Vol. 5 No. 2 (2026)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Younis et al - 2026

DOI: http://doi.org/10.5281/zenodo.20772014

KNOWLEDGE, ATTITUDE AND PRACTICE (KAP) TOWARD HAND WASHING AMONG UNDERGRADUATE NURSING STUDENTS

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Keywords:
Attitude, Hand hygiene, Hand Washing, Health Care Associated Infections, Knowledge, Nursing Students, Practice.

Received on 22 Apr 2026
Accepted on 04 May 2026
Published on 20 Jun 2026

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Abstract

Background: Health care associated infections and emerging multi drug resistance in nosocomial pathogens is perceived as a serious public health threat with grievous concerns. Hand hygiene by nursing students, if practiced properly is cheapest, simplest and most effective tool in tackling this problem. The objective of this study was to assess levels of knowledge, attitude and practices of hand hygiene among undergraduate nursing students for identifying and filling the gaps for planning and implementing corrective measures to minimize the infections.

Methods: This cross-sectional study involved self-administered pre-structured questionnaires distributed to the undergraduate nursing students (84) enrolled at Mustafa Kamal Institute of Nursing and Medical Sciences, Vehari Pakistan.

Results: The study participants exhibited high levels of knowledge and practice with marginal difference, while attitude were found to exhibit a remarkably higher. However, mean difference being statistically significant among the undergraduate nursing students.

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Conclusions: This study has stressed upon the dire need for prompt interventions at institutional level for addressing and filling the gaps evident from the study.

CHAPTER 01
INTRODUCTION
1.1 Background

Hand hygiene is universally recognized as the single most effective measure to prevent healthcare associated infections (Buković, Kurtović et al. 2021). It plays a crucial role in breaking the chain of infection and ensuring patient safety. Among healthcare professionals, nurses are at the forefront of patient care and are frequently involved in direct patient contact, making hand hygiene compliance particularly vital (Issac, Nayak et al. 2026). Despite its simplicity, studies worldwide reveal that compliance with proper hand hygiene practices among healthcare providers, including nursing students, remains suboptimal.

Undergraduate nursing students represent the future workforce of healthcare systems (Rusaanes, Eide et al. 2024). Their knowledge, attitude, and practice (KAP) toward hand washing not only influence their own clinical behavior but also shape their professional habits and patient safety culture. Nursing education emphasizes infection control principles; however, a discrepancy often exists between theoretical understanding and practical adherence (Driscoll and Evans 2022).

Infection prevention and control (IPC) measures are particularly significant in developing countries like Pakistan, where hospital-acquired infections contribute to increased morbidity, mortality, and healthcare costs. Hence, assessing KAP toward hand washing among undergraduate nursing students is crucial for designing targeted educational interventions and promoting a culture of safety within healthcare institutions (Shyaka, Nzisabira et al. 2024).

Hand hygiene is the single most effective measure for preventing health-care–associated infections (HAIs) and interrupting transmission of pathogens in clinical settings (Abalkhail, Marzouk et al. 2025). The World Health Organization (WHO) emphasizes “My Five Moments for Hand Hygiene” and a multimodal improvement strategy to reduce HAIs globally (Kamara 2020). Effective hand hygiene among healthcare personnel, including nursing students during clinical placements, protects patients, staff, and the students themselves.

Despite global guidelines, multiple studies report variable knowledge and suboptimal compliance with hand hygiene among nursing students and trainees, indicating the need for targeted education and monitoring (Labrague, McEnroe-Petitte et al. 2018). Undergraduate nursing students spend substantial time in clinical environments where they perform patient care and are at risk of transmitting pathogens if hand hygiene is inadequate. Assessing their knowledge, attitudes and self-reported practices (KAP) provides an evidence base to design curriculum interventions, clinical supervision, and institutional infection prevention programs (Gupta, Sharma et al. 2020).

Local studies in Pakistan and other regions have reported mixed levels of KAP from adequate to low- to moderate underscoring the need for context-specific assessment (Cutajar). Thousands of people

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depart this life every day in the region of the world from infections acquired while in receipt of health care. Hands are the foremost pathways of germ broadcast during health care (Kolmos 2012). Hand hygiene is therefore the most important compute to avoid the broadcast of dangerous microorganisms and prevent health care-associated infections.

This leaflet explains how and when to put into practice hand hygiene. Any health-care worker, caregiver or person concerned in direct or indirect patient care needs to be afraid about hand hygiene and should be capable to execute it in the approved manner and at the right time (Ragusa, Marranzano et al. 2021). Hand hygiene, a broad phrase referring to any action of hand decontamination (Ragusa, Marranzano et al. 2021). Founded on recommendations from World Health Organization, hand hygiene is the essentially imperative manner to manage the sickbay infections. Due to the vital role of nurses in long-suffering concern, they should have crucial and rationalized information about hand hygiene (Khan and Care 2021).

Therefore, this study aims to assess the Knowledge, Attitude and Practice toward hand washing among Undergraduate Nursing Students. A wide-reaching operation on hand hygiene by the World Health Organization (WHO) is an imperative program for a fundamental fortification from a range of contagious diseases (Khan and Care 2021).

WHO started an operation, "Save Lives Clean Your Hands" which encompassed the hand washing techniques and a trouble-free manner of managing drug-resistant microorganisms (Kilpatrick, Tartari et al. 2024). In Pakistan, contagious diseases are foremost trouble for which the WHO initiated the Hand Hygiene operation in Pakistan Institute of Medical Sciences (PIMS) (Ameen and Research 2024). As end result of this operation, avoidance of health-care related infections (HCAIs) has developed into a high precedence patient agenda of PIMS (Ameen and Research 2024).

Each year millions of patients in the region of the world are exaggerated by infections that are transmitted by the health-care professionals (Abbas, Robalo Nunes et al. 2021).

Hand hygiene protects irritable disease in hospitals, but observance with suggested commands is usually unfortunate. We attempted to endorse hand hygiene by introducing a hospital-wide programmed, with particular prominence on bedside, alcohol-based hand disinfection. We deliberate nosocomial infections in corresponding (Cooney 2023).One of the major troubles and challenges in Neonatal intensive care units (NICU) are hospital acquired infections (Cooney 2023).

1.2: Problem Statement

World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) has issued guidelines for compliance with hand hygiene practices that are less followed by nursing students (McKnight 2025). This gap between knowledge and actual practice results in increased risk of nosocomial infections during clinical training.

Therefore, there is a dire need to assess the Knowledge, Attitude, and Practice (KAP) toward Hand Washing among Undergraduate Nursing Students to identify areas requiring improvement and boost infection control education.

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1.3: Significance of Study

A Knowledge, Attitude, and Practice (KAP) study plays a crucial role in identifying gaps between what people know, what they believe, and how they act in real-life situations. Understanding these dimensions helps researchers and policymakers design more effective interventions, health education programs, and behavior change strategies (Okoh, Batur et al. 2025).

This study is significant because it provides evidence-based insights into the level of knowledge, attitude, and compliance of nursing students toward hand washing practices. Understanding these aspects is crucial for identifying gaps between theoretical awareness and actual behavioral practice. Often, students may possess adequate knowledge but fail to translate it into proper clinical behavior due to misconceptions, lack of motivation, or institutional barriers. Hence, assessing their KAP will allow educators and administrators to develop targeted interventions, including educational modules, workshops, and behavioral reinforcement strategies, that can promote effective and consistent hand hygiene practices (Pieters, Fahsen et al. 2025).

1.4: Objectives/Study Questions

The objective of this study is to assess the level of knowledge, attitudes and practices regarding hand washing among undergraduate nursing students.

1.5: Research Questions:

1. What will be the level of knowledge regarding hand hygiene among undergraduate nursing students?
2. What will be the level of attitude regarding hand hygiene among undergraduate nursing students?
3. What will be the level of practice regarding hand hygiene among undergraduate nursing students?

CHAPTER 02
REVIEW OF LITERATURE

Hand hygiene is recognized universally as the single most effective and cost-efficient measure to prevent healthcare-associated infections (HAIs) and interrupt transmission of pathogens in healthcare settings (Abalkhail, Marzouk et al. 2025). Health organizations including the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) centralize hand hygiene in infection prevention and control (IPC) policies, and have developed operational tools notably the WHO “My 5 Moments for Hand Hygiene” framework and a multimodal improvement strategy for implementation, monitoring, and education (EKATA 2025). These tools emphasize system change (availability of alcohol-based handrub and sinks), education and training, monitoring and feedback, reminders in the workplace, and institutional safety culture.

Undergraduate nursing students are a key target group for hand hygiene education because students spend substantial time in clinical environments, act as vectors for transmission if non-adherent, and

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DOI: http://doi.org/10.5281/zenodo.20772014

are future frontline practitioners who shape the safety culture of their workplaces (Hugman 2025). KAP (Knowledge, Attitude, Practices) studies among nursing students therefore serve both diagnostic and evaluative roles. A well-designed KAP study can identify knowledge deficits, misconceptions, attitudinal barriers, and practical constraints that lead to suboptimal adherence, guiding curricular improvements and system interventions.

This literature review synthesizes published evidence (global and regional) on nursing students' KAP toward hand hygiene, the measurement tools used, determinants of compliance, effectiveness of educational and system interventions, and remaining gaps with emphasis on evidence relevant to low- and middle-income countries in Pakistan.

2.1 Knowledge

Systematic reviews and cross-sectional studies across continents generally report low to moderate knowledge levels among nursing students. While exact scores vary by instrument and country, many studies place average knowledge in the moderate range (often between ~50–75% correct depending on the scoring system). Final-year students tend to score higher than earlier-year students, reflecting cumulative curricular exposure and clinical experience, but substantial gaps remain even in later years especially around technical aspects (e.g., when alcohol rub is appropriate vs when soap and water are necessary, the minimum contact time for alcohol rub, and specific "5 moments").

Table: 1 Knowledge assessment scale

Score Range (%)	*Category*	*Interpretation*
≥ 75%	Good Knowledge	Adequate understanding of hand hygiene principles and guidelines
50–74%	Moderate Knowledge	Partial understanding; needs reinforcement
< 50%	Poor Knowledge	Inadequate or insufficient understanding

(Das, Mannan et al. 2025)

2.2 Attitude

Overall, attitudes toward Hand hygiene among nursing students are frequently reported as favorable**:** students typically acknowledge the importance of hand hygiene in preventing HAIs and express positive intent to comply. A favorable attitude do not consistently predict high compliance. Studies highlight that while students may endorse Hand hygiene in principle, situational constraints social norms (role modelling by senior staff), and perceived low risk during some interactions reduce actual adherence.

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Table: 2 Attitude Assessment Scale

Score Range (%)	*Category*	*Interpretation*
≥ 75%	Positive Attitude	Strong belief and motivation toward hand hygiene compliance
50–74%	Neutral Attitude	Ambivalent or inconsistent attitude
< 50%	Negative Attitude	Poor perception or low motivation regarding hand hygiene importance

(Stetz 2025)

2.3 Practice and compliance

There is a recurring and robust finding across settings: self-reported compliance is observed compliance. Direct observation studies using the WHO "5 Moments" show adherence rates often well below recommended levels, even where self-reported adherence is high. Barriers cited across studies include lack of time, unavailability of alcohol-based handrub or functioning sinks, skin irritation concerns, inadequate role modelling by clinical supervisors, and low perceived priority of Hand hygiene during busy clinical shifts. Intervention studies and audits show that multimodal programs can improve observed compliance, but sustained gains require systemic support.

One cross-sectional and institutional reports from Pakistan (various tertiary hospitals and teaching colleges) report similar themes: nursing students demonstrate variable and often only moderate knowledge about hand hygiene; attitudes are generally positive; but compliance especially when observed is inconsistent (Amjad, Nisa et al. 2025). Local studies identify barriers specific to the setting: shortage of handrub or soap at point of care, limited curricular emphasis on practical Hand Hygiene skills, inconsistent role-modelling by clinical faculty, and inadequate monitoring and feedback systems. These studies often recommend integrating WHO training materials into nursing curricula and implementing multimodal institutional strategies adapted to resource constraints.

Pakistan-centric reports include moderate mean knowledge scores in sampled cohorts, high reported belief that Hand hygiene prevents nosocomial infection, but low consistent use of Hand Hygiene practices in clinical settings (Hu, Jia et al. 2025). Several institutional audits and short-term audit-feedback cycles in the region have reported improvements in compliance when supplies and reminders are provided but also report difficulty sustaining gains post-intervention.

The literature consistently indicates that while nursing students generally understand the importance of hand hygiene and often report favorable attitudes, there is a persistent and important gap between knowledge/attitude and actual practice particularly when practices are measured objectively (Salih, Jawahi et al. 2025). Multimodal strategies informed by behavioral theory, which combine system changes (ensuring availability of hand rub and handwashing stations), repeated competency-based training (including simulation), audit and feedback, role modelling, and contextual adaptation, produce the most reliable improvements.

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In Pakistan, KAP research should be rigorous and explicitly designed to lead to sustainable, low-cost institutional changes and curricular reforms (Aruleba and Esenogho 2026). The present study, by combining validated knowledge instruments, TPB-based attitude and behavioral intention measures, and WHO 5 Moments observation, can directly respond to these evidence gaps and produce findings that are immediately actionable for nursing educators and hospital administrators.

Table:3 Practices Assessment Scale

Score Range (%)	*Category*	*Interpretation*
≥ 75%	Good Practice	Consistent adherence to hand hygiene steps and timing
50–74%	Moderate Practice	Performs hand hygiene but not consistently
< 50%	Poor Practice	Rarely performs or follows proper hand hygiene technique

(Noorjahan and Nazarulla)

CHAPTER 03
MATERIALS AND METHODS

3.1: Study Design:

This study was following a quantitative research approach using a Descriptive Cross-sectional research design. This design was used to assess the knowledge, attitude and practice regarding hand hygiene among undergraduate nursing students in Mustafa Kamal Institute of Nursing and Medical Science Vehari, Pakistan.

3.2: Study Variables:

Knowledge, Attitude and Practices

3.2.1: Dependent Variables

Hand Hygiene

3.2.2: Independent Variables

Knowledge, attitude and practices

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3.3: Operational Definitions:

3.3.1: Knowledge:

In this research survey, knowledge regarding hand hygiene among undergraduate nursing students will be assessed using a structured questionnaire. The questionnaire consists of seven (07) knowledge-based items. Each correct response will be awarded one (1_4) mark, while incorrect or unanswered responses will receive zero (0) marks.

The lowest possible score is 0, while the highest possible score is 56. The scoring criteria state that participants who achieve a score of higher than 28 (≥75%) will be classified as having "Good Knowledge" regarding hand hygiene. Conversely, participants who obtain a score below 28 (<50%) will be classified as having "Poor Knowledge" while (≥50%) will be classified as "Moderate Knowledge".

3.3.2: Attitude:

The survey was included four questions related to attitude regarding Hand Hygiene, encompassing seven (07) different questions. As a result, the average score calculated was 5.5. Individuals who achieved a score of higher than 5.5 (≥75%) were classified as exhibiting "Good attitude" towards hand Hygiene. Conversely, those who scored below the average of 5.5 (<50%) were classified as having "poor attitude" concerning hand hygiene while (≥50%) with "Moderate Attitude".

3.3.3: Practice:

The survey was included four questions related to practices regarding Hand Hygiene, encompassing six (06) different variables. As a result, the average score calculated was 6.5. Individuals who achieved a score of higher than 5.5 (≥75%) were classified as exhibiting "good practices" towards NNJ. Conversely, those who scored below the average of 5.5 (<50%) were classified as having "poor practices" concerning hand hygiene while with score (≥50%) will be categorized as "Moderate Practice".

3.4: Study Setting:

This study was conducted in Mustafa Kamal Institute of Nursing and Medical Science Vehari, Pakistan

3.5: Study Population:

The target population for this study consists of undergraduate nursing students currently enrolled at KIMS College in the 4th, 6th, and 8th semesters. Each semester comprises 50 students, resulting in a total target population (N) of 150 students.

3.6: Sampling Technique:

A non-probability convenience sampling technique was used to collect data from undergraduate nursing students.

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3.7: Sample Size:

The study is statistically representative, the sample size was determined using Slovin's Formula (Taro Yamane's Formula), which is appropriate for a known, selected population.

The Formula:

n = (Amadu, Hoedoafia et al.)

Where:

n = Required Sample Size

N = Total Population (150)

e = Margin of Error (0.05, representing a 95% confidence level)

Sample Size Calculation:

Square the margin of error: 0.05 \times 0.05 = 0.0025

Multiply by the population: 105 \times 0.0025 = 0.2625

Add 1 to the denominator: 1 + 0.2625 = 1.2625

Divide the population by the denominator: n = 150 / 1.2625 = 83.168

The calculated sample size is 83.16. For the purposes of this research, the number is rounded up to the nearest whole integer. Therefore, the final sample size for this study is eighty-four (84) students.

3.8: Duration of Study:

The study was carried out within four (04) months after the approval from the synopsis committee of KIMS college Vehari.

3.9: Sample Selection:

3.9.1: Inclusion Criteria:

Participants will be eligible to participate in this study, if they meet the following specific criteria:

1. Students enrolled in the Generic BS Nursing at KIMS College, Vehari.
2. Students of Semester 4th, 6th, and 8th were included.
3. Students who give informed consent and complete the assessment questionnaire form.
4. Students who completed one semester clinical rotation.

3.9.2: Exclusion Criteria:

Potential participants will be excluded from the study if they meet any of the following criteria:

1. Students enrolled in other health sciences disciplines.
2. Students of semester 1st, 2nd, or 3rd semesters.
3. Students who were on medical leave, or suspended from clinical duties.
4. Post RN enrolled students at KIMS, Vehari.

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3.10: Research Tool:

Questionnaire on Knowledge, attitude and practices regarding hand hygiene among undergraduate nursing students was adopted (Hu, Jia et al. 2025).

Contents of Questionnaire

The survey's first section asked about the participants' demographics, including their gender, age, Year of experience, Qualification level.

3.11: Validity and Reliability:

Knowledge, attitude and practices regarding hand hygiene was assessed using a questionnaire that was valid, clear, relevant, understandable and pretested (Hu, Jia et al. 2025). The questionnaire's developer evaluated its reliability to be 0.9.

3.12: Data Collection Procedure:

An adopted questionnaire was used for data collection. It was presented to the participants through an introductory discussion. The participants were get facilitation during questionnaire fulfillment. The data is collected purposefully and cooperatively. At the end of work, all participants were regard to because of their voluntary participation as confirm by informed consent.

3.13: Data Analysis:

The data analysis of this study "knowledge, attitude and practice regarding hand hygiene among undergraduate nursing students" was analyzed using IBM SPSS Statistics 23. The demographic and other variables are presented in the form of Frequencies, Percentages, and graphs.

3.14. Ethical consideration:

The rules and regulations set by the ethical committee of KIMS College, Vehari was followed while conducting the research and the rights of the research participants were respected.

- Written informed consent will be taken from all the participating students.
- All information and data collection will be kept confidential.
- Participants will be remained anonymous throughout the study.
- The subjects will be informed that there are no disadvantages or risk of the study.

They will also be informed that they will be free to withdraw at any time during the process of the study.

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3.15. GANTT CHART

Activity	Months				
	January & February 2026		March 2026	April 2026	May 2026
Proposal completion					
Data collection					
Data analysis and interpretation					
Research compilation					
Research presentation and Final submission					

ETHICAL APPROVAL

A written approval was taken from Principal of Mustafa Kamal Institute of Nursing and Medical Sciences, Vehari, Pakistan. Informed consent has been taken from all study participants after explaining the method of data collection and procedure of study.

STATISTICAL ANALYSIS

Data were analyzed with 95% confidence interval through SPSS version 23. Frequency distribution of demographical variable was checked. Results were presented in tabular and graphical form.

CHAPTER 04

RESULTS AND DISCUSSION

In this cross-sectional Descriptive study 84 students were registered from Mustafa Kamal Institute of Nursing and Medical Sciences Vehari, Pakistan. The exclusion and inclusion criteria as mention in methodology section were followed. A questionnaire was used to address the demographic characteristics & knowledge, attitude and practice regarding hand hygiene among undergraduate Nursing Students. The research tool Likert scale was used to assess the knowledge, attitude and practice towards hand washing:

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DEMOGRAPHICS

A total of 84 questionnaires were returned. This gives a response in this study 80.95% were female.

Table. 1: Demographics of study participants

Gender	No. of Participants	Frequency
Male	16	19.05
Female	68	80.95

Table. 2: Formal Training on Hand Hygiene.

Training attended	N	t	p
Equal variances	84	-0.049	0.961

Table 2 reports the results on training method on hand hygiene among undergraduate nursing students. The students' level of formal training experienced was not significantly different (t= -0.049, p=0.96) between the two gender groups. This indicates that there is no significant difference exist of being male and female students in the nursing college.

Table. 3: Clinical posting Experience.

Clinical Exposure	N	t	P
Equal variances	84	-0.208	.836

Table 3 presents the sample, means and the standard deviation for the overall scores on clinical exposure of undergraduate nursing students. There is a variance in the sample of the female nursing students (n=68), and male (n=16) of the all the semester who took part in the study. The means for the two gender groups were female (M= 75.63, SD ±9.64), male (M= 15.72, SD ±9.88).

PARTICIPANT'S KNOWLEDGE REGARDING HAND HYGIENE

The participants having knowledge about WHO recommendation and steps on hand hygiene were 77.3% and method of effective hand washing in prevention from nosocomial infection was 82.1%.

Table. 4: Respondent's knowledge about hand hygiene

Variables (n=84)	Frequency (%)
WHO recommendation and steps on hand hygiene.	
Good Knowledge	65 (77.3)
Moderate Knowledge	15 (17.8)
Poor Knowledge	4 (4.7)
Methods of effective hand washing in preventing the infection.	
Good Knowledge	69 (82.1)
Moderate Knowledge	13 (15.4)
Poor Knowledge	2 (2.4)

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COMPONENTS OF HAND WASHING

Majority of respondents had good knowledge about components of hand washing. The awareness of respondents about hand washing through use of running water and antiseptic was 68% and respondents they use only running tap water were 10%. 22% respondents use soap water in basin.

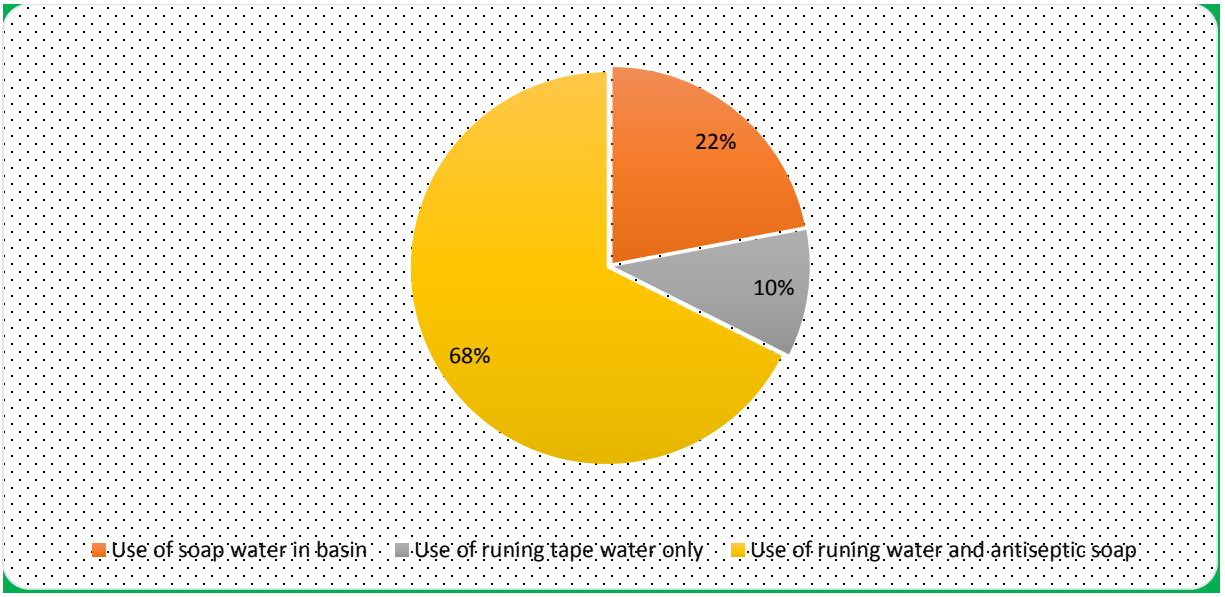

Figure 1: Participant's response regarding components of hand washing.

EFFECTIVENESS OF HAND WASHING

Almost 99% participants knew about contaminated hands can serve as a vehicle for infection transmission and 89% participants knew that effective hand washing involve washing of hands must be for at least 30 seconds.

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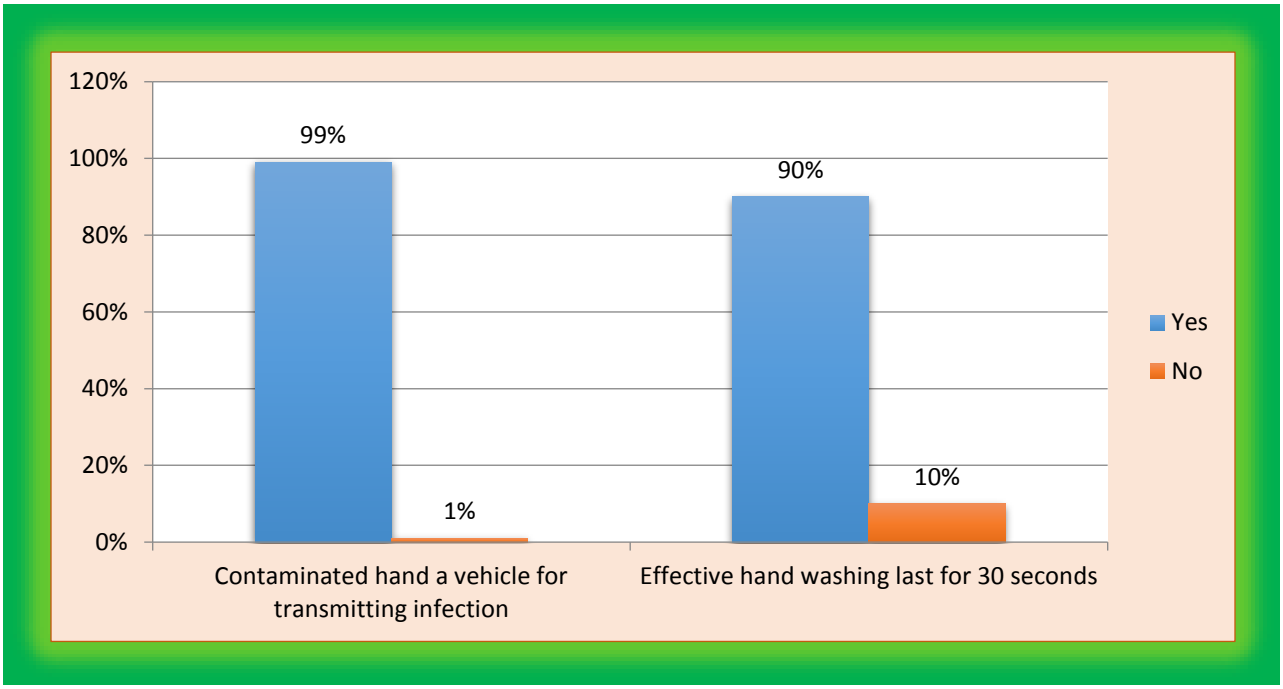

Figure 2: Participant's knowledge regarding effectiveness of hand washing.

ATTITUDE TOWARDS HAND WASHING

Participants were agreed about hand washing can be improved by administrative order and continuous health education 97.8%, motivation to wash their hands because of fear of contracting disease 96.7%, hand washing is often not adhered to because of busy work schedule in between patients 75.27%, hand washing should be done when in contact with patients and patient fomites 97.8% and hand washing can be protective for health providers 99.4%.

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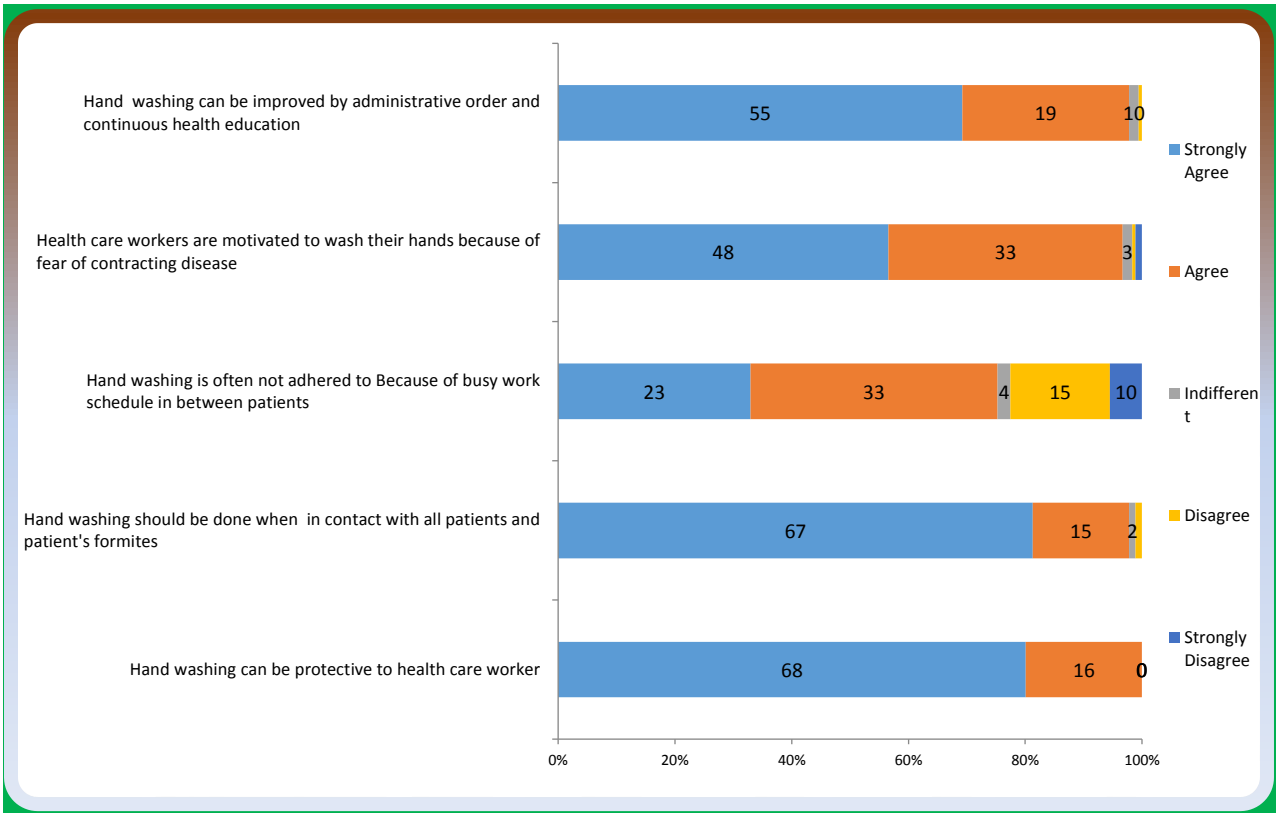

Figure 3: Participant's attitude towards hand washing

HAND HYGIENE PRACTICE OF PARTICIPANTS:

Regarding the hand hygiene practice 95.2% respondents wash their hands before patient contact or bedside procedures with mean score of (1.02). Respondents do not practice their hand wash were 4.8% only. Respondents dry their hands after washing 92.8%.

Practice (n=84)	**Frequency** (%)
Wash hand before patient contact or bed side procedure	
Yes	80 (95.2)
No	4 (4.8)
Avoid touching surfaces immediately after hand hygiene	
Yes	78 (92.8)
No	6 (7.2%)

Table# 03: Participants practice towards hand hygiene.

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CHAPTER 05
CONCLUSION, LIMITATION AND RECOMMENDATIONS

5.1: Conclusion

Hand hygiene is consequently the significant measure to keep away from the broadcast of destructive microorganisms and put off health care-associated infections. This study has explored the knowledge attitude and practice of hand cleanliness among undergraduate nursing students. In this study participants have enough knowledge towards hand hygiene components. The responsiveness of respondents about hand washing through WHO recommendation and use of running water and antiseptic was 77% and respondents they use only running tap water were 17% and 22% respondents use soap water in basin.

This finding is dissimilar to that reported surrounded by nursing students in the hospital of a Multispecialty sickbay in India (90%) (Havaldar and CP 2025), but in some way comparable than facts reported among HCPs in Cairo in Elgalea Government Hospital (73.1%), and Cleopatra Private Hospital (72.7%) (AlGhuraibi, Aleisawi et al. , Sharma, Aharwal et al. 2026).

An optimistic outlook towards hand washing was also established in this study. Participants having knowledge about nosocomial infection impact on patient clinical outcomes were 62.1% and prevention from nosocomial infection through hand washing 68.7%. More constructive result have been reported in other studies (Shen, Wang et al. 2026). In Cairo, nursing students were also establish to have a optimistic attitude (96.0%) (Leuci, Benvenuto et al. 2026). Similar was reported among nursing student in the university students in Italy (86.2%) (Zhang, Fan et al. 2026). This optimistic outlook towards hand washing exhibited by the respondents may be accredited to their acquaintance of the penalty of deprived hand hygiene.

Knowledge and attitude towards hand washing may optimistically weight the practice of hand washing among undergraduate nursing students. This study has also revealed that undergraduate students have a propensity to wash their hands more often after contact with patients then before contact and also after performing a bedside procedure than before such procedure. This finding is at higher-score to Intern nursing students (Hu, Lv et al. 2026). In one of such studies, a hand washing rate of zero percent was reported before HCPs interacted with patients, this augmented to 63% hand washing rate after undergraduates and patients interaction (Alenezi 2025).

This finding needs for imperative intrusion measures by college administration respecting to hand washing guidelines, emphasizing necessitate for hand washing before patients-undergraduates contact/interaction. The patients are evenly sheltered from transmittable agents if all undergraduate students put into practice good hand cleanliness (AlGhuraibi, Aleisawi et al.).

The student of college having good knowledge regarding hand hygiene, Students have good knowledge about nosocomial impact on patients and as well hand-washing practice reduces the risk of infection. Students will have good understanding about components of hand washing. They also have enough knowledge about how to prevent infections through hand hygiene and majority of students have practiced hand washing after touching patients and surroundings then before.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

DOI: http://doi.org/10.5281/zenodo.20772014

5.2: Recommendations

The study emphasis on regular hand hygiene training programs for nursing students to improve awareness and compliance with infection prevention protocols. Additionally, the quantity of electrical hand dryers should be increased in different departments of colleges and hospitals to promote proper hand drying practices. Healthcare institutions should also ensure the adequate provision of disposable towels and hand sanitizers in all clinical areas. Furthermore, hand sanitizers should be made readily available at each patient's bedside, particularly in highly infected areas and intensive care units, to enhance accessibility and reduce the risk of hospital-acquired infections.

5.3 : Limitation

The study had several limitations that should be considered while interpreting the findings. Firstly, the small sample size and a non-probability convenience sampling technique have limited the representativeness of the study population. The data were collected through self-reported questionnaires, there was a possibility of response and recall bias, as participants may have provided socially desirable answers rather than their actual practices.

Secondly, the participants had limited exposure to formal hand hygiene training programs, which may have affected their level of knowledge, attitude, and practices regarding proper hand hygiene measures.

Thirdly, the study was conducted within a specific institution and geographical region; therefore, the findings cannot be generalized to all undergraduate nursing students across the country. Furthermore, the participants had limited exposure to practical demonstrations and skill laboratory sessions, which may have impacted their practical competency and compliance with recommended hand hygiene practices.

CHAPTER 06
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https://pakjmcr.com/index.php/1/about
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Online ISSN 3007-2387
Print ISSN 3007-2379

DOI: http://doi.org/10.5281/zenodo.20772014

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