" [Namdev et al., 2014; Ahmed et al., 2020; Al-Jundi, 2006; AlGhamdi et al., 2016; Al-Sehaibany et al., 2018; Kaul et al., 2016; Ozer et al., 2012; Tian et al., 2022], "need to attend educational programs on management of TDIs" [Namdev et al., 2014; Yassen et al., 2013; Al-Jundi, 2006; Hashim, 2012; Nagaveni, 2005; Loo et al., 2014; Kebriaei et al., 2020; Al-Sehaibany et al., 2018; Kaul et al., 2016; Ozer et al., 2012; Ningthoujam et al., 2019; Alzahrani and Almaqboul, 2019; Tian et al., 2022], "availability of during/after working hour emergency service" [Yassen et al., 2013; Al-Jundi,

2006; Hashim, 2012]. Regarding the self-assessment of the level of knowledge about managing TDIs, a rather high percentage of parents (61.8%-98%) acknowledged not having the necessary information to handle such an event correctly and expressed dissatisfaction with their level of knowledge on this topic (31%-93.45%). In 58% of the studies, parents reported already having information about the management of dental traumas, and they obtained this information from dentists, family physicians, friends, brochures, magazines, television, and the internet. On average, 80.1% of parents recognised the importance of educational programs on dental trauma management, and 72.4% expressed their willingness to participate in such programs.

Practice

Two out of the thirty-one selected studies have investigated parents' practice towards TDIs in pediatric age [Quaranta et al., 2016; Abdellatif and Hegazy, 2011], particularly their awareness that traumas to deciduous teeth can have serious repercussions on the permanent dentition. Specifically, parents stated that they would be more concerned about a trauma to a permanent tooth rather than to a deciduous tooth [Quaranta et al., 2016]. In only one study, a relatively high percentage of interviewed parents declared recognising the importance of TDIs on primary dentition [Abdellatif and Hegazy, 2011].

Discussion

Knowledge, attitude, and practice (KAP) survey is a quantitative

Topics investigated	No. of articles in which each topic was investigated (%)
Knowledge	
Meaning of dental trauma	2 (6.4%)
Previous experience of TDIs	20 (64.5%)
First place of contact to manage a dental trauma	22 (70.9%)
Prevention of TDIs during sport activity	4 (12.9%)
Facial parts susceptible to trauma	1 (3.2%)
Need of the tetanus vaccine when the trauma happens in a dirty place	2 (6.4%)
Correct identification of the traumatized tooth	8 (25.8%)
Management of TDIs:	
a. How to manage the traumatized area and the bleeding	4 (12.9%)
b. How to manage the loss of consciousness	2 (6.4%)
c. What is the optimal time to go to the dentist after a TDI	16 (51.6%)
d. How to manage a tooth avulsion	14 (45.1%)
e. Possibility of reimplantation of primary and permanent teeth	25 (80.6%)
f. What is the optimal time to attempt the reimplantation	14 (45.1%)
g. How to handle an avulsed tooth	21 (67.7%)
h. Transport media of a displaced tooth or tooth fragment	28 (90.3%)
i. How to manage a tooth fracture	2 (6.4%)
j. Possibility to glue a piece of a fractured tooth	5 (16.1%)
k. How to handle a tooth fragment	2 (6.4%)
l. Knowledge of post-traumatic recommendations	4 (12.9%)
Complications of TDIs affecting the traumatized tooth	1 (3.2%)
Attitude	
Self-assess knowledge in TDIs management	13 (41.9%)
Satisfaction with self-assessed knowledge	7 (22.6%)
Previous information about TDIs	7 (22.6%)
Importance of educational program regarding management of TDIs	6 (19.3%)
Need to attend educational programs on management of TDIs	12 (38.7%)
Availability of during/after working hour emergency service	5 (16.1%)
Practice	
TDIs in primary teeth can have significant consequences on permanent teeth	2 (6.4%)

TABLE 4 TDIs-related topics investigated in the questionnaire-based surveys.

method (predefined questions formatted in standardised questionnaires) that provides access to quantitative and qualitative information. KAP surveys are popular in health care because they provide useful information and appear easy to design and execute [D'Ambrosio et al., 2022; Cantile et al., 2022]. A KAP survey can: enhance the knowledge, attitude, and practices of specific themes; identify what is known and done about various health-related subjects; establish the baseline (reference value) for use in future assessments and help measure the ability of health education activities to change health-related behaviors; suggest an intervention strategy that reflects specific local circumstances and the cultural factors that influence them; and plan activities that are suited to the respective population involved [D'Ambrosio et al., 2022; Cantile et al., 2022].

The present systematic review aimed at assessing parental KAP on traumatic dental injuries in pediatric age.

Regarding the sociodemographic characteristics of the analysed samples, it was found that in the majority of studies, the sample of parents who completed the questionnaire was predominantly composed of women. Only in 3 studies, the sample showed a prevalence of men compared to women [Ahmed et al., 2020; Jain et al., 2017; Ningthoujam et al., 2019]. In six articles [Jain et al., 2017; Loo et al., 2014; Alyahya et al., 2018; Kebriai et al., 2020; Kaul et al., 2016; Ningthoujam et al., 2019] the possible correlation between gender and the level of knowledge about dental traumas was evaluated. In some studies, a statistically significant difference was found between males and females. According to Jain et al., male parents showed higher percentage rate when questioned on previous information about tooth avulsion [Jain et al., 2017]. On the contrary, according to Loo et al., the level of knowledge with regards to urgency of reimplantation was observed to be associated with gender of the parents, with female parents exhibiting higher knowledge level [Jain et al., 2017]. The other articles did not find statistically significant differences in the rate of correct responses provided by male or female parents [Alyahya et al., 2018; Kebriai et al., 2020; Kaul et al., 2016; Ningthoujam et al., 2019].

Regarding the age of the subjects who answered the questionnaires, the most represented age group was between 30 and 50 years old. Some authors also investigated the possible correlation between the age of the parents and their level of knowledge about dental traumas [Santos et al., 2009; Cosme-Silva et al., 2018; Namdev et al., 2014; Alyahya et al., 2018; Kebriai et al., 2020; Kaul et al., 2016]. Since none of the selected studies detected any significant difference in the level of knowledge among parents based on age groups, the idea that parental knowledge about dental traumas may not be strongly correlated with their age was further reinforced.

In some studies, it was observed that knowledge was proportional to education level and was influenced by the individuals' professions. Indeed, categories such as teachers and doctors provided a higher percentage of correct responses compared to other professional categories [Cosme-Silva et al., 2018; Yassen et al., 2013; Hegde et al., 2010; Nagaveni, 2005; Jain et al., 2017; Kebriai et al., 2020; Kaul et al., 2016; Abdellatif and Hegazy, 2011].

The previous experience with dental traumas did not seem to significantly influence the parents' ability to handle a traumatic event [Murali et al., 2014; Świątkowska et al., 2018; Cosme-Silva et al., 2018; Namdev et al., 2014; Yassen et al., 2013]. In only three studies, subjects who had already witnessed one or more dental traumas provided a significantly higher percentage of correct responses compared to parents who had never witnessed a traumatic event [Ahmed et al., 2020; Nagaveni, 2005; Kaul et al., 2016].

Regarding the prevention of traumas during sports activities, a relatively low percentage of parents were aware that the use of helmets, protective masks and mouthguards can reduce the incidence of dental traumas [Quaranta et al., 2014; Quaranta et al., 2016; Yassen et al., 2013; Hegde et al., 2010]. Indeed, these devices effectively protect the upper incisors from direct frontal impacts and provide protection from soft tissue lacerations by keeping them at a distance from the teeth [Lieger and Von Arx, 2006; Spinas et al., 2014].

All the articles administered questions to parents about the correct and timely management of a dental trauma. The results revealed a lack of awareness among parents in the majority of cases. According to guidelines, if the traumatic event occurred in a contaminated environment, an antitetanic vaccine should be administered [Cagetti et al., 2019]. This aspect was only

Studies included in the review	D1	D2	D3	D4	D5	D6	D7	Overall
Study 1 [Murali et al., 2014]	+	X	+	+	+	+	+	X
Study 2 [Quaranta et al., 2014]	+	X	+	+	+	+	+	X
Study 3 [Quaranta et al., 2016]	+	X	+	+	+	+	+	X
Study 4 [Świątkowska et al., 2018]	+	X	+	+	+	+	+	X
Study 5 [Santos et al., 2009]	+	X	+	+	+	+	+	X
Study 6 [Cosme-Silva et al., 2018]	+	X	X	+	+	+	+	X
Study 7 [Cosme-Silva et al., 2017]	+	X	X	+	+	+	+	X
Study 8 [Oliveira et al., 2007]	+	X	X	+	+	+	+	X
Study 9 [Vergotine and Koerber, 2010]	+	X	X	+	+	+	+	X
Study 10 [Namdev et al., 2014]	+	X	+	+	+	+	+	X
Study 11 [Yassen et al., 2013]	+	X	+	+	+	+	+	X
Study 12 [Ahmed et al., 2020]	+	X	+	+	+	+	+	X
Study 13 [Al-Jundi, 2006]	+	X	+	+	+	+	+	X
Study 14 [Hegde et al., 2010]	+	X	X	+	+	+	+	X
Study 15 [Hashim, 2012]	+	X	X	+	+	+	+	X
Study 16 [Nagaveni, 2005]	+	X	X	+	+	+	+	X
Study 17 [Jain et al., 2017]	+	X	+	+	+	+	+	X
Study 18 [Loo et al., 2014]	+	X	+	+	+	+	+	X
Study 19 [Nikam et al., 2014]	+	X	X	+	+	+	+	X
Study 20 [Alyahya et al., 2018]	+	X	+	+	+	+	+	X
Study 21 [Kebriaei et al., 2020]	+	X	+	+	+	+	+	X
Study 22 [AlGhamdi et al., 2016]	+	X	+	+	+	+	+	X
Study 23 [Al-Sehaibany et al., 2018]	+	X	+	+	+	+	+	X
Study 24 [Kaul et al., 2016]	+	X	+	+	+	+	+	X
Study 25 [Al-Jame et al., 2007]	+	X	X	+	+	+	+	X
Study 26 [Ozer et al., 2012]	+	X	+	+	+	+	+	X
Study 27 [Ningthoujam et al., 2019]	+	X	+	+	+	+	+	X
Study 28 [Alzahrani and Almaqboul, 2019]	+	X	+	+	+	+	+	X
Study 29 [Tian et al., 2022]	+	X	+	+	+	+	+	X
Study 30 [Raphael and Gregory, 1990]	+	X	X	+	+	+	+	X
Study 31 [Abdellatif and Hegazy, 2011]	+	X	X	+	+	+	+	X

Judgement: ! Critical; X Serious; – Moderate; + Low; ? No information.

Domains: D1: bias due to confounding; D2: bias due to selection of participants; D3: bias in classification of interventions; D4: bias due to deviations from intended interventions; D5: bias due to missing data; D6: bias in measurement of outcomes; D7: bias in selection of the reported result.

TABLE 5 Risk of Bias - assessment using ROBINS-I tool.

investigated in two studies [Kebriaei et al., 2020; Kaul et al., 2016], with quite variable results: in the first study, only a minority of parents answered correctly, while in the second study, the majority of parents provided the correct response.

Furthermore, less than half of the parents declared that they could recognize whether the traumatised tooth was deciduous or permanent [Namdev et al., 2014; Yassen et al., 2013; Ahmed et al., 2020; Al-Jundi, 2006; Hashim, 2012; Kebriaei et al., 2020; Al-Sehaibany et al., 2018; Kaul et al., 2016].

Regarding the management of a traumatic event, a correct and timely intervention is crucial for improving the long-term prognosis of a traumatised tooth. Therefore, parents play a crucial role in handling such events. A high percentage of dental traumas in children reach specialists late, which may result in less effective therapy, likely due to the parents' limited knowledge and awareness. Therefore, traumatic events often lead to unfavorable outcomes [Al-Jundi, 2004]. In this regard, nine studies asked parents about the optimal timeframe to visit a dentist after a trauma and more than half of parents correctly stated that they would seek dental attention within 30 minutes of the traumatic event [Murali et al., 2014; Quaranta et al., 2014; Quaranta et al., 2016; Santos et al., 2009; Cosme-Silva et al., 2018; Cosme-Silva et al., 2017; Namdev et al., 2014; Alyahya et al., 2018; Kaul et al., 2016]. In the case of traumatic tooth avulsion (complete displacement of a tooth from its socket), just over half of the interviewed subjects were aware of the possibility of re-implanting the tooth, and only a minority of the subjects was conscious that the prognosis of a re-implantation depended on how promptly it was performed. In fact, only a small

percentage of subjects stated that they would attempt immediate re-implantation or seek dental attention within 30 minutes of the traumatic event. The prognosis of replantation also depends on the proper storage of the avulsed tooth by first responders: the ideal storage medium is represented by Hanks Balanced Salt Solution, followed in descending order by fresh milk, physiological saline solution, saliva, and water. These storage solutions help maintain the viability of the avulsed tooth and increase the chances of successful re-implantation [Cagetti et al., 2019]. Many of the studies asked parents about the most suitable means for preserving an avulsed tooth or a fractured fragment. Most of them stated that they would store the avulsed tooth in a clean handkerchief until they reach the dentist, while only a small percentage responded that they would preserve the tooth in an appropriate transport medium.

In 7 studies, the ability of parents to manage a traumatic dental fracture was evaluated, and less than half of parents was aware of the possibility of saving the fractured fragment for reattachment [Świątkowska et al., 2018; Cosme-Silva et al., 2018; Yassen et al., 2013; Al-Jundi, 2006; Hashim, 2012; Al-Sehaibany et al., 2018; Tian et al., 2022].

Despite a limited knowledge of dental trauma management, a high percentage of subjects was aware of the main post-traumatic recommendations to follow, such as a soft diet, using a toothbrush with soft bristles, and rinsing with antibacterial mouthwashes [Świątkowska et al., 2018; Santos et al., 2009; Namdev et al., 2014; Kaul et al., 2016].

With regard to attitude domain, in eight articles parents were asked to evaluate their own level of knowledge about TDIs. A

Authors/Year	Knowledge
Quaranta et al., 2014	Lack of awareness, knowledge and skills in managing a TDI.
Quaranta et al., 2016	Only half of the sample knew how to manage a TDI; in particular, older adults with the highest educational level.
Świątkowska et al., 2018	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and educational level.
Santos et al., 2009	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and educational level, age and socioeconomic status, respectively.
Cosme-Silva et al., 2017	No significant difference between parents of children from private and public schools about the knowledge of TDIs management.
Cosme-Silva et al., 2018	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and previous experience of TDIs.
Oliveira et al., 2007	Lack of awareness, knowledge and skills in managing a TDI.
Vergotine and Koerber, 2010	Lack of awareness, knowledge and skills in managing a TDI. Parents of recalled patients to follow-up visits were more knowledgeable, so dental visits can be an effective vehicle for education.
Namdev et al., 2014	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and previous experience of TDIs.
Yassen et al., 2013	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and educational level, age, socioeconomic status, personal experience with dental trauma or first aid training, respectively.
Ahmed et al., 2020	Lack of awareness, knowledge and skills in managing a TDI.
Al-Jundi, 2006	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and educational level, age socioeconomic status, personal experience with dental trauma, respectively.
Hegde et al., 2010	The knowledge of both working and non-working mothers regarding dental trauma was inadequate.
Hashim, 2012	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and previous experience of TDIs.
Nagaveni, 2005	Both urban and rural parents were lacking in knowledge regarding emergency management of avulsed permanent incisors.
Jain et al., 2017	Lack of awareness, knowledge and skills in managing a TDI.
Loo et al., 2014	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and educational background and geographical locality.
Nikam et al., 2014	Lack of awareness, knowledge and skills in managing a TDI.
Alyahya et al., 2018	Lack of awareness, knowledge and skills in managing a TDI.
Kebriaei et al., 2020	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and educational level, age and socioeconomic status.
Alghamdi et al., 2016	Lack of awareness, knowledge and skills in managing a TDI.
Al-Sehaibany et al., 2018	Lack of awareness, knowledge and skills in managing a TDI.
Murali et al., 2014	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and previous experience of TDIs.
Kaul et al., 2016	Lack of awareness, knowledge and skills in managing a TDI.
Al-Jame et al., 2007	Lack of awareness, knowledge and skills in managing a TDI.
Ozer et al., 2012	Lack of awareness, knowledge and skills in managing a TDI.
Ningthoujam et al., 2019	Lack of awareness, knowledge and skills in managing a TDI.
Alzahrani and Almaqbool, 2019	Lack of awareness, knowledge and skills in managing a TDI.
Tian et al., 2022	Lack of awareness, knowledge and skills in managing a TDI.
Raphael and Gregory, 1990	Lack of awareness, knowledge and skills in managing a TDI.
Abdellatif and Hegazy, 2011	Lack of awareness, knowledge and skills in managing a TDI; no correlations found between knowledge and educational level.

TABLE 6 Knowledge: summary of the main outcomes in the selected studies.

relatively low percentage of parents considered themselves to have adequate knowledge about trauma management [Yassen et al., 2013; Al-Jundi, 2006; Hashim, 2012; AlGhamdi et al., 2016; Al-Sehaibany et al., 2018; Ozer et al., 2012; Alzahrani and Almaqbool, 2019; Tian et al., 2022]. In three articles, parents were asked if they were satisfied with their level of knowledge. Only in one article, the majority of parents expressed dissatisfaction with their knowledge [Namdev et al., 2014]. In the other two articles, more than half of the parents stated they were satisfied with their knowledge regarding dental traumas in their children [Yassen et al., 2013; Kaul et al., 2016]. On average, almost all parents recognised the importance of education programs on proper dental trauma management and expressed interest in receiving further information about traumas and their management in the future.

In more than half of the articles, parents were asked if they already had information about dental traumas and, if so, from which sources they received this information. More than half of parents stated that they already had knowledge about managing a dental-alveolar trauma, and in most cases, they received this information from their dentist, followed by family physicians, brochures, magazines, the internet, and television. In only two of the selected articles, the correlation between parents' attitudes towards the importance of dental trauma management and prevention and factors like age range and socioeconomic status was evaluated. No statistically significant differences were found regarding the parents' socioeconomic status [Quaranta et al., 2016]. However, a statistically significant difference was observed concerning the age range, with younger parents showing better attitudes and awareness towards dental trauma management and prevention [Kaul et al., 2016].

With regard to practice domain, this was investigated only in two studies. In only one of these articles, all parents were aware that a trauma to a deciduous tooth was as important as a trauma to a permanent tooth [Abdellatif and Hegazy, 2011]. In the second article, the majority of parents showed greater sensitivity towards the importance of a trauma to permanent teeth, disregarding the serious consequences that a trauma to deciduous teeth could also cause on the permanent teeth, such as mineralization disorders, change of the appearance of a crown/root, damage to a tooth bud, relocation of a tooth bud or postponed eruption of a permanent tooth [Quaranta et al., 2016].

Conclusions

Dento-alveolar traumas represent one of the main oral health issues during childhood. Epidemiological studies have demonstrated that the majority of dental traumas in pediatric age occurs in domestic settings. Since a correct and timely intervention is crucial to improve the long-term prognosis of a traumatized dental element, parents play a determining role in managing traumatic events. A high percentage of dental traumas in children reaches specialists late, leading to less effective therapy, likely due to the parents' limited knowledge and awareness, resulting in unfavorable outcomes. From this systematic literature review, it was evident that parents' knowledge about dental traumas in pediatric age is still quite limited. Additionally, their perception of the relevance of these traumas to the psychophysical well-being and quality of life of children, as well as the role parents play in managing a traumatic event, are lacking. Despite the limited knowledge, however, most parents are willing to acquire new information about dental traumas and their management. This can be considered an

Authors/Year	Attitude	Practice
Quaranta et al., 2014	This study did not address attitude.	This study did not address practice.
Quaranta et al., 2016	This study did not address attitude.	TDLs of a permanent tooth were viewed with concern more than TDLs of a baby tooth.
Świątkowska et al., 2018	This study did not address attitude.	This study did not address practice.
Santos et al., 2009	This study did not address attitude.	This study did not address practice.
Cosme-Silva et al., 2017	This study did not address attitude.	This study did not address practice.
Cosme-Silva et al., 2018	This study did not address attitude.	This study did not address practice.
Oliveira et al., 2007	This study did not address attitude.	This study did not address practice.
Vergotine and Koerber, 2010	This study did not address attitude.	This study did not address practice.
Namdev et al., 2014	Most of parents would like to attend an educational program on management of TDLs, since they were no satisfied with their knowledge.	This study did not address practice.
Yassen et al., 2013	Most of parents would like to attend an educational program on management of TDLs.	This study did not address practice.
Ahmed et al., 2020	Only half of parents was interested in attending an education program.	This study did not address practice.
Al-Jundi, 2006	Most of parents would like to attend an educational program on management of TDLs, since they were no satisfied with their knowledge.	This study did not address practice.
Hegde et al., 2010	This study did not address attitude.	This study did not address practice.
Hashim, 2012	Mothers admitted having poor knowledge on the management of TDLs, most of them were enthusiastic about being educated further.	This study did not address practice.
Nagaveni, 2005	Urban parents showed interest in knowing about the emergency management of the avulsed tooth compared to rural parents.	This study did not address practice.
Jain et al., 2017	This study did not address attitude.	This study did not address practice.
Loo et al., 2014	Most of parents would like to attend an educational program on management of TDLs.	This study did not address practice.
Nikam et al., 2014	This study did not address attitude.	This study did not address practice.
Alyahya et al., 2018	This study did not address attitude.	This study did not address practice.
Kebriaei et al., 2020	Most of parents were reluctant to learn about TDLs and their management.	This study did not address practice.
Alghamdi et al., 2016	Most of parents would like to attend an educational program on management of TDLs.	This study did not address practice.
Al-Sehaibany et al., 2018	Most of parents would like to attend an educational program on management of TDLs, since they were no satisfied with their knowledge.	This study did not address practice.
Murali et al., 2014	This study did not address attitude.	This study did not address practice.
Kaul et al., 2016	Most of parents would like to attend an educational program on management of TDLs, since they were no satisfied with their knowledge.	This study did not address practice.
Al-Jame et al., 2007	This study did not address attitude.	This study did not address practice.
Ozer et al., 2012	Most of parents would like to attend an educational program on management of TDLs, since they were no satisfied with their knowledge.	This study did not address practice.
Ningthoujam et al., 2019	Most of parents would like to attend an educational program on management of TDLs.	This study did not address practice.
Alzahrani and Almaqboul, 2019	Insufficient awareness among parents regarding the emergency management of TDLs.	This study did not address practice.
Tian et al., 2022	Most of parents were no satisfied with their knowledge and acknowledged the importance of an educational program in TDI management, but only few of them were interested in attending such programs.	This study did not address practice.
Raphael and Gregory, 1990	This study did not address attitude.	This study did not address practice.
Abdellatif and Hegazy, 2011	This study did not address attitude.	Most of parents would be concerned about the avulsion of a primary tooth; all parents would be concerned about the avulsion of a permanent tooth.

TABLE 7 Attitude and Practice: summary of the main outcomes in the selected studies.

encouraging result for increasing the level of awareness among the population regarding this issue. Motivating parents to adopt a preventive approach to traumas and to acquire the essential first aid maneuvers for managing a traumatic event could lead to positive changes, resulting in long-term improvements in the

health of children facing these events.

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SUPPLEMENTARY MATERIALS

Appendix 1

References of publications excluded after full-text analysis.

Authors	Title	Journal	Year	Motivation for exclusion
Hamilton FA et al., 1997	Investigation of lay knowledge of the management of avulsed permanent incisors	Endod Dent Traumatol	1997	Other categories investigated
Sae-Lim V et al., 1999	Patient and parental awareness of the importance of immediate management of traumatised teeth	Endod Dent Traumatol	1999	Other categories investigated
Nourwali IM et al., 2019	Emergency management of dental trauma: a survey of public knowledge, awareness, and attitudes in Al-Madinah Al-Munawwarah	Clinical, Cosmetic and Investigational Dentistry	2019	Other categories investigated
Bamashmous N et al., 2020	Information seeking behaviour of dental trauma patients and their parents	Dental Traumatology	2020	Other categories investigated

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