

Strengthening Public Health: An Assessment of Hand Washing Practices among Primary School Students in India

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Abstract

Background: Hand washing is a fundamental practice for preventing infectious diseases, especially in primary schools where children are vulnerable. This cross-sectional study aims to comprehensively assess hand washing practices, identify influencing factors, and evaluate existing initiatives in primary schools across diverse regions of India.

Methods: A representative sample of 162 students (classes 1-5), were participated in this study. Data were collected through age-appropriate questionnaires, on-site observations, and facility assessments. Statistical analyses, including chi-square tests, were employed to examine associations between variables.

Results: Within school hours, 70% of participants reported consistent hand washing, dropping to 45% outside school hours. Good knowledge of hand washing techniques (45%) and awareness of its importance (60%) were noted, with 20% recognizing barriers. Factors significantly influencing handwashing included the availability of soap ($p = 0.001$), accessibility of facilities ($p = 0.003$), and participation in educational programs ($p = 0.015$). Gender, but not age, showed a significant association ($p = 0.045$) with handwashing practices. Facility assessments indicated 40% reported excellent conditions, while 60% were accessible.

Conclusion: This study provides insights into handwashing practices in Indian primary schools, offering a foundation for evidence-based interventions. Addressing knowledge gaps, enhancing facilities, and implementing tailored strategies can foster a culture of consistent hand hygiene, contributing to improved public health outcomes.

Keywords: handwashing, hygiene practices, primary schools, educational interventions, public health,

INTRODUCTION

Handwashing stands as a foundational and economically viable practice with a crucial role in impeding the dissemination of infectious diseases. This significance is particularly accentuated in the unique environment of

primary schools, where young children represent a demographic highly vulnerable to communicable illnesses. The act of handwashing involves the thorough cleansing of hands with soap and water, serving as a

frontline defense against the transmission of pathogens.^{1,2} In the context of primary schools, where students often engage in close contact activities and share communal spaces, the risk of infections spreading rapidly is elevated. Young children, with developing immune systems and sometimes limited adherence to hygiene practices, are more susceptible to contracting and transmitting infectious diseases. Hence, instilling proper hand washing habits becomes paramount as it not only protects the individual but also contributes significantly to the collective health of the school community.³

The importance of hand hygiene in reducing the transmission of pathogens is well-established in global public health literature.⁴ Proper hand washing can significantly decrease the incidence of respiratory and gastrointestinal infections, contributing to the overall well-being of students, teachers, and the broader community.^{5,6}

In the Indian context, where densely populated communities and diverse socio-economic conditions prevail, the risk of infectious diseases is heightened, necessitating a thorough understanding of hand washing practices in primary schools.⁷ Despite the acknowledged significance of hand hygiene, there is a paucity of comprehensive studies addressing the specific challenges and opportunities for promoting effective hand washing in the Indian primary school setting.

The World Health Organization (WHO) emphasizes the importance of integrating hygiene practices into the educational curriculum and ensuring the provision of adequate handwashing facilities in schools.⁸ However, the extent to which these recommendations are implemented and their impact on the day-to-day practices of students in Indian primary schools remains an area requiring in-depth exploration.

This study seeks to bridge this gap by conducting a detailed assessment of hand washing practices in primary schools across India. By examining the current state of hand hygiene, identifying influencing factors, and

evaluating the efficacy of existing initiatives, the findings of this research aim to inform evidence-based interventions that can enhance hand washing practices in primary schools, contributing to the broader goal of disease prevention and health promotion.

MATERIALS AND METHODS

In this cross-sectional study, we aimed to assess hand washing practices in primary schools across various regions of India. Recognizing the crucial role of hand hygiene in preventing the spread of infections, especially in the school setting, our study focused on understanding the current state of hand washing practices, identifying influencing factors, and evaluating the effectiveness of existing initiatives.

1. Study Design: We conducted a cross-sectional study, selecting a representative sample of primary schools to ensure diversity in geographical and socio-economic factors. The study included 162 students from classes 1 to 5

Ethical Considerations and Informed Consent: Prior to data collection, consent was obtained from school authorities, teachers, and parents/guardians. Ethical approval was secured from the institutional review board.

2. Data Collection:

3. Questionnaires: Age-appropriate questionnaires were meticulously designed to capture a comprehensive understanding of hand washing practices among the 162 students involved in the study. The questionnaires were structured to gather information on various dimensions, including:

- **Hand washing Frequency:** Participants were asked about the frequency with which they engaged in hand washing activities, both inside and outside school hours.
- **Knowledge:** Assessments were made regarding participants' knowledge of proper hand washing techniques, the importance of hand hygiene, and its impact on health.
- **Perceptions:** The questionnaires delved into participants' perceptions of the

existing hand washing facilities, the perceived barriers to consistent hand washing, and attitudes towards hygiene practices.

Prior to administration, the questionnaires were pilot-tested to ensure clarity, relevance, and cultural appropriateness. Responses were anonymized to encourage honest and unbiased feedback.

3.2 Observations: Trained observers conducted on-site visits to primary schools, carefully assessing various aspects of hand washing practices. This involved a systematic approach to observe and document the following:

- **Hand washing Facilities:** Observers examined the type, number, and condition of hand washing facilities available within the school premises.
- **Soap Availability:** The presence and accessibility of soap in proximity to the hand washing stations were noted.
- **Hygiene Practices:** Observers recorded the actual hand washing behavior of students during critical times, such as before meals or after using the restroom. This included assessing compliance with recommended hand washing protocols.

The observational data collection process adhered to a standardized protocol to ensure consistency across all schools. Observers were trained to be discreet, minimizing any impact on the natural behavior of students.

Facility Assessment: A structured checklist was systematically employed to assess the condition and accessibility of hand washing facilities in each school. The checklist covered the following key elements:

- **Physical Condition:** The structural integrity, cleanliness, and maintenance of hand washing stations were evaluated.
- **Accessibility:** The proximity of hand washing facilities to classrooms and common areas, ensuring easy access for students.
- **Amenities:** The availability of soap, water, and drying facilities at each hand washing station was documented.

The facility assessment was conducted in collaboration with school authorities to ensure access to all relevant areas

4. Variables:

4.1 Dependent Variables: Data on the frequency and adequacy of hand washing practices were collected, along with factors influencing these behaviors.

4.2 Independent Variables: Demographic information, including age and gender, was collected. Additionally, the availability and condition of hand washing facilities and the presence of educational programs were considered.

5. Data Analysis:

All the obtained data were statistically analyzed using SPSS software Version 21.0

Descriptive Analysis: Frequencies and percentages were calculated for hand washing practices, and demographic characteristics were summarized.

Inferential Analysis: Statistical tests, such as chi-square tests, were used to identify associations between variables.

RESULTS

Descriptive Analysis:

Hand washing Practices

Table 1 reveals that 70% of participants reported always engaging in hand washing inside school hours, while 45% maintained this frequency outside of school hours. These findings suggest a positive influence of the school setting on hand hygiene practices. However, the lower frequency reported outside school hours underscores the importance of interventions that extend beyond the school premises to promote consistent hand washing behaviors in various settings.

Knowledge and Perceptions

In Table 2, the majority of participants exhibited good to excellent knowledge of proper hand washing techniques (45%) and recognized the importance of hand hygiene (60%). Nevertheless, the data also indicate that 20% acknowledged perceived barriers to consistent hand washing.

Inferential Analysis:

Factors Influencing Hand washing Practices

Table 3 underscores the significant role of specific factors in shaping hand washing practices. Participants in schools with readily available soap exhibited more consistent hand washing ($p = 0.001$). Similarly, accessibility of hand washing facilities ($p = 0.003$) and participation in educational programs ($p = 0.015$) were associated with improved hand hygiene practices.

Demographic Factors

In Table 4, while age did not show a statistically significant association with hand washing practices ($p = 0.102$), gender emerged as a significant factor ($p = 0.045$). This suggests the potential effectiveness of gender-specific interventions in promoting uniform hand washing practices among students.

Facility Assessment:

Condition and Accessibility of Hand washing Facilities

Table 5 provides insights into the condition and accessibility of hand washing facilities. Notably, 40% reported the physical condition of hand washing stations as excellent, while 60% were accessible to classrooms and common areas. However, attention should be given to the small percentages reporting fair or poor conditions (10% and 5%, respectively), indicating the need for targeted improvements to maintain high standards of hygiene infrastructure.

DISCUSSION

In the realm of public health, promoting proper hand hygiene practices is fundamental to preventing the spread of infections, particularly in high-risk environments such as primary schools. This cross-sectional study aimed to conduct a comprehensive assessment of hand washing practices in primary schools across diverse regions of India. Recognizing the critical role of hand hygiene in curbing the transmission of infections, the study focused on understanding the current state of hand washing practices, identifying influencing factors, and evaluating the effectiveness of existing initiatives.

Hand washing Practices The observed hand washing practices indicate a positive influence

within the school setting, with 70% of participants reporting consistent engagement in hand washing during school hours. However, a notable decrease to 45% outside of school hours signals the need for interventions beyond institutional boundaries. This aligns with the broader global health agenda emphasizing the extension of hygiene practices into various contexts.^{9,10}

Knowledge and Perceptions: The study revealed that participants exhibited commendable knowledge of proper hand washing techniques (45%) and recognized the importance of hand hygiene (60%). However, the acknowledgment of perceived barriers by 20% of participants emphasizes the multifaceted nature of promoting consistent hand washing. This underscores the importance of tailored educational initiatives to address these barriers and enhance accessibility to hand washing facilities.^{11,12}

Factors Influencing Hand washing Practices: Statistical analyses established a significant association between hand washing practices and key factors, including the availability of soap, accessibility of hand washing facilities, and participation in educational programs. These findings resonate with existing literature emphasizing the crucial role of infrastructure and educational initiatives in fostering positive hand hygiene behaviors.^{13,14}

Demographic Factors: While age did not emerge as a statistically significant factor, gender exhibited a notable association with hand washing practices. This highlights the necessity for gender-specific interventions, recognizing the potential variations in hygiene behavior based on demographic characteristics.¹⁵ Such tailored approaches have been successful in promoting uniform adherence to hand hygiene practices in diverse cultural settings.¹⁶

Condition and Accessibility of Hand washing Facilities: The facility assessment provided nuanced insights into the condition and accessibility of hand washing facilities. While 40% reported the physical condition of stations as excellent, and 60% were accessible to

classrooms and common areas, attention is warranted for the 10% and 5% reporting fair or poor conditions, respectively. These findings underscore the need for targeted improvements to sustain high standards of hygiene infrastructure in primary schools.¹⁷

Several strengths characterize the design and implementation of this study, enhancing the credibility and reliability of its findings. First and foremost, the utilization of a cross-sectional study design allows for a comprehensive assessment of hand washing practices in primary schools across diverse regions of India. This design facilitates the collection of data at a single point in time, providing a snapshot of the current state of hand hygiene within the selected schools. The inclusion of a representative sample of primary schools ensures the generalizability of findings, considering the geographical and socio-economic diversity inherent in the Indian context. Additionally, the multi-faceted data collection approach, combining age-appropriate questionnaires, on-site observations, and facility assessments, ensures a comprehensive exploration of hand washing practices and associated factors, adding robustness to the study's methodology. These methodological strengths collectively contribute to the study's capacity to generate meaningful insights and inform evidence-based interventions for improving hand hygiene in primary schools.

Public Health Implications:

The findings of this study hold significant public health implications, particularly in the context of primary schools in diverse regions of India. Understanding the dynamics of hand washing practices and associated factors within the school environment provides a foundation for targeted interventions to enhance public health outcomes.

1. **Disease Prevention:** Effective hand hygiene is a cornerstone in preventing the transmission of infectious diseases, especially in settings where individuals come into close contact, such as primary schools. By identifying areas of improvement in hand

washing practices, public health interventions can be tailored to reduce the incidence of infections among students.

2. **Health Promotion in Schools:** The school setting offers a unique opportunity for health promotion initiatives. The study underscores the need for comprehensive hygiene education programs that go beyond theoretical knowledge and actively promote positive hand washing behaviors. Implementing such programs can instill lifelong habits that extend beyond the school years.

3. **Infrastructure Enhancement:** The assessment of hand washing facilities reveals critical insights into the condition and accessibility of hygiene infrastructure. Public health efforts can be directed towards targeted improvements in infrastructure, ensuring that hand washing stations are not only available but also well-maintained and easily accessible to all members of the school community.

4. **Demographic Tailoring:** The significant association between gender and hand washing practices highlights the importance of tailoring interventions to specific demographic groups. Public health campaigns can incorporate gender-specific strategies to address variations in hand hygiene behavior among students. This personalized approach may contribute to more equitable health outcomes.

Future Directions:

1. **Longitudinal Studies:** To gain a deeper understanding of the sustained impact of interventions, future research could adopt a longitudinal approach. Long-term studies tracking hand washing practices and associated factors over an extended period would provide insights into the durability of behavior change and the lasting effects of interventions.

2. **Qualitative Exploration:** Complementing quantitative findings with qualitative exploration could offer richer insights into the cultural and contextual factors influencing hand hygiene. In-depth interviews and focus group discussions with students, teachers, and parents could provide a nuanced

understanding of attitudes, beliefs, and social norms related to hand washing .

3. Multi-Stakeholder Collaboration: Future interventions should involve collaboration between public health authorities, school administrators, parents, and local communities. Engaging all stakeholders in the design and implementation of hand hygiene initiatives can enhance the sustainability and effectiveness of interventions.

4. Technological Solutions: The integration of technology, such as mobile applications or interactive platforms, could be explored to reinforce hand hygiene practices. Gamified educational modules or real-time monitoring systems may provide innovative ways to engage students and promote sustained behavior change.

5. Economic Evaluations: Conducting economic evaluations of hand hygiene interventions could further inform decision-

makers about the cost-effectiveness of various strategies. Understanding the economic impact of interventions can guide resource allocation and prioritize initiatives that yield the greatest public health benefits.

Conclusion

This study contributes substantially to the understanding of hand washing practices in primary schools in India. The nuanced findings inform evidence-based interventions encompassing educational initiatives, infrastructure enhancements, and demographic-specific strategies. By addressing these facets, primary schools can play a transformative role in cultivating a culture of consistent hand hygiene, ultimately contributing to the overall health and well-being of students.

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TABLES

Table 1: Hand washing Practices

Frequency of Hand washing	Inside School Hours (%)	Outside School Hours (%)
Always	70	45
Often	20	30
Rarely	8	15
Never	2	10

Table 2: Knowledge and Perceptions Regarding Hand washing

Aspect	Excellent (%)	Good (%)	Fair (%)	Poor (%)
Knowledge of Proper Hand washing Techniques	45	35	15	5
Understanding of the Importance of Hand Hygiene	60	25	10	5
Perceived Barriers to Consistent Hand washing	20	35	30	15
Positive Attitudes Toward Hygiene Practices	70	25	3	2

Table 3: Factors Influencing Hand washing Practices

Variable	P-value
Availability of Soap	0.001*
Accessibility of Hand washing Facilities	0.003*
Participation in Educational Programs	0.015*

*Statistically significant

Table 4: Demographic Factors and Hand washing Practices

Demographic Characteristic	P-value
Age	0.102
Gender	0.045*

*Statistically significant

Table 5: Condition and Accessibility of Hand washing Facilities

Aspect	Excellent (%)	Good (%)	Fair (%)	Poor (%)
Physical Condition of Hand washing Stations	40	45	10	5
Accessibility to Classrooms and Common Areas	60	30	8	2
Availability of Amenities (Soap, Water, Drying)	50	40	7	3