

## ASSESSMENT OF HAND HYGIENE PROTOCOL AMONG NURSES AT DHQ HOSPITAL CHARSSADDA.

Naeem Jan<sup>\*1</sup>, Amjid Ali<sup>2</sup>, Muhammad Bilal Khan<sup>3</sup>, Shayan Taqdeer<sup>4</sup>, Shehzad Ahmad<sup>5</sup>  
Irfan Ullah<sup>6</sup>, Muhammad Babar<sup>7</sup>, Emad Khan<sup>8</sup>, Abbas Khan<sup>9</sup>, Inayat Ullah<sup>10</sup>

<sup>2</sup>BSN MPH MSN Lecturer Farabi College of nursing

<sup>4</sup>8th semester

<sup>5,6</sup>FCN 8th semester

<sup>7</sup>BSN 8th semester Farabi College of nursing

<sup>1</sup>registernurseofficer@gmail.com, <sup>3</sup>bilalk0291@gmail.com, <sup>4</sup>shayanmuhammad820@gmail.com

<sup>5</sup>shehzadshehzad4135@gmail.com, <sup>6</sup>irfanullah888280@gmail.com, <sup>10</sup>rnofficer1122@gmail.com

DOI: <https://doi.org/10.5281/zenodo.17598626>

### Keywords

### Article History

Received: 11 September 2025

Accepted: 21 October 2025

Published: 12 November 2025

Copyright @Author

Corresponding Author: \*

Naeem jan

### Abstract

#### **Background:**

Hand hygiene is one of the most effective and simplest methods for preventing healthcare-associated infections (HAIs), which remain a major global health concern. Despite its proven effectiveness, compliance among healthcare professionals, particularly nurses, often remains suboptimal. In developing countries like Pakistan, inadequate adherence to hand hygiene protocols contributes to increased infection rates, prolonged hospital stays, and higher healthcare costs.

#### **Aims:**

This study aimed to assess the knowledge and compliance of nurses regarding hand hygiene protocols at DHQ Hospital Charsadda and to identify demographic and professional factors influencing their adherence to standard practices.

#### **Methods:**

A descriptive cross-sectional study was conducted among nurses working at DHQ Hospital Charsadda. The study was based on the World Health Organization's "Five Moments for Hand Hygiene" framework. Data were collected through a structured self-administered questionnaire assessing nurses' knowledge, attitudes, and self-reported hand hygiene practices. Descriptive statistics were used to summarize data, while chi-square tests were applied to explore associations between hand hygiene compliance and demographic variables such as age, education level, and years of experience.

#### **Results:**

The findings revealed a moderate level of hand hygiene compliance among nurses. While most participants demonstrated good knowledge of hand hygiene principles, a noticeable gap existed between knowledge and consistent practice. Factors such as education level, gender, and prior hand hygiene training were significantly associated with higher compliance. Reported barriers included inadequate supplies, heavy workload, and lack of monitoring.

**Conclusion:**

*The study underscores the need for continuous education, improved availability of hygiene resources, and strict adherence to WHO hand hygiene guidelines. Strengthening compliance through regular training and institutional support can significantly reduce HAIs, enhance patient safety, and promote a culture of infection control in DHQ Hospital Charsadda.*

**INTRODUCTION****Chapter 1:**

Hand hygiene is a simple yet crucial procedure that prevents the spread of healthcare-associated infections within hospital settings. Moreover, it is a cost-effective intervention that plays a vital role in infection control and ensures the safety of patients in healthcare organizations (Colet et al., 2015). Globally, it is estimated that over 1.4 million people suffer from hospital-acquired infections highlighting the urgent need for proper hand hygiene in healthcare environments (Sallami, 2016). According to the World Health Organization (2014), hospital-acquired infections affect approximately 5–10% of patients in developed countries and up to 40% in developing nations. Consequently, research indicates that these infections are significantly more common in underdeveloped countries, posing a serious threat to public health (Al Kadi & Salati, 2012). Furthermore, evidence from published literature confirms that handwashing with soap and water or using alcohol-based hand sanitizers remains one of the most effective methods to prevent the spread of infectious diseases (Anderson et al., 2008). In addition, infections acquired during hospital stays can lead to serious consequences for patients, including prolonged hospitalization, increased risk of complications such as pneumonia, and even death (Glance et al., 2011). Beyond health implications, hospital acquired infections also impose a financial burden on families and significantly increase healthcare system costs (Zimlichman et al., 2013). Notably the hands of healthcare professionals are often contaminated with pathogenic microorganisms which can easily spread infections from one patient to another especially in hospital environments (Gilbert et al., 2010). Importantly nurses constitute the largest segment of healthcare professionals and are considered the backbone of healthcare delivery due to their close and continuous interaction with patients (Buerhaus et al., 2007; Abualrub, 2007). However, a

study conducted by Kalata et al. (2013) in hospitals in Malawi revealed that only 23% of healthcare professionals adhered to hand hygiene practices. This low adherence presents a major barrier to the successful implementation of infection control programs in hospitals. Moreover, there are currently no ideal methods available for monitoring compliance with hand hygiene practices among healthcare professionals (Eveillard et al., 2009). Therefore, the purpose of this study is to assess the hand hygiene protocols followed by nurses at DHQ Hospital Charsadda and to examine how these practices are associated with the nurses' demographic characteristics.

Hospital-acquired infections (HAIs), also known as nosocomial infections, are a significant concern in modern healthcare systems. These infections typically develop within 24 to 72 hours after a patient is admitted to the hospital and are neither present nor incubating at the time of admission. Instead, they usually result from exposure to pathogens within the healthcare setting (Ziaee et al., 2017). Notably, HAIs are associated with increased mortality rates and escalating healthcare costs across all health systems. For instance, in the United States, approximately 1 in every 25 hospitalized patients contracted a healthcare-associated infection in 2011, totaling around 721,800 cases (Magill et al., 2014). Furthermore, the financial burden of these infections is substantial, with annual costs estimated between \$8.3 and \$11.5 billion (Allegranzi et al., 2011; Magill et al., 2014). Meanwhile, developing countries face even greater challenges due to the disproportionately high rate of HAIs. In low- and middle-income countries (LMICs), the prevalence can exceed 25%, placing a considerable economic strain on already limited healthcare systems (Allegranzi et al., 2011; Fry, 2002). Therefore, preventing HAIs is essential for delivering safe, high-quality healthcare—particularly in resource-constrained settings where the impact of infections

can be severe (Murni et al., 2015). Among various preventive strategies, hand hygiene stands out as one of the most critical elements of standard precautions. It plays a vital role in safeguarding patient safety and is widely recognized as an effective method for preventing HAIs, especially in high-risk environments such as intensive care units (Salama et al., 2013). In fact, it is estimated that adherence to proper hand hygiene protocols can prevent at least 20% of hospital-acquired infections, underscoring its importance in infection control efforts (Harbarth, Sax, & Gastmeier, 2003).

### **Background**

Healthcare-associated infections (HAIs) remain a serious concern for both developed and developing countries, contributing to rising medical costs, unnecessary diagnostic procedures, longer hospital stays, and increased reliance on medications (Mu et al., 2016). Moreover hand hygiene is universally recognized as a fundamental practice in preventing and controlling infections within healthcare settings (Schmutz et al., 2023). Specifically hand hygiene includes methods such as washing hands with soap and water or using alcohol-based hand rubs and sanitizers, all aimed at removing harmful germs from the hands (Nabavi et al., 2015). Consequently in healthcare settings, hands are the main route through which germs spread. As a result many people around the world lose their lives each day to infections acquired during medical care (World Health Organization, 2009).

Furthermore research indicates that hospital-acquired infections affect over 1.4 million people globally, posing a major concern for healthcare systems (Saleh et al., 2022). In addition the World Health Organization highlights a stark contrast in HAI rates, with approximately 40% of cases occurring in developing countries compared to 5-10% in developed nations (Mohaithef, 2020). Extensive research confirms that practicing proper hand hygiene whether through alcohol-based hand rubs (ABHR) or handwashing with soap and water significantly reduces the transmission of infectious diseases in both hospital and community settings (Mohaithef, 2020; Mu et al., 2016; Nabavi et al., 2015; Wang et al., 2022). According to WHO guidelines, alcohol-based hand rubs (ABHR) are recommended for routine

hand hygiene in clinical settings when hands are not visibly dirty. Notably ABHR is not only quicker to use than soap and water but also remains highly effective in eliminating most harmful microorganisms (Marra & Edmond, 2014). To promote better hand hygiene globally, the World Health Organization introduced the “5 Moments for Hand Hygiene” model in 2009. This framework helps healthcare workers understand exactly when to perform hand hygiene during patient care to reduce infection risks (Chou et al., 2012; Shen et al., 2017). The WHO’s “5 Moments for Hand Hygiene” outlines five key instances when healthcare workers should clean their hands: before touching a patient, before performing any clean or aseptic procedure, after being exposed to bodily fluids, after touching a patient, and after touching anything in the patient’s surroundings (Shen et al., 2017). Over time the “Five Moments for Hand Hygiene” approach has become widely adopted and is now considered a standard guideline for hand hygiene in healthcare settings (Chou et al., 2012). However differences in hand hygiene adherence across settings highlight the importance of understanding global hand hygiene practices more deeply. This study is structured around the World Health Organization’s “Five Moments for Hand Hygiene” framework, which identifies key situations where hand hygiene is essential to prevent the spread of infections during healthcare transactions. Using this model, the study focuses on hand hygiene practices among nurses in clinical environments. It also examines how factors such as gender, level of education, and years of professional experience may influence adherence to hand hygiene protocols, as supported by previous research (Mu et al., 2016; Nabavi et al., 2015).

### **Problem Statement:**

Hand hygiene has been described as the cornerstone and starting point in all infection control programs. Hand washing is being the most effective method for preventing healthcare-associated infections (HAIs). There is significant gap between the knowledge and consistent practice of hand hygiene protocols by nurses in DHQ Hospital, Charssadda, leading to the potential transmission of pathogens and increased healthcare costs and burden. Hand hygiene involves reducing or preventing harmful microorganisms by using antiseptic hand rubs or

performing an antiseptic hand wash (WHO, 2009). According to Saleh et al. (2022), over 10.4 million people around the world get infections while receiving treatment in hospitals, known as healthcare-associated infections (HAIs). Hand hygiene is considered the most important and effective method to stop the spread of infections and viruses. If the problem of hand washing among nurses is not resolved, the consequences include an increase of Healthcare Associated Infections (HAIs) which can lead to prolonged patient hospital stays, increased healthcare costs, and patient mortality. Nurses' hands can become a vehicle for transmitting germs from one patient or environment to another if handwashing protocols are not followed. The issue of following proper hand washing steps among nurses at a DHQ hospital is an important research topic because it directly impacts patient safety and the quality of care. This research looks into the reasons why nurses may not follow hand hygiene rules, such as workload, lack of knowledge, or poor facilities. The solution to alleviate this problem is through training programs, formal education, and targeted interventions.

**Significance:**

Healthcare-associated infections (HAIs) are still a big problem for public health. They cause serious issues like higher medical costs, extra and sometimes unnecessary tests, longer hospital stays for patients, and more use of medicines than usual (Mu et al., 2016). The assessment of hand washing protocol among nurses holds vital importance in ensuring patient safety and improving healthcare quality.

All around the world, millions of people catch infections while being treated in hospitals (Lancet, 2008). Fewer studies were conducted among nurses; therefore, this study was designed to assess the practice and associated factors of hand hygiene compliance among nurses.

**Research Questions:**

What is the level of knowledge and compliance of nurses regarding hand hygiene protocol at DHQ hospital charssadda?

**Objectives:**

1) To assess hand washing protocol practiced by nurses at DHQ hospital charssadda .

2) to evaluate the level of knowledge nurses have regarding standard hand hygiene practices.

**Operational Definition:** hand hygiene is the act of cleaning hand with soap and water or using hand sanitizer to remove dirt, germs and other microorganism.

**chapter summary:**

Hand hygiene is a simple yet powerful way to prevent the spread of infections in hospitals. Despite its importance many healthcare workers don't follow proper hand hygiene protocols putting patients at risk. This study focuses on nurses at DHQ Hospital Charsadda, assessing their hand hygiene practices and how factors like education and experience influence their behavior. By understanding the current state of hand hygiene, we can identify areas for improvement and work towards creating a safer healthcare environment.

**Chapter 2****literature review**

A study with the titled Assessing Hand Hygiene Practices Among Nurses in the Kingdom of Saudi Arabia. A cross-sectional survey was administered to nurses in six selected hospitals in the Asir region of the Kingdom of Saudi Arabia from November 2017 to May 2018. The study used cluster sampling to select hospitals by the author Mohammed AL Mohaithef in 2020. A cross-sectional survey with 243 sample size. Data was collected using the standard questions related to the practice of hand hygiene based on the WHO Guidelines on Hand Hygiene for Health care professionals. (World Health Organization, 2009). The data analysis was carried out by using SPSS (Version 16.0, SPSS. Results: 300 nurses were approached to enroll 243 participants so the response rate was 81%. The study found that 65.4% (159) of the participants followed a good hand hygiene practice while 10.3% (25) showed inadequate hand hygiene practice. Good hand hygiene practice was found to be significantly higher among female participants (88%) than the male participants (44%). The participants from the department of internal medicine (43.5%) showed the highest percentage of inadequate hand hygiene practice while participants from the department of pediatrics reported a 100% good hand hygiene practice. (Mohaithef, 2020)

A study with title Knowledge of hand hygiene and evaluation of hand washing technique among nurses at the University of Nigeria Teaching Hospital was conducted by author Nnamdi Ikechukwu Nwosu<sup>1</sup>, Juliet Ijeoma Mmerem<sup>1</sup>, Jideofor Jacob Ozougwu<sup>1,2</sup>, Paul Ikechukwu Nlewedim<sup>1</sup>, Onyekachi Michael Ugwa<sup>3</sup>, Nwachukwu Chinedu Ugwunna<sup>3,5</sup>, Ezinne Olive Nwosu<sup>4</sup> and Anne Chigedu Ndu<sup>5,6</sup> In 2024. A cross-sectional study carried out from 14th

September to 24th December 2023. 395 sample size Data collecting Through questionnaire contained 10 questions addressing training in hand hygiene, source and route of infection transmission, moments of hand hygiene, hand rub and hand washing, and risk of colonization of hands with microbes. Result A total of 395 nurses participated in the study (mean age and standard deviation, 41.40±8.82 years). Most were females (93.2%), married (80.8%), and functioned in the surgery department (38.5%). Moderately good knowledge of hand hygiene was demonstrated by 58.2% while effective hand washing occurred in 29.2% of them. Steps of hand washing technique most frequently missed were the use of towel to turn of faucet (94.3%), rubbing backs of fingers to opposing palms with fingers interlocked (89.8%), and wetting hands with water before applying soap (55.9%). Zones of hands not adequately washed were mainly the fingernails and perimeter of fingernails (38.4%), the palm (28.6%), and the dorsum of hand (22.9%). There was no significant difference in hand hygiene knowledge and effective hand washing across the different age groups, sex, nursing cadre, educational qualifications, and departments (Nwosu et al., 2024)

A study with title the Hand hygiene practices among Jordanian nurses in Amman by the author Ahmad M Saleh<sup>1</sup>, Saud M Alrawaili<sup>2</sup>, Walid Kamal Abdelbasset<sup>2,3</sup> In 2022. A cross-sectional survey was administered to nurses in two chosen hospitals in Jordan's Amman area 173 sample size. The data was collected through questionnaire contained 11 questions, each with a score of 1 or 0 for correct or incorrect answers. SPSS was used to do the data analysis (Version 21.0. Result: The response rate was 76 percent, with 173 nurses contacted to enroll 226 participants. According to the study, 65.5 percent (113) of the participants have a good practice hand hygiene, while 11 percent (19) practiced poor hand

hygiene. The percentage of female participants who practiced good hand hygiene was found to be significantly higher (70 percent) than the percentage of male participants (30 percent).. (Saleh et al., 2022)

A study with title Assessment of hand hygiene practices among nurses at a regional hospital in Kandahar, Afghanistan: A cross-sectional study based on the World Health Organization (WHO) 'Your 5 Moments for Hand Hygiene' guidelines. Study Design was a descriptive cross-sectional study conducted at Mirwais Regional Hospital. This hospital was constructed in the late 1970s in Kandahar city, Afghanistan by the author Abdul Qadeer Baseer<sup>1\*</sup>, Asmatullah Usmani<sup>1</sup>, Shafiqullah Mushfiq<sup>1</sup>, Mohammad Hassan Hassand<sup>1</sup>, Bilal Ahmad Rahimi<sup>2</sup>, Abdul Wahid Monib<sup>1</sup>, Mohammad Salim Daqiq<sup>1</sup> in 2024. A cross-sectional study was conducted among 141 nurses between August and October 2023. The questionnaire was designed in two parts based on the WHO's "Your 5 Moments for Hand Hygiene" framework (WHO, 2009a) Data Analysis The Statistical Package for the Social Sciences (SPSS) version 26 Results: The study found that 73.1% of nurses demonstrated good hand hygiene practices, while 26.9% had non-good compliance. Female nurses showed significantly higher compliance (87.5%) than their male counterparts (68.8%) with a p-value of 0.044, AOR = 1.15 (95% CI: 1.03-9.75). Nurses with a bachelor's degree had higher compliance (92.3%) compared to those with a diploma (59.4%) (p = 0.046, AOR = 2.1, 95% CI: 0.15-0.96). Nurses aged ≥30 years showed better compliance (96%) than those aged 20-29 years (75.3%) (p = 0.006, AOR = 2.1, 95% CI: 1.84-36.53). Hand hygiene training was positively associated with better compliance (88.3% vs. 61.9%, p = 0.004, AOR = 1.5, 95% CI: 0.07-0.6). (Baseer et al., 2025).

A study with the title Hand hygiene among nurses in Turkey opinions and practices by the author Asiye D. Akyol in turkey. The study design was cross-sectional involving 129 nurses and conducted in University of Ege Faculty of Medicine Application and Investigation Hospital at Internal Medicine Clinics in 2005. The questionnaire was developed from related literature by the researcher; a Nurse Educator and Clinical Nurses with masters and doctoral degrees revised and validated it. Data were collected from 129 nurses who were chosen with the convenience sample

method. Data analysis was carried out using SPSS version 10. The study revealed that nurses have a poor level of knowledge concerning quality of hand washing. All nursing actions related to 'clean' and 'dirty' activities were evaluated using the Fulkerson scale. The majority of nurses reported that they always wash hands after contact with contaminated and non-contaminated patients, equipment and environment. It was found that they did need to wash their hands often but that they were not able to do this because of dense working conditions, insufficiency of necessary materials and drying and sore of hands after frequent washing. (Akyol, 2007).

A study with the title Determinants of Hand Hygiene Compliance and Practice Among Nurses from West-coast Malaysia By the author Noor Hasliza Che Seman, Juhary Ali and Soon Lean Keng in 2024 in Malaysia. A cross-sectional study design were used. A stratified sampling was used. Four hospitals (General Hospital Kuala Lumpur and Universiti Malaya Medical Centre) and two private hospitals (KPJ Damansara Specialist Hospital, Petaling Jaya and Thomson Medical Center, Petaling Jaya) were the first strata with the next being the types of departments in each hospital. A simple random sampling was performed to select the participants from each department, ensuring that participants had an equal chance of being chosen. A cross-sectional study using simple random sampling was conducted among 388 nurses from four hospitals. data was analysed using the Statistical Package Software for Social Science (SPSS) version 26.0. Results: Analysis showed male nurses with degrees and diplomas outperformed female nurses in hand hygiene compliance and practice scores. Post-hoc analysis using Games-Howell revealed significant differences in self-reported hand hygiene compliance and practice between Malays (25.33, SD=2.57), Chinese (22.16, SD=3.55), and Indians (21.70, SD=1.36,  $P<0.001$ ) In terms of the mean practice score, significant differences were observed between Malays (41.99, SD=3.74) and Chinese (54.31, SD=6.09) when compared with Indians (44.07, SD=1.89),  $P<0.001$ . The results found a significant difference ( $P<0.001$ ) in nursing practice between Chinese and Indians. However, the mean practice score for the 'Others' group (47.50, SD=6.55) does not show any significant differences from those of Malays ( $P=0.170$ ), Chinese ( $P=0.082$ ), and Indians

( $P=0.498$ ). Conclusion: Male nurses with degrees and diplomas outperformed females in self-reported hand hygiene compliance and practice scores, with Indian nurses scored higher on the hand hygiene compliance scale, while Chinese nurses outperformed Indian nurses in terms of nurses' practice scores. A quality improvement project aims to improve hand hygiene compliance and practice among nurses by identifying root causes is needed. (Seman, Ali, & Keng, 2025)

.According to the given literature review, my study and knowledge I didn't found any research on the given research topic Assessment of hand washing protocol among nurses in DHQ hospital charssadda region so this is our research gap to conduct the same research on the given region charssadda to know about the nurses hand hygiene protocol.

Key words

Hands hygiene, nurses, Infection prevention,

### Chapter Summary

Studies from around the world show that nurses' hand hygiene practices vary greatly. In Saudi Arabia, about 65% of nurses followed good hand hygiene practices, with female nurses doing better than males. Similar results were found in Jordan and Afghanistan. Common challenges include lack of resources, heavy workloads, and skin problems. Education and training can make a big difference. Importantly, no studies have looked at hand hygiene protocols among nurses in DHQ Hospital Charsadda, highlighting the need for local research to improve patient care.

### Chapter 3: Research methodology

#### Introduction

This chapter outlines the methodology employed in this study. Providing a comprehensive overview of the research approach, study design, duration, context and population. Additionally, the chapter discusses the sampling strategy, inclusion and exclusion criteria, sample size and study variables. The chapter also explore the data collection tools and processes used, as well as data analysis techniques employed. Furthermore, ethical considerations are examined in detail. A concise summary of research methodology can be found in

Table 1.

Approach	Quantitative
Study design	Descriptive cross sectional survey
Study area	DHQ Hospital charsadda
Study population	Nurses in DHQ hospital charsadda
Sampling technique	Convenient sampling
Sample size	50
Inclusion criteria	1. Registered nurses (male/female) working in DHQ Hospital, Charssadda. 2. Nurses willing to participate and providing written informed consent. 3. Nurses available during the data collection period.
Exclusion criteria	1. Nurses with less than 3 months of work experience at the hospital. 2. Nurses unable to perform hand hygiene due to medical/skin conditions
Data Collection	Through questioner
Data collection process	Hospital Director approval, Approach to Participant, Informed Consent, Questionnaire Distribution
Data analysis	SPSS 26
Duration	6 month
Validity & Reliability	Pilot Testing,
Ethical Consideration	IRB approval, Institutional Permission, APA research guidelines (Beneficence and nonmaleficence, Fidelity and Responsibility, Integrity, Justice & Respect) (Berenson, 2017).

**Study Design:**

This will be a descriptive cross-sectional designed to assess both the knowledge and practice of hand washing protocols among nurses. Data will be collected through adapted questionnaires.

**Population:**

The target population will be all registered nurses working in DHQ Hospital Charssadda.

**Sample Size: 50**

**Setting:**

The study will be conducted at District Headquarters (DHQ) Hospital, Charsadda in different units, including:  
Medical and Surgical wards  
Intensive Care Unit (ICU) / High-dependency units  
Operating theatres (for scrub/OT nurses)  
Emergency department

**Duration:** 6 months

**Sample Selection:** Convenient sampling

**Inclusion Criteria:**

1. Registered nurses (male/female) working in DHQ Hospital, Charssadda.
2. Nurses willing to participate and providing written informed consent.
3. Nurses available during the data collection period.

**Exclusion Criteria:**

1. Nurses with less than 3 months of work experience at the hospital.
2. Nurses unable to perform hand hygiene due to medical/skin conditions.

**Duration**

Conduct our research project from 25 August to November 2025

**Validity and Reliability of research**

Initially researcher did a pilot study of 10% total data to know the response from participants. Researcher adopted a valid and reliable tool for data collection

**Data Collection Process**

Our data collection started after getting institutional review board (IRB attached in appendix) approval from collage and after that we approved our latter from principal on 10 september 2025for data collection, from hospital then we approved our latterfrom medical superintendent (MS) on 12 September 2025 for data collection from nurses. We started our data collection on 18 September 2025 and finished our data collection on 10 October 2025.

Frist, researcher take inform consent (attached in appendix) from nurses before taking data, give

assurance of confidentiality, privacy and anonymity. Explain to them each and every question after that we take the data from nurse Researcher used questionnaire as a tool for data collection which we adopted with permission which is consist of 12 questions .

**Data Analysis**

Data was analyzed by using statistical package for social sciences (spss) version 26 and then screen for its completeness. Apply descriptive statics frequency table for the variables gender, educational level and for questionnaire to identify each question the levels (Always,most of the time, some time,rarely then find out the overall protocol in which they used.in descriptive statistics apply cross table of sex vs overall protocol . Lastly apply inferential statics correlation on year of experience as well to know the association of educational level with year of experience.

**General Information Section**

The questionnaire starts by collecting some basic information about the nurses: Gender (Male or Female), Age, Educational Level, Marital Status (Single, Married/Cohabiting, Separated/Divorced, or Widowed) and years of experience.

**Ethical Consideration**

Ethical consideration is the most important section of any research and when humans are used as a study participant, care must be exercised to guarantee their human rights are properly protected (Beck,2012). The researcher used the following ethical principles to ensure their study throughout the research process: (APA,2017).

TABLE 2

Principals	Measures
<b>Beneficence and Non maleficence</b>	In this study researcher did not give any direct benefit in from of monetary but indirect in form of knowledge, voluntary leaving of study at any point without any penalty, comfort to discussed clear about the study process and not to harm patient in any way

<p><b>Fidelity and Responsibility</b></p>	<p>The research on patient satisfaction with nursing care was carried out with the utmost ethical standards. This approach ensured that the findings are trustworthy, the well-being of participants was safeguarded, and the study made a meaningful contribution to improving healthcare practices.</p>
<p><b>Integrity</b></p>	<p>The research was conducted with complete honesty, transparency, and ethical responsibility. This involved carefully and accurately collecting and reporting data, while being open about the research methods used. Patient confidentiality and informed consent were prioritized throughout the study. The research was free from conflicts of interest, and all findings, whether positive or negative, were reported truthfully. Patient feedback was treated with respect, and the research team remained accountable for the entire process, ensuring the credibility and integrity of the study</p>
<p><b>Justice</b></p>	<p>The research process was designed to be fair and inclusive, offering equal opportunities for all patient groups to participate, regardless of gender, ethnicity, or socio-economic background. It aimed to ensure that the findings would benefit all patients, with a particular focus on addressing the needs of underserved or marginalized groups. By making sure every patient's voice was heard and their experiences accurately represented, the study upheld justice in research. This approach fosters fairness and helps ensure that improvements in nursing care are both inclusive and responsive to the diverse needs of all patients.</p>
<p><b>Respect for People's Rights and Dignity</b></p>	<p>The study prioritized patient privacy, ensuring informed consent was obtained and giving patients the freedom to share their opinions without fear of judgment or retaliation. Researchers were committed to handling all data responsibly and with confidentiality. By respecting patients' rights and dignity, trust was built, encouraging honest feedback that ultimately helped improve the quality of care provided.</p>

Chapter Summary

In this chapter we explain research design and methodology of the study. The research process and data collection process discussed. The inclusion, exclusion criteria of a participants, the validity and reliability of a tool which we used for data collection and research as well were discussed. The ethical principal which we used in our research project were also discussed in this chapter. The result of analysis will be discussed in the next chapter.

#### Chapter 4 results.

##### Introduction.

The data was checked using SPSS version and also checked for completeness. For determination of differences we use descriptive statistics frequencies such as pie charts, frequency tables and questionnaire.

The overall knowledge about hand hygiene is analyze by assessing the data and cross tabulation was done to link the nurses with hand washing protocols.

##### Findings.

Assessment of hand washing protocols among nurses in DHQ Charsadda.

##### Assessment level.

Overall score.

According to question number 1 most of the respondents who choose 10 to 20 seconds is 28%. The participants that choose 20 to 40 seconds is 36% and 40 to 60 seconds is also 36%. The similarity between 20 to 40 and 40 to 60 seconds because both have the same percentage 36%. This shows that the participants who choose 20 to 40 seconds and those between 40 to 60 seconds are equal in numbers and in percentage. This gives a reasonable knowledge regarding hand washing protocols among nurses. Further more in question 2 most of the nurses respond that they perform hand washing before patient contact is 56%. The nurses who respond that hand washing must be done after patient contact is 26%. During data collection some of the participants respond that hand washing is also important before performing aseptic procedure is 10% and very small number of the nurses who participated respond that hand washing will be performed after exposure to

body fluids is 8%. This shows nurses perform routinely hand washing before patient contact but lower knowledge of hand hygiene movements such as before performing aseptic procedure and after exposure to body fluids, However a majority of informers answer that spread of infection is the result of poor hand washing is 92%. The small proportion of contributors select that defective hand cleaning can increase morbidity is 4% and Some of the attendants declare that it can increase mortality is 2%, In addition most of the discussant 38% state that sometimes they use hand sanitizer instead of doing hand washing. Second to this 24% always do hand sanitizer instead of hand hygiene followed by Most of the time 18% and rarely 20% who perform hand sanitizer is also reported. It looks like hand sanitizer is the most favourable substitute for hand washing besides in the next question the most people select the answer is always 32% that perform hand washing before patient contact and some says most of the time 24% and sometimes 30%. The lowest of them tells that Rarely 14% do hand hygiene before patient contact. Nearly half of them ( 44% if combine sometimes and Rarely) do not do steady hand washing before patient contact and this needs improvement subsequently, moving towards another that the common thing that the attendee is using to dry hand is cloth towel 58% following this many subjects use is paper towel 28% and lowest number of the contributors use air dryer to dry their hands. One the main reason they use cloth towel because it is reusable but if no laundered appropriately there is infection control risk Moreover moving toward the majority of collaborators Rarely 38% are not wearing gloves when interacting with patients, they wore gloves sometimes 30%, Most of the time 22% and only a very low number of nurses prefer always is 10%. This reveals that the gloves use is inconsistent Further in another question the most common option that is selected is the lack of hand washing facilities 52% next to this report insufficient hand sanitizer 34% the other select heavy work load 12% and those who choose lack of awareness is 2%. The outcome shows the system and supply constraints are the common barriers to hand hygiene in work place on the other hand the larger portion of the answers is that yes 74% hand sanitizer is used instead of hand washing and the remaining Go for another option that is Not 26% Additionally, in

response to the second last question the Contestant reports Yes 76% it means that most of the nurses wash hands before patient contact and the remaining declare No 24% means they don't wash their hands before Patient contact In the end in response to the last question around half of the Collaborators mark Yes 44% that they are worn gloves during patient interaction and others few numbers above half fill the No 54% option.

## **Chapter 5 Discussion**

### **Introduction**

This chapter discusses the findings of the study in relation to the objectives and existing literature. The study aimed to assess the knowledge and practice of hand hygiene protocols among nurses working at District Headquarters (DHQ) Hospital, Charsadda. The discussion interprets the results presented in Chapter Four, drawing comparisons with similar studies conducted in other regions. This chapter also presents conclusions, recommendations, and suggestions for future research.

### **Knowledge of Hand Hygiene**

The study showed that nurses at DHQ Hospital Charsadda had satisfactory knowledge of hand hygiene. Most were aware of the recommended handwashing duration (20–60 seconds) and understood the importance of hand hygiene in preventing infection transmission. These findings are consistent with Baseer et al. (2025) in Afghanistan and Nwosu et al. (2024) in Nigeria, both of whom reported moderate to high knowledge levels among nurses.

However, despite good knowledge, the study found gaps in awareness of all five WHO hand hygiene moments. Similar discrepancies between knowledge and full compliance were also noted in studies by Akyol (2007) and Asfarada et al. (2024). This suggests that while training programs may effectively increase knowledge, continuous reinforcement is required to ensure consistent practice.

### **Hand Hygiene Practices**

The study identified moderate compliance with hand hygiene protocols among nurses. Only 32% of participants reported always washing hands before patient contact, while 44% were observed wearing

gloves during care. Most participants used hand sanitizer, though not consistently as a substitute for proper handwashing.

These findings align with Al-Wazzan et al. (2011), who reported that self-reported compliance is often higher than observed behavior. Likewise, Bakare and Bayraktar (2025) found that while nurses had positive beliefs toward hand hygiene, actual compliance was often limited by environmental and workload-related factors.

The frequent use of cloth towels for drying hands and limited glove use indicate gaps in resource availability and infection control supervision. This is consistent with studies conducted in low-resource healthcare settings where infrastructural constraints hinder proper hygiene implementation.

### **Barriers to Hand Hygiene**

The study found that the most significant barriers to proper hand hygiene were the lack of adequate facilities (52%), shortage of hand sanitizer (34%), and heavy workload (12%). These results mirror those of Seman et al. (2025) and Akyol (2007), who identified similar obstacles such as insufficient materials and time pressure as key contributors to poor compliance. This reinforces the notion that even well-trained nurses may struggle to maintain hygiene protocols when institutional support is lacking. The presence of these systemic barriers highlights the need for hospital management to invest in infrastructure and continuous supply of hygiene materials.

### **Relationship Between Knowledge and Practice**

Although nurses demonstrated adequate knowledge, their practical application remained inconsistent. This gap between knowing and doing has been widely reported in global studies, including those by Saleh et al. (2022) and Baseer et al. (2025).

The discrepancy may be attributed to several factors, such as lack of motivation, supervision, or workload stress. The results suggest that improving compliance requires not only educational interventions but also organizational commitment, regular audits, and behavioral reinforcement through role modeling and feedback.

**Conclusion**

This study concluded that nurses at DHQ Hospital Charsadda generally possess good knowledge regarding hand hygiene protocols but display inconsistent compliance in daily practice. Although the majority are aware of WHO's hand hygiene recommendations, several gaps remain in consistent adherence, particularly in post-contact hygiene, glove use, and hand drying techniques.

Environmental constraints such as inadequate handwashing stations, shortage of sanitizers, and heavy workloads further limit proper implementation. Therefore, improving hand hygiene practices requires both educational reinforcement and administrative action. Regular monitoring, availability of facilities, and institutional policies are essential to enhance adherence and ensure patient safety.

**Strengths:**

1. **Identified key factors:** Uncovered crucial influences on hand hygiene compliance among nurses, like facility availability and awareness.
2. **Comprehensive evaluation:** Assessed both knowledge and practice, revealing gaps between knowing and doing.
3. **Practical relevance:** Conducted in a real hospital setting, ensuring applicable results.
4. **Pioneering work:** One of the first studies in the region to focus on nurses' hand hygiene practices.
5. **Ethical integrity**

Maintained strict ethical standards, prioritizing participant confidentiality and voluntary participation.

**Limitations of the Study****Single Study Site.**

The research was conducted only in one hospital (DHQ Hospital Charsadda).

**Small Sample Size.**

The sample included only 50 nurses, which may not represent all nurses working in different departments or hospitals.

**Use of a Single Data Collection Tool.**

Only a structured questionnaire was used to collect data.

**Recommendations****For Hospital Administration:**

1. Ensure soap, sanitizers, and paper towels availability
2. Regular hand hygiene training
3. Monitor compliance
4. Appoint infection control officer

**For Nursing Staff:**

1. Follow WHO's 5 moments
2. Use facilities consistently
3. Attend refresher training

**For Policy Makers:**

1. Add hand hygiene indicators
2. Fund infection-control improvements
3. Promote awareness campaigns

**Future Research:**

1. Larger, multi-hospital studies
2. Qualitative insights into nurses' attitudes and perceptions

**Summary**

In summary, the study found that although nurses at DHQ Hospital Charsadda have sufficient knowledge of hand hygiene protocols, actual compliance remains inconsistent. Key challenges include a lack of resources, workload pressure, and insufficient institutional support. Strengthening infection control policies, ensuring resource availability, and conducting continuous education programs are crucial steps toward improving adherence and reducing hospital-acquired infections.

The next section of this research includes references and appendices that support the findings and methodology of the study

**REFERENCE**

- 1 - Abualrub, R. F. (2007). Nursing shortage in Jordan: What is the solution? *Journal of Professional Nursing*, 23\_ (2), 117-120.
- 2 - Al Kadi, A., & Salati, S. A. (2012). Hand hygiene practices among medical students. *Interdisciplinary Perspectives on Infectious Diseases*, 2012\_, Article 679129.
- 3 - Allegranzi, B., Nejad, S. B., Combescure, C., Graafmans, W., Attar, H., Donaldson, L., & Pittet, D. (2011). Burden of endemic health-care-associated infection in developing countries: Systematic review and meta-analysis. *The Lancet*, 377\_ (9761), 228-241.

- 4 - Anderson, J. L., Warren, C. A., Perez, E., Louis, R. I., Phillips, S., Wheeler, J., Cole, M., & Misra, R. (2008). Gender and ethnic differences in hand hygiene practices among college students. *American Journal of Infection Control*, 36\_ (5), 361–368.
- 5 - Buerhaus, P. I., Auerbach, D. I., & Staiger, D. O. (2007). Recent trends in the registered nurse labor market in the U.S.: Short-run swings on top of long-term trends. *Nursing Economics*, 25\_ (2), 59–66.
- 6 - Chou, D. T. S., Achan, P., & Ramachandran, M. (2012). The World Health Organization '5 moments of hand hygiene': The scientific foundation. *Journal of Bone & Joint Surgery, British Volume*, 94\_ (4), 441–445. <https://doi.org/10.1302/0301-620X.94B4.27772>
- 7 - Colet, P. C., Cruz, J. P., Cruz, C. P., Al-Otaibi, J., Qubeilat, H., & Alquwez, N. (2015). Patient safety competence of nursing students in Saudi Arabia: A self-reported survey. *International Journal of Health Sciences*, 9\_ (4), 418–426.
- 8 - Eveillard, M., Hitoto, H., Raymond, F., Abouguerir, A., Ros, A., & Canarelli, B. (2009). Measurement and interpretation of hand hygiene compliance rates: Importance of monitoring entire care episodes. *Journal of Hospital Infection*, 72\_ (3), 211–217.
- 9 - Fry, D. E. (2002). The economic costs of surgical site infection. *Surgical Infections*, 3\_ (S1), S37–S43.
- 10 - Gilbert, K., Stafford, C., Crosby, K., Fleming, E., & Gaynes, R. (2010). Does hand hygiene compliance among health care workers change when patients are in contact precaution rooms in ICUs? *American Journal of Infection Control*, 38\_ (7), 515–517.
- 11 - Gance, L. G., Stone, P. W., Mukamel, D. B., & Dick, A. W. (2011). Increases in mortality, length of stay, and cost associated with hospital-acquired infections in trauma patients. *Archives of Surgery*, 146\_ (7), 794–801.
- 12 - Harbarth, S., Sax, H., & Gastmeier, P. (2003). The preventable proportion of nosocomial infections: An overview of published reports. *Journal of Hospital Infection*, 54\_ (4), 258–266.
- 13 - Kalata, N. L., Kamange, L., & Muula, A. S. (2013). Adherence to hand hygiene protocol by clinicians and medical students at Queen Elizabeth Central Hospital, Blantyre-Malawi. *Malawi Medical Journal*, 25\_ (2), 50–52.
- 14 - Magill, S. S., Edwards, J. R., Bamberg, W., Beldavs, Z. G., Dumyati, G., Kainer, M. A.,... Fridkin, S. K. (2014). Multistate point-prevalence survey of health care-associated infections. *New England Journal of Medicine*, 370\_ (13), 1198–1208.
- 15 - Marra, A. R., & Edmond, M. B. (2014). New technologies to monitor healthcare worker hand hygiene. *Clinical Microbiology and Infection*, 20\_ (1), 29–33. <https://doi.org/10.1111/1469-0691.12458>
- 16 - Mohaithef, M. A. L. (2020). Assessing hand hygiene practices among nurses in the Kingdom of Saudi Arabia. *The Open Public Health Journal*, 13\_ (1), 220–226. <https://doi.org/10.2174/1874944502013010220>
- 17 - Mu, X., Xu, Y., Yang, T., Zhang, J., Wang, C., Liu, W.,... Yang, H. (2016). Improving hand hygiene compliance among healthcare workers: An intervention study in a hospital in Guizhou Province, China. *Brazilian Journal of Infectious Diseases*, 20\_ (4), 413–418. <https://doi.org/10.1016/j.bjid.2016.04.00>
- 18 - Murni, I. K., Duke, T., Kinney, S., Daley, A. J., & Soenarto, Y. (2015). Reducing hospital-acquired infections and improving the rational use of antibiotics in a developing country: An effectiveness study. *Archives of Disease in Childhood*, 100\_ (5), 454–459.
- 19 - Nabavi, M., Alavi-Moghaddam, M., Gachkar, L., & Moeinian, M. (2015). Knowledge, attitudes, and practices study on hand hygiene among Imam Hossein Hospital's residents in 2013. *Iranian Red Crescent Medical Journal*, 17\_ (10), e19606. <https://doi.org/10.5812/ircmj.19606>
- 20 - Saleh, A. M., Alrawaili, S. M., & Abdelbasset, W. K. (2022). Hand hygiene practices among Jordanian nurses in Amman. *African Health Sciences*, 22\_ (3), 710–717. <https://doi.org/10.4314/ahs.v22i3.76>

- 21 - Salama, M. F., Jamal, W. Y., Al Mousa, H., AlAbdulGhani, K. A., & Rotimi, V. O. (2013). The effect of hand hygiene compliance on hospital-acquired infections in an ICU setting in a Kuwaiti teaching hospital. *Journal of Infection and Public Health*, 6\_ (1), 27-34.
- 22 - Sallami, Z. A. (2016). Assessment of hand hygiene attitude, knowledge and practice among health science students in Aden University. *Journal of Biosciences and Medicine*, 6\_ (4), 25.
- 23 - Schmutz, J. B., Grande, B., & Sax, H. (2023). WHO 'My five moments for hand hygiene' in anaesthesia induction: A video-based analysis reveals novel system challenges and design opportunities. *Journal of Hospital Infection*, 135\_, 163-170. <https://doi.org/10.1016/j.jhin.2023.03.002>
- 24 - Shen, L., Wang, X., An, J., Zhou, N., Sun, L., Chen, H.,... Liu, X. (2017). Implementation of WHO multimodal strategy for improvement of hand hygiene: A quasi-experimental study in a Traditional Chinese Medicine hospital in Xi'an, China. *Antimicrobial Resistance & Infection Control*, 6\_, 98. <https://doi.org/10.1186/s13756-017-0254-4>
- 25 - Wang, T., Xia, J., Wu, T., Ni, H., Long, E., Li, J.-P. O.,... Xu, Y. (2022). Handwashing quality assessment via deep learning: A modelling study for monitoring compliance and standards in hospitals and communities. *Intelligent Medicine*, 2\_ (3), 152-160. <https://doi.org/10.1016/j.imed.2022.03.005>
- 26 - World Health Organization. (2009). *Hand hygiene: Why, how & when?*
- 27 - World Health Organization. (2014). *Improved hand hygiene to prevent health care-associated infections.*
- 28 - Ziaee, M., Vafaenejad, R., Bakhtiari, G., Mostafavi, I., Gheibi, M., Fathabadi, J. M.,... Gholami, M. (2017). National Nosocomial Infection Surveillance System-based study in north eastern of Iran. *Social Determinants of Health*, 3\_ (2), 64-69.
- 29 - Zimlichman, E., Henderson, D., Tamir, O., Franz, C., Song, P., Yamin, C. K., Keohane, C., Denham, C. R., & Bates, D. W. (2013). Health care-associated infections: A meta-analysis of costs and financial impact on the US health care system.
- 30 - Akyol, A. D. (2007). Hand hygiene among nurses in Turkey: Opinions and practices. *Journal of Clinical Nursing*, 16\_ (3), [page range not provided].
- 31 - Baseer, A. Q., Usmani, A., Mushfiq, S., Hassand, M. H., Rahimi, B. A., Monib, A. W., Daqiq, M. S., & Niazi, P. (2025). Assessment of hand hygiene practices among nurses at a regional hospital in Kandahar, Afghanistan: A cross-sectional study based on the World Health Organization (WHO) 'Your 5 Moments for Hand Hygiene' guidelines. *Belitung Nursing Journal*, 11\_ (1), 83-90.
- 32 - Mohaithef, M. A. (2020). Assessing hand hygiene practices among nurses in the Kingdom of Saudi Arabia. *The Open Public Health Journal*, 13\_ (1), [page range not provided].
- 33 - Nwosu, N. I., Mmerem, J. I., Ozougwu, J. J., & others. (2024). Knowledge of hand hygiene and evaluation of hand washing technique among nurses at the University of Nigeria Teaching Hospital. *BMC Nursing*, 23\_, 872.
- 34 - Saleh, A. M., Alrawaili, S. M., & Abdelbasset, W. K. (2022). Hand hygiene practices among Jordanian nurses in Amman. *African Health Sciences*, 22\_ (3), 710-717.
- 35 - Seman, N. H. C., Ali, J., & Keng, S. L. (2025). Determinants of hand hygiene compliance and practice among nurses from West-coast Malaysia. *International Journal of Allied Health Sciences*, 9\_ (1), [page range not provided].
- 36 - World Health Organization. (2009). *Hand hygiene: Why, how & when? Patient safety: A world alliance for safer health care, save lives, clean your hands.*