

Assessment of Oral Hygiene Status and Prevalence of Dental Caries and Traumatic Injuries to Anterior Teeth among Visually Impaired Children in Chennai City

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ABSTRACT

Aim: To assess the oral hygiene status and prevalence of dental caries and trauma to anterior teeth among visually impaired children in Chennai city. Settings and design—a cross-sectional study was conducted in institutionalized blind schoolchildren.

Materials and methods: A total of 130 children from two blind schools were selected based on the inclusion and exclusion criteria. Oral hygiene status was assessed using the oral hygiene index-simplified (OHI-S). Dental caries were assessed using decayed-missing-filled teeth (DMFT) and decayed, extracted due to caries, filled teeth (deft) index for permanent and primary dentition, respectively. Trauma to anterior teeth was assessed using Ellis and Davey classification. Statistical analysis used—all the data were analyzed using the Statistical Package for the Social Sciences (SPSS) software 20.0.

Results: The assessment of oral hygiene status showed that 54.6% of children had good oral hygiene, 45.4% had fair oral hygiene, and none had poor oral hygiene. The prevalence of dental caries in permanent and primary dentition was found to be 40 and 63.1%, respectively. The prevalence of trauma to anterior teeth was found to be 35.4%.

Conclusion: Primary prevention approaches should be taught to parents and school teachers for early intervention of oral health problems.

Keywords: Dental caries, Oral health status, Visually impaired children.

International Journal of Clinical Pediatric Dentistry (2023): 10.5005/jp-journals-10005-2509

INTRODUCTION

The demand for maintaining oral health is essential in children with special needs.¹ Visual impairment is a major special healthcare issue that needs to be considered.² The most common oral health problem suffered by visually impaired children are orofacial trauma, dental caries, and periodontal diseases, of which the main health hazard is orofacial trauma.² Visually impaired children cannot visualize the presence of debris and calculus. Visually impaired people are at higher risk of developing dental caries because they are not able to detect the signs of caries development, such as discoloration, which is the early indication of the disease process.³ Inadequate plaque removal leads to a higher prevalence of dental caries in their population.⁴ Furthermore, parents who lack knowledge regarding oral health fail to bring their children for regular dental check-ups.⁵ Dentists play an important role in attending to the concern and needs of visually impaired children and providing adequate dental care.

MATERIALS AND METHODS

A cross-sectional study was conducted to assess the prevalence of oral hygiene status, dental caries, and traumatic injuries to anterior teeth among visually impaired children in Chennai City Corporation. The source of data regarding the number of schools for blind children was obtained from "Welfare of the differently abled—Tamil Nadu." Based on the inclusion and exclusion criteria, two schools were selected. G*Power statistical software was used to estimate the sample size.

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How to cite this article: Kannappan J, Srinivasan D, Chiriyankandath JL, et al. Assessment of Oral Hygiene Status and Prevalence of Dental Caries and Traumatic Injuries to Anterior Teeth among Visually Impaired Children in Chennai City. *Int J Clin Pediatr Dent* 2023;16(1):93–96.

Source of support: Nil

Conflict of interest: None

Visually impaired children of age-groups 6–12 years of both sexes with no other systemic impairments were included in the present study. Hearing-impaired and speech-impaired children, medically compromised children, physically/mentally challenged children, and children not cooperating with examinations were excluded.

The approval was granted by the Institutional Human Ethics Committee to conduct the study. The study was explained to the school authorities, and permission was obtained. Details of the examination to be performed were informed to the legally accepted representative of the child, and informed consent was obtained. Strict confidentiality was maintained throughout the study.

A schedule for data collection, along with clinical examination, was prepared. The examinations were carried out in the institutionalized blind school. Demographic details were obtained from the school records. Visually impaired children were gathered in a classroom and were allowed to sit on a chair in a comfortable position where sufficient natural daylight was available. The picture describing the examination was painted in the minds of visually impaired children before the examination. Each child was then examined individually for oral hygiene status, dental caries, and trauma to anterior teeth by a single examiner.

Oral hygiene status was assessed using OHI-S given by Greene and Vermilion. Dental caries was assessed using the DMFT index for the permanent dentition and the deft index for the primary dentition. Traumatic injuries to anterior teeth were assessed using Ellis and Davey's classification (1970). All the data were entered on a standard proforma. All the children received oral hygiene instructions through the Touch-Feel-Do technique using a dental model and toothbrush. Statistical analysis was performed using the SPSS IBM version 20.0.

RESULTS

The oral hygiene status across different age-groups revealed that 56.1, 63.6, and 48.2% had good oral hygiene status among 6–7, 8–9, and 10–12 years, respectively. None of the study participants had poor oral hygiene. There was no significant difference in oral hygiene across the different age-groups and between the genders (Table 1).

The dental caries prevalence in permanent dentition was 40%. The prevalence of dental caries in permanent teeth among the 6–7-year age group was lesser (12.2%) as compared to the 8–9 years (45.5%) and 10–12 years (57.1%) age-groups, respectively. In the 6–7-year age group, 87.8% of children were free

from caries, which gradually decreased as the age advanced, with many 54.5 and 42.9% of children remaining caries-free at 8–9 years and 10–12 years age group, respectively. The difference in the prevalence of caries in permanent dentition between the age-groups was statistically significant ($p < 0.001$) (Table 2).

The prevalence of caries in primary dentition was 63.1%. The prevalence of carious lesions in primary teeth was 90.2, 93.9, and 25% among children in 6–7, 8–9, and 10–12 years, respectively. Only 9.8% of children in 6–7 years and 6.1% of children in 8–9 years were found to be having caries-free primary dentition, whereas 75% of children in 10–12 years were found to be caries-free. A statistically significant difference was observed in the caries status of primary dentition across the different age-groups ($p < 0.001$) (Table 3).

The mean DMFT score was 0.57 ± 0.80 . The decayed component and missing teeth component accounted for 98.6 and 1.4% of the total DMFT value of study participants, respectively. The filled component was nil. The mean deft score was 1.13 ± 1.11 . The major contribution to the total deft value was from the decayed component (99.3%). Extracted and filled teeth component contribution to deft score were 0.7 and 0%, respectively (Table 4).

The prevalence of traumatic dental injuries to anterior teeth was 35.4% ($n = 46$). Across age-groups, the prevalence of traumatic dental injuries to anterior teeth was 29.3, 27.3, and 44.6% among children in 6–7 years, 8–9 years, and 10–12 years, respectively (Table 5).

DISCUSSION

Visually impaired children are enrolled in institutionalized school from standard I, which corresponds to 6 years of age. The occurrence of dental caries in permanent dentition is related to the various status of the primary dentition. Thus, age-groups of 6–12 years

Table 1: Assessment of oral health status

		Oral health status across the age-groups			Chi-square	p-value
		6–7 years	8–9 years	10–12 years		
OHI-S Interpretation	Oral hygiene status	n (%)	n (%)	n (%)		
0.1–1.2	Good	23 (56.1)	21 (63.6)	27 (48.2)	1.3–3.0	Fair
18 (43.9)	12 (36.4)	29 (51.8)	3.1–6.0	Poor	0 (0)	0 (0)
0 (0)	Total		41 (100)	33 (100)	56 (100)	

Table 2: Prevalence of caries in permanent dentition across the age-groups

Age group	No. of children examined	Children free of caries		Children with caries		Chi-square	p-value
		n (%)	n (%)	n (%)	n (%)		
6–7 years	41	36 (87.8)	5 (12.2)	5 (12.2)	20.74	<0.001	
8–9 years	33	18 (54.5)	15 (45.5)	15 (45.5)			
10–12 years	56	24 (42.9)	32 (57.1)	32 (57.1)			
Total	130	78 (60)	52 (40)	52 (40)			

Table 3: Prevalence of caries in primary dentition across the age-groups

Age-group	No. of children examined	Children free of caries		Children with caries		Chi-square	p-value
		n (%)	n (%)	n (%)	n (%)		
6–7 years	41	4 (9.8)	37 (90.2)	37 (90.2)	61.35	<0.001	
8–9 years	33	2 (6.1)	31 (93.9)	31 (93.9)			
10–12 years	56	42 (75)	14 (25)	14 (25)			
Total	130	48 (36.9)	82 (63.1)	82 (63.1)			

Table 4: Distribution of DMFT and deft

Age group	Total DMFT score	DMFT			Mean DMFT score	Deft			Mean deft score	
		D n (%)	M n (%)	F n (%)		d n (%)	m n (%)	f n (%)		
6–7 years	5	5 (100)	0 (0)	0 (0)	0.12 ± 0.33	75	75 (100)	0 (0)	0 (0)	1.83 ± 1.07
8–9 years	19	19 (100)	0 (0)	0 (0)	0.58 ± 0.70	53	53 (100)	0 (0)	0 (0)	1.58 ± 0.93
10–12 years	50	49 (98)	1 (2)	0 (0)	0.89 ± 0.94	23	22 (95.7)	1 (4.3)	0 (0)	0.36 ± 0.69
Total	74	73 (98.6)	1 (1.4)	0 (0)	0.57 ± 0.80	151	150 (99.3)	1 (0.7)	0 (0)	1.13 ± 1.11

D, decay in permanent teeth; M, missing in permanent teeth; F, filling in permanent teeth; T/t-permanent/primary teeth; d, decay in primary teeth; m, missing in primary teeth; f, filling in primary teeth

Table 5: Prevalence of traumatic dental injuries

Age group	No. of children examined	Prevalence of traumatic dental injuries across the age-groups					
		No trauma		Presence of trauma		Chi-square	p-value
		n	%	n	%		
6–7 years	41	29	70.7	12	29.3	3.70	0.15
8–9 years	33	24	72.7	9	27.3		
10–12 years	56	31	55.4	25	44.6		
Total	130	84	64.6	46	35.4		

comprising both dentitions were selected. Luxation injuries are common in primary dentition due to the cancellous nature of alveolar bone, whereas crown fractures are more frequent in permanent teeth due to dense alveolar bone. Thus, a mixed dentition period comprising both the dentition was selected.

The result of the present study regarding overall oral hygiene was similar to Ajami et al., but in contrast to Ahmad et al. in 2009.^{6–9} The acceptable oral hygiene status in these children could be due to the supervision of caregivers on routine oral hygiene procedures enforced by the institution. It was observed that the male children had separate personnel to supervise during brushing to guide them to the brush. This emphasizes the role of supervised brushing, which could improve the oral hygiene status of these children.

There were a greater number of children in the 6–7 years age group who were caries-free when compared to other age-groups in this study. There was an increasing trend in the caries prevalence in permanent dentition as the age advanced which may be due to a greater number of erupted permanent teeth in the 10–12 years age group compared to nil or fewer permanent teeth erupted in 6–7 years age-group and 8–9 years age-group. The prevalence of dental caries in permanent dentition was found to be 40%. The results of the study were similar to Suresan et al. and Parkar et al.^{6–10} The result was in contrast to Singh et al.¹¹ The difference in prevalence could be due to the inclusion of a wider age range in their study population. The implementation of oral hygiene measures in visually impaired children during their preschooling period could have been questionable. This could be the reason for the increased caries prevalence in primary teeth.

The mean DMFT score of the study population was 0.57 ± 0.80. The result of the present study was similar to Prashanth et al. in 2011 (0.6) and Tagelsir et al. in 2013 (0.4 ± 0.7).^{3,9} The mean deft score of the study population was 1.13 ± 1.11. The result of the present study was similar to Singh et al. (1.87).¹¹

The prevalence of traumatic dental injuries to anterior teeth in the present study was found to be 35.4%. It was similar to Agrawal et al. in 2013 (34.95%), Ramaiah et al. in 2014 (37.5%), and Munot et al. in 2017 (39%).^{8–14} The prevalence of the present study was in contrast to Suresan et al. (4.62%) and Shyama et al. (24.6%).^{6,13} The

higher prevalence of tooth fracture in the children of the 10–12 years age group could be that children at this age will start to engage themselves more independently without supervision which might cause more personal harm.^{15,16}

The wide variation in the prevalence of trauma could be because of various factors like trauma classification used, age of children examined, total blind vs partial blind children, behavioral differences, and geographical and social variations. The major risk factors for trauma, such as increased overjet, inadequate lip coverage, and other related malocclusions, have not been accounted for in the present study. Visually impaired children cannot save themselves from the impact of falls. The inherent anxiety for an accessible infrastructure and fear of dental treatment could prevent visually impaired children from approaching the dentist. Therefore, buildings and infrastructure should be made especially children-friendly. The use of the ramp, wayfinder, tactile cues, and barrier-free design could help visually impaired children to navigate easily. Primary prevention approaches should be taught to school teachers and parents for early intervention of oral health problems. Braille pamphlets and audio instructions can be provided to help them maintain oral hygiene. The educational program should include the importance of primary and permanent teeth, brushing techniques, diet counseling, space maintainers, trauma management, various preventive measures available, treatment for dental caries, fluoride supplementation, application of pit and fissure sealants, and finally, motivation towards proper oral health care. The dental care for the visually impaired individual should be limited to a single dentist for good rapport and communication. Providing dental care to these children should be a community service by dental professionals.

DISCLOSURE

This article is a part of the author's (Jayanthi K) dissertation titled "Assessment of Oral Hygiene Status and Prevalence of Dental Caries, Trauma to Anterior Teeth among Visually Impaired Children in Chennai city," archived in the "The Tamil Nadu Dr MGR Medical University" repository (<http://repository-tnmgrmu.ac.in/14509/>).

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