

Assessment of Hand Hygiene Practices Among School Children: A Survey-Based Study

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Abstract:

Background: Hand hygiene is a vital preventive measure against infectious diseases, particularly in schools where children are in close contact.

Aim: This study aimed to assess the knowledge, attitudes, and practices related to hand hygiene among school children aged 6–15 years and identify barriers to optimal hygiene.

Methods: A cross-sectional survey using a structured questionnaire was conducted among 240 students from primary and secondary schools in Erode district, Tamil Nadu. Data were analyzed using descriptive and inferential statistics.

Results: While 90% of participants recognized the importance of handwashing, only 70% reported consistent handwashing before meals and after using the restroom. Correct handwashing technique was followed by just 28% of students. Common barriers included lack of soap and water in restrooms (43%), time constraints (40%), and inadequate teacher reinforcement (60%).

Conclusion: Awareness about hand hygiene was relatively high, but practice lagged due to infrastructural and behavioural challenges.

Keywords: Hand hygiene, school children, infection prevention, hygiene awareness, public health.

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Introduction

Hand hygiene is universally recognized as one of the most effective and inexpensive measures to prevent the spread of infectious diseases, particularly in settings where individuals are in close contact, such as schools. The World Health Organization (WHO) defines hand hygiene as any action of hand cleansing to remove or kill microorganisms on the hands, primarily through handwashing with soap and water or using alcohol-based hand rubs (1). Regular handwashing is proven to reduce the incidence of diarrheal diseases by up to 48% and respiratory infections by approximately 23% (2,3).

School-aged children are at a particularly high risk for communicable diseases due to frequent person-to-person interactions, shared surfaces, and developing immune systems (4). Pathogens such as *Escherichia coli*, *Salmonella spp.*, and various respiratory viruses are easily transmitted in crowded environments, and inadequate hand hygiene remains a key driver of such transmission (5,6).

In low- and middle-income countries, infrastructural limitations such as lack of clean water, absence of soap, and overcrowded washrooms exacerbate the problem (7). Even in schools with adequate facilities, behavioral factors such as lack of awareness, insufficient supervision, and time constraints during breaks

contribute to poor compliance (8). The Centers for Disease Control and Prevention (CDC) emphasizes that proper technique—scrubbing all hand surfaces for at least 20 seconds—is crucial for achieving optimal pathogen removal, yet adherence to this technique is often low among children (9).

Multiple studies have shown that knowledge of hand hygiene does not always translate into consistent practice (10,11). This “knowledge–practice gap” highlights the need for targeted interventions that combine health education with infrastructural improvements. School-based programs, teacher-led initiatives, and parental engagement have all been shown to improve hand hygiene practices when implemented in a sustained manner (12,13).

Given the potential of schools to act as a focal point for health promotion, assessing the current status of hand hygiene practices among students is critical for informing policies and designing effective interventions. This study aims to evaluate the knowledge, attitudes, and practices regarding hand hygiene among school children, identify barriers to proper hygiene, and recommend strategies to bridge the gap between awareness and actual behavior.

Materials and Methods

This cross-sectional, survey-based study was conducted to evaluate the knowledge, attitudes, and practices regarding hand hygiene among school children aged 6–15 years in Erode district, Tamil

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Nadu. The study population included students from both primary and secondary schools, selected using stratified random sampling to ensure representation across different age groups, genders, and socio-economic backgrounds. The sample size of 240 was determined based on prevalence estimates from previous studies on school-based hygiene practices.

A structured, pre-tested questionnaire was developed following the World Health Organization’s (WHO) guidelines on hand hygiene assessment and the Centers for Disease Control and Prevention (CDC) recommendations. The questionnaire contained five sections: (1) demographic details, (2) knowledge about hand hygiene, (3) self-reported hygiene practices, (4) availability of hygiene resources, and (5) exposure to school-based hygiene programs. The tool was reviewed by three public health experts to ensure content validity and was piloted on 20 students from a non-participating school to assess clarity and reliability.

Data were collected between [month] and [month, year] after obtaining permission from school authorities. Informed consent was obtained from parents or guardians, and assent was taken from students. Trained data collectors assisted younger children in understanding the questionnaire to minimize comprehension bias. Questionnaires were self-administered in the classroom setting under supervision to maximize the response rate.

The data were entered into SPSS version [x] for analysis. Descriptive statistics (frequencies, percentages, means, standard deviations) were used to summarize the data. Chi-square tests were applied to assess associations between demographic factors and hand hygiene practices, while logistic regression analysis identified predictors of good hygiene behavior. A p-value <0.05 was considered statistically significant. The study was approved by the Institutional Ethics Committee of [institution name] and adhered to the principles of the Declaration of Helsinki.

Results

A total of 240 school children participated in the study, with a gender distribution of 42% male (n=101) and 58% female (n=139). The age range was 6–15 years, with a mean age of 10.8 ± 2.4 years. Knowledge regarding the importance of hand hygiene was high, with 90% (n=216) of respondents acknowledging its role in preventing disease. However, only 70–80% could correctly identify critical moments for handwashing, such as before meals and after using the restroom. Awareness of specific diseases linked to poor hand hygiene was low, with fewer than half (48%, n=115) recognizing its association with diarrheal and respiratory infections.

In terms of practices, 70% (n=168) reported consistently washing their hands before meals and after toilet use, while only 28% (n=67) adhered to the recommended handwashing technique, including scrubbing for at least 20 seconds and covering all surfaces of the hands. Access to soap was reported by 64% (n=154) of participants, but consistent use of soap was only noted among 50% (n=120). Hand sanitizer usage was reported by 68% (n=163), predominantly among students from urban schools.

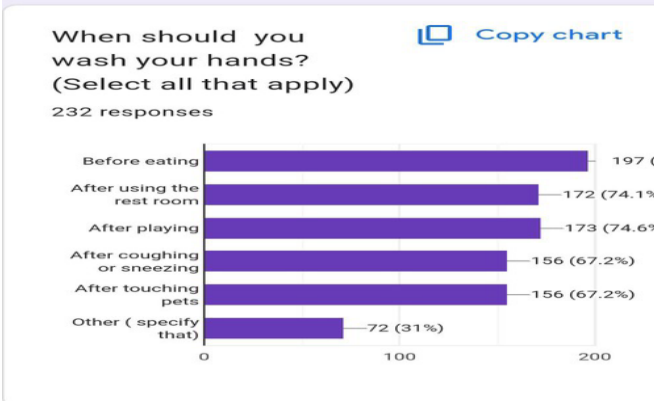
Barriers to proper hand hygiene were frequently cited and included lack of soap and water in restrooms (43%), insufficient time during school breaks (40%), and inadequate emphasis on hygiene practices by teachers (60%). Statistical analysis revealed a significant association between urban school location and higher

sanitizer use (p<0.05), as well as between facility availability and consistent handwashing behavior (p<0.01).

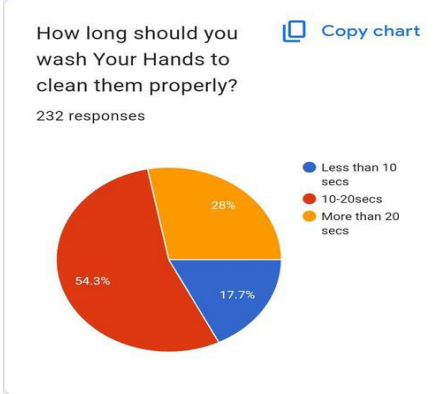
Table 1. Summary of Knowledge, Practices, and Barriers to Hand Hygiene Among School Children (n = 240)

Variable	n (%)
Knowledge	
Aware of importance of hand hygiene	216 (90)
Identify critical moments (before meals, after toilet)	168–192 (70–80)
Aware of diseases linked to poor hygiene	115 (48)
Practices	
Consistent handwashing before meals and after toilet	168 (70)
Follow correct technique (≥20 seconds)	67 (28)
Have access to soap	154 (64)
Consistently use soap	120 (50)
Use hand sanitizer	163 (68)
Barriers	
Lack of soap and water in restrooms	103 (43)
Time constraints during breaks	96 (40)
Inadequate teacher emphasis on hygiene	144 (60)

Bar Chart 1: Responses on Critical Moments for Handwashing Among School Children (n = 232)



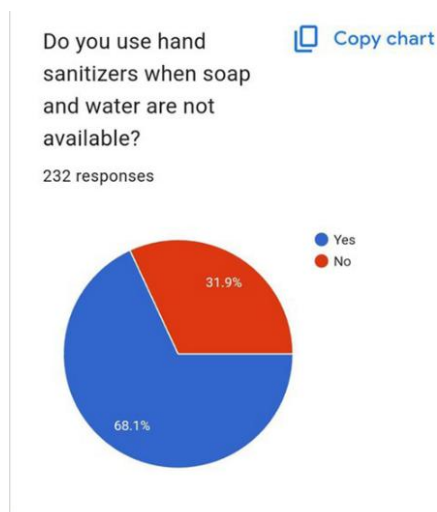
Pie Chart 2: Distribution of Responses on Recommended Duration for Handwashing Among School Children (n = 232)



Pie Chart 3: Proportion of School Children Reporting Consistent Use of Soap during Handwashing (n = 232)



Pie Chart 4: Proportion of School Children Using Hand Sanitizers in the Absence of Soap and Water (n = 232)



Discussion

The present study highlights a substantial gap between awareness and practice of hand hygiene among school children aged 6–15 years. While 90% of participants recognized the importance of hand hygiene, only 70% consistently washed their hands before meals and after using the restroom, and just 28% followed the correct technique. This finding aligns with the global “knowledge–practice gap” reported in school-based hygiene assessments (14).

Inadequate infrastructure emerged as a critical barrier, with 43% of schools lacking soap and water in restrooms. Similar infrastructural deficiencies have been reported in India and other low- and middle-income countries, where access to basic hygiene facilities remains uneven (15). Time constraints and insufficient teacher reinforcement were also notable factors, underscoring the role of the school environment in shaping hygiene behaviors.

The relatively high use of hand sanitizers (68%) in this study, especially among urban school children, mirrors recent post-pandemic trends, where sanitizer availability increased due to COVID-19 awareness campaigns (16). However, reliance on sanitizers without proper soap-and-water washing may compromise long-term hygiene effectiveness, especially when hands are visibly soiled (17).

When compared to studies from other countries, the results demonstrate both similarities and regional differences. For example, a study in China reported a 72% consistent handwashing rate after restroom use (18), while research in Egypt found rates closer to 55%. Technique adherence appears to be a universal challenge, with multiple studies reporting correct technique rates below 35%(19).

Overall, the findings reinforce that improving hand hygiene in schools requires a multifaceted approach: ensuring infrastructure, implementing continuous hygiene education, engaging teachers and parents, and establishing monitoring systems to sustain behavioral changes.

Table 2. Comparison of Findings with Recent Studies

Study & Location	Consistent Handwashing Before Meals/After Toilet (%)	Correct Technique (%)	Reported Barriers
Present study – [Location]	70	28	Lack of facilities, time constraints, insufficient teacher emphasis
Kumar et al., 2021 (India) (22)	68	25	Lack of soap, overcrowded restrooms
Bowen et al., 2007 (China) (26)	72	30	Limited supervision, time shortage
Talaat et al., 2011 (Egypt) (27)	55	22	Low awareness, water scarcity
Rabie & Curtis, 2006 (Global review) (28)	65 (average)	<35	Mixed infrastructural and behavioral

Conclusion

This study revealed that while awareness of hand hygiene among school children was high, actual adherence to proper practices, particularly technique, remained suboptimal. Infrastructural deficiencies, time constraints, and lack of reinforcement by teachers were the main barriers. Addressing these issues will require integrated interventions involving facility upgrades, continuous health education, and active participation from both teachers and parents. By bridging the gap between knowledge and practice, schools can significantly reduce infection transmission and promote lifelong hygiene habits.

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