

# Prevalence and Risk Factors of Dental Trauma in Ha'il, Saudi Arabia

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## ABSTRACT

**Aim:** This study will aid in determining the prevalence and risk factors for dental trauma. This will assist in developing a treatment budget plan, thereby, fend off complications.

**Materials and methods:** This study was an observational study, having a cross-sectional design, in which information was obtained from 555 participants. Data were obtained using a non-probability convenient sampling technique. A validated questionnaire was used as a study tool. Data were analyzed using the statistical package for the social sciences (SPSS, version 20). Descriptive and inferential statistics were used. Data were displayed as numbers and percentages, and the Chi-squared test was used to measure the association.

**Results:** Dental trauma was found to be 44% prevalent. Most of the injuries occurred in the 6–9-years age-group (19.1%) and were more common in boys (54.13%) than in girls. The majority of respondents (61%) identified “falls” as the most common cause of dental trauma, and the frequent location for the occurrence of dental injuries was found to be “home” (64.44%). Only 18% of parents reported that their kid's experienced nail-biting concerns, with the majority claimed that their kids never developed oral habits. Most dental injuries occurred during the summer season (48%).

**Conclusion:** Young aged group and male gender group were more prone to dental injuries; dental injuries along with fall were found as the most common cause of dental trauma, whereas most of the dental traumas were reported to have occurred at home.

**Clinical significance:** The study evaluated risk factors and the prevalence of dental trauma in the population of Ha'il, Saudi Arabia. It will be an effective tool for determining the need for treatment facilities.

**Keywords:** Children, Dental trauma, Ha'il, Prevalence, Risk factors, Saudi Arabia, Traumatic dental injuries.

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## INTRODUCTION

Dental trauma is a significant dental public health problem. It has a high incidence rate and is associated with numerous risk factors that increase the frequency of dental injuries.<sup>1</sup> Systemic review on traumatic dental injuries (TDIs) reported the prevalence of dental trauma as 22.7% in primary dentition and 15.7% in permanent dentition with an incidence rate of 2.82 per hundred people.<sup>2,3</sup> This is a serious public health issue that has received insufficient attention; it could be ranked as the fifth most common disease/condition. Various studies depicted that people with high socioeconomic status are more prone to TDIs and male gender as well. Most prevalent sites are central incisors while lack of lip coverage and high overjet are the associated risk factors.<sup>4</sup> The prevalence rate was reported as 49% in a study conducted in the Eastern region of Saudi Arabia.<sup>5</sup> Traumatic dental injuries are unannounced and emergency events, which commonly occur in children and young adults. In this case, emergency treatment/management is required, that's why organized and standardized care strategies can help speed up recovery in a reasonable time.<sup>6,7</sup> Many previous studies have shown that in the recent years, the incidence of TDIs in children has raised.<sup>8</sup> Some interesting studies are already conducted in Ha'il region, targeting schools, and measuring oral health status, and dental trauma in Ha'il, Saudi Arabia.<sup>9–12</sup> Patients with dental injuries not only experience pain but also experience loss of function, psychological effects, and decreased self-confidence. The periapical complications from dental trauma may affect both the development of permanent teeth and the development of occlusion.<sup>13,14</sup> Traumatic dental injuries can result in complications such as hypoplasia, discoloration, delayed tooth eruption, and tooth deformity.<sup>15</sup> Dental

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trauma frequently causes damage to the enamel and/or periodontal tissues. However, uncomplicated crown fracture and avulsion have a significantly greater proportion.<sup>7</sup> Avulsion is one of the main consequences of periodontal dental trauma. A tooth is completely removed from its socket and represents a high percentage of all dental injuries.<sup>16</sup> Uncomplicated crown fracture is also amongst common TDIs which involves the enamel and dentin. Predispose factors in children for dental trauma includes incompetent lips, protrusion of anterior teeth, open bite, and increased incisal over jets.<sup>10,17</sup> A study reported that 59.5% of teachers were quickly able to treat dental trauma and only 37.8% of them were able to differentiate between deciduous and permanent teeth. School teachers perceived the best educational method for the management of dental trauma is videos and mobile applications.<sup>10</sup> In another study, it was found that dental trauma in males is higher than in females by 10.2%, and enamel fracture is the most common fracture in the anterior teeth with 69%.<sup>15</sup> Another study by Dharmani et al. in 2019 reported that maxillary incisors are the teeth's that mostly get trauma. Enamel fracture again was most prevalent in 74.8%, and dento–enamel 11.7%. Traumatic dental injuries were reported more in males than females.<sup>17</sup> A study by Azami–Aghdash et al. has found home as the most commonplace to have dental trauma. Falling is the main reason and they found the prevalence 17%.<sup>18</sup> Findings from the previous studies regarding risk factors for dental trauma reported male gender is more prominent in getting TDIs, for the anatomical position, enamel was found to be more prone, whereas for the place of trauma, the home was considered to be contributing most for TDIs, and fall was observed as the most common reason. Children in Saudi Arabia are at a higher risk of developing dental injuries at a young age. Multiple studies have examined faculty members' knowledge and understanding of dental trauma management in the Ha'il region, but no specific study has been conducted to my knowledge on the prevalence and risk factors in preschool and school-aged children.<sup>19</sup> This study was planned to identify the risk factors for dental trauma in Ha'il, Saudi Arabia, and the type of injury and the associated clinical findings. This can help optimize and expedite treatment planning and prevent complications.

## MATERIALS AND METHODS

This observational study used a cross-sectional design. Data were collected through a valid and reliable questionnaire (designed in collaboration with a team of field experts) using a non-probability convenient sampling technique. The study was conducted from March 2020 to May 2020. This study was approved by the Scientific Research Ethics Committee at the University of Ha'il, Saudi Arabia (IEC No. H-20116-034). The target population consisted of individuals (of age-group 6–15 years), their parents, and teachers residing in Ha'il, Saudi Arabia.

### Inclusion Criteria

Individuals (of age-group 6–15 years) who faced dental trauma at least once in their childhood, their parents, and teachers residing in Ha'il, Saudi Arabia. The children have no systemic disease and parafunctional habits.

### Exclusion Criteria

Individuals aged above 15 years and children having any systematic disease or developmental anomaly. A total of 555 people participated in the study after signing the informed consent. The data was recorded through a questionnaire (given in person to each participant), including demographic characteristics of the patients (such as age, gender, and

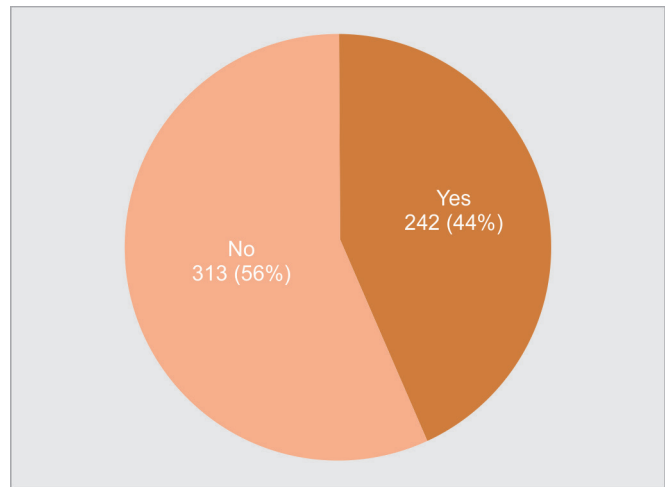


Fig. 1: Prevalence of dental trauma

level of education), place of dental injury (e.g., home, school, street, and playground), reason and cause of the dental trauma (e.g., fall, fighting, sport, accident, and bite on a hard object), oral habits (e.g., finger sucking, nail biting, bruxism, and lip sucking), time and season when the dental trauma occurred. The questionnaire was translated into Arabic by a team of native translators comprised of the translator, editor, and a proofreader. This was followed by a backward translation by another translator and after reviewing with a senior bilingual linguist, the final questionnaire was approved. The reliability of the study tool was measured through Cronbach's alpha test, and the score identified was 0.78. A face and content validated questionnaire was designed and used to collect data for the present study. The study has categorical data which were displayed as percentages, and numbers. Inferential statistics were applied to check the statistical significance using the Pearson Chi-squared test through the statistical package for social sciences SPSS, version 20;  $p \leq 0.05$  was considered significant.

## RESULTS

In response to the presence of dental trauma among their children, 242 (44%) respondents claimed that their children went through dental trauma while 313 (56%) believe that their children never had any dental trauma (Fig. 1).

The respondents reiterated the oral habits of their children, as seen in Figure 2. Majority (61%) believe that their children never had any oral habits of thumb-sucking, nail biting, bruxism, and lip-biting or lip sucking. While nail biting makes up the highest percentage among the established habits, 18% of parents claim that their kids had the tendency. Bruxism, thumb-sucking, and lip-biting or sucking are claimed as 11, 6, and 4%, respectively (Fig. 2).

In response to the question of how long their child has dental trauma, 38% stated that their child has trauma between the ages of 1 and 3, while 24% stated that their child has dental trauma at the age of 6 or older. The proportion of those who do not recall when or for how long it occurred is 15%, the lowest among the responses. While 23% stated that their dental trauma occurred between the age range of 4–6 years (Fig. 3).

The majority (48%) of respondents indicated that their child experienced trauma during the summer, whereas only 17% indicated that their second-largest majority, did not know the season during which their children experienced the trauma. As shown in Figure 4, the child experienced trauma during the winter is unusual that it comprised 35% of respondents.

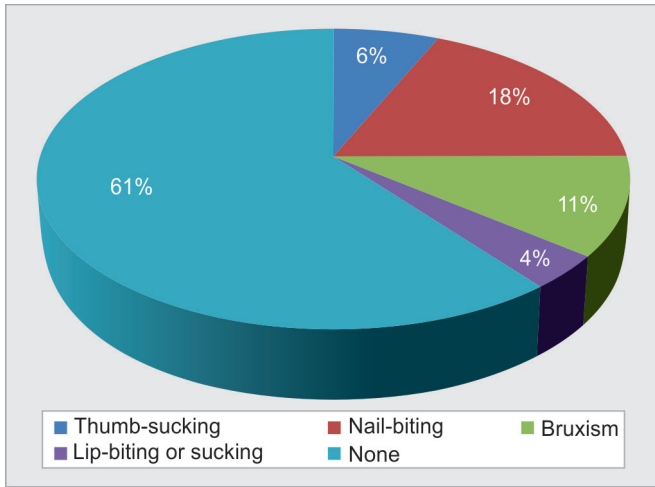


Fig. 2: History of oral habits

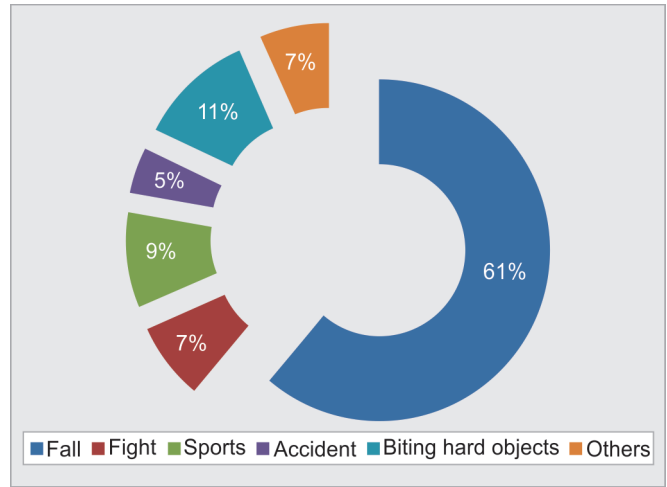


Fig. 5: Causes of dental trauma

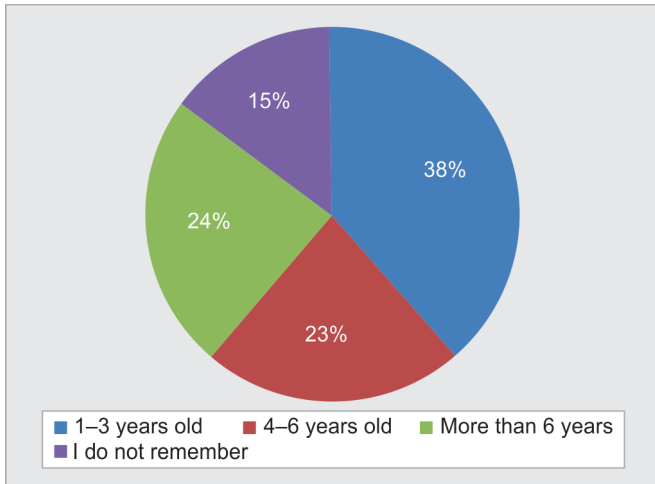


Fig. 3: History of dental trauma

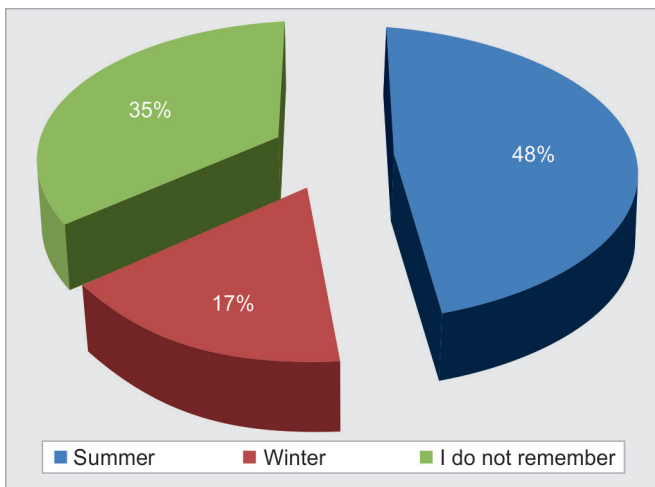


Fig. 4: Prevalent season of dental trauma

The highest percentage (61%) of respondents claimed that fall is the major cause of oral injury, whereas only 5% stated that accidents can be the cause, as seen in Figure 5. A bite on a hard

object was marked as the source of trauma in 11% of cases, while sports were reported as the primary cause in 9% of cases. A small fraction (7%) of students asserted that fight and other causes can lead to oral injuries (Fig. 5).

An association was made between the sociodemographic characteristics of the participants (gender, age, study location, and the place of the incident) with causes of dental trauma (Table 1). While considering the causes of trauma from a gender perspective, we can see that a high percentage of both male and female respondents agree on "fall" as the primary cause 49.32 and 50.67%, respectively. The second most common cause reported in males is "sport" while in females, it is "biting hard objects." A highly statistical significance (0.001%) has been computed between the causes of dental trauma and the gender of participants. The age-group of 6-9 years has the highest ratio of dental trauma, as the majority of dental injuries occur during this period of a child's life. Fall is recorded as the most common cause (66.17%) of dental injuries while the least common cause is accidents, that is, 2.20%. Moreover, fall is reported to be the main cause of dental trauma among participants of all age-groups.

In response to whether they attended public or private schools, the majority (216) attended public schools, and they identified falls as the leading cause of trauma (58.80%). Biting a hard object is the second most common cause, accounting for 12.04%, while an accident accounts for 5.09%. Only 26 respondents said their children attend private schools, and the most common cause of dental trauma (80.76%) was a fall. No respondents named an accident as a cause of dental trauma.

In response to the question about the location of the children's dental trauma. A sum of 116 respondents identified their home, A total of 11 schools, 8 streets, 9 playgrounds, and 4 others as a major cause of dental trauma. Fall is the most common cause reported followed by biting hard objects which is reported as the second most common cause of dental trauma, while sports is the least common. The association between the location of injury and causes of dental trauma was found significant with  $p \leq 0.001$ .

## DISCUSSION

As stated earlier, this study was conducted to investigate the risk factors of dental trauma among children in different age-groups (6-16 years). Dental trauma is considered to be a major issue with a plethora of risk factors associated with it in our day-to-day life.<sup>1</sup>

**Table 1:** Causes of dental trauma

<i>Variables</i>	<i>Fall</i>	<i>Fight</i>	<i>Sports</i>	<i>Accident</i>	<i>Biting hard objects</i>	<i>Others</i>	<i>Total</i>	<i>p-value (0.05)</i>
Male	73 (49.32%)	13 (9.92%)	21 (16%)	9 (6.87%)	12 (9.16%)	3 (2.29%)	131 (54.13%)	≤0.001
Female	75 (50.67%)	5 (4.50%)	1 (0.90%)	2 (1.80%)	15 (13.51%)	13 (11.71%)	111 (45.87%)	
Total	148 (61.15%)	18 (7.44%)	22 (9.11%)	11 (4.54%)	27 (11.15%)	16 (6.61%)	242	
<i>Age of the child</i>								
6–9 years	90 (66.17%)	12 (8.82%)	10 (7.35%)	3 (2.20%)	9 (6.61%)	12 (8.82%)	136	0.42
10–12 years	26 (49%)	3 (5.66%)	8 (15%)	3 (5.66%)	10 (18.87%)	3 (5.66%)	53	
13–15 years	32 (60.37%)	3 (5.66%)	4 (7.55%)	5 (9.44%)	8 (15.09%)	1 (1.89%)	53	
Total	148 (61.15%)	18 (7.44%)	22 (9.11%)	11 (4.54%)	27 (11.15%)	16 (6.61%)	242	
<i>Studying in a government or private school</i>								
Government school	127 (58.80%)	17 (7.87%)	21 (9.72%)	11 (5.09%)	26 (12.04%)	14 (6.48%)	216	0.307
Private school	21 (80.76%)	1 (3.85%)	1 (3.85%)	0 (0%)	1 (3.85%)	2 (7.69%)	26	
Total	148 (61.15%)	18 (7.44%)	22 (9.11%)	11 (4.54%)	27 (11.15%)	16 (6.61%)	242	
<i>Where did he/she have dental trauma?</i>								
Home	116 (64.44%)	16 (8.89%)	5 (2.78%)	4 (2.23%)	24 (13.33%)	15 (8.33%)	180	≤0.001
School	11 (45.83%)	1 (4.17%)	8 (33.33%)	1 (4.17%)	2 (8.33%)	1 (4.17%)	24	
Street	8 (40%)	1 (5%)	4 (20%)	6 (30%)	1 (5%)	0 (0%)	20	
Playground	9 (64.29%)	0 (0%)	5 (35.71%)	0 (0%)	0 (0%)	0 (0%)	14	
Others	4 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	4	
Total	148 (61.15%)	18 (7.44%)	22 (9.11%)	11 (4.54%)	27 (11.15%)	16 (6.61%)	242	

Community-based oral health studies examining the prevalence and risk factors of TDI are uncommon, particularly among young people—this is an improvement over clinical samples, which include care-seeking individuals who are more likely to have dental issues. To the best of our knowledge, no such study has been conducted in Ha'il to determine the most common cause/risk factor, most common site, and season of DTIs in school-aged children. Furthermore, this study assessed the relationship of dental trauma with students (6–15 years) studying at the government and private schools.

This study concludes that the cause of dental trauma is associated with child gender, and has demonstrated that the importance of dental trauma should not be underestimated, as 56%

of respondents have confirmed their children have been affected by it, which differs from the finding reported from a study conducted in Sudan, which reported dental trauma to be 18%, and they have also reported that girls have more tendency of dental trauma, which differs from the finding of this study in which boys were more affected with dental trauma.<sup>8</sup> Only 18% of parents reported that their children had nail-biting issues, with the vast majority claiming that their children had no oral habits that could cause dental trauma. This has shown that oral habits are not the primary cause of dental trauma. Summer is considered to be the most effective season for dental trauma as it opens more outdoor opportunities and free movement. It also justifies the highest recorded percentage of falls

among all categories. A study conducted in Iran by Azami–Aghdash et al. reported the same findings.<sup>18</sup> This study concludes that the majority of children experience dental trauma between the age of 6 and 9 years. Moreover, it validates the previous findings that children are more vulnerable to dental injuries than adults. The findings of the current study support the null hypothesis, which states that age is not directly related to dental trauma; however, given the high prevalence rates among children, age is an important factor that can lead to dental trauma. As this study revealed, dental trauma can be linked to the location and type of school, with falls being a major cause in both government and private schools. This study also confirmed that the home as a location is more susceptible to dental trauma than other locations such as schools, streets, playgrounds, and so on.

This study has highlighted some important factors to identify the major causes of dental trauma for the Ha'il population, that may help to prevent its occurrence through policymaking. It is important to identify the various risk factors of dental trauma which will help in devising strategies for its prevention and proper diagnosis (Ahmed et al.)<sup>1,20</sup>

Fall is considered the leading cause of dental trauma and the primary risk factor, with a high prevalence rate. The faculty of Ha'il must organize training and awareness sessions for the parents to reduce the risk factors that can lead to dental injuries. Further research is needed to determine the most effective instructional strategies for healthcare professionals on how to prevent falls.<sup>10</sup>

## CONCLUSION

This study has shown the importance of dental trauma and risk factors associated in the context of Ha'il, Saudi Arabia. This study found that more than half of the respondents stated to have dental trauma in their children. Fall is considered as the major cause while the home was found as the most common location/site for dental trauma. Interestingly most of the dental trauma occurred during the summer season. Oral habits have not been found as the real cause of dental trauma.

## Clinical Significance

The study evaluated risk factors and the prevalence of dental trauma among the population in Ha'il, Saudi Arabia. It will be an effective tool for determining the need for treatment facilities and will aid in the development of prevention strategies to reduce the prevalence of TDIs in children.

## Limitation

Due to lack of logistics and support, convenient sampling was used, which may not be exactly generalizable to the whole population of interest.

## FUTURE DIRECTIONS

This study has practical implications not only for the practitioners but also for the other stakeholders to devise strategies for eradicating or reducing dental traumatic injuries. As evident from the results that fall is a major cause in all variables while homes and schools are the pertinent places in its occurrence; therefore, management and faculty at schools and parents at homes have extra responsibilities in preventing their children from the causes of dental trauma with additional care. It increases the responsibilities of the practitioners in dental surgeries to educate the parents and use the information for awareness in reducing dental trauma. Future

research should be conducted to investigate effective strategies for educating parents and children to reduce risk factors and, ultimately, the prevalence of TDIs.

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