Prevalence of anterior dental trauma and its associated factors among children aged 3–5 years in Jaipur City, India – A cross sectional study

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Abstract

Objective: To study the prevalence of anterior dental trauma and its associated factors among 800 preschool children aged 3 to 5 years in Jaipur City, Rajasthan, India. Materials and Methods: A cross-sectional survey was conducted among children aged 3–5 years, who were enrolled in various private and public schools in Jaipur. Parents were asked to fill a form addressing socio-demographic data and clinical examinations were performed by a single dentist. Traumatic dental injuries (TDI) were assessed and recorded based on Andreasen's classification. Associated factors such as sex, socioeconomic status (SES), and the type of injury were also analyzed. The data were analyzed statistically using Statistical Package for the Social Sciences software (version 20). Results: An overall 10.2% prevalence of TDI was observed among the study population. TDI were reported to be more among male children (11.87%) compared to female children (8.14%). Enamel fractures (69%) were the most prevalent type of anterior dental trauma. Upper central incisors were the most frequently affected. The SES of the parents had little influence on the prevalence of TDI. Conclusions: The prevalence rate of dental trauma among children aged 3–5 years was 10.2%. Associated factors, such as SES, were observed to be not significantly correlated to dental trauma among the studied preschoolers.

Key words: Preschool children, socio-economic status, traumatic dental injury

INTRODUCTION

Traumatic dental injuries (TDI) are the most overlooked oral conditions regardless of their high prevalence rate and associated impact on children.¹ Dental trauma in addition to causing pain and loss of function has the potential for periapical sequelae, which can adversely affect the development of the permanent teeth as well as the developing occlusion.¹,² Epidemiological data showed a wide variation in the prevalence of dental injuries in children.¹³⁴ Dental injuries to the deciduous teeth can result in problems to the underlying permanent teeth, such as hypoplasia, discoloration, and delay in eruption time, and tooth malformation.⁵⁶⁷ Along with pain and possible infection,
the consequence of dental trauma includes alteration
in physical appearance, speech defects, and emotional
impacts; thus, affecting the child’s quality of life.\[^{9,11}\]

Risks and severity to dental trauma vary according to the
age, sex, and location of the tooth in the oral cavity.\[^{12,13}\]
A review of literature has shown that a higher degree
of prevalence among anterior dental trauma exists
compared to posterior teeth.\[^{12}\] Preschool children are
more prone to TDI due to their poor stability, passive
reflexes and indefinite movements.\[^{11,14,15}\]

A correlation between low socio-economic status
and high prevalence of dental trauma have been
emphasized.\[^{11,16}\] Reports also highlighted that children
of parents with low educational level tend to have
increased rate of dental trauma.\[^{17}\] However, the
clarification on impact of socio-economic status of
the parents or their educational level are still under
investigation.\[^{11,18}\]

Parents and home environment have a significant
impact on the perception and attitude towards oral
health among young children.\[^{19}\] Delaying the treatment
of the dental injuries in children are common in many
countries.\[^{20-23}\] This can be attributed to various factors
such as short-lived primary dentition, memory bias,
and lack of required attention because the child might
not show any associated sign or symptom. Other
determinants such as high cost, low standard of living
and lack of knowledge also play a vital role.\[^{11}\]

Only a few studies have been conducted in India on
the prevalence of TDI among preschool children.\[^{6,24,25}\]
Shekhar and Mohan\[^{28}\] reported a prevalence of
6.2% of injuries among deciduous anterior teeth in
a sample of 1,126 preschool children in Chennai.
A study from Gulbarga city reported a prevalence of
76.13% deciduous teeth injury among 4–6-year-old
children.\[^{6}\] Another study involving preschool as well as
school children between the age of 3–16 years reported
a prevalence of 5.29% of incisors and canine fractures.\[^{24}\]

Jaipur city, the capital of the state of Rajasthan, is
located in the north-western side of India, and is
home to diverse culture and population belonging to
different socio-economic status.\[^{26}\] There is scarcity
of epidemiological data on the prevalence of dental
trauma among preschoolers in this region and the
factors associated with it. Thus, due to limitations of
the prevailing data, the present study was conducted
to assess the prevalence of anterior dental trauma in
primary dentition among 3–5-year-old children in
Jaipur city, India, and its associated factors such as the
socioeconomic status (SES) of their parents.

**MATERIALS AND METHODS**

The study was conducted in 800 preschool children
aged 3 to 5 years residing in Jaipur city, India during
June 2014 to September 2014. The study was approved
by the institutional review board. The sample size
was calculated using the Epi-Info 6.0 software
program (CDC, 1600 Clifton Rd, Atlanta, GA 30333).
It was estimated that a minimum sample size of 625
children was required to achieve a level of precision
with a standard error of 4% or less. The 95% confidence
interval level and a prevalence of dental trauma of
50% were used for the calculation. To compensate
for the possible losses during the survey of data, the
sample size was increased, resulting in a final sample of
800 children.

Parents were asked to fill out a form addressing
socio-demographic data that included their education
level and SES. Children with debilitating systemic
disease, missing incisors due to caries or physiological
exfoliation, and who failed to return the consent forms
and completed questionnaires were excluded from the
study.

Clinical examination was performed by a single dentist
with a specialization in Pediatric Dentistry. Children
were examined on a dental chair using mouth mirror
under normal sunlight. Dental examination comprised
only the primary maxillary and mandibular teeth. The
anterior dental trauma was assessed by the method
used by Andreasen \textit{et al}.,\[^{27}\] consisting of the visual
assessment of tooth discoloration and dislocation of
teeth [Table 1]. Root fracture was not recorded and no
radiographs were obtained. The SES of the family was
calculated using Modified Kuppuswamy Scale for SES
of an Indian population, which includes occupation,
education level, and income of the parents to arrive
at an SES score.\[^{28}\] The data were then subjected to
simple descriptive analysis and the statistical analysis
was performed with Statistical Package for the Social
Sciences version 20 (SPSS, IBM SPSS Inc, Chicago, IL).
Chi-square test was employed to compare qualitative
data and determine the statistical significance. The level
of statistical significance was set at $P < 0.05$.

**RESULTS**

Out of the 800 children enrolled in the study, only
686 were included based on the inclusion criteria.
Out of the 686 children, 379 (55.2%) were males and 308 (44.8%) were females. The prevalence of children sustaining anterior dental trauma was recorded to be 10.2%. Out of the 70 children who suffered TDI, 64.3% were males and 35.7% were females. However, the association of gender characteristics with children exposed to anterior dental trauma was not significantly correlated ($P = 0.109$) [Table 2]. Maxillary anterior teeth were affected more compared to the mandibular teeth, and central incisors were the most affected teeth. The teeth least involved were the maxillary and mandibular canines [Table 3].

Enamel fracture was 69% followed by 24% of pulpal injury or crown discoloration and 7% of enamel and dentin fracture [Table 3 and Figure 1]. Majority of anterior dental trauma was observed at an older age of 5 years followed by 4 and 3 years [Figure 2]. Males were more prone to dental injury than females [Figure 3]. Although anterior dental trauma was not significantly correlated to the SES of their parents, it was relatively more among high SES (57.2%) compared to low SES (42.9%) [Table 4].

**DISCUSSION**

TDI range from minor fractures of the enamel to major damage involving the displacement or avulsion of teeth. The prevalence of TDI in primary teeth ranges from 9.4% to 71.4%. Of all the dental injuries that occur before 30 years of age, 50% occur before the age of 10 with the peak being between 2–4 years. However comparisons between studies should be performed with caution due to the lack of uniformity in the samples, clinical diagnostic criteria, location of the study, and age groups. The prevalence of anterior dental trauma in the present study population was 10.2%, which was in concordance with the studies reported earlier. males experienced more dental trauma than females, and accidents at home and school are the major sources of TDI. In the present study, males experienced significantly higher incidence of dental trauma compared to females. Gender is a well-known risk factor.
In the present study, we could not find any correlation between SES and dental trauma. Earlier studies have reported inconsistencies in the association between SES and dental trauma in children.[7,33] A study conducted among various school children in Jordon, Jamani, and Fayyad[33] reported high prevalence of dental injuries among children from high SES in Jordon, which is in agreement with a later study from Brazil.[36] Hamilton et al.[37] reported that children in the lower socioeconomic groups had significantly more dental injuries. Several other studies failed to establish any conclusion regarding the SES of the parents and TDI.[33,38‑40] In the Indian population, the measurement of SES is generally done using BG Prasad’s scale and Uday Pareek scale for urban and rural areas, respectively.[41] On the other hand, for the urban population, the scale developed by Kuppuswamy in 1976 attempts to accurately measure the SES of the family based on three variables; education, occupation of the head of the family, and per capita income per month.[28] In this study, we used the Kuppuswamy scale to assess the SES.

Dental injuries occurs more often in the maxilla than in the mandible, and the upper central incisors are the teeth most commonly injured.[42,43] The explanation for this could be the natural protection of the mandibular incisors combined with the relative prominence of the maxillary central incisors.[44] In the present study, we found that the maxillary central incisors are the worst affected. Thus, they tend to be the first ones to procure a direct blow resulting in a fracture. In addition, the upper jaw is attached to the skull which makes it rigid, whereas mandible, being a flexible part, aids in reduced impact forces toward lower anterior teeth by movement.[38] The study was conducted in a selected area in a city. Future studies should aim at randomizing the sample with a larger group of children. This preliminary data can be used by health policy makers to conduct a national community-level survey at a later stage to implement specific policies.[45]
CONCLUSION

The prevalence rate of dental trauma among children aged 3–5 years was 10.2%. This observation is in accordance with similar studies conducted elsewhere. However, limitations such as different systems used to record the injuries have crippled the comparison of the observations. However, this observation will be helpful in organizing national-level surveys as well as to assess the treatment requirements. It will also help in educating parents and primary school caregivers on the consequence of injuries to children and educating them regarding the preventive strategies. Associated factors such as SES was observed to be not significantly correlated to dental trauma among the studies preschoolers.

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Conflicts of interest

There are no conflicts of interest.

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