



Original Article

Dental Problems and Oral Hygiene Practices among School-going Children in Northeastern Rajasthan; An Observational Cross-Sectional Study

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Received: 10-05-2026

Accepted: 05-06-2026

Available online: 17-07-2026

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ABSTRACT

Background: Dental problems are highly prevalent among school-aged children and are influenced by inadequate oral hygiene practices, poor awareness and limited access to dental care services.

Aim: Study aimed to assess dental problems and oral hygiene practices among school going children.

Methodology: A descriptive cross-sectional study was conducted among 300 school going children from class 1st to 5th students of government and private schools of northeastern Rajasthan. Children were selected via simple random sampling from 7 government and 4 private schools. Pre-tested interview-based questionnaire with clinical oral examination for data collection.

Results: Among 300 children, 162 (54%) were males and 150 (50%) belongs to Socio-economic class IV. Only 120 (40%) cleaned their teeth regularly. Prevalence of dental caries, periodontal disease, gingival bleeding and malocclusion was 141 (47%), 94 (31.33%), 32 (10.67%) and 26 (8.67%) respectively. Study founded that dental problems were significantly associated with teeth-cleaning practices ($p < 0.001$). Government school students had higher prevalence of dental problems compared to private school students, which were statistically significant ($p < 0.05$).

Conclusion: Children's having poor dental hygiene practices had significantly higher dental caries, periodontal disease and gingival bleeding. Government school students had statistically higher burden of oral morbidities than private schools. Health education activities and oral screening camps can be regularly planned at school level to reduce disease burden.

Keywords: Dental problem, Oral Hygiene, School going children, Observational study, Rajasthan.

INTRODUCTION

Oral diseases are among the most common non-communicable diseases worldwide and remain a major public-health challenge. Global analyses estimate that nearly 3.7 billion people were affected by some form of oral disease in 2021 and untreated dental caries (in primary and permanent teeth) is the most frequent condition contributing to this burden, underlining persistent gaps in prevention and access to care.(1,2)

World Health Organization South-East Asia Region (SEAR) action plan and regional oral-health profiles estimate an age-standardized prevalence of main oral diseases of approximately 50%, with more than 900 million cases of untreated caries, severe periodontal disease and edentulism estimated in the region figures that point to large unmet needs in prevention, early detection and treatment.(3,4)

Within India, systematic reviews and pooled analyses report consistently high prevalence of dental caries among children and adolescents. A national meta-analysis estimated an overall dental caries prevalence of around 52% among 3–18 year-olds and approximately 54% overall across age groups, with notable regional variation (higher prevalence in some western and rural areas). These reviews also document frequent untreated disease and low utilization of dental services among children.(5,6)

State-level and district-level studies from Rajasthan mirror national findings. Recent school-based surveys in north-west Rajasthan (for example, Bikaner and Churu districts) reported caries prevalence in the 40–50% range among children, alongside low rates of twice-daily brushing, limited dental-service use and higher disease burden in government school attendees compared with private school peers.(7,8) These local studies illustrate intra-state inequalities and reinforce the need for place-based data to guide interventions in rural field practice areas.

Despite national policies such as India's National Oral Health Programme (NOHP) that emphasize school-based preventive services and community education, implementation in many rural settings remains inconsistent, leading to continued high prevalence, poor oral-hygiene practices and low treatment coverage among schoolchildren.(9) School screening, supervised tooth-brushing programs and regular referral pathways are therefore critical but often under-resourced in rural primary-care outreach settings.

Taken together global, regional, national and Rajasthan state evidence indicates a consistently high burden of dental caries and other oral conditions among children, widespread deficits in preventive practices and inequitable access to dental care. This study provides local prevalence estimates and oral-hygiene behavior data for 1st to 5th class children in northeastern Rajasthan area, therefore provide essential, actionable evidence to plan targeted school-based oral-health promotion, screening and referral where national policy goals are not yet fully implemented.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted from March 2024 to August 2024 at field practice area of Rural Health Training Center of a medical college at northeastern Rajasthan.

Objectives: To estimate the prevalence of dental problems and assess oral hygiene practices among Class 1st to 5th school children studying in government and private schools.

Inclusion and exclusion criteria: Students who were present during the school visit and whose consent obtained from their guardians or class teachers were included, while children who were non-cooperative or had a history of serious illness were excluded from the study.

Sample size: Calculated based on a reported prevalence of 77.4% dental health problems among school-going children in the study by Reddy ER et al.(10) and using a 95% confidence level, 5% allowable error, and $\alpha = 0.05$, a minimum sample size of 270 was calculated, and a rounded sample size of 300 students was selected for the study.

Sampling method: Simple random sampling was used to select 11 schools (7 governments and 4 private) from the list of schools in the RHTC field practice area and all eligible children from Classes 1st to 5th in these schools were screened.

Data collection and Analysis: Data were collected using a pretested, interview-based questionnaire to assess oral hygiene practices and a clinical examination to identify dental problems. Data were analyzed using descriptive statistics, including frequency, percentage, mean and standard deviation. Inferential statistics included the Chi-square test for testing association between categorical variables.

RESULTS:

Among the 300 children, the majority 147 (49%) were in the 7–9 years age group. Males 162 (54%) constituted a higher proportion than females 138 (46%). Most participants belonged to the Hindu religion 290 (96.67%). Table 1 shows that large proportion of children was from joint families 207 (69%) and the most common was Scheduled Tribe caste 92 (30.67%). Regarding parental education, the majority of mothers had primary school education 91 (30.33%), while most fathers had middle school education 79 (26.34%). In terms of socio-economic status, half of the participants belonged to Class IV 150 (50%) as per the updated BG Prasad scale.

Table:1 Socio-demographic profile of study participants (n = 300)

S. no.	Socio-demographic characteristics	Frequency (%)
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1	Age group (in years)	4 to 6	72 (24%)
		7 to 9	147 (49%)
		10 to 12	81 (27%)
2	Sex	Male	162 (54%)
		Female	138 (46%)
3	Religions	Hindu	290 (96.67%)
		Muslim	10 (3.33%)
		Others	0 (0.00%)
4	Family Type	Nuclear	84 (28%)
		Joint	207 (69%)
		Three Generation	9 (3%)
5	Caste	GEN	76 (25.33%)
		SC	64 (21.33%)
		ST	92 (30.67%)
		OBC	68 (22.67%)
6	Mother's Education Status	Graduate or upper education	7 (2.33%)
		Senior Secondary school certificate	22 (7.33%)
		Secondary school certificate	50 (16.67%)
		Middle school certificate	87 (29%)
		Primary school certificate	91 (30.33%)
		Illiterate	43 (14.34%)
7	Father's Education Status	Graduate or upper education	25 (8.33%)
		Senior Secondary school certificate	57 (19%)
		Secondary school certificate	60 (20%)
		Middle school certificate	79 (26.34%)
		Primary school certificate	63 (21%)
		Illiterate	16 (5.33%)
8	Socio-economic Status (Updated BG Prasad Scale-October 2023)	Class I	1 (0.33%)
		Class II	28 (9.33%)
		Class III	59 (19.67%)
		Class IV	150 (50%)
		Class V	62 (20.67%)
9	Type of School	Government	140 (46.67%)
		Private	160 (53.33%)

Figure 1 shows prevalence of dental problems in children. Among 300 children dental caries was present in 141 (47%) children, Periodontal disease was observed in 94 (31.33%), Gingival bleeding in 32 (10.67%) while only 26 (8.67%) children having malocclusion, this distribution was statistically significant($p < 0.001$).

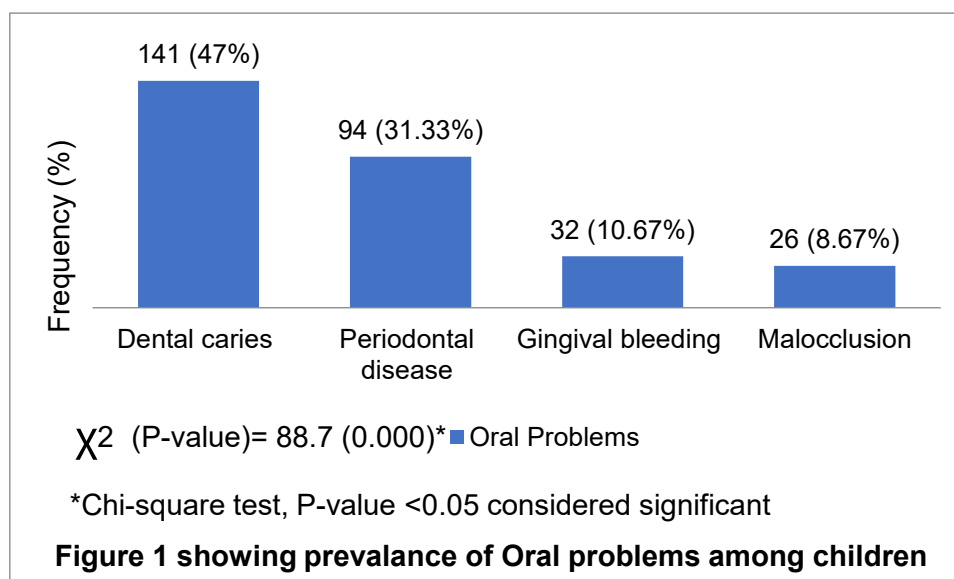
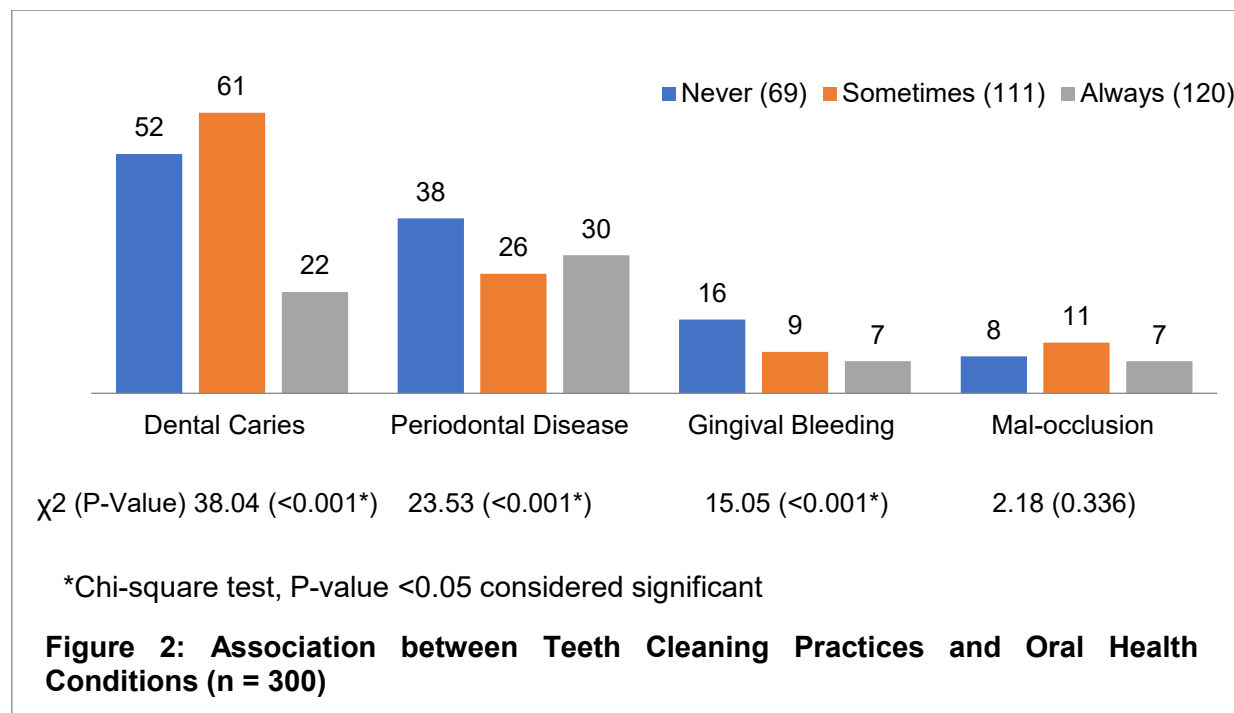


Figure 2 shows that dental caries was present in 52 (75.36%) participants who never cleaned their teeth, 61 (54.95%) who cleaned sometimes and 22 (18.33%) that always cleaned their teeth, showing a statistically significant association with teeth-cleaning practices ($p < 0.001$). Periodontal disease was observed in 38 (55.07%) of those who never cleaned, 26 (23.42%) of those who cleaned sometimes and 30 (25.00%) of those who always cleaned their teeth, with a significant association ($p < 0.001$). Gingival bleeding observed in 16 (23.18%) participants who never cleaned, 9 (8.10%) who cleaned sometimes and 7 (5.83%) who always cleaned their teeth, and this association was statistically significant ($p < 0.001$). Malocclusion was found in 8 (11.60%), 11 (9.90%) and 7 (5.83%) participants in the never, sometimes, and always cleaning groups respectively, with no statistically significant association ($p = 0.336$).



Gender wise distribution of Dental and Periodontal Morbidity showing in table 2. According to that dental caries was observed in 64 (39.51%) males and 71 (51.45%) females, with a higher prevalence among females. Gingivitis was present in 13 (8.02%) males and 19 (13.77%) females. Periodontal disease affected 53 (32.72%) males and 41 (29.71%) females. Malocclusion was found in 15 (9.26%) males and 11 (7.97%) females. These differences were not statistically significant ($p > 0.05$).

Table 2: Gender wise distribution of Dental and Periodontal Morbidity among study participants				
Category	Status	Male No. (%) (Out of 162)	Female No. (%) (Out of 138)	χ^2 (P-value)
Dental Caries	Yes	64 (39.51%)	71 (51.45%)	2.961 (0.085)
	No	93 (57.41%)	67 (48.55%)	
Gingivitis	Yes	13 (8.02%)	19 (13.77%)	2.012 (0.156)
	No	149 (91.98%)	119 (86.23%)	
Periodontal Disease	Yes	53 (32.72%)	41 (29.71%)	0.189 (0.664)
	No	109 (67.28%)	97 (70.29%)	
Malocclusion	Yes	15 (9.26%)	11 (7.97%)	0.036 (0.85)
	No	147 (90.74%)	127 (92.03%)	
*Chi-square test, p value <0.05 considered as significant				

As per Table 3 Government school students exhibited a significantly higher burden of oral morbidities compared to private school students. As dental caries affecting 76 (54.29%) students of government schools and 59 (36.87%) among private school students, gingival bleeding was 29 (20.71%) and 3 (1.87%), periodontal disease 73 (52.14%) and 21 (13.13%) and malocclusion 19 (13.57%) and 7 (4.38%), respectively, these differences were statistically significant ($p < 0.05$).

Table 3: Distribution of Dental and Periodontal Morbidity among study participants according to type of school				
Types of School	Dental Caries No. (%)	Gingival Bleeding No. (%)	Periodontal Disease No. (%)	Malocclusion No. (%)

Government (n = 140)	76 (54.29%)	29 (20.71%)	73 (52.14%)	19 (13.57%)
Private (n = 160)	59 (36.87%)	3 (1.87%)	21 (13.13%)	7 (4.38%)
Total (n = 300)	135 (45%)	32 (10.87%)	94 (31.34%)	26 (8.67%)
χ^2 (P-value)	8.455 (0.004*)	25.869 (0.000*)	51.035 (0.000*)	6.858 (0.009*)
*Chi-square test, p value <0.05 considered as significant				

The present study demonstrated a substantial burden of oral morbidities among school children, with dental caries prevalence of 47%, periodontal disease 31.33%, and malocclusion 8.67%.

A study conducted in Udaipur district, Rajasthan by Dhar V. et al.(11) among school children aged 5–14 years reported a dental caries prevalence of 46.75%, which is comparable to the findings of the present study. However, another study by Sharda J. et al.(12) from Udaipur among 12–13-year-old children reported a significantly lower dental caries prevalence of 18.9%, indicating variability across age groups and populations.

Study reported a prevalence of 31.33% periodontal conditions which is considerably lower than findings of study conducted by Dhar V. et al.(13) in Udaipur, where gingival disease was observed in 84.37% of children. This difference may be due to variations in diagnostic criteria, age distribution and oral hygiene practices among study populations.

Study showed a prevalence of malocclusion 8.67%, which is much lower compared to studies conducted in Udaipur by Dhar V. et al.(13) reported malocclusion prevalence of 36.42% among school children, while study Tak M. et al.(14) found prevalence around 33.3% in 12–15-year-old children, which was differ from our findings. Additionally, Dhar V. et al.(15) study of rural Udaipur have emphasized a high burden of untreated dental caries and significant treatment needs among children.

Oral hygiene practices showed a strong and statistically significant association with oral morbidities in the present study. Dental caries prevalence was markedly higher among children who never cleaned their teeth (75.36%) compared to those who cleaned sometimes (54.95%) and those who always cleaned their teeth (18.33%) ($p < 0.001$). This finding highlights the critical role of regular oral hygiene in preventing dental caries.

These findings are consistent with studies conducted in Rajasthan. Study by Sharda J. et al.(12) in Udaipur demonstrated a significant association between oral hygiene practices and dental caries, where children with poor brushing habits had higher caries prevalence. Similarly, research by Dhar V. et al.(13) reported that inadequate oral hygiene practices were strongly associated with both dental caries and periodontal diseases among school children in rural Udaipur.

Study from rural Rajasthan by Dhar V. et al.(15) further supported these findings, showing that children with poor or absent oral hygiene practices had a high burden of untreated dental caries and increased treatment needs.

Study reveals that only 40% of children reported regular tooth cleaning and the majority brushed once daily, mainly in the morning, indicating suboptimal oral hygiene practices. Similar patterns have been reported in study by Sharda J. et al.(12), where inadequate frequency of tooth brushing was associated with poorer oral health outcomes among school children.

Study revealed no statistically significant association between gender and the prevalence of dental caries, gingivitis, periodontal disease, or malocclusion. This finding is consistent with study by Dhar V. et al.(13) conducted in Rajasthan, where no significant gender differences were observed in oral disease prevalence among school children.

The present study demonstrated that government school students exhibited a significantly higher burden of oral morbidities compared to private school students, including dental caries (54.29% Vs 36.87%), gingival bleeding (20.71% Vs 1.87%), periodontal disease (52.14% Vs 13.13%), and malocclusion (13.57% Vs 4.38%) ($p < 0.05$). These results are consistent with study by Singh N et al.(16) in Kanpur reported significantly higher dental caries prevalence among government school children (63.1%) compared to private school children (56.9%), along with a higher prevalence of gingivitis in government school students ($p < 0.05$). Similarly, a study conducted in Bharatpur by Ingle NA et al.(8) reported dental caries prevalence of 53% in government schools versus 47% in private schools, with significantly higher DMFT scores among government school students. More other studies by Sukhabogi JR et al.(17), Kulkarni et al.(18) and Singh A et al.(19) aligns closely with the present study, where government school children showed a higher caries burden.

CONCLUSION

In our study majority of school students belongs to male gender, 7-9 years age group, Hindu religion, from joint families and Class IV SES as per Modified BG Prasad classification. Children who never cleaned their teeth had approximately four times higher dental caries, over twice the periodontal disease and nearly three times more gingival bleeding compared to those who always cleaned their teeth which is statistically significant, while malocclusion showed no significant difference across hygiene practices. Females exhibited higher burden of gingivitis and dental caries while males shows higher burden of periodontal disease and malocclusion which is statistically non-significant. Government school students

demonstrated a markedly higher burden of oral morbidities than private school students, with about one and a half times more dental caries, around four times higher periodontal disease, over ten times greater gingival bleeding and three times higher burden of malocclusion which is statistically significant. The markedly higher burden of oral diseases among government school students underscores socioeconomic and access-related disparities in oral health.

Recommendations

The findings highlight that inadequate oral hygiene practices substantially increase the risk of dental caries, periodontal disease and gingival bleeding among school-going children's. Present findings corroborate existing regional and national evidence that dental caries, periodontal disease, inadequate oral hygiene practices and low dental service utilization remain prevalent among rural school children. These results emphasize the need for early, school-based oral health education, regular dental screening, and targeted preventive interventions, particularly for children with poor hygiene practices and those attending government schools, to reduce preventable oral disease burden.

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