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Dental Trauma among Iranian Children and Adolescents: A Comprehensive Study

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Abstract

Background

Various accidents threaten children and adolescents. One of these accidents is Traumatic dental injury (TDI). This study aimed to review systematically TDI in children and adolescents in Iran.

Materials and Methods: This study is a systematic review of the literature that has searched TDI articles from April 2000 to April 2020. Search was conducted using keywords including Epidemiology, Prevalence, Traumatic Injuries, Dental Trauma, Traumatic dental injury, Etiology, Pediatric, Children, Adolescent, Iran, in English or their Persian equivalent, using the "AND" and "OR" search strategy. Search was conducted on online national databases of (SID), Magiran, Iran Doc, as well as on international sites such as Scopus, Medline, EMBASE, Web of Science, CINAHL, and Science Direct. The articles were analyzed after entering the End Note X8 software and reviewing them according to the instructions of the systematic review articles.

Results: In this review, firstly, 189 studies were identified. Then 120 duplicates were omitted and after the assessment of titles and abstracts, 84 other articles were excluded. Finally, eight articles entered this systematic review. The sample size in 8 extracted articles was equal to 4567 children and adolescents. According to the findings, the prevalence ranged from 8.9% to 36.9%. The prevalence of dental trauma was also higher in boys and adolescents of the male sex. One of the most common causes of fall trauma as well as trauma occurred in environments such as home, school, playground and passages.

Conclusion

Given that most dental trauma occurs in boys; it is necessary to give this group the necessary training to reduce trauma.

Key Words: Adolescents, Children, Comprehensive study, Traumatic dental injury.

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1- INTRODUCTION

Childhood and adolescence are considered as a critical period in which children need parents and the health care system's support and care for the maintenance of their health (1). The rapid biological and socio-psychological changes occurring during this period lead to making childhood and adolescence the unique periods of life. The health improvement of this group of persons as a future stratum can guarantee community development by becomiing healthy middle-aged adults in the future (2, 3). Various accidents threaten children and adolescents. One of these accidents is Traumatic dental injury (TDI), (4, 5). Traumatic dental injury in adolescence and childhood is prevalent and is one of the most important traumas in this lifetime. The epidemiologic data showed high prevalence of this type of trauma, so it is known as a serious concern (6, 7). Traumatic dental injury can lead to tooth displacement, fracture or tooth loss, which are very important not only in terms of beauty but it also provides a financial burden for the health-care system (7, 8). Oral health is linked to the quality of life of children and adolescents and any injury can cause a reduction in quality of life (9), maintaining high quality of life is very important (10). Oral-health related quality of life is described as a multi-dimensional concept which consists of an assessment of an individual's oral health, individuals' expectations and satisfaction of care, performance well-being and individual's emotions (11). In fact, if any problem occurs in oral health, it can impact on quality of life of the children and adolescents, their performance in life and their success. In addition, these concerns are hazardous for these ages due to the problems that are caused by changes in diet, talking, welfare and general health (12). Due to the importance of childhood and adolescence and also the effects of oral diseases on a child's health, this study aimed to comprehensively study Traumatic dental injury in children and adolescents in Iran.

2- MATERIALS AND METHODS

2-1. Study protocol

This study is a systematic review of the literature searched on Traumatic dental injury articles from April 2000 to April 2020. This study is based on a checklist of systematic review articles (PARISMA), (13).

2-2. Search strategy

Search was conducted by the keywords including Epidemiology, Prevalence, Traumatic Injuries, Dental Trauma, Traumatic dental injury, Etiology, Pediatric, Children, Adolescent, Iran, in English or their Persian equivalent using the "AND" and "OR" search strategy. Search was conducted on the SID, Magiran, Iran Doc, as well as on international databases such as Scopus, Medline, EMBASE, Web of Science (ISI), CINAHL, and ScienceDirect. The Google Scholar browser was also used to perform the search.

Table-1: Search strategy for Medline (via PubMed).

(Epidemiology[Title/Abstract]) OR Prevalence[Title/Abstract]) OR Etiology[Title/Abstract]) AND Dental Trauma[Title/Abstract]) OR traumatic injuries[Title/Abstract]) AND pediatric[Title/Abstract]) OR children[Title/Abstract]) OR child[Title/Abstract]) OR adolescent[Title/Abstract]) AND Iran[Transliterated Title]. After searching the articles and extracting the data, the articles were analyzed qualitatively.

2-3. Inclusion and Exclusion criteria

2-3-1. Inclusion criteria

Articles published (original articles) in the Children and Adolescents Group with the aim of dental trauma were included in the study. PICO in the study is, **P**atient: dental

trauma Patient, **I**ntervention: Prevalence, Etiology, Anatomic, Gender, Age and Location dental trauma, **C**omparison: No obstetrical complications, **O**utcome: Dental trauma for any reason.

2-3-2. Exclusion criteria

Repetitive studies, letters to the editor, meta-analysis, case report, Cohort Studies, Clinical Trials articles, as well as articles that did not provide complete information to researchers were excluded.

2-4. Study selection

Two researchers (MM & MS) separately and completely independently reviewed the title and abstract of the articles in the first stage and then carefully read the full text of the article. In the event of any dispute between them, the article was reviewed by a third author (FZ).

2-5. Statistical Analysis

The articles were analyzed after entering the End Note X8 software and reviewing them according to the instructions of the systematic review articles. Data mining and analysis were performed by 3 authors. So that with their cooperation, a form was prepared for reviewing articles. The form included questions on age, gender, education, the location of the trauma, the causes of the trauma, prevalence, etiology, and anatomic. Due to the fact that the articles that entered the systematic review stage in the field of dental trauma did not have the necessary conditions to conduct a systematic review and meta-analysis study, therefore, the articles were reported by the systematic review method.

3- RESULTS

3-1. Article Selection

In this review, all the studies conducted in Persian and English language in the context of DT among Iranian children and adolescents were evaluated. Firstly, 189 studies were identified. Then 120 duplicates were omitted and after the assessment of titles and abstracts, 84 other articles were excluded. Finally, eight articles entered this systematic review (**Figure.1**). The sample size in 8 extracted articles was equal to 4,567 children and adolescents.

3-2. Prevalence TDI

The general prevalence of dental trauma was assessed in three studies (14, 15). In the study by Afshar et al. prevalence of dental trauma was 23 (39.6%), in the study by Vejdani et al. (14), 159 children (15.3%) were affected by dental trauma, and in the study by Ansari et al. (15), total rate of dental trauma was 8.96%.

3-3. Etiology Dental Trauma

Dental trauma was assessed based on the etiology of dental trauma in four studies (14, 16-18). In the study by Nilchian et al. (16), 205 (51.1%) of cases of dental trauma were due to training, 86 (21.4%) were due to accident, 72 (19.2%) were due to collision against objects, 33 (8.2%) were due to beating. In the study by Vejdani et al. (14), dental trauma was also occurred respectively due to Falling, collision against objects, exercise, biking, fighting, and traffic accidents. In the study by Akhavan et al. (17) in the children aged 1-6 years, falls and falling down at the rate of 71.4%, playing and training and collision against objects with the rate of 14.3% were the reasons for dental trauma. In addition, in children aged 6-12 years, fall and falling down with the rate of 55.5%, accidents with the rate of 22.3% and in adolescents aged 12-18 playing and training, accidental falls and falling down each consist of 33.3% of the reasons for dental trauma. In the study by Navabazam et al. (18) on the reasons for occurring dental trauma, 121 (30.47%) were due to fall, 85 (21.41%) were due to collision against objects or people, 79 (19.89%) were due to sport accidents, 23 (8.81%) were due to bicycling and 15 (3.77%) were due to traffic accidents.

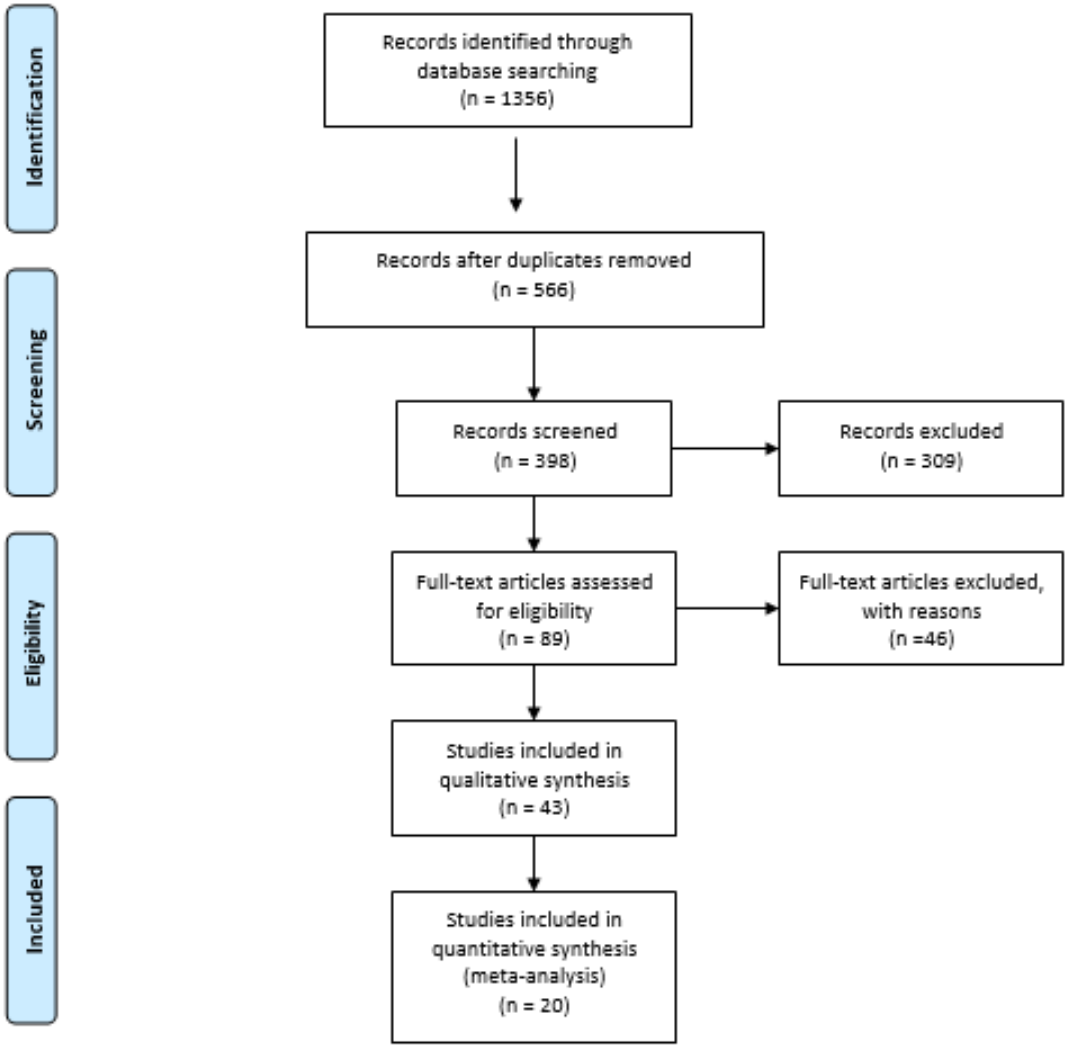

Fig1: PRISMA Flowchart.

3-4. Anatomic TDI

Four studies investigated the dental trauma status based on the anatomic region (14, 16, 19). In the study by Vejdani et al. (14), 1,042 students were investigated, of which 159 (15.3%) children had anterior central crown fractures, the rate of damage in them was 183 teeth. Out of 183 injuries, the degree of damage in enamel fracture was 147 (80.3%), enamel and dentin fracture were 31 (16.9%), enamel and dentin fracture with pulp exposure was 4 (2.1%), and total loss of crown was 1 (0.7%). Fracture of maxillary middle incisor had the highest crown fracture rate of 53.5%. In the study by Ansari et al. (17) one of the most common types of injury was crown fracture with no pulp involvement (65%). In the study by Shahrabi et al. (19) the prevalence of dental trauma in the maxilla was 271 (90.3% and in the mandible 30 (9.96%). In the maxilla, the rate of deciduous trauma for the central incisor was 37, lateral was 25, the canine was 3, posterior teeth were zero and the total was 65. Also, in relation to permanent teeth, the rate of central incisor was 180, lateral was 26, canine and posterior teeth were zero and its total rate was 206. In the mandible, the rate of deciduous trauma for central incisor was 6,

lateral was 4, the canine was 1, posterior teeth were 2 and the total rate was 13. Regarding the permanent teeth, the central incisors were 10, lateral was 7, canine and posterior teeth were zero and its total rate was 17. In the study by Nilchian et al. (16), 367 (91.5%) crown fractures, 117 (29.2%) loose tooth, 57 (14.2%) root fractures, 19 (4.7%) avulsed teeth, 326 (81.3%) restoration, 147 (36.7%) pulp treatment, 73 (18.2%) splinting, 70 (17.5%) extraction, 59 (14%) prosthesis therapy, 14 (3.5%) pulp cap and 7 (1.7%) displacement had occurred. Thirty-seven (75.5%) of the children had upper central trauma, 7 of them had upper lateral trauma, 4 of them had lower central trauma, and one (2%) had lower lateral trauma.

3-5. Gender

In four studies, the rate of tooth trauma based on gender was assessed (14, 16). In the study by Vejdani et al. (14), out of 159 children with dental trauma, 101 (63.5%) were male and 58 (36.5%) were female. In the study by Ansari et al., (17) out of total injury, 60% in boys and 40% in girls, in the study by Nilchian et al. (16) 261 (71.1%) boys and 106 (28.9%) girls, had dental trauma. In the study by Afshar et al., the prevalence of dental trauma in girls was 13 (22.4%), and in boys it was 45 (77.6%).

3-6. Age

In six studies the rate of dental trauma was assessed based on age (14, 16, 19). In the study by Vejdani et al. (14), the most common age for occurring trauma was 10 years with the rate of 34.5%, in the study by Ansari et al., (17) the highest rate of occurred injury (26%) was at the age of 10 years, in the study by Shahrabi et al. (19) common age for dental trauma was 8-9 years with the rate of 43.03%. In the study by Nilchian et al. (16) frequency of damage in the age range of 7-9 years was 152 (41.4%) and in the age range of 10-12 years was 215 (58.6%). In the study by Akhavan et al. (17) the most involvement rate (15.5%) was at the age of 8 years. In the study by Afshar et al., the damage rate at the age of 2.5-5.5 years was 6 (10.5%), at the age of 5.6-8.5 was 15 (25.8%), at the age of 8.6-12 years it was 37 (63.7%).

3-7. Location

The location of trauma in two studies was evaluated (16, 17). In the study by Akhavan et al. (17) home was 100% the location of occurring dental trauma at the age of 1-6 years, at the age of 6-12 years passages with the rate of 50% and home and school with the rate of 21.4%, at the age of 12-18 years the school with the rate of 60%, and playground and passages with the rate of 20% were the cause for DT. In the study by Nilchian et al. (16), 303 (75.6%) of dental trauma cases were in public school, and 98 (24.4%) of them occurred in private school.

4- DISCUSSION

The aim of this study was to evaluate dental trauma in children and adolescents by systematic review. Dental trauma is an important health concern, considering its importance in the individual's QOL (22, 23). This study is the first systematic review conducted on dental trauma in children and adolescents of Iran. Previous articles in the field systematic review and meta-analysis of dental trauma in children and adolescents include the study of Azami-Aghdash et al. (20). In a systematic review and meta-analysis by Azami-Aghdash et al. (20), dental trauma was studied all over the world, and in only one article was dental trauma in Iran examined. But in this study, 8 articles in Iran have been studied. In this review, eight studies in the context of TDI in children and adolescents were evaluated, in which the findings of these articles were divided into 6 fields of the total prevalence of TDI, etiology of TDI, anatomic TDI, gender, age and location of TDI. According to results, total prevalence was between

8.96% in the study by Ansari et al. (17), and 39.6% in the study by Vejdani et al. (14). For the prevalence of TDI conducted in other studies, the study by Eltair et al. in Germany can be referred, in which the prevalence of traumatic crown injuries in children aged 10 and 12 years was 6.3% and in those aged 15 years was 14% (21). In the study by Silva-Oliveira et al., 29.4% of children suffered TDI (22). In addition, in the review study by Azami-Aghdash et al., the prevalence of TDI in children and adolescents was 17.5% after the evaluation of 44 articles (20).

The results showed, the rate of TDI in boys was higher than girls which was in line with the review by Eltair et al. (21), the review by Azami-Aghdash et al. (20), the study by Rozsa et al. (23), cohort study by Cully et al. in USA (24), and Ogordi et al.'s study in Nigeria (25), indicating more TDI in boys than girls. It seems that due to the fact that boys do more sports and aggressive activities, therefore, the prevalence of traumatic events is higher in them (26, 27). According to the findings of this review article, out of 8 reviewed articles, 4 articles examined the anatomical location of the trauma, which included anterior central crown fractures, damage in enamel fracture, enamel and dentin fracture and fracture of maxillary middle incisor. Ogordi et al.'s study showed prevalence of Competent lip 132 (85.7%), and Incompetent lip 22 (14.3%)(25).

Also, Malikaew et al.'s study showed Tooth injuries including dentine, and enamel fractures (28). According to the findings, one of the main causes of trauma is fall, which is in line with the findings of a review by Azami-Aghdash et al. in which one of the main and important causes of TDI in children and adolescents was due to fall (20). In addition, in the study by Abdulaziz et al., 94.6% of TDI cases were due to fall in preschool children that was consistent with our results (29). Also, Ogordi et al.'s study in Nigeria (25) showed 44% of traumas occurred as a result of falls. This is consistent with the findings of this study that most dental trauma occurred in Iranian children as a result of falls. Regarding the geographical location of the trauma, the findings showed that home, school, playground and passages were the most important causes of TDI. In the study by Ogordi et al. in schools (25), and in the study of Rózsa et al., 46% of TDI occurred in home, 29% in schools, and 15% in playground (23). Dental trauma affects children's health and can affect their quality of life, psychological status and aesthetically (25, 30).

5- CONCLUSION

The TDI rate in Iranian children and adolescents was considerable. Therefore, it is necessary to identify effective factors in TDI occurrence along with required attempts for prevention TDI and provide the needed background to prevent it. Given that most dental trauma occurs in boys, it is necessary to give this group the necessary training to reduce trauma.

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7- CONFLICT OF INTEREST: None.

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