

Assessment of Hand Hygiene Knowledge and Practices Among Healthcare Professionals: A Cross-Sectional Online Survey

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Abstract

Background: Hand hygiene is one of the most important measures for preventing healthcare-associated infections and reducing the transmission of pathogenic microorganisms in healthcare settings. Despite the availability of standard guidelines, gaps in knowledge and adherence to recommended hand hygiene practices may persist among healthcare professionals.

Methods: A descriptive cross-sectional online survey design is proposed to assess hand hygiene knowledge and practices among healthcare professionals. A structured, self-administered online questionnaire may be distributed to eligible participants through professional networks and healthcare institutions. The questionnaire will cover demographic characteristics, knowledge of hand hygiene indications, appropriate hand hygiene techniques, use of alcohol-based hand rubs, and self-reported adherence to recommended practices. Data will be analysed using descriptive statistics and appropriate inferential tests.

Results: The results will describe the participants' level of hand hygiene knowledge, reported practices, and potential barriers to compliance. The actual findings, including sample size, percentages, mean scores and statistical associations, will be reported after data collection and analysis.

Conclusion: Assessing hand hygiene knowledge and practices can help identify educational needs among healthcare professionals. The findings may support targeted training, improved access to hand hygiene facilities and institutional infection prevention initiatives.

Keywords: Hand Hygiene, Healthcare Professionals, Infection Prevention, Healthcare-Associated Infections, Online Survey, Standard Precautions, Patient Safety.

INTRODUCTION

Hand hygiene is a fundamental component of infection prevention and control in healthcare settings. Healthcare professionals come into contact with patients, body fluids, medical equipment and contaminated environmental surfaces during routine clinical activities. Inadequate hand hygiene can contribute to the transmission of pathogenic microorganisms and healthcare-associated infections.¹

Healthcare-associated infections remain an important concern for patient safety and healthcare quality. Effective hand hygiene helps interrupt the transmission of microorganisms between healthcare professionals, patients and the surrounding environment. The World Health Organization (WHO)

recommends hand hygiene at five critical moments during patient care: before touching a patient, before clean or aseptic procedures, after body-fluid exposure risk, after touching a patient, and after touching the patient's surroundings.²

Hand hygiene can be performed using an appropriate alcohol-based hand rub or by washing with soap and water, depending on the clinical situation. Alcohol-based hand rub is generally preferred for routine clinical hand antisepsis when hands are not visibly soiled. Soap and water should be used when hands are visibly dirty or when otherwise indicated by applicable infection prevention guidance.³

Although hand hygiene guidelines are widely available, adherence may be affected by workload, time pressure, inadequate facilities, skin irritation, limited training and institutional practices. Knowledge of hand hygiene recommendations is important, but knowledge alone does not necessarily ensure consistent compliance.⁴

An online survey provides a practical approach to assessing healthcare professionals' understanding of hand hygiene and their self-reported practices across different professional groups. It can also help identify perceived barriers and areas requiring additional education.⁵

Therefore, the present study focuses on assessing hand hygiene knowledge and self-reported practices among healthcare professionals through a cross-sectional online survey.⁶

OBJECTIVES

1. To assess knowledge regarding recommended hand hygiene indications and techniques among healthcare professionals.
2. To assess self-reported hand hygiene practices among healthcare professionals.
3. To identify perceived barriers to performing hand hygiene.
4. To determine the association between hand hygiene knowledge and selected professional characteristics.
5. To identify areas requiring further hand hygiene education and training.

RESEARCH HYPOTHESES

H₁: There is a statistically significant association between hand hygiene knowledge level and selected professional characteristics.

H₂: Healthcare professionals who have received recent hand hygiene training have significantly different knowledge scores from those who have not received recent training.

H₃: There is a statistically significant association between hand hygiene knowledge level and self-reported practice category.

These hypotheses should be tested only after collecting actual survey data and defining the scoring system.

Research Methodology

Research Approach

A quantitative research approach will be used.

Research Design

A descriptive cross-sectional survey design will be adopted.

Research Setting

The survey may include healthcare professionals working in selected hospitals, clinics, diagnostic laboratories and other healthcare facilities in Rajasthan or other selected locations.⁷

The final manuscript should identify the actual geographical area and participating institutions.⁸

Target Population

The target population will consist of eligible healthcare professionals involved in patient care or healthcare support services.

Sample Size

The sample size should be determined before data collection using the expected prevalence of adequate knowledge or another appropriate primary outcome.

For a prevalence-based calculation, the following formula may be used:

For example, using 95% confidence, an expected prevalence of 50%, and 10% absolute precision gives approximately 96 participants before adjustment for non-response. The final sample size should account for the study design and anticipated response rate.⁹

Sampling Technique

Convenience sampling or another clearly defined recruitment strategy may be used, depending on access to participants and the study objectives.

The recruitment method must be described accurately because an online convenience sample may not represent all healthcare professionals.

Inclusion Criteria

Participants who:

1. are healthcare professionals aged 18 years or older;
2. are currently working in an eligible healthcare setting;
3. can understand the language of the questionnaire;
4. have access to the online survey;
5. provide informed consent.

Exclusion Criteria

Participants who:

1. do not provide informed consent;
2. submit substantially incomplete questionnaires according to predefined criteria;
3. submit duplicate responses where these can be identified using an ethically appropriate method.

Study Variables

Primary outcome: Hand hygiene knowledge score.

Secondary outcomes: Self-reported hand hygiene practice score and perceived barriers.

Independent variables: Professional role, years of experience, workplace type, previous hand hygiene training, availability of alcohol-based hand rub and other selected professional characteristics.

Description of the Data Collection Tool

A structured online questionnaire may be prepared using Google Forms or another secure online survey platform.

The questionnaire will consist of four sections.

Section A: Demographic and Professional Information

Section B: Hand Hygiene Knowledge

This section will assess knowledge regarding the WHO Five Moments for Hand Hygiene, indications for soap and water, appropriate use of alcohol-based hand rub, glove use and recommended hand hygiene techniques.¹⁰

Section C: Self-Reported Hand Hygiene Practices

Participants will report how frequently they perform recommended hand hygiene activities in their workplace. Responses may be recorded on a five-point frequency scale: always, often, sometimes, rarely and never.¹¹

Section D: Perceived Barriers

This section will identify perceived barriers such as workload, time constraints, limited access to supplies, skin irritation, inadequate training and lack of reminders.

The questionnaire should undergo expert review and pilot testing before the main survey. Its validity and reliability should be assessed where appropriate.

Data Collection Procedure

After obtaining the required institutional permissions and ethics approval, eligible healthcare professionals will be invited to participate.

The online survey link will be shared through approved professional networks or participating healthcare institutions. An information statement will explain the study objectives, voluntary nature of participation, expected completion time and confidentiality arrangements.

Electronic informed consent will be obtained before the questionnaire begins.

Participants will complete the questionnaire independently. Responses will be checked for completeness and duplicate entries using predefined procedures. The collected data will be exported to statistical software for cleaning, coding and analysis.

Ethical Considerations

Ethical approval will be obtained from the appropriate Institutional Ethics Committee before data collection, where required.

Participation will be voluntary, and electronic informed consent will be obtained. Identifying information will not be collected unless necessary and approved. Data will be stored securely, and results will be presented in aggregate form.

Participants will be informed that they may decline to participate. The study will follow applicable institutional and data-protection requirements.

Statistical Analysis

Data analysis will be conducted using suitable statistical software.

- Frequency and percentage: To summarize demographic characteristics, knowledge responses, practice responses and barriers.
- Mean and standard deviation: To summarize knowledge scores when the score distribution and measurement properties support these statistics.
- Median and interquartile range: To summarize skewed score distributions.
- Chi-square test or Fisher's exact test: To examine associations between categorical variables.
- Independent samples t test or Mann–Whitney U test: To compare knowledge scores between two independent groups, depending on the assumptions.
- ANOVA or Kruskal–Wallis test: To compare scores across more than two groups, as appropriate.

A two-sided p value below 0.05 may be considered statistically significant. Effect estimates and confidence intervals should be reported where appropriate.

RESULTS

Table 1. Demographic and Professional Characteristics of Healthcare Professionals (N=150)

Demographic variable	Frequency (n)	Percentage (%)
Age		
18–25 years	42	28.0
26–35 years	63	42.0
36–45 years	30	20.0
Above 45 years	15	10.0
Gender		
Male	54	36.0
Female	93	62.0
Prefer not to say	3	2.0
Professional designation		
Staff nurses	72	48.0
Doctors	30	20.0
Laboratory professionals	18	12.0
Allied health professionals	20	13.3
Other healthcare professionals	10	6.7
Professional experience		
Less than 1 year	24	16.0
1–5 years	60	40.0
6–10 years	39	26.0

More than 10 years	27	18.0
Hand hygiene training in the past 12 months		
Yes	96	64.0
No	54	36.0
Total	150	100.0

Interpretation: In this illustrative distribution, 42% of participants were aged 26–35 years, 62% were female, and 48% were staff nurses. Nearly two-thirds (64%) reported receiving hand hygiene training during the preceding 12 months.

Table 2. Knowledge Regarding Hand Hygiene (N=150)

Knowledge item	Correct responses (n)	Percentage (%)
Understanding the purpose of hand hygiene	141	94.0
Knowledge of the WHO Five Moments	120	80.0
Appropriate use of alcohol-based hand rub	132	88.0
Indications for soap and water	126	84.0
Knowledge that gloves do not replace hand hygiene	144	96.0
Hand hygiene after glove removal	138	92.0
Knowledge of commonly missed hand surfaces	111	74.0
Correct hand hygiene technique	117	78.0

Interpretation: The highest proportion of correct responses concerned the understanding that gloves do not replace hand hygiene (96%). Knowledge of commonly missed hand surfaces was comparatively lower (74%), suggesting a possible need for additional practical demonstrations.

Table 3. Overall Level of Hand Hygiene Knowledge (N=150)

Knowledge level	Frequency (n)	Percentage (%)
Adequate knowledge	90	60.0
Moderate knowledge	42	28.0
Inadequate knowledge	18	12.0
Total	150	100.0

Proposed scoring categories: adequate $\geq 80\%$, moderate 60–79%, and inadequate below 60% of the total knowledge score.

Interpretation: In this illustrative dataset, 60% of healthcare professionals had adequate knowledge, while 40% had moderate or inadequate knowledge. These categories are proposed for this study and should be finalized before actual data analysis.

Table 4. Self-Reported Hand Hygiene Practices (N=150)

Practice item	Always/often (n)	Percentage (%)
Hand hygiene before touching a patient	111	74.0
Hand hygiene before an aseptic procedure	132	88.0
Hand hygiene after body-fluid exposure risk	138	92.0
Hand hygiene after touching a patient	126	84.0
Hand hygiene after touching patient surroundings	102	68.0
Hand hygiene after removing gloves	129	86.0

Use of alcohol-based hand rub when appropriate	123	82.0
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Interpretation: The highest reported frequency was for hand hygiene after body-fluid exposure risk (92%). Hand hygiene after touching patient surroundings had the lowest reported frequency (68%). These are self-reported practices, not directly observed compliance.

Table 5. Perceived Barriers to Hand Hygiene (N=150)

Multiple responses permitted.

Perceived barrier	Frequency (n)	Percentage (%)
Heavy workload	78	52.0
Lack of time	66	44.0
Inadequate availability of supplies	36	24.0
Skin dryness or irritation	33	22.0
Lack of recent training	30	20.0
Lack of reminders or supervision	45	30.0
No major barriers reported	27	18.0

Interpretation: Heavy workload (52%) and lack of time (44%) were the most frequently reported barriers. Because participants could select multiple responses, percentages do not add up to 100%.

Table 6. Association Between Recent Hand Hygiene Training and Knowledge Level (N=150)

Training status	Adequate knowledge n (%)	Moderate/inadequate knowledge n (%)	Total
Received training	68 (70.8%)	28 (29.2%)	96
No recent training	22 (40.7%)	32 (59.3%)	54
Total	90 (60.0%)	60 (40.0%)	150

Illustrative Pearson chi-square result: $\chi^2 \approx 12.66$, $df = 1$, $p < 0.001$.

Interpretation: In this illustrative table, adequate knowledge was more common among participants who reported recent training (70.8%) than among those who did not (40.7%). The association is statistically significant in this example. Actual significance must be recalculated using real survey responses.

Association Between Professional Experience and Knowledge Level

Professional experience	Adequate knowledge n (%)	Moderate/inadequate knowledge n (%)	Total
Less than 1 year	10 (41.7%)	14 (58.3%)	24
1–5 years	34 (56.7%)	26 (43.3%)	60
6–10 years	26 (66.7%)	13 (33.3%)	39
More than 10 years	20 (74.1%)	7 (25.9%)	27
Total	90 (60.0%)	60 (40.0%)	150

Illustrative Pearson chi-square result: $\chi^2 \approx 8.28$, $df = 3$, $p \approx 0.041$.

Interpretation: The illustrative distribution shows a higher proportion of adequate knowledge among participants with more professional experience. This association should be tested with actual data before drawing a conclusion.

Results Summary

The illustrative tables suggest that hand hygiene knowledge and self-reported practices may vary among healthcare professionals. Recent training and professional experience appear to be relevant factors for further investigation. Heavy workload and lack of time are potential barriers that healthcare institutions could address through staff education, convenient access to hand hygiene products and workplace quality-improvement programmes.

DISCUSSION

The discussion should interpret the actual findings in relation to previous literature and established infection prevention guidance.

If participants who received recent training have higher knowledge scores, the association should be compared with previous research on educational interventions. However, a cross-sectional study cannot establish that training caused higher knowledge or better practice.

The WHO Five Moments for Hand Hygiene provides a useful framework for interpreting responses concerning hand hygiene indications.^{1,2} Studies evaluating hand hygiene improvement interventions also emphasize the importance of education and institutional support.⁴

LIMITATIONS OF THE STUDY

1. Online recruitment may exclude healthcare professionals with limited internet access.
2. Convenience sampling may limit the representativeness of the sample.
3. Self-reported practices may be affected by recall and social-desirability bias.
4. Cross-sectional data cannot establish causal relationships.
5. The results may not be generalizable to all healthcare facilities.
6. A researcher-developed questionnaire may require additional validation before wider use.

IMPLICATIONS FOR NURSING AND HEALTHCARE PRACTICE

Nursing practice: The findings may help identify gaps in hand hygiene knowledge and reported practices among nurses and other healthcare professionals.

Nursing education: The study may guide the development of structured hand hygiene education, demonstrations and refresher training.

Hospital administration: Identified barriers may support improvements in the availability of alcohol-based hand rub, sinks, supplies and reminders at points of care.

Research: Further studies may use direct observation, repeated surveys or intervention designs to assess changes in actual hand hygiene compliance.

RECOMMENDATIONS

1. Conduct regular hand hygiene training for healthcare professionals.
2. Ensure convenient access to hand hygiene products at points of care.
3. Reinforce the WHO Five Moments for Hand Hygiene.

4. Conduct periodic assessments of knowledge and reported practices.
5. Use direct observation or other validated methods when actual compliance is the outcome of interest.
6. Conduct multicentre studies with more representative sampling.
7. Evaluate the effectiveness of multifaceted infection prevention interventions.

CONCLUSION

Hand hygiene is an essential component of infection prevention and patient safety. Assessing knowledge, self-reported practices and perceived barriers among healthcare professionals can help identify areas requiring educational and institutional improvement. The proposed cross-sectional online survey provides a practical framework for such an assessment. The final conclusions regarding knowledge levels, reported practices and associated factors must be based on actual collected and analysed data.

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