

Prevalence of Traumatic Dental Injury among Primary School Children in Riyadh, Saudi Arabia

Sherif Mohamed Okash^{1*}, Abdulmajeed Sultan Alenazi², Abdulelah Sindy Aldraan², Ahmed Hussein Hassan³, Abdulmajeed Ahmed Alanazi², Basel Abdurzag Alanazi², Ali Tamam Alanazi²

¹Lecturer of Pediatric Dentistry, Preventive Dental Science Department, Alfarabi College for Dentistry & Nursing, Khaleej, Riyadh 13224, Saudi Arabia

²Internship Student, Alfarabi College for Dentistry & Nursing, Khaleej, Riyadh 13224, Saudi Arabia

³Assistant Professor of Mathematics /Statistics, Basic Science Department, Alfarabi College for Dentistry & Nursing, Khaleej, Riyadh 13224, Saudi Arabia

*Corresponding author: Sherif Mohamed Okash

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Abstract

This study was conducted to assess prevalence of Traumatic Dental Injury among primary school children in Riyadh, Kingdom of Saudi Arabia (KSA). This was a cross-sectional study based on clinical examination. It was conducted at private and public schools of Riyadh. 400 schoolchildren aged 8-11 years old were selected. Traumatic Dental Injury was recorded using epidemiologic classification adopted by (WHO) 1992 and modified by Andreasen et al. The data obtained were compiled systematically and then statistically analyzed; study revealed the prevalence of Traumatic Dental Injury (TDI) in primary schools of Riyadh was 13.6%, also showed higher prevalence in public schools than in private schools (7.3% vs 6.3%), 9 year old children had the highest prevalence of TDI (6.04%), followed by 8 years old children (5.8%). Maxilla scored higher prevalence of TDI than mandible (10.8 % vs 0.76%) and both Central & Lateral incisor teeth are the most commonly affected anterior teeth. Enamel fracture was the most common traumatic injury (48.1%). This study recorded low prevalence of TDI among primary school children, and recommended periodic oral health education programs targeting causes and methods of prevention of TDIs.

Keywords: Primary school children, Trauma, Prevalence, Riyadh, KSA, Teeth.

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INTRODUCTION

Traumatic dental injuries (TDI) affect a variety of population including; infants, children and young adults [1]. It was hypothesized that dental trauma will exceed dental caries and periodontal diseases in the foreseeable future by Andreasen [1]. TDI is an injury or trauma to the tooth and supporting structure. It can involve any tooth structure such as enamel, dentine and the pulp according to its severity; it can also affect supporting structure for example the periodontium and alveolar process. Traumatic dental injuries can lead to harmful outcomes like necrosis of the affected tooth or sinus tract [2, 3].

TDI has high prevalence, and also has an impact on child esthetics, function, comfort, confidence and daily life [4-6]. These injuries are more seen in upper anterior teeth than the lower anterior teeth [7], which might lead to difficulties that could impair the child such as; difficulty in speaking, restrictions in biting and bad appearance [8]. Malocclusions may occur in a brief time due to loss of proximal and incisal

contacts [9]. The awareness of the community about dental injury is very poor resulting in increased risk of injuries due to lack of the sufficient information. However, some health professionals including dentists underestimate incidence of dental trauma and concentrate on its treatment rather than its prevention [10].

There were several variations in the studies that were conducted on TDI such as "Type of study, trauma classification, differences in methodology, limited age groups and geographic and behavioral differences between study locations and countries" [11]. Noori & Al-obaidi conducted a study in Sulaimani city, northern Iraq on a sample of 4015 of children aged (6 - 13 years old) and reported low prevalence of traumatic dental injury (6.1%) among them, maxillary central incisors were the most common affected teeth by dental trauma [12]. Whereas Anokla *et al.*, [13] conducted another study in Belgaum, India on a sample of 13200 children aged (6 - 11 years old), they found prevalence of (14.74%) among them. Males were highly affected

by TDI than females, with high prevalence of enamel fracture without pulp exposure. Also Tasneem S *et al.*, [14] conducted another study in Kashmir, India on a sample of 1600 school children aged 12 years old, and reported low prevalence of traumatic dental injury of their anterior teeth (9.3%), males were more affected than females. El- Kalla *et al.*, [15] in his study which was conducted in Mansoura city, Egypt on a sample of 11700 school children aged (11-14 years old) found low prevalence of TDI (13.6 %) among them. Also males were more affected than females. They found higher prevalence of enamel fracture than enamel – dentine fracture.

According to the WHO, TDI is a serious public health problem and research in its field is insufficient in most countries [16, 17]. So this study was conducted in Riyadh city to measure prevalence of Traumatic Dental Injury among primary school children.

MATERIALS AND METHODS

This survey-based cross sectional study was performed in Riyadh in the period between November 2017 and May 2018. A total number of 400 children with ages of 8-11 years were randomly selected from private and public schools of the Riyadh city. The children were randomly selected from four districts in Riyadh city (North, East, West and South). One private school and another public one from each district were selected (8-schools). The inclusion criteria was male children with permanent anterior teeth and free from systemic diseases, while the exclusion criteria was female children and children with primary anterior teeth or those with teeth affected by dental caries or other dental anomalies. Written consents were obtained from their parents before conducting the study. Ethical approval was obtained from scientific research unit of Al Farabi colleges in Riyadh.

Special examination sheet (Fig-1) based on the epidemiologic classification adopted by (WHO) 1992 and modified by Andreasen *et al.*, [18], More than 400 examination sheets was prepared and more than 400 copies were printed. The examination procedures were carried out by the same examiner to exclude any inter-individual variation. The examinations of children took place in the school medical room, if not available

another suitable rooms were used for the examination. The children were examined using appropriate individual cross-infection protection equipment and disposable examination kits. The examination is carried on 400 students in eight schools, after collecting the information we sorted them according the types of injury, type of the school and student's ages.

All data were processed and analyzed using an SPSS (Social Package of Statistical Sciences), version 16.0. Independent (T-Test) was used for comparison of traumatic dental injury (TDI) between private & public schools. One Way Anova for more than 2 samples and Post Hoc Test for multiple comparisons were used.


RESULTS AND DISCUSSION

After examination, three children were excluded as they were under the estimated age of the study. Figure-2 and Table-1 showing the prevalence of (TDI) among different school children. Children of public schools are more subjected to (TDI) than those of private schools but this difference was statistically insignificant ($P=0.075$). The most affected age was 9 years while the least affected age was 11 year. The difference among all age groups was statistically insignificant ($P=0.2$). On the other hand, there was a high significant difference ($P=0.0001$) among all the different examined teeth with the highest prevalence recorded for combination of central and lateral incisors together. The highest prevalence recorded for single tooth was recorded for the central incisor while the canine in the least affected tooth. Also there was a high significant difference ($P=0.0001$) between maxilla and mandible with the heist prevalence recorded for the maxilla. This significant difference existed in all comparisons; between maxilla and mandible and between any one of them and a combination of both.

The prevalence of the severity of (TDI) among the affected children is listed in Table-2. Among all defects, enamel fracture only came first with the highest prevalence (48.1%), while sinus tract formation came last with the lowest prevalence (1.9%).

Legend to Figures:

1. Examination sheet
2. Prevalence of (TDI) among different school children

كليات الشارابي 

Examination sheet

a- Personal information

* Student name:

* Student age:

* School name:

* District name:

b- Examination data

13	12	11	21	22	23
43	42	41	31	32	33

0	No trauma
1	Enamel fracture
2	Enamel and dentine fracture
3	Enamel and dentine fracture with pulp exposure
4	Missing tooth due to trauma
5	Discolored tooth
6	Sinus tract without sign of caries

Fig 1: Examination sheet

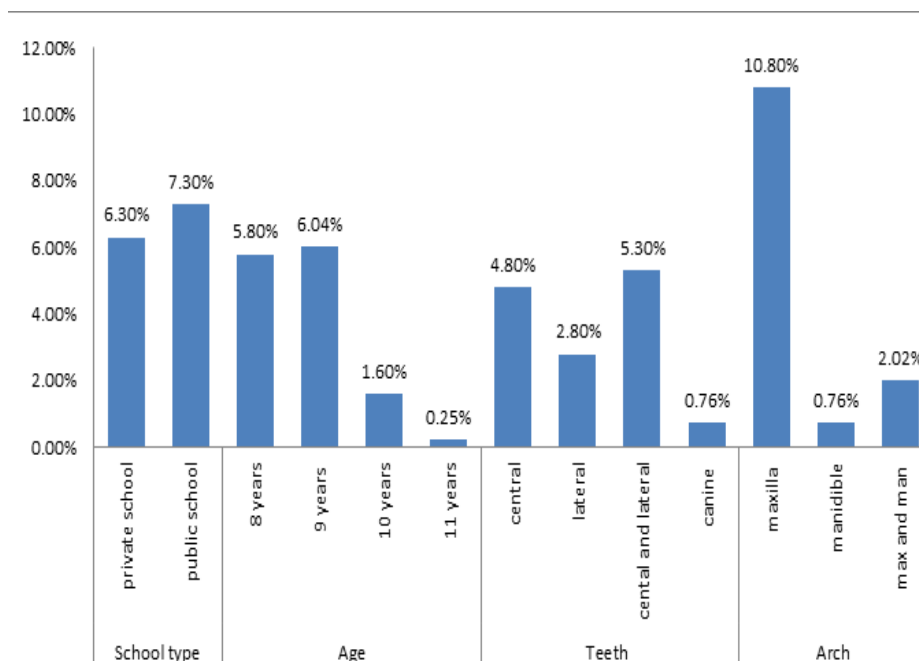


Fig 2: Prevalence of (TDI) among different school children

Table-1: Prevalence of (TDI) among different school children

Variable		Prevalence (%)
School Types	Private N= 25	6.3
	Public N= 29	7.3
Ages	8- Y N= 23	5.8
	9- Y N= 24	6.04
	10-Y N= 6	1.6
	11- Y N= 1	0.25
Teeth	Central N= 19	4.8
	Lateral N= 11	2.8
	Central & lateral N= 21	5.3
	Canine N= 3	0.76
Archives	Maxilla N= 43	10.8
	Mandible N= 3	0.76
	Maxilla& Mandible N= 8	2.02
Total		13.6

Table-2: The prevalence of the severity of (TDI) among the affected children

Trauma scores	Enamel Fracture	En/Dentine Fracture	EN / Dentine with Pulp Exposure	Missing of Tooth Structure due to Trauma	Discoloration of Tooth due to Trauma	Sinus Tract Formation due to Trauma
Number	26	4	4	17	2	1
Prevalence (%)	48.1%	7.4%	7.4%	31.5%	3.7%	1.9%

DISCUSSION

The future dental health of the children can be negatively affected by (TDI). Complete and sound dentition has a positive effect on esthetic, speech and psychological status of the children. Prevention of dental trauma, preservation of sound teeth, and restoration of the fractured ones should be a prime concern of dental practitioners. This study was conducted on male children's with age 8-11 years, as they are more susceptible to Traumatic Dental Injury than girls with the same age [13]. At this age boys are more active outdoors than girls, as they participate in hard sport and play in non-safety places without safety protective. Few epidemiological studies were conducted in Al-Riyadh city to measure prevalence of Traumatic Dental Injury, so this study was carried out to compensate this shortage.

This study reported low prevalence of Traumatic Dental Injury (13.6%) among primary school

children, and this result was matched with the result of El-Kalla *et al.*, [15]. Other studies also strengthen our results as they found low prevalence of (TDI) (below 15%) [12-14, 19]. On the other hand, the results disagreed with Traebert *et al.*, [20] who reported prevalence of (18.9%). Furthermore our result disagreed with Rouhani *et al.*, [21] as they reported prevalence of (22.6%), and this difference could be attributed to the difference in the diagnostic criteria they used. Also, the nature of the place of the study may have its effect on the results. Also Gabriela *et al.*, [22] reported high prevalence of Traumatic Dental Injury among 5-6 year old children (52.3%), this difference could be attributed to the age of their sample, as their sample aged from 5-6 years old. the most of children in this age may suffer from imbalanced motion which may lead to repeated falls with subsequent teeth fracture.

Concerning the age, high prevalence of (TDI) was found among 9 years old children's (6.04%), and

this was matched with Tumen *et al.*, [19], and Anokla *et al.*, [13]. However this result was not in a line with Noori & Al-obaidi [12] as they reported the age of (10-11) years old was higher than the age of (8-9) years old. They claimed that, increased activity with age may result in increased trauma prevalence. In regards to the affected dental arch, maxillary arches reported higher prevalence of TDI than mandibular ones (10.8 % vs 0.76) and this was matched with more than one previous study [12, 19, 21, 22]. The cause in this state is obvious, as the anterior mandibular teeth are usually covered by the maxillary counterparts, so the maxillary ones act as a protective barrier for the mandibulars. In regards to the examined teeth, our study revealed that prevalence of TDI in both Central & Lateral incisor together was the highest among all examined teeth (5.3 %), while Central incisor is the most affected solely tooth (4.8 %) followed by lateral incisor. This may be related to the morphology, location and vulnerable position of central and lateral incisors in the face make it more susceptible to traumatic injuries. This result was matched with Noori & Al-obaidi [12] and Gabriela *et al.*, [22], Rouhani *et al.*, [21] and Tumen *et al.*, [19].

Regarding the severity of (TDI), the highest prevalence was recorded for enamel fracture only without involvement of dentin (48.1 %). As enamel is the outer coverage of the teeth, so it is the most vulnerable part of the tooth subjected to external trauma and thus it is the most affected part. This result was matched with that of Traebert *et al.*, [20], Gabriela *et al.*, [22], El- Kalla *et al.*, [15], and Tumen *et al.*, [19]. While traumatic injury with sinus tract formation encountered the lowest prevalence (1.9). This low prevalence may be attributed to the low prevalence of pulp exposure due to dental trauma also fast medication in such cases may prevent the progression of the case into sinus tract formation.

CONCLUSIONS AND RECOMMENDATIONS

Traumatic dental injury prevalence among school children is low and the highest affected tooth is central incisor. The most affected children are those of public schools with the age of 9 years. Finally periodic oral health education programs targeting at raising knowledge about TDI causes and methods to prevent it should be conducted periodically among primary school children.

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