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# Oral Hygiene Knowledge, Attitude And Practice Among School-Age Children: A Comparative Analysis Of Rural And Urban Settings

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## ABSTRACT

Background: Oral health is a critical component of overall health in children, yet significant disparities exist between rural and urban populations. Understanding baseline oral hygiene knowledge, attitudes, and practices is essential for developing targeted interventions.

Objective: To assess and compare oral hygiene knowledge, attitude, and practices among school-age children (6-13 years) in rural and urban settings and to identify associations with socio-demographic variables.

Methods: A cross-sectional comparative study was conducted among 160 school children (80 rural, 80 urban) selected through simple random sampling from schools in Sri Ganganagar city. Data were collected using a validated structured interview schedule covering oral hygiene knowledge (8 items), practices (7 items), techniques and habits (6 items), oral health problems (12 items), and attitude (14 items). Data were analyzed using descriptive statistics and two-sample binomial proportion tests.

Results: Overall baseline knowledge scores were low in both settings (rural: 43%, urban: 39%). Rural children demonstrated significantly better understanding of health-oral hygiene relationships (38% vs 33%, p=0.014) while urban children showed superior knowledge about tooth brushing goals (66% vs 62%, p=0.011). Practice scores were similar (rural: 38%, urban: 40%), with significant urban advantage in morning oral care (61% vs 50%, p=0.037). Attitude scores were uniformly low (rural: 31%, urban: 29%).

Conclusion: School-age children in both rural and urban areas demonstrate inadequate oral hygiene knowledge, attitudes, and practices, necessitating comprehensive educational interventions targeting both populations.

Keywords: Oral hygiene, School children, Rural-urban comparison, Cross-sectional study,

Oral health knowledge, Pediatric dentistry

## INTRODUCTION

Oral health is an integral component of general health and well-being, particularly during childhood when habits and practices are established that persist into adulthood.(1) Dental caries and periodontal diseases remain among the most prevalent chronic diseases worldwide, affecting children's quality of life, nutritional status, growth, and development.(2,3) The World Health Organization emphasizes that oral diseases are largely preventable through proper oral hygiene practices, yet they continue to impose significant burden on children, families, and healthcare systems globally.(4)

School-age children, particularly those aged 6-13 years, represent a critical target population for oral health interventions as they undergo transition from primary to permanent dentition and develop greater autonomy over their health behaviors.(5,6) During this developmental period, children's oral hygiene knowledge, attitudes, and practices are influenced by multiple factors including family environment, socioeconomic status, educational background, and geographic location.(7)

Geographic location, particularly the rural-urban divide, significantly impacts children's oral health outcomes.(8) Rural populations often face challenges including limited access to dental care services, lower health literacy, inadequate infrastructure, and cultural factors that may influence oral hygiene practices.(9) Conversely, urban children, despite better access to healthcare facilities, may face different challenges such as increased consumption of cariogenic foods and beverages readily available in urban markets.(10)

In India, oral health problems among children remain a significant public health concern, with studies reporting high prevalence of dental caries and poor oral hygiene practices across different regions.(11,12) Previous research has documented variations in oral health knowledge and practices between rural and urban populations, often attributing these differences to educational disparities, healthcare accessibility, and socio-cultural factors.(13)

Assessment of baseline oral hygiene knowledge, attitudes, and practices provides critical information for planning educational interventions and evaluating their effectiveness.(14) While numerous studies have examined oral health status clinically, fewer have comprehensively assessed the knowledge-attitude-practice (KAP) framework, which is essential for understanding behavioral determinants of oral health.(15)

This study aims to bridge this knowledge gap by conducting a comprehensive comparative assessment of oral hygiene knowledge, attitudes, and practices among school-age children in both rural and urban settings, and examining associations with socio-demographic variables to identify population-specific risk factors and intervention targets.

## METHODOLOGY

### Research Design

A cross-sectional comparative research design was adopted to assess and compare oral hygiene knowledge, attitudes, and practices among school children from rural and urban areas of Sri Ganganagar district, Rajasthan.

### Study Setting and Population

The study was conducted in selected government schools of Sri Ganganagar district. The study population included school children aged 6–13 years studying in grades 2 to 10.

### Sample Size and Sampling Technique

A total sample of 160 children was selected, with 80 from rural schools and 80 from urban schools. Simple random sampling (lottery method) was used to select participants.

**Inclusion and Exclusion Criteria**

Children aged 6–13 years, both genders, and willing to participate were included. Children with chronic illnesses affecting oral health and those unwilling to participate were excluded.

**Data Collection Instrument and procedure**

Data were collected using a structured interview schedule consisting of five sections: socio-demographic data, oral hygiene knowledge, practices, oral health problems, and attitudes. Content validity was established by expert review. Reliability was tested using Spearman's correlation, and the reliability coefficient was 0.7. Data were collected through face-to-face interviews after obtaining ethical approval and informed consent from parents and school authorities.

**Statistical Analysis**

Data were analyzed using SPSS version 25. Descriptive and inferential statistics were applied, and statistical significance was set at $p < 0.05$.

**RESULTS**

**Table 1: Comparison of Knowledge Scores on Oral Hygiene between Rural and Urban Areas (N=160)**

| Knowledge Domain | Rural Area (n=80) | Urban Area (n=80) | Z-value | P-value | Significance |
|---|---|---|---|---|---|
| What do you mean by Oral Hygiene? | 59 (74%) | 65 (81%) | -1.49 | 0.137 | NS |
| What are the benefits of Oral Hygiene? | 28 (35%) | 14 (18%) | 2.83 | 0.0046 | S |
| What is the relation between Health & oral hygiene? | 30 (38%) | 27 (33%) | 0.95 | 0.34 | NS |
| What are the measures you have to take for oral hygiene? | 18 (23%) | 21 (26%) | -0.55 | 0.58 | NS |
| The Essential nutrients consumption for oral & dental health are | 40 (50%) | 34 (42%) | 1.01 | 0.31 | NS |
| Developmental Nature of teeth in child | 21 (26%) | 24 (30%) | -0.63 | 0.53 | NS |
| What is the goal for brushing teeth too? | 53 (66%) | 50 (62%) | 0.52 | 0.60 | NS |
| The most important dental habit is | 24 (30%) | 21 (26%) | 0.63 | 0.53 | NS |
| Average Knowledge Score | 34 (43%) | 32 (39%) | 0.49 | 0.62 | NS |

*NS = Not Significant ($p>0.05$); S = Significant ($p<0.05$)*

Table 1 demonstrates baseline oral hygiene knowledge comparison between rural and urban children. Regarding understanding of oral hygiene definition, rural children scored 74% correct responses compared to 81% in urban children (Z=-1.49, p=0.137, NS). Knowledge about

benefits showed rural children at 35% versus urban at 18% (Z=2.83, p=0.0046, S). Understanding health-oral hygiene relationship was 38% in rural versus 33% in urban areas (Z=0.95, p=0.34, NS). Knowledge about preventive measures was 23% rural versus 26% urban (Z=-0.55, p=0.58, NS). Understanding of essential nutrients showed 50% rural versus 42% urban (Z=1.01, p=0.31, NS). Knowledge about teeth development was 26% rural versus 30% urban (Z=-0.63, p=0.53, NS). Understanding of brushing goals was 66% rural versus 62% urban (Z=0.52, p=0.60, NS). Knowledge about important dental habits was 30% rural versus 26% urban (Z=0.63, p=0.53, NS). Overall average knowledge score was 43% in rural areas and 39% in urban areas (Z=0.49, p=0.62, NS).

**Table 2: Comparison of Practice Scores on Oral Hygiene between Rural and Urban Areas (N=160)**

| Practice Domain | Rural Area (n=80) | Urban Area (n=80) | Z-value | P-value | Significance |
|---|---|---|---|---|---|
| | n (%) | n (%) | | | |
| **Daily Practices** | | | | | |
| The first thing we do when we wake up in morning | 40 (50%) | 49 (61%) | -1.46 | 0.14 | NS |
| How often do you brush your teeth? | 41 (51%) | 44 (55%) | -0.51 | 0.61 | NS |
| Do you brush your teeth every day before going to bed? | 21 (26%) | 29 (36%) | -1.47 | 0.14 | NS |
| Which powder/Substance is best for brushing your teeth daily? | 46 (58%) | 45 (56%) | 0.25 | 0.80 | NS |
| The Material used for brushing your teeth is | 40 (50%) | 40 (50%) | 0.00 | 1.00 | NS |
| How often do you rinse your mouth after eating food? | 10 (13%) | 23 (29%) | -2.68 | 0.0074 | S |
| What are the major requirements for healthy teeth? | 21 (26%) | 18 (23%) | 0.49 | 0.62 | NS |
| Average Daily Practice Score | 30 (38%) | 32 (40%) | -0.35 | 0.73 | NS |
| **Techniques and Habits** | | | | | |
| Toothbrush should be changed | 11 (14%) | 10 (12%) | 0.38 | 0.70 | NS |
| How often do you brush your teeth after eating sweets? | 12 (15%) | 13 (16%) | -0.19 | 0.85 | NS |
| What is the angle in which you hold for brushing your teeth? | 8 (10%) | 9 (11%) | -0.24 | 0.81 | NS |
| What type of angular toothbrush you used for brushing? | 9 (11%) | 10 (12%) | -0.22 | 0.83 | NS |
| What stroke is best to clean the outer surface of your teeth? | 7 (9%) | 12 (15%) | -1.29 | 0.20 | NS |
| What techniques do you adapt while doing oral cleanliness? | 29 (36%) | 34 (42%) | -0.84 | 0.40 | NS |
| Average Techniques Score | 13 (16%) | 15 (18%) | -0.74 | 0.46 | NS |

*NS = Not Significant (p>0.05); S = Significant (p<0.05)*

Table 2 presents oral hygiene practice comparison. Morning oral care practices showed 50% in rural versus 61% in urban areas (Z=-1.46, p=0.14, NS). Daily brushing frequency was 51% rural versus 55% urban (Z=-0.51, p=0.61, NS). Bedtime brushing practice showed 26% rural versus 36% urban (Z=-1.47, p=0.14, NS). Knowledge about best brushing substance was 58% rural versus 56% urban (Z=0.25, p=0.80, NS). Appropriate brushing material usage was 50% rural versus 50% urban (Z=0.00, p=1.00, NS). Mouth rinsing after eating was 13% rural versus 29% urban (Z=-2.68, p=0.0074, S). Knowledge about requirements for healthy teeth was 26% rural versus 23% urban (Z=0.49, p=0.62, NS). Overall average practice score was 38% in rural and 40% in urban areas (Z=-0.35, p=0.73, NS). Regarding techniques and habits, average score was 16% rural versus 18% urban (Z=-0.74, p=0.46, NS).

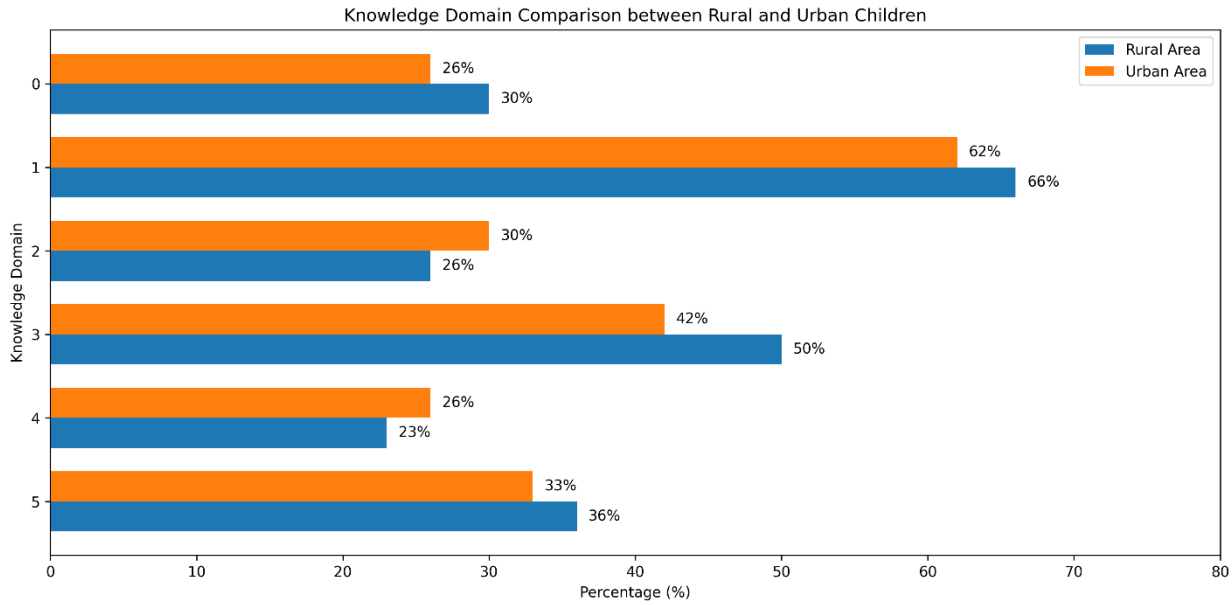
**Table 3: Comparison of Oral Health Problems Knowledge and Attitude Scores between Rural and Urban Areas (N=160)**

| **Domain** | **Rural Area (n=80)** | **Urban Area (n=80)** | **Z-value** | **P-value** | **Significance** |
|---|---|---|---|---|---|
| | n (%) | n (%) | | | |
| Oral Health Problems Knowledge | | | | | |
| Consuming too much sweets per day by children causes | 10 (13%) | 9 (11%) | 0.43 | 0.67 | NS |
| Which of the following can cause bad odor in the mouth? | 13 (16%) | 15 (19%) | -0.55 | 0.58 | NS |
| Healthy dentition promotes | 14 (18%) | 13 (16%) | 0.38 | 0.70 | NS |
| How often do you have bleeding from gums? | 7 (9%) | 9 (11%) | -0.48 | 0.63 | NS |
| Signs & Symptoms of gum diseases are | 9 (11%) | 11 (14%) | -0.59 | 0.55 | NS |
| Which is the first stage in formation of dental caries? | 11 (14%) | 14 (18%) | -0.75 | 0.45 | NS |
| How does the gum disease begin? | 5 (6%) | 8 (10%) | -0.99 | 0.32 | NS |
| When the gums are in a state of inflammation bleeding is known as | 10 (13%) | 10 (13%) | 0.00 | 1.00 | NS |
| What are the impacts of oral negligence? | 11 (14%) | 13 (16%) | -0.42 | 0.67 | NS |

| | | | | | |
|---|---|---|---|---|---|
| What are the diseases occurred in absence of oral cleanliness? | 14 (18%) | 16 (20%) | -0.35 | 0.73 | NS |
| How will we identify the oral related ailments? | 17 (21%) | 19 (24%) | -0.46 | 0.65 | NS |
| Which following statement is correct about teeth caring? | 15 (19%) | 14 (18%) | 0.18 | 0.86 | NS |
| Average Oral Health Problems Score | 10 (12%) | 11 (13%) | -0.23 | 0.82 | NS |
| Attitude towards Oral Hygiene | | | | | |
| Overall Attitude Score (14 items) | 25 (31%) | 23 (29%) | 0.32 | 0.75 | NS |

*NS = Not Significant ($p>0.05$); S = Significant ($p<0.05$)*

Table 3 displays knowledge about oral health problems and attitudes. Knowledge about excessive sweets consumption effects was 13% rural versus 11% urban ($Z=0.43$, $p=0.67$, NS). Understanding of bad odor causes showed 16% rural versus 19% urban ($Z=-0.55$, $p=0.58$, NS). Knowledge about healthy dentition benefits was 18% rural versus 16% urban ($Z=0.38$, $p=0.70$, NS). Awareness of gum bleeding was 9% rural versus 11% urban ($Z=-0.48$, $p=0.63$, NS). Understanding gum disease signs was 11% rural versus 14% urban ($Z=-0.59$, $p=0.55$, NS). Knowledge about dental caries stages was 14% rural versus 18% urban ($Z=-0.75$, $p=0.45$, NS). Understanding how gum disease begins was 6% rural versus 10% urban ($Z=-0.99$, $p=0.32$, NS). Knowledge about inflammation and bleeding was 13% rural versus 13% urban ($Z=0.00$, $p=1.00$, NS). Understanding oral negligence impacts was 14% rural versus 16% urban ($Z=-0.42$, $p=0.67$, NS). Knowledge about diseases from poor oral hygiene was 18% rural versus 20% urban ($Z=-0.35$, $p=0.73$, NS). Awareness of identifying oral ailments was 21% rural versus 24% urban ($Z=-0.46$, $p=0.65$, NS). Knowledge about teeth care statements was 19% rural versus 18% urban ($Z=0.18$, $p=0.86$, NS). Overall average knowledge about oral health problems was 12% rural and 13% urban ($Z=-0.23$, $p=0.82$, NS). Attitude scores averaged 31% in rural areas and 29% in urban areas ($Z=0.32$, $p=0.75$, NS).




## DISCUSSION

This cross-sectional comparative study reveals significant deficiencies in oral hygiene knowledge, attitudes, and practices among school-age children in both rural and urban settings, with overall knowledge scores of only 43% and 39% respectively. These findings align with previous studies conducted in similar populations, highlighting the persistent challenge of inadequate oral health education among Indian schoolchildren.(16,17)

Our study found no statistically significant difference in overall oral hygiene knowledge between rural and urban children, contradicting some earlier studies that reported better knowledge in urban populations.(18,19) This similarity may reflect the universal lack of structured oral health education in school curricula across both settings. However, Hassan et al. (2024) reported similar findings in Punjab, noting that while urban children had better access to dental care facilities, knowledge levels remained comparable due to inadequate health education programs in both settings.(10) The marginally better performance of rural children in understanding oral hygiene benefits (35% vs 18%, p=0.0046) suggests that traditional practices and cultural transmission of health knowledge may play protective roles in certain domains.

Practice scores were uniformly low across both groups (rural: 38%, urban: 40%), indicating substantial gaps between knowledge and behavior. This knowledge-practice gap has been documented extensively in oral health literature.(20,21) Urban children demonstrated significantly better mouth-rinsing practices after eating (29% vs 13%, p=0.0074), possibly reflecting better water availability and hygiene infrastructure in urban schools. Similar findings were reported by Al-Darwish et al. (2016) in Qatar, where urban children showed better hygiene habits related to school infrastructure.(22) However, the overall low practice scores in both groups underscore that access alone does not translate to consistent healthy behaviors without reinforcement through education and environmental support.

Knowledge about oral health problems was alarmingly low in both settings (rural: 12%, urban: 13%), revealing critical gaps in understanding common dental conditions, their causes, symptoms, and prevention. This finding corroborates studies by Wandera et al. (2003) in Uganda, which identified similar knowledge deficits about dental diseases among school

children.(17) The inability to recognize signs of dental problems may lead to delayed treatment-seeking and progression of preventable conditions. Simangwa et al. (2025) recently reported that even when children experience oral health problems, lack of knowledge prevents appropriate responses.(23)

Attitude scores were lowest across all domains (rural: 31%, urban: 29%), indicating that children in both settings lack positive perceptions and emotional investment in oral health maintenance. Smyth et al. (2007) emphasized that attitudes are critical mediators between knowledge and practice, and poor attitudes represent significant barriers to behavior change regardless of knowledge levels.(21) The uniformly negative attitudes suggest that oral health is not perceived as a priority by children, possibly reflecting broader family and community attitudes toward dental care.

Socio-demographic analysis revealed that 74% of children never visited a dentist, despite 58% reporting previous dental disease experiences. This alarming disconnect between disease experience and professional care-seeking reflects multiple barriers including cost, accessibility, and lack of awareness about the importance of preventive dental care. Hassan et al. (2024) reported similar patterns in rural Punjab, where dental visits occurred only during acute painful conditions rather than for preventive care.(10) The high prevalence of families with relatively higher income (76% earning above Rs. 20,000) suggests that economic factors alone do not explain poor dental care utilization, pointing to attitudinal and awareness barriers.

The similarity in oral health knowledge and practices between rural and urban children, despite differential access to healthcare infrastructure, challenges assumptions about urban advantage in health behaviors.(24,25) This finding suggests that school-based oral health education, if properly implemented, could effectively reach children across both settings. Comparative studies examining oral health disparities between rural and urban children in developing countries have reported similar patterns, with geographic location being less important than quality of health education and family support.(26,27)

Our study's use of validated instruments with established reliability (r=0.7) strengthens confidence in these findings. The comprehensive assessment across knowledge, attitude, and practice domains provides a holistic picture of oral health behaviors. However, limitations include the cross-sectional design which precludes causal inferences, reliance on self-reported data which may be subject to social desirability bias, and sampling from selected schools which may limit generalizability.

The findings underscore urgent need for comprehensive school-based oral health education programs targeting both rural and urban children. Such programs should address not only knowledge gaps but also attitude formation and practical skill development in oral hygiene techniques.(28) Given the high proportion of children who never visit dentists, school-based dental screening and preventive services could play crucial roles in early detection and management of oral health problems.

## CONCLUSION

School-age children in both rural and urban settings of Sri Ganganagar demonstrate inadequate oral hygiene knowledge, negative attitudes, and poor practices, with no significant differences between geographic locations. The uniformly low scores across all domains highlight systemic gaps in oral health education and preventive care access. These findings call for urgent implementation of comprehensive, age-appropriate oral health education programs in schools,

coupled with improved access to preventive dental services, to establish healthy oral hygiene behaviors during this critical developmental period. Future research should evaluate intervention effectiveness and identify family and community factors influencing children's oral health behaviors.

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**CONFLICT OF INTEREST**

The authors declare no conflict of interest.

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