



Prevalence and Factors Associated with Traumatic Dental Injuries Among Preschool Children in Salvador, Bahia, Brazil: A Cross-Sectional Study (2022–2023)

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Abstract

Objective: To describe the prevalence and distribution of traumatic dental injuries (TDI) among preschool children in Salvador, Bahia, Brazil, and to investigate associated factors in the post-COVID-19 period.

Methods: A cross-sectional study was conducted among 523 children aged 2–6 years attending municipal daycare centres in Salvador, Bahia, Brazil, between 2022 and 2023. The presence of two or more teeth affected by TDI was considered the outcome variable. Clinical examinations recorded tooth discolouration, enamel fractures, and complete crown fractures. Sociodemographic and behavioural variables, including age, race/skin colour, maternal education, social isolation during the pandemic, and malocclusion, were assessed as potential factors associated with the outcome. Multivariable logistic regression analyses were performed, adopting a 95% confidence level.

Results: The prevalence of TDI was 18.6%. Tooth discolouration and enamel fractures were the most frequent injuries. The maxillary primary central incisors were the teeth most commonly affected. Children identified as Black were more likely to present with multiple affected teeth than their counterparts (OR = 2.33; 95% CI: 1.22–4.44). The presence of malocclusion was also associated with a higher likelihood of TDI (OR = 1.58; 95% CI: 1.01–2.46). No significant associations were observed for age, maternal education, or social isolation during the pandemic.

Conclusions: Traumatic dental injuries were common among preschool children in this population, predominantly affecting the maxillary primary central incisors. Black race/skin colour and malocclusion were independently associated with a greater occurrence of TDI. These findings highlight the importance of preventive and early intervention strategies targeting vulnerable children in both home and school settings.

Keywords: Traumatic Dental Injuries; Tooth Fractures; Preschool Child; Epidemiology; COVID-19

Introduction

The COVID-19 pandemic spread rapidly worldwide, significantly affecting healthcare systems. Because dental settings were classified as high-risk environments for viral transmission, access to oral healthcare was substantially reduced, particularly during

2020 [1,2]. This restriction compromised preventive measures and regular dental follow-up, especially among children, for whom early intervention is essential to prevent disease progression and promote health education among both children and their caregivers [2,3].

Although children are at lower risk of developing severe forms of COVID-19, the effects of social isolation were considerable. Behavioural changes, including anxiety, stress, delays in biopsychosocial development, and increased social withdrawal, were reported, particularly among socioeconomically vulnerable populations [1,2,4-6]. At the same time, increased family stress and caregiver burden affected household dynamics and may have directly influenced children's health and safety [1,7,8].

Traumatic dental injury (TDI), defined by the International Association of Dental Traumatology as injuries affecting teeth and their supporting structures resulting from external impacts, represents an important public health concern. It is estimated that approximately 25% of school-aged children have experienced some form of traumatic dental injury, with the maxillary anterior region—especially the central incisors—being the most frequently affected [9-11]. These injuries may include crown fractures, tooth discolouration, luxation injuries, and, in more severe cases, avulsion, potentially leading to pulpal complications, occlusal alterations, speech impairment, and significant psychosocial consequences [8,9-11].

The aetiology of traumatic dental injuries (TDI) is frequently associated with falls and household accidents, with children being particularly susceptible due to their developmental stage and the increasing range of locomotor experiences across different age groups [8,9]. Traumatic dental injuries in preschool children have a multifactorial aetiology. They should be understood in light of the social determinants of health, which encompass the conditions in which children are born, grow, and live, as well as the socioeconomic, cultural, and environmental contexts that shape their exposure to risks and access to healthcare. Factors such as low family income, poor housing conditions, household overcrowding, lower caregiver educational attainment, and limited access to health services and preventive measures may increase vulnerability to accidents and reduce the capacity to respond adequately to traumatic events. Furthermore, contexts characterised by greater social instability and family stress may influence the supervision of children and increase the occurrence of risk situations, including violence. In this regard, variables such as race/skin colour, commonly used in epidemiological studies, should be interpreted as social markers of structural inequalities, reflecting historical processes of exclusion that directly affect oral health. Therefore, traumatic dental injury should not be viewed solely as an accidental event, but rather as a multifactorial condition deeply influenced by social inequities [4-7,9,10,8,12].

During the pandemic period, there was also a documented increase in rates of child abuse and neglect, particularly among

socially vulnerable populations. Reduced contact with healthcare professionals and child protection networks may have contributed to the underreporting and undertreatment of traumatic injuries resulting from physical aggression [4,12], in addition to exacerbating other potential factors associated with traumatic dental injuries.

Given this scenario and the scarcity of updated local studies, investigating the epidemiological status of traumatic dental injuries among preschool children is essential, particularly from the perspective of sociodemographic and behavioural factors that the pandemic context may have influenced. Therefore, the present study aimed to describe the prevalence, severity, and distribution of traumatic dental injuries among preschool children in Salvador, Bahia, Brazil, during 2022 and 2023, and to investigate potential factors associated with their occurrence.

Methods

A cross-sectional study was conducted to investigate the oral health status of preschool children. Data were collected in the municipality of Salvador, Bahia, Brazil, during 2022 (September to November) and 2023 (March and April). The study was approved by the Research Ethics Committee of the School of Dentistry at the Federal University of Bahia (UFBA) (CAAE: 60817222.6.0000.5024).

This project was part of a broader research initiative aimed at monitoring the oral health conditions of preschool children in Salvador, Bahia, in which several oral health outcomes were investigated, including traumatic dental injuries.

The study sample consisted of preschool children residing in Salvador, Bahia, and attending municipal public daycare centres, regardless of previous exposure to COVID-19. Sample size calculation was based on an estimated prevalence of 30% for the outcome of interest and an odds ratio of 1.3 for variables potentially associated with the outcome. A statistical power of 80% and a 95% confidence level were adopted. Based on these parameters, the minimum required sample size was estimated at 388 children.

Children aged 2 to 6 years enrolled in municipal public daycare centres in El Salvador during 2022 and 2023 were eligible for inclusion. Participation was conditioned upon the signing of an informed consent form by parents or legal guardians, as well as the child's assent. Children outside the established age range, those with physical or mental impairments that prevented the oral examination, and cases without informed consent or child assent were excluded from the study.

Data collection was conducted in Municipal Early Childhood Education Centres (CMEIs) across different districts of El Salvador, with authorisation from the Municipal Department of Education. Institutions were selected by convenience, based on their agreement to participate in the study during the data collection period. The survey covered approximately 50% of the municipality's health districts, including Barra, Brotas, Boca do Rio, Itapuã, Cabula, and Pau da Lima.

Data collection involved two instruments: a clinical examination form for oral health assessment and a structured, self-administered questionnaire completed by parents or legal guardians. The questionnaire included information on sociodemographic characteristics, dietary habits, food security, daily routines, lifestyle, oral habits, and access to healthcare services. For the final analytical model, the dependent variable was defined as the presence of two or more teeth affected by traumatic dental injury, among other oral health conditions evaluated, such as dental caries and malocclusion.

Clinical examinations were conducted on the premises of the Municipal Early Childhood Education Centres (CMEIs) during the academic year by dentists and faculty members from the Department of Community Health at the School of Dentistry of the Federal University of Bahia (FOUFBA), who had been previously trained and calibrated. Inter-examiner agreement was assessed using the Kappa statistic, with values exceeding 0.90. Examinations strictly adhered to the biosafety protocols recommended by the World Health Organisation (WHO), including the use of personal protective equipment (PPE), such as disposable gowns, caps, N95 respirators, protective eyewear, face shields, gloves, and wooden spatulas. Assessments were performed under natural light with children seated on chairs.

Traumatic dental injury was assessed according to the World Health Organisation (WHO) classification criteria. When present, both the affected tooth and the type of injury were recorded as follows: 0 – Missing; 1 – Tooth discolouration; 2 – Enamel crack; 3 – Enamel fracture; 4 – Enamel and dentin fracture; 5 – Enamel and dentin fracture with pulp exposure; 6 – Complete crown fracture; 7 – Total tooth loss; 9 – Not recorded. For the logistic regression model, a case of traumatic dental injury was defined as the presence of at least two teeth affected by trauma.

Data were entered into an Excel database and statistically analysed using MINITAB 14. Descriptive analyses were performed for both categorical and continuous variables, followed by an exploratory analysis to identify potential factors associated with traumatic dental injury.

Associations between traumatic dental injury and the independent variables were initially assessed using the chi-square test at a significance level of 5%. Subsequently, bivariate and multivariable exploratory analyses were conducted to identify

factors associated with traumatic dental injury by estimating odds ratios (ORs) and their respective 95% confidence intervals using logistic regression models.

Multivariable logistic regression analysis was performed using the backward stepwise method, with a 95% confidence interval. Variables presenting a significance level of up to 20% in the bivariate analysis were considered eligible for inclusion in the multivariable model. Variables showing high collinearity were excluded to improve the predictive performance of the final model. Statistical significance was established at the 5% level, and model fit was assessed using the Hosmer–Lemeshow goodness-of-fit test.

Results

Of the 728 eligible children in the target population, 523 were included in the study. Most exclusions were due to incomplete completion of at least one study instrument ($n = 122$), while the remaining exclusions were due to children's absence during data collection in the school setting ($n = 83$). No participants refused to take part in the study.

Table 1 presents a detailed description of the sociodemographic characteristics of the preschool children. Slightly more than half of the participants were female (51.82%), the majority were identified as Black (90.63%), and more than half were older than 48 years (52.20%). Regarding maternal characteristics, 51.82% of mothers were aged 33 years or younger, and most had completed no more than a high school education (80.31%).

Regarding COVID-19, 92.35% of children had not been affected by the disease, according to parental reports. In terms of household income, 74% of families earned up to one minimum wage, and 66.35% reported receiving emergency financial assistance during the pandemic. Most families reported maintaining complete social distancing or leaving home only when necessary (67.30%). Regarding housing conditions, 34.23% of the children lived in households with more than four residents, and most homes had four rooms or fewer (77.25%).

Among the potential impacts of the pandemic, sleep quality was reported to be affected in 20.08% of the children, and 76.29% spent more than two hours per day using screens at the time of data collection. Regarding outdoor activities during the same period, 37.09% of the children did not engage in such activities.

Table 1: Sociodemographic and Behavioural Characteristics of Preschool Children in Salvador, Bahia, Brazil, 2022–2023 ($n = 523$).

	n	%
Race/ethnicity		
Black and brown	474	90.63
Others	49	9.37
Age (in months)		
Until 48	250	47.8

≥48 meses	273	52.2
Gender		
Male	252	48.18
Female	271	51.82
The child had COVID-19.		
Yes	40	7.65
No	483	92.35
Mother's age		
Until 33 years	271	51.82
≥ 33 years	252	48.18
Maternal education		
High school or less	420	80.31
More than high school (college/university)	103	19.69
Number of household members		
< 4	344	65.77
≥ 4	179	34.23
Familiar income		
< 1 Minimum wage	387	74
≥ 1 Minimum wage	136	26
Number of rooms in the household		
< 4	404	77.25
≥ 4	119	22.75
Level of social distancing during the COVID-19 pandemic		
Complete or minimal outings	352	67.3
Moderate or frequent outings	171	32.7
Receipt of the Brazilian Emergency Financial Aid		
Yes	347	66.35
No	176	33.65
Child's sleep quality decreased during the COVID-19 pandemic.		
Yes	105	20.08
No	418	79.92
Children's screen time during the COVID-19 pandemic		
< 2 horas	124	23.71
≥2 horas	399	76.29
Participation in outdoor activities during the COVID-19 pandemic		
Yes	329	62.91
No	194	37.09

Overall, 18.55% of the children experienced some traumatic dental injury, and 15.11% reported tooth pain during the study period. Nevertheless, 86.42% did not seek dental care when

treatment was needed. Regarding occlusal conditions, 43.21% of the children presented with some form of malocclusion.

Table 2: Oral Health–Related Characteristics of Preschool Children in Salvador, Bahia, Brazil, 2022–2023 (n = 523).

Clinical Condition	n	%
Traumatic dental injury		
Yes – at least one tooth affected	97	18.55
Yes – two or more teeth affected	71	13.57
Não	426	81.55
Dental pain during the COVID-19 pandemic		
Yes	79	15.11
No	444	84.89
Received dental treatment		
Yes	71	13.58
No	452	86.42
Malocclusion		
Yes	226	43.21
No	297	56.79

The maxillary primary central incisors (teeth 51 and 61) exhibited the highest occurrence of traumatic dental injuries, particularly enamel-limited fractures and tooth discolouration. Among the 523 children evaluated, 3.63% presented tooth

discolouration in tooth 51, while 6.12% exhibited an enamel-limited fracture in the same tooth. Total tooth loss was rare, with only one case reported involving tooth 51, indicating that although uncommon, this type of traumatic injury can occur (Table 3).

Table 3: Types of Traumatic Dental Injuries by Tooth. Salvador, Bahia, Brazil, 2022–2023 (N = 523).

Type of traumatic dental injury	teeth 51 (n)	(%)	teeth 52 (n)	(%)	teeth 61 (n)	(%)	teeth 62 (n)	(%)
Tooth discoloration	19	3.63	7	1.34	19	3.63	4	0.76
Enamel crack	3	0.57	2	0.38	4	0.76	2	0.38
Enamel fracture	32	6.12	6	1.15	23	4.4	6	1.15
Enamel–dentin fracture	3	0.57	2	0.38	4	0.76	-	-
Avulsion	1	0.19	-	-	-	-	-	-

Note: The unit of analysis was the affected tooth; each child could have more than one affected tooth.

In the bivariate analysis of traumatic dental injury severity (defined as the involvement of two or more teeth among preschool children), the variables presence of malocclusion ($p = 0.039$) and race/skin colour ($p = 0.008$) showed statistically significant

associations. The remaining variables analysed did not demonstrate a potential association with traumatic dental injury according to the adopted selection criterion ($p < 0.20$).

Table 4: Bivariate Analysis of the Association Between Severe Traumatic Dental Injury Involving Two or More Teeth and Sociodemographic and Behavioural Factors among Preschool Children in Salvador, Bahia, Brazil, 2022–2023 (N = 523).

Traumatic dental injury			
Variables	No	yes	P
	n (%)	n (%)	value
Ethnicity			
Black or brown Others	393 (82.91)	81 (17.09)	0.008

	33 (67.35)	16 (32.65)	
Age (in months)			
< 48	206 (48.36)	44 (45.36)	0.594
≥ 48	220 (51.64)	53 (54.64)	
Gender			
Male	201 (47.18)	51 (52.58)	0.337
Female	225 (52.82)	46 (47.42)	
Mother's age			
< 33 years	221 (81.55)	50 (18.45)	0.953
≥ 33 years	205 (81.35)	47 (18.65)	
Maternal education			
High school or less	339 (80.71)	81 (19.29)	0.372
More than high school	87 (84.47)	16 (15.53)	
Number of household members			
<4	282 (81.98)	62 (18.02)	0.069
≥ 4	144 (80.45)	35 (19.55)	
Number of rooms in the household			
<4	329 (81.44)	75 (18.56)	0.985
≥ 4	97 (81.51)	22 (18.49)	
Familiar income			
<1 Minimum wage	314 (81.14)	73 (18.86)	0.754
≥ 1 Minimum wage	112 (82.35)	24 (17.65)	
Receipt of the Brazilian Emergency Financial Aid			
Yes	141 (80.11)	35 (19.89)	0.575
No	285 (82.13)	62 (17.87)	
Child's sleep quality decreased during the COVID-19 pandemic			
Yes	344 (82.30)	74 (17.70)	0.322
No	82 (78.10)	23 (21.90)	
Children's screen time			
< 2 h	104 (83.87) 322 (80.70)	20 (16.13)	0.428
≥2 h		77 (19.30)	
Dental pain during the COVID-19 pandemic			
Yes	359 (80.86)	85 (19.14)	0.405
No	67 (84.81)	12 (15.19)	
Received dental treatment			
Yes	369 (81.64)	83 (18.36)	0.785
No	57 (80.28)	14 (19.72)	
Malocclusion			
Yes	251 (84.51)	46 (15.49)	0.039
No	175 (77.43)	51 (22.57)	

Variables that were statistically significant in the bivariate analysis were included in the multivariable logistic regression model. Children identified as Black or Brown had 2.33 times higher odds of severe traumatic dental injury (OR = 2.33; 95% CI: 1.22–

4.44), while children presenting any malocclusion had 1.58 times higher odds of severe traumatic dental injury (OR = 1.58; 95% CI: 1.01–2.43).

Table 5: Results of the Multivariable Logistic Regression Analysis of Factors Associated with Severe Traumatic Dental Injury Involving Two or More Teeth among Preschool Children in Salvador, Bahia, Brazil, 2022–2023.

Variables	OR	CI 95%
Race/ethnicity		
Others	1	1.22 – 4.44
Black and brown	2.33	
Malocclusion		
No	1	1.01 – 2.46
Yes	1.58	

Discussion

Overall, the findings indicate that traumatic dental injury was present in a substantial proportion (18.55%) of the preschool children evaluated, with the greatest involvement observed in the maxillary primary central incisors, particularly teeth 51 and 61. A high frequency of behavioural and sociodemographic changes was observed between 2022 and 2023, and a considerable prevalence of malocclusion was observed among the children assessed (43.21%). In the multivariable analysis, children identified as Black and those presenting malocclusion were more likely to have two or more teeth affected by traumatic dental injury.

The prevalence of traumatic dental injury (18.55%) observed in this study indicates that this condition remains common among preschool children. Similar prevalence rates have been reported by Oliveira et al. [13] (16.3%) among Brazilian children aged 24 to 60 months and by Prieto-Regueiro et al. [14] (12.2%) among Spanish preschoolers aged 3 to 5 years. In contrast, higher prevalence estimates have been reported by Patnana et al. [8] (24.2%) in a meta-analysis involving different populations worldwide and by Born et al. (47.0%) [15] among children in the United States. These discrepancies may be attributed to methodological differences across studies, including the diagnostic criteria adopted—such as the WHO criteria and the modified Ellis classification—the age groups evaluated, data collection settings, and distinct sociocultural contexts. Furthermore, studies employing more comprehensive classifications of traumatic dental injury tend to identify a greater number of lesions, thereby contributing to higher prevalence estimates.

Despite the pandemic context, which was characterised by substantial changes in children's daily routines and by impacts already reported for other health conditions—including increased screen time, dietary changes, alterations in family dynamics, and reduced household income, particularly among socioeconomically vulnerable populations, factors that were also identified in the present study [4,5]—no marked increase in the occurrence of traumatic dental injuries was observed. One possible explanation is the greater amount of time children spend at home, potentially associated with increased adult supervision and reduced exposure

to group activities and other risk situations. This finding suggests that patterns of risk exposure may have been modified during the pandemic; however, the available data do not allow this relationship to be established conclusively.

Furthermore, the increased presence of adults in the household during this period may have contributed to closer supervision and more rigorous caregiving practices. In addition, restrictions on group and sports activities during the pandemic may have reduced exposure to situations commonly associated with traumatic dental injuries [6,16].

Regarding age, children older than 48 months showed a higher frequency of traumatic dental injuries involving multiple teeth compared with younger children, although this association was not statistically significant. The literature indicates that traumatic dental injuries are common during the preschool years due to motor development, exploratory behaviour, and the sensory discoveries characteristic of this stage of life. These factors may be associated with greater participation in physical activities and an increased risk of falls among older preschool children [9,13].

In contrast, one study reported a higher prevalence of traumatic dental injuries among children aged 0 to 3 years [17], identifying falls from standing height as the primary cause of trauma in the primary dentition. When older children or more severe traumatic injuries are considered, these events tend to be associated with bicycle accidents, traffic accidents, and sports activities rather than simple falls from standing height [8,9,18]. Because the present investigation was a cross-sectional study, it was not possible to assess the specific causes of traumatic injuries according to age group.

Regarding sex, there is a broad consensus in the literature that traumatic dental injuries are more prevalent among boys. Both national and international studies have reported a higher occurrence of trauma in males, which has been attributed to more active behaviours and greater exposure to risk situations [18,13,17]. These findings are consistent with the results of the present study, in which boys also showed a higher prevalence of traumatic dental injuries than girls. However, the association did not reach statistical significance.

The predominance of injuries affecting the maxillary central incisors and the high frequency of enamel-limited fractures are consistent with previous reports and may be explained by the anatomical position of these teeth and their greater vulnerability to direct impacts [8,13,19,20]. Regarding the type of injury, tooth discolouration and enamel-limited fractures were the most frequently observed conditions, differing from findings reported in other studies [8,17,18]. This observation suggests that the pattern of trauma exposure in this population was distinct, potentially influenced by the environmental and behavioural context during the study period.

The association between malocclusion and traumatic dental injury reinforces the role of clinical factors as proximal determinants of this condition. Occlusal alterations, particularly those associated with increased incisor protrusion, may increase susceptibility to impacts and therefore represent an important target for early preventive interventions. Greater exposure of the anterior teeth increases their vulnerability to trauma, thereby elevating the risk of injury. Other factors, such as anterior open bite, excessive overjet, obesity, and a previous history of traumatic dental injury, have also been reported as risk factors, particularly for injuries affecting the maxillary central incisors [8,21,22].

It was also observed that some children who experienced physical or verbal aggression during the study period presented traumatic dental injuries. However, this estimate may be underestimated due to feelings of fear or embarrassment among caregivers during the interview process, resulting in a potentially important information bias. The literature indicates that some of the most severe forms of traumatic dental injury are associated with physical violence, with the head and neck region being among the most frequently affected areas. The context of home confinement during the pandemic may have increased children's vulnerability to situations of violence, reinforcing the important role of dentists in identifying signs suggestive of child abuse [8,9,12].

In the present study, no association was found between traumatic dental injury and demographic or income-related variables. The literature remains inconclusive regarding the relationship between sociodemographic factors and traumatic dental injury. The variables most frequently investigated include maternal education, family income, age, and sex [21,22]. The absence of an association with traditional socioeconomic indicators, such as family income and maternal education, may reflect limitations of the study design, including the low variability of the sample, which was predominantly composed of socially vulnerable populations, or the limited discriminatory capacity of these isolated variables to capture more complex social inequalities. This finding highlights the need for analytical approaches that consider social determinants of health in an integrated and hierarchical manner.

Nevertheless, the present study identified a higher proportion of traumatic dental injury among Black and Brown children compared with children from other racial/ethnic groups. This finding should

not be interpreted from a biological or genetic perspective, as race/skin colour is not a direct causal factor for the occurrence of traumatic dental injuries. In the Brazilian context, Black children are more frequently exposed to conditions of social vulnerability, including poorer housing conditions, greater household crowding, and reduced access to healthcare services. Thus, traumatic dental injury emerges as a condition that is sensitive to social inequities rather than being exclusively an accidental event [23]. Accordingly, the association observed in this study should be understood within the framework of the social determinants of health, as an expression of health inequalities rather than an intrinsic characteristic of the child.

Additionally, although variables related to the pandemic context—including social isolation, increased screen time, reduced outdoor activities, and sleep disturbances—were included in the analyses, no statistically significant associations with traumatic dental injury were observed. This result may be interpreted from several perspectives. First, the measurement of these exposures relied on caregiver self-report, which may have introduced recall bias and misclassification [24]. Second, the sample's relative homogeneity with respect to these conditions—characterised by high adherence to social distancing measures and similar behavioural patterns—may have reduced the variability needed to detect meaningful differences. Furthermore, the effects of the pandemic on traumatic dental injury may have been indirect and mediated by factors not captured in the analytical model, such as changes in parental supervision, reorganisation of family routines, and characteristics of the home environment. Finally, the cross-sectional design limits the ability to establish temporal relationships between exposures and outcomes, particularly within a dynamic context such as the COVID-19 pandemic. These considerations suggest that the absence of statistically significant associations should not be interpreted as evidence of no effect, but rather as a reflection of potential limitations in the measurement and modelling of these variables.

Overall, the findings of this study reinforce the notion that traumatic dental injury in preschool children is a multifactorial condition involving individual, clinical, behavioural, and contextual factors. Although the prevalence observed was lower than that reported in some previous studies, it remains clinically and epidemiologically relevant. It should be interpreted within the context of the COVID-19 pandemic, a period marked by substantial changes in children's daily routines, social environments, and access to healthcare services due to the suspension of routine outpatient care. The association observed between malocclusion and traumatic dental injury highlights the importance of occlusal characteristics as predisposing factors for trauma. Furthermore, findings related to age, sex, exposure to violence, and sociodemographic characteristics, although not statistically significant, revealed differences in the distribution of traumatic dental injury across groups, underscoring the complexity of the factors involved in this condition. These results reinforce the need for preventive and oral

healthcare strategies that integrate both clinical aspects and the broader social and family context in which children live.

Several limitations should be considered when interpreting these findings. Due to its cross-sectional design, with data collected at a single point in time, the study does not permit causal inference. It is limited to identifying associations and estimating point prevalence. In addition, self-reported information from parents or caregivers may be subject to recall bias. The low variability in the occurrence of some events within the study population, as well as the possibility of indirect effects not captured by the variables included in the analysis, may also have influenced the results. Furthermore, the use of a convenience sample and the specific geographic setting limit the generalizability of the findings to other populations.

Nevertheless, the results contribute to expanding current knowledge regarding traumatic dental injuries in preschool children and provide relevant evidence to support the local implementation of health promotion and disease prevention strategies. These findings may have positive implications for clinical practice, school-based interventions, and the development of oral health policies. They also highlight the need for intersectoral public policies committed to reducing the social inequalities observed within the study population.

Despite these limitations, the findings contribute to a broader understanding of traumatic dental injury as a multifactorial condition shaped by the interaction between clinical and contextual determinants. From a public health perspective, the results suggest that preventive strategies should extend beyond individual-level approaches to include actions that reduce social vulnerabilities, improve home and school environments, and expand access to oral healthcare services.

Conclusion

Between 2022 and 2023, the prevalence of traumatic dental injury among the preschool children evaluated was 18.55%. The maxillary primary central incisors (teeth 51 and 61) were the most frequently affected teeth, with tooth discolouration and enamel-limited fractures being the predominant types of injury. Multivariable analysis revealed statistically significant associations between the occurrence and severity of traumatic dental injury and Black race/skin colour (OR = 2.33; 95% CI: 1.22–4.44) and the presence of malocclusion (OR = 1.58; 95% CI: 1.01–2.46).

These findings reinforce the need for preventive measures to improve oral health among preschool children, particularly in school and home settings. The implementation of educational programs for parents, caregivers, and teachers is recommended, with a focus on fall prevention, the early recognition of traumatic dental injuries, and timely dental care-seeking behaviours. Furthermore, the importance of the early diagnosis and management of malocclusions should be emphasised, along with expanding access to pediatric oral healthcare services, while addressing the social

inequalities associated with this condition.

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Declaration of Conflicting Interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Written informed consent was obtained from all parents or legal guardians before participation, and assent was obtained from the children whenever appropriate. All procedures were conducted in accordance with the ethical standards of the institutional research committee and the principles of the Declaration of Helsinki.

Data Availability Statement

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

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