International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Hand Hygiene Behaviors among School-Aged Children in Primary and Secondary Grades in Amalapuram: A Cross-Sectional Study

Dr. Pendyala Divya Chaitanya Lakshmi[1], Dr Naga Karthik G[2], Dr. Ummidi Anusha[3], Dr. Shaik Mabbul[4]

[1]IInd year Postgraduate, Department of Paediatrics, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram, Andhra Pradesh, India

[2]Consultant Pediatric Surgeon, Department of Paediatric Surgery, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram, Andhra Pradesh, India

[3]IInd year Postgraduate, Department of Paediatrics, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram, Andhra Pradesh, India

[4]Senior Resident, Department of Paediatrics, Konaseema Institute of Medical Sciences & Research Foundation, Amalapuram, Andhra Pradesh, India

OPEN ACCESS

Corresponding Author:

Dr. Pendyala Divya Chaitanya Lakshmi

IInd year Postgraduate, Department of Paediatrics, Konaseema Institute of Medical Sciences and Research Foundation, Amalapuram, Andhra Pradesh, India.

Received: 07-01-2026
Accepted: 25-01-2026
Published: 06-02-2026

ABSTRACT

Background: Hand hygiene is a low-cost, high-impact behavior that interrupts fecal-oral and respiratory pathogen transmission. Schools are strategic platforms for establishing sustained handwashing habits during childhood. **Objectives:** To assess knowledge, attitudes, and self-reported hand hygiene practices among school-aged children in Amalapuram, and to identify school- and family-level factors associated with better practices. **Methods:** A school-based cross-sectional study was conducted during April-May 2025 in five randomly selected schools in Amalapuram, Andhra Pradesh. A pretested, structured questionnaire captured participant profile and key domains of hand hygiene knowledge, attitudes, and practices. Data were summarized using frequencies and percentages; associations between selected determinants and good practice were assessed using chi-square tests. **Results:** Among 422 participants (mean age 11.2 ± 2.7 years), knowledge about disease prevention through handwashing was high. Most children recognized the importance of handwashing and acknowledged its role in preventing illness. However, consistent handwashing before eating and after toilet use was reported by only about three-fifths of students. Soap use was common, yet a substantial proportion reported skipping handwashing due to forgetfulness or limited facilities. Better practices were associated with higher parental education, functional school handwashing stations, and visual reminders. **Conclusion:** Although knowledge and perceived importance of handwashing were high, gaps persisted in routine practice and enabling school environments. Strengthening school WASH infrastructure and reinforcing behavior change cues can improve daily hand hygiene among children.

Keywords*: Hand hygiene; Schoolchildren; Knowledge attitude practice; Soap use; WASH; India.*

INTRODUCTION:

Hand hygiene is a foundational public health behavior with a direct impact on the transmission of enteric and respiratory pathogens. Because hands frequently contact contaminated surfaces and subsequently touch the mouth, nose, or eyes, effective handwashing with soap can interrupt common pathways of infection. Evidence syntheses have demonstrated that handwashing promotion reduces diarrheal disease and improves child health outcomes [1]. In school settings, hygiene interventions that combine behavior change and provision of soap or water have shown measurable improvements in hand hygiene behavior and reductions in hand contamination [2].

School-aged children represent a priority group for hygiene promotion for two complementary reasons. First, they experience high exposure to communicable diseases through close contact, shared learning materials, crowded classrooms, and limited WASH resources in some schools. Second, childhood is a sensitive period for habit formation, and regular practice in structured environments can translate into stable behaviors at home and in later life. Global guidance emphasizes hand hygiene as a core infection prevention action and highlights the importance of clear technique and behavioral cues

[3,4]. When school environments support access to soap and water and provide prompts (posters, teacher reinforcement, peer norms), children are more likely to translate knowledge into practice.

Despite broad recognition of hand hygiene, studies from diverse regions show persistent gaps in routine practice among students. KAP surveys in Ethiopia and Saudi Arabia identified substantial variations in knowledge and reported behavior, with practice often lagging behind awareness [5,6]. Multi-country adolescent analyses similarly reported inconsistent handwashing across settings, influenced by socioeconomic context and facility access [7]. Within Southeast Asia, school-based studies documented low rates of handwashing with soap and emphasized the influence of school grades, ethnic context, and availability of functional stations [8]. Recent cross-sectional surveys from Mongolia and Ethiopia reiterate that soap availability, school WASH infrastructure, and supportive supervision are critical determinants of reported practice [9,10].

In India, the burden of infections among children and the scale of school enrollment make the education system an efficient platform for hygiene promotion. However, program effectiveness is sensitive to the reliability of infrastructure and the strength of behavior reinforcement. Randomized trials in Kenya demonstrated that hygiene promotion and sanitation packages can influence hand contamination, while regular soap provision increased observed handwashing and reduced microbial contamination [11,12]. Large-scale behavior change campaigns and teacher-led programs in Bihar improved handwashing with soap at school and also influenced practices at home, underscoring the role of sustained cues and normative change [13,14].

Local data are required to tailor school WASH interventions to community realities, particularly in semi-urban settings where facility availability and promotion intensity vary across schools. Amalapuram is a growing educational hub in coastal Andhra Pradesh, and understanding student knowledge, motivation, and practice patterns can inform targeted strategies for schools and families. The present study aimed to assess hand hygiene knowledge, attitudes, and practices among primary and secondary grade schoolchildren in Amalapuram and to examine factors associated with better hand hygiene practices.

MATERIALS & METHODS:

Study design and setting: A school-based cross-sectional study was conducted during April-May 2025 in Amalapuram, Andhra Pradesh, India.

Study population and eligibility: Children enrolled in participating primary and secondary grades and present during data collection were eligible. Children with acute illness at the time of survey or those unwilling to participate were excluded.

Sampling and sample size: A list of eligible schools was obtained from local education authorities and five schools were selected by simple random sampling. Within each school, students were recruited using stratification by primary and secondary grades to ensure representation. Sample size planning assumed 50% prevalence of adequate practice with 95% confidence and 5% precision; the target was inflated for clustering and non-response. A total of 422 complete questionnaires were available for analysis.

Data collection tool and variables: A pretested, structured questionnaire captured age, sex, grade level, and key domains of hand hygiene knowledge, attitudes, and practices. The instrument was informed by standard hand hygiene concepts and adapted from published school-based KAP surveys and implementation guidance [3-6]. Knowledge items assessed awareness of invisible germs, disease prevention, and correct method of washing. Attitude items assessed perceived importance, motivation, and perceived benefit. Practice items captured handwashing at critical moments and reported soap use.

Operational definitions: Functional handwashing stations were defined as designated school locations where water was available for handwashing during school hours. Visual reminders referred to posters or cue materials displayed near toilets, eating areas, or washing points. Parental education was recorded as the highest education level of either parent/guardian and analyzed as a higher-versus-lower category.

Outcome definition: A composite hand hygiene practice score was created from core indicators, including consistent handwashing before eating and after toilet use and reported soap use. Each indicator was scored as 1 (consistent) or 0 (not consistent). Good practice was defined as a total score at or above the median value.

Statistical analysis: Data were entered in a secured dataset and checked for completeness. Categorical variables were summarized as frequencies and percentages and continuous variables as mean ± standard deviation. Associations were tested using chi-square tests, with $p < 0.05$ considered statistically significant.

Ethical considerations: Administrative permission was obtained from participating schools. Written informed consent from parents/guardians and assent from children were obtained. Data were de-identified and stored securely to maintain confidentiality.

Data collection was performed during scheduled classroom periods to minimize academic disruption. Investigators provided standardized instructions and clarified items in the local language when required, without prompting answers. Completed forms were reviewed on the same day to reduce missing responses. Selected determinants (parental education,

functional stations, and visual reminders) were examined because prior school studies and trials show that facility reliability and environmental cues influence handwashing behavior [2,11-14].

RESULTS:

A total of 422 children participated in the study. The mean age was 11.2 ± 2.7 years; males constituted 52.13% and females 47.87%. Primary grade students represented 54.98% of the sample, while 45.02% were from secondary grades (Table 1).

Table 1. Participant characteristics (N = 422)

Characteristic	Category	n (%)
Sex	Male	220 (52.13)
	Female	202 (47.87)
Grade level	Primary	232 (54.98)
	Secondary	190 (45.02)
Age (years)	Mean ± SD	11.2 ± 2.7

Knowledge regarding hand hygiene was generally high. Overall, 85.07% reported knowing that handwashing is important for disease prevention, 77.96% recognized that germs are invisible and can spread via hands, and 76.07% indicated awareness of the correct method of washing hands (Table 2).

Table 2. Knowledge regarding hand hygiene (N = 422)

Knowledge item	Yes, n (%)
Handwashing is important for disease prevention	359 (85.07)
Germs are invisible and can spread through hands	329 (77.96)
Aware of correct method of washing hands	321 (76.07)

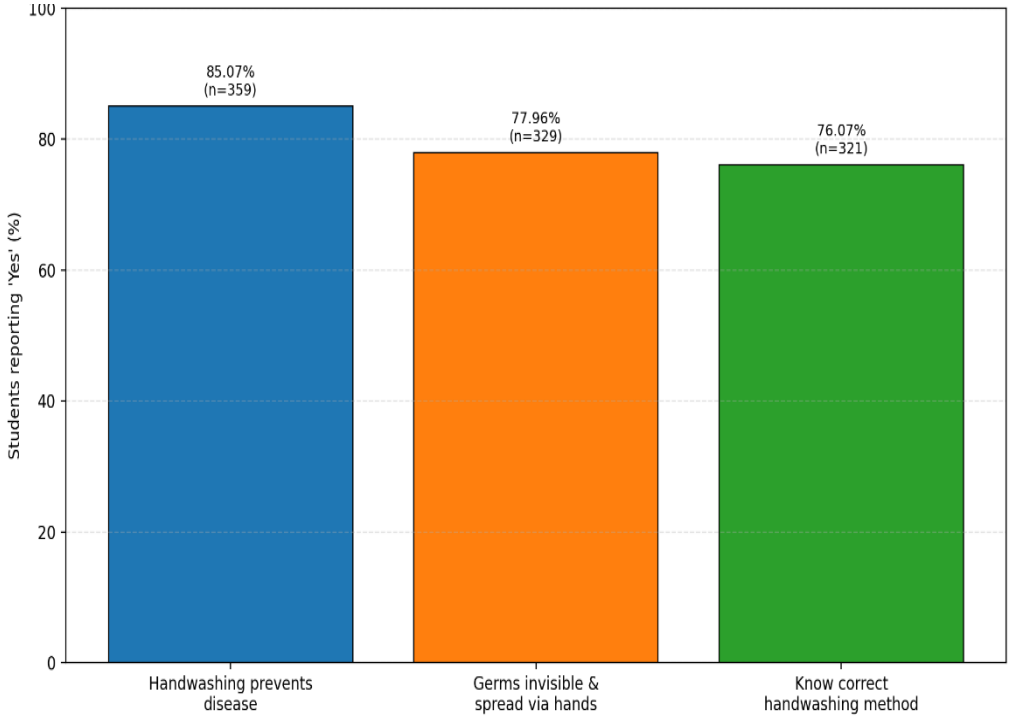

Figure 1: Knowledge regarding hand hygiene

Attitudes were favorable, with 90.05% stating that handwashing is important and 81.99% believing that handwashing prevents illness. Nevertheless, only 68.01% felt motivated to wash hands regularly (Table 3).

Table 3. Attitudes toward hand hygiene (N = 422)

Attitude item	Agree/positive, n (%)
Handwashing is important	380 (90.05)
Motivated to wash hands regularly	287 (68.01)
Handwashing prevents illness	346 (81.99)

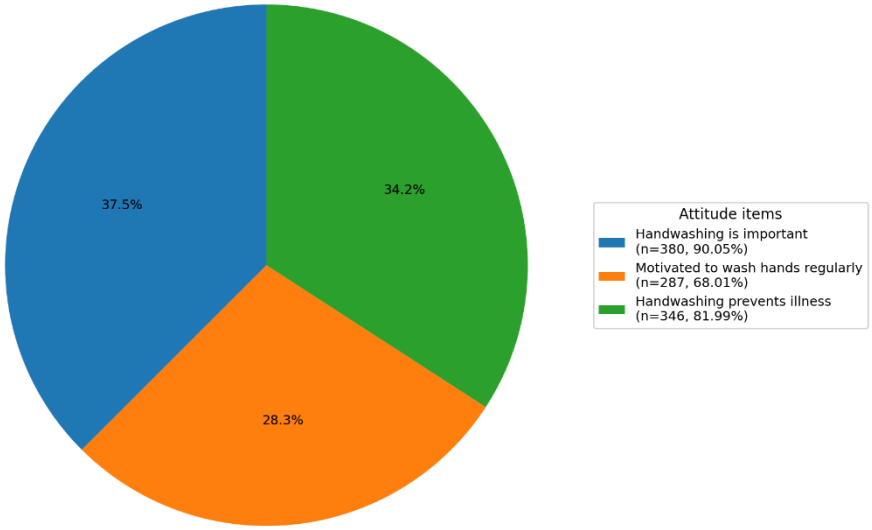

Figure 2:Attitudes toward hand hygiene

In terms of practice, 62.08% reported consistent handwashing before eating and after toilet use. Soap use was reported by 69.91%, whereas 18.01% used only water and 12.08% were unsure. Notably, 37.91% admitted skipping handwashing due to forgetfulness or lack of facilities, and only 40.05% reported regular handwashing promotion by their schools (Table 4).

Table 4. Self-reported hand hygiene practices and enabling environment (N = 422)

Practice / enabling factor	Response	n (%)
Handwashing at key moments	Consistently before eating and after toilet use	262 (62.08)
Type of cleansing agent used	Soap	295 (69.91)
	Only water	76 (18.01)
	Unsure	51 (12.08)
Barriers to handwashing	Skip due to forgetfulness or lack of facilities	160 (37.91)
School reinforcement	School regularly promotes handwashing	169 (40.05)

Bivariate analysis identified three determinants associated with better hand hygiene practices: higher parental education ($p = 0.01$), functional school handwashing stations ($p = 0.03$), and the presence of visual reminders such as posters ($p = 0.02$) (Table 5).

Table 5. Factors associated with better hand hygiene practices (bivariate analysis)

Factor	Association direction	p value
Higher parental education	Better practices observed	0.01
Functional handwashing stations in schools	Better practices observed	0.03
Presence of visual reminders (posters/cues)	Better practices observed	0.02

DISCUSSION:

This cross-sectional assessment of schoolchildren in Amalapuram documented a clear gradient between awareness and routine behavior. Most participants recognized the importance of handwashing and its role in preventing illness, consistent with findings from school-based KAP surveys in Ethiopia and Saudi Arabia [5,6]. High awareness in the current study likely reflects increasing public messaging around hygiene and infection prevention. However, knowledge alone did not translate into uniform practice, a pattern widely reported across settings.

Only about three-fifths of students reported consistent handwashing before eating and after toilet use, and over one-third reported skipping handwashing because of forgetfulness or limited facilities. Similar gaps have been reported in multi-country analyses of adolescent hand hygiene, where practice variability is influenced by environmental supports and household context [7]. The role of facilities is especially salient in schoolchildren: the availability of soap and water, functional stations, and supervision predicts whether hygiene behaviors become automatic. Studies from Vietnam and Mongolia emphasize that station availability and usability are strongly linked to handwashing with soap and to disparities between subgroups of children [8,9].

In the present study, reported soap use was common, yet a sizeable minority used only water or were uncertain, suggesting incomplete understanding of soap's added benefit or inconsistent access. This aligns with observations from Ethiopia indicating that enabling infrastructure and the reliability of WASH resources shape day-to-day adherence [10]. The significant association between functional handwashing stations and better practices supports the premise that facility readiness is not a peripheral detail but a central determinant of behavior.

School-level promotion was reported by only 40% of students, indicating limited reinforcement. Intervention trials provide a useful contrast: in Kenya, combined hygiene promotion and sanitation packages influenced hand contamination, and regular soap provision improved handwashing and reduced microbial contamination on hands [11,12]. In India, cluster trials in Bihar demonstrated that structured behavior change campaigns and teacher-led programs can increase handwashing with soap at school and also extend gains to home environments [13,14]. These findings, together with the observed associations in Amalapuram, argue for an integrated strategy that links reliable facilities with consistent cues, teacher engagement, and student-friendly messaging.

Parental education was associated with better practices in our analysis, suggesting that home norms and supervision reinforce school messaging. Programs that involve parents through brief take-home materials or school meetings can strengthen the continuity of cues across settings. Overall, the results support a pragmatic roadmap for Amalapuram schools: ensure functional stations with soap and water, strengthen visual reminders at points of use, and implement routine, teacher-supported reinforcement to convert high awareness into consistent daily practice.

Limitations

This study relied on self-reported hand hygiene behaviors, which are influenced by social desirability and imperfect recall. The survey did not include structured observation of handwashing episodes or microbiological validation of hand cleanliness. Facility assessment was based on student reports rather than an independent checklist. Because the sample was drawn from five schools in one town, the findings do not represent all schools in the district or other regions.

CONCLUSION:

Among school-aged children in Amalapuram, knowledge and perceived importance of handwashing were high, yet consistent practice remained suboptimal. Only about three-fifths reported handwashing before eating and after toilet use, and more than one-third reported skipping handwashing due to forgetfulness or inadequate facilities. Soap use was common but not universal, and routine school-level promotion was reported by fewer than half of students. Better practices were linked to parental education, functional handwashing stations, and visible reminders. Improving the reliability of school WASH infrastructure, embedding cues at points of use, and sustaining teacher-supported reinforcement can bridge the gap between awareness and routine behavior. School–parent partnerships can reinforce these routines beyond the classroom.

Declaration:

Conflicts of interests: The authors declare no conflicts of interest.

Author contribution: All authors have contributed in the manuscript.

Author funding: Nill

REFERENCES:

1. Ejemot-Nwadiaro RI, Ehiri JE, Meremikwu MM, Critchley JA. Hand washing promotion for preventing diarrhoea. Cochrane Database Syst Rev. 2015 Sep 3;2015(9):CD004265. doi:10.1002/14651858.CD004265.pub3.
2. Mbakaya BC, Lee PH, Lee RLT. Hand hygiene intervention strategies to reduce diarrhoea and respiratory infections among schoolchildren in developing countries: a systematic review. Int J Environ Res Public Health. 2017 Apr 1;14(4):371. doi:10.3390/ijerph14040371.
3. Pittet D, Allegranzi B, Boyce J; World Health Organization World Alliance for Patient Safety First Global Patient Safety Challenge Core Group of Experts. The World Health Organization guidelines on hand hygiene in health care and their consensus recommendations. Infect Control Hosp Epidemiol. 2009 Jul;30(7):611-622. doi:10.1086/600379.
4. World Health Organization. WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care. Geneva: World Health Organization; 2009. (PMID: 23805438).
5. Vivas AP, Gelaye B, Aboset N, Kumie A, Berhane Y, Williams MA. Knowledge, attitudes and practices (KAP) of hygiene among school children in Angolela, Ethiopia. J Prev Med Hyg. 2010 Jun;51(2):73-79.
6. Almoslem MM, Alshehri TA, Althumairi AA, Aljassim MT, Hassan ME, Berekaa MM. Handwashing knowledge, attitudes, and practices among students in Eastern Province schools, Saudi Arabia. J Environ Public Health. 2021 Sep 21;2021:6638443. doi:10.1155/2021/6638443.
7. Smith L, Butler L, Tully MA, Jacob L, Barnett Y, Lopez-Sanchez GF, et al. Hand-washing practices among adolescents aged 12-15 years from 80 countries. Int J Environ Res Public Health. 2020 Dec 27;18(1):138. doi:10.3390/ijerph18010138.
8. Xuan LTT, Hoat LN. Handwashing among schoolchildren in an ethnically diverse population in northern rural Vietnam. Glob Health Action. 2013 Jan 31;6:1-8. doi:10.3402/gha.v6i0.18869.
9. Enkhbat M, Togoobaatar G, Erdenee O, Katsumata A. Handwashing practice among elementary schoolchildren in urban setting, Mongolia: a school-based cross-sectional survey. J Environ Public Health. 2022 Sep 16;2022:3103241. doi:10.1155/2022/3103241.
10. Melaku A, Addis T. Handwashing practices and associated factors among school children in Kirkos and Akaki Kality Sub-Cities, Addis Ababa, Ethiopia. Environ Health Insights. 2023 Feb 23;17:11786302231156299. doi:10.1177/11786302231156299.

11. Greene LE, Freeman MC, Akoko D, Saboori S, Moe C, Rheingans R. Impact of a school-based hygiene promotion and sanitation intervention on pupil hand contamination in Western Kenya: a cluster randomized trial. Am J Trop Med Hyg. 2012 Sep;87(3):385-393. doi:10.4269/ajtmh.2012.11-0633.
12. Saboori S, Greene LE, Moe CL, Freeman MC, Caruso BA, Akoko D, et al. Impact of regular soap provision to primary schools on hand washing and E. coli hand contamination among pupils in Nyanza Province, Kenya: a cluster-randomized trial. Am J Trop Med Hyg. 2013 Oct;89(4):698-708. doi:10.4269/ajtmh.12-0387.
13. Lewis HE, Greenland K, Curtis V, Schmidt WP. Effect of a school-based hygiene behavior change campaign on handwashing with soap in Bihar, India: cluster-randomized trial. Am J Trop Med Hyg. 2018 Oct;99(4):924-933. doi:10.4269/ajtmh.18-0187.
14. Tidwell JB, Gopalakrishnan A, Unni A, Sheth E, Daryanani A, Singh S, et al. Impact of a teacher-led school handwashing program on children's handwashing with soap at school and home in Bihar, India. PLoS One. 2020 Feb 27;15(2):e0229655. doi:10.1371/journal.pone.0229655.