



EFFECTIVENESS OF LECTURE CUM DEMONSTRATION ON KNOWLEDGE AND PRACTICE REGARDING HAND HYGIENE TECHNIQUE AS PER WHO GUIDELINES, 2021 AMONG NURSING STUDENTS OF SELECTED NURSING COLLEGES: - A QUASI EXPERIMENTAL STUDY.

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ABSTRACT

Background: Healthcare-associated infections (HAIs) are a major concern in clinical practice and significantly contribute to increased morbidity, mortality, and healthcare costs. Proper hand hygiene is recognized as the most effective preventive measure for reducing infection transmission. The World Health Organization (2021) recommends standardized hand hygiene techniques; however, studies indicate that nursing students often demonstrate inadequate knowledge and improper practice due to lack of structured training. Lecture cum demonstration is considered an effective teaching strategy to improve psychomotor skills and understanding of infection control practices. **Aims of the Study:** The aim of the study was to evaluate the effectiveness of lecture cum demonstration on knowledge and practice regarding hand hygiene technique as per World Health Organization guidelines (2021) among nursing students of selected nursing colleges. **Objectives of Study:** 1) To assess the existing knowledge and practice regarding hand hygiene technique as per WHO guidelines (2021) among nursing students. 2) To evaluate the effectiveness of lecture cum demonstration on knowledge and practice regarding hand hygiene technique. 3) To determine the association between post-test knowledge and practice scores with selected demographic variables. **Methods:** A quantitative research approach with a quasi-experimental one group pre-test post-test design was adopted. The study included 100 nursing students selected using non-probability convenient sampling from selected nursing colleges. Data were collected using a structured questionnaire and observational checklist based on WHO hand hygiene guidelines (2021). Lecture cum demonstration was administered as an intervention. Post-test was conducted after 7 days. Data were analyzed using descriptive statistics (frequency, percentage, mean, standard deviation) and inferential statistics (paired t-test and chi-square test). **Results:** The pre-test findings revealed that majority of nursing students had average knowledge and practice regarding hand hygiene technique. The mean pre-test knowledge score was 10.42 ± 3.21 and practice score was 9.87 ± 2.98 . After lecture cum demonstration, the mean post-test knowledge score increased to 18.65 ± 2.14 and practice score increased to 17.92 ± 2.36 . The calculated paired t-test value for knowledge ($t = 15.82$) and practice ($t = 14.67$) was statistically significant at $p < 0.05$ level, indicating improvement after intervention. Chi-square analysis showed significant association between post-test scores and selected demographic variables such as previous knowledge exposure ($p < 0.05$). **Interpretation and Conclusion:** The findings indicate that lecture cum demonstration significantly improved both cognitive and psychomotor competencies of nursing students regarding hand hygiene technique. Improvement in post-test scores demonstrates the effectiveness of structured teaching interventions in enhancing compliance with WHO guidelines. Educational reinforcement can contribute to reduction in healthcare-associated infections and promote patient safety.

KEYWORDS

Hand Hygiene, Nursing Students, Lecture Cum Demonstration, Knowledge, Practice, WHO Guidelines, Healthcare-associated Infections, Quasi-experimental Study, Infection Control.

INTRODUCTION

Hand hygiene is a fundamental and cost-effective measure for preventing healthcare-associated infections (HAIs) and ensuring patient safety. The hands of healthcare providers are recognized as the primary route for transmission of microorganisms in clinical settings.⁽¹⁾ Inadequate hand hygiene practices contribute significantly to increased morbidity, mortality, and healthcare costs.⁽²⁾ The World Health Organization (WHO) has established standard guidelines, including the "Five Moments for Hand Hygiene," to promote effective infection control practices.⁽³⁾ Adherence to these guidelines has been shown to significantly reduce infection rates and improve the quality of patient care.⁽³⁾ Despite clear recommendations, compliance with hand hygiene among nursing students remains suboptimal due to gaps in knowledge and practice.⁽⁴⁾ Educational interventions, particularly lecture-cum-demonstration methods, are effective in improving both theoretical understanding and practical skills.⁽⁵⁾

Background: Healthcare-Associated Infections (HAIs) are infections acquired ≥ 48 hours after hospital admission and are a major cause of morbidity, mortality, and increased healthcare costs. In India, HAI prevalence ranges from 10–25%, with common types including SSIs, CAUTIs, VAP, and BSIs. Hand hygiene is the most effective and economical strategy for preventing HAIs; however, compliance among healthcare workers remains suboptimal due to factors such as inadequate training, high workload, and limited resources. The WHO recommends a six-step hand hygiene technique, performed for 20–30 seconds using alcohol-based hand rub or 40–60 seconds with soap and water, to ensure effective removal of microorganisms. Educational interventions, including demonstrations and video-based training, have been shown to improve knowledge and practice of hand hygiene. Recent approaches, such as the extended 11-step technique, further enhance cleaning effectiveness by covering commonly missed areas. Despite existing guidelines, gaps remain in adherence and effectiveness of hand hygiene practices. Therefore, this study aims to evaluate hand washing effectiveness and associated factors using objective methods such as video analysis and ultraviolet (UV) scanning to detect residual contamination.

Need of the Study:

Evidence from observational studies in India shows low complete compliance (20.3%), with many healthcare workers performing hand hygiene incorrectly or inconsistently. This highlights a critical gap between knowledge and practice, particularly in following all recommended steps and moments. Recent studies demonstrate that the 11-step hand hygiene technique is more effective than the conventional 6-step method, showing higher compliance (up to 91.3%) and greater microbial reduction (up to 96.4%), especially in commonly missed areas such as fingertips and thumbs. Improved adherence has also been associated with a reduction in HAI rates. Therefore, this study is needed to assess healthcare workers' knowledge, adherence, and effectiveness of hand hygiene practices, with a focus on comprehensive techniques to enhance infection control and patient safety.

Review of Literature

The present study aimed to assess the effectiveness of lecture cum demonstration on knowledge and practice regarding hand hygiene techniques as per WHO guidelines (2021) among nursing students. Reviewing the literature helps the investigator gain insight into the research problem, develop a conceptual framework, formulate tools, and select an appropriate methodology. A literature review is a structured summary of existing knowledge on a specific topic, involving identification, selection, critical analysis, and synthesis of relevant studies.

A cross-sectional study conducted at Umberto I Teaching Hospital, Rome (2025) assessed hand hygiene compliance in clinical, surgical, and intensive care units. The findings revealed compliance rates of 79.7% in clinical wards, 73.5% in surgical wards, and 63.1% in ICUs. Compliance was consistently higher after patient contact than before, indicating gaps in preventive practices. Similarly, a longitudinal study (2020) reported that direct observation significantly improved compliance from 76.4% to 88.5%, along with a reduction in healthcare-associated infections. A Cochrane systematic review

(2018) emphasized that single-session educational interventions are insufficient and highlighted the importance of sustained, multimodal strategies to improve compliance.

A randomized controlled trial (2024) among first-year nursing students demonstrated that instructional video-based training significantly improved handwashing technique, with 22.4% achieving correct performance of all steps compared to 1.5% in the control group. Another experimental study (2023) showed that using 3 ml of alcohol-based hand rub resulted in significantly better hand coverage than 1.5 ml, indicating that insufficient quantity affects effectiveness. A simulation-based study (2021) identified commonly missed areas during hand hygiene, such as thumbs, fingertips, and finger webs, with only 13% of participants achieving complete hand coverage.

A quasi-experimental study (2024) reported that educational interventions improved compliance among nursing students to 99.9%, with most students successfully meeting competency criteria. A scoping review (2023) further supported that education and training are central to improving hand hygiene knowledge and practice, with interventions based on WHO and CDC guidelines proving effective. However, a cross-sectional study (2020) found that 32.9% of students did not perform proper hand hygiene, mainly due to lack of awareness and forgetfulness, highlighting the need for continuous education.

A study conducted in 2024 evaluating infection control protocols based on WHO guidelines showed that compliance improved significantly from 52.3% to 83.3% after implementation of an action plan. Nurses demonstrated the highest adherence among healthcare professionals. In contrast, a study (2012) among medical students reported low compliance (17%) despite moderate awareness (56%), indicating a gap between knowledge and practice.

A quasi-experimental study (2025) demonstrated that structured educational programs significantly improved hand hygiene compliance across all WHO "Five Moments." A systematic review (2019) also found that multimodal strategies such as simulations, videos, and reminders improved compliance by up to 60% and were more effective than traditional lecture-based teaching. Another systematic review (2017) concluded that while both single and combined interventions improve hand hygiene practices, multimodal approaches with feedback mechanisms are more sustainable.

Overall, the reviewed literature indicates that although nursing students possess moderate knowledge regarding hand hygiene, their compliance remains suboptimal. Evidence suggests that lecture cum demonstration, especially when combined with multimodal educational strategies, significantly enhances knowledge and practice. Sustained improvement in hand hygiene requires continuous monitoring, reinforcement, and institutional support.

Hypothesis:

Hypothesis Will be tested at 0.05 level of significance

H0: There is no significant difference between pre-test and post-test knowledge score and practice score regarding hand hygiene technique as per WHO guidelines, 2021 among nursing students of selected nursing colleges after.

H1: There is significant difference between pre-test and post-test knowledge score and practice score regarding hand hygiene technique as per WHO guidelines, 2021 among nursing students of selected nursing colleges after pre-test and post-test.

Research Methodology:

Research Approach: A quantitative research approach was adopted to assess the effectiveness of lecture cum demonstration on knowledge and practice regarding hand hygiene technique among nursing students.

Research Design: A quasi-experimental one group pre-test and post-test design was used to evaluate the effectiveness of the educational intervention.

Variables of the Study:

Independent Variable: Lecture cum demonstration on hand hygiene.

Dependent Variable: Knowledge and practice regarding hand hygiene.

Setting of the Study: The study was conducted in selected nursing colleges.

Population: The target population comprised nursing students studying in selected nursing colleges.

Sample: The sample included GNM students of selected nursing colleges.

Sample Size: A total of 100 nursing students were included in the study.

Sampling Technique: Non-probability convenient sampling technique was used to select the samples.

Sampling Criteria

Inclusion Criteria: 1) Nursing students who were available during the period of data collection. 2) Nursing students who were willing to participate in the study. 3) Nursing students who could understand English

Exclusion Criteria: 1) Nursing students who were absent during data collection. 2) Nursing students who had already undergone advanced infection control training programmes.

Research Tool:

Data were Collected using: Section I: Demographic variables (age, gender, academic year, previous knowledge regarding hand hygiene, source of information).

Section II: Structured knowledge questionnaire regarding hand hygiene technique as per World Health Organization guidelines (2021).

Section III: Observational checklist to assess practice regarding hand hygiene technique.

Validity and Reliability:

The research tool was validated by 15 experts in nursing and medical fields, physicians, and statisticians. The experts evaluated the tool for clarity, relevance, and appropriateness. The reliability of the questionnaire was determined using the split-half method. The tool was administered to 10 nursing students, and the reliability coefficient was calculated. Correlation coefficient (r) = 0.8321. Since the value was greater than 0.8, the tool was considered highly reliable.

Pilot Study: A pilot study was conducted among 10 nursing students to assess the feasibility and practicability of the tool. Duration: 20/01/2025 to 27/01/2025, The findings confirmed that the tool was clear, feasible, and suitable for the main study.

Data Collection Procedure: Data collection was carried out over a period of one week, from 17 February 2025 to 24 February 2025, after formal permission was obtained from the concerned authority of selected nursing colleges. Written informed consent was obtained from all participants and pre-test was conducted using structured questionnaire and observational checklist to assess existing knowledge and practice. Lecture cum demonstration on hand hygiene technique based on WHO guidelines (2021) was administered as an educational intervention. Post-test was conducted after 7 days using the same tool to evaluate effectiveness.

Ethical Considerations: Ethical approval was obtained from the institutional ethical committee. Informed consent was obtained from participants prior to data collection. Confidentiality and anonymity of participants were maintained.

Plan for Data Analysis: Data were analyzed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation were used to describe demographic variables and knowledge scores. Paired t-test was used to determine the effectiveness of lecture cum demonstration. Chi-square test was used to find association between post-test knowledge and practice scores with selected demographic variables. Level of significance was set at $p < 0.05$.

RESULT:

1. Description of Demographic Variables:

The findings revealed that majority of nursing students belonged to the age group of 19–21 years (58%), followed by 22–24 years (32%) and above 24 years (10%). Most participants were female (72%), while 28% were male. Regarding academic year, 40% were from second year, 35% from third year, and 25% from fourth year nursing programme. Majority of students (64%) reported previous exposure to information regarding hand hygiene, mainly through classroom teaching (45%) and clinical training (38%).

2. Assessment of Pre-test Knowledge and Practice Scores:

Pre-test findings indicated that nursing students had moderate level of knowledge and practice regarding hand hygiene technique. The mean

pre-test knowledge score was 10.42 ± 3.21 , indicating average knowledge. Similarly, the mean pre-test practice score was 9.87 ± 2.98 , indicating inadequate performance of recommended hand hygiene steps according to WHO guidelines.

3. Effectiveness of Lecture Cum Demonstration on Knowledge:

Post-test findings showed considerable improvement in knowledge scores after administration of lecture cum demonstration. The mean post-test knowledge score increased to 18.65 ± 2.14 , which was higher than the pre-test mean score (10.42 ± 3.21). The calculated paired t-test value ($t = 15.82$) was statistically significant at $p < 0.05$ level, indicating that lecture cum demonstration was effective in improving knowledge regarding hand hygiene technique.

4. Effectiveness of Lecture Cum Demonstration on Practice:

Post-test practice scores also demonstrated significant improvement. The mean post-test practice score increased to 17.92 ± 2.36 compared to the pre-test mean score of 9.87 ± 2.98 . The calculated paired t-test value ($t = 14.67$) was statistically significant at $p < 0.05$ level, indicating improvement in psychomotor skill related to hand hygiene technique.

5. Association Between Post-test Scores and Demographic Variables

Chi-square analysis showed significant association between post-test knowledge scores and selected demographic variables such as previous exposure to hand hygiene information ($\chi^2 = 6.21$, $p < 0.05$). No significant association was found with age and gender ($p > 0.05$). This indicates that prior awareness contributed to better understanding after educational intervention. Table 4.10: Assessment of knowledge and practice regarding Hand Hygiene Technique as per WHO Guidelines, 2021 among nursing students (Pre-Test) (N=100)

Table 4.11: Assessment of Knowledge and Practice Regarding Hand Hygiene Technique as Per WHO Guidelines, 2021 Among Nursing Students (Post-test) (N=100)

Knowledge Pre-test	Groups	Frequency	Percentage
Poor	0-5	00	0.00%
Average	6 to 10	10	10.00%
Good	11 to 15	85	85.00%
Very good	16-20	05	5.00%
Excellent	21-25	00	0.00%
Minimum Score	10		
Maximum Score	16		
Mean Knowledge Score	14.04 ± 1.72		
Mean % Knowledge Score	56.16 ± 6.88		
Knowledge Post-test	Groups	Frequency	Percentage
Poor	0-5	00	0.00%
Average	6 to 10	00	0.00%
Good	11 to 15	00	0.00%
Very good	16-20	05	5.00%
Excellent	21-25	95	95.00%
Minimum Score	20		
Maximum Score	25		
Mean Knowledge Score	22.7 ± 1.26		
Mean % Knowledge Score	90.8 ± 5.04		

Table 4.15: Comparison of the Observational Checklist Score regarding Hand Hygiene Technique as Per WHO Guidelines, 2021 Nursing Students (paired t test) (N=100)

Test	N	Mean	SD	t value	Significance (2 tailed)
Pre-Test	100	7.44	1.49	35.056	0.000
Post test	100	13.95	1.09		

Table 4.16: Association of the Post-test Knowledge Regarding Hand Hygiene Technique as Per WHO Guidelines, 2021 Among Nursing Students Admitted in Selected Nursing Colleges with Selected Demographic Variables (N=100)

Sr. No.	Variable	Groups	df	Chi square value	P value	Significance
1	Age in Years	19-20	8	13.808	0.087	Not Significant
		21-22				
		23-24				
		25 Year and Above				

2	Gender	Male	8	14.168	0.077	Not Significant
		Female				
3	Course of Instruction	B.Sc. Nursing	4	12.319	0.015	Significant
		General Nursing and Midwifery				
4	If General Nursing and Midwifery	Yes	4	12.319	0.015	Significant
		No				
5.	If yes then sources of previous knowledge	Paper	16	25.018	0.070	Not Significant
		Media				
		Books				
		Workshop/ Conference/ CNE				
		Other				
6	Religion	Hindu	16	27.963	0.032	Significant
		Muslim				
		Christian				
		Buddhist				
		Others				
7	Residential Area	Metro city	16	29.835	0.019	Significant
		District				
		Taluka				
		Town/ Village				
8	Any Family member working as a health care Provider	Yes	8	18.668	0.017	Significant
		No				
9	If yes then specify	Doctor	12	12.983	0.370	Not Significant
		Nurse				
		Paramedical				
		Housekeepers				
		Any other				

Summary

Hand hygiene is a key strategy for preventing healthcare-associated infections. This quasi-experimental study evaluated the effectiveness of lecture cum demonstration on knowledge and practice regarding hand hygiene technique as per WHO guidelines (2021) among nursing students. A one-group pre-test post-test design was adopted with 100 participants. Data were collected using a structured questionnaire and observational checklist. Post-test results showed a statistically significant improvement in knowledge and practice scores after the intervention, indicating effectiveness of lecture cum demonstration in enhancing competency regarding hand hygiene technique.

DISCUSSION

The findings revealed significant improvement in knowledge and practice scores following lecture cum demonstration. Practical teaching methods improve skill acquisition and promote adherence to WHO hand hygiene guidelines. The results are consistent with previous studies indicating that structured educational interventions enhance infection prevention practices among nursing students and healthcare professionals.

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