

# A Study to Assess the Knowledge and Practices of Hand Hygiene among Nursing Staff in Different Department of the Hospitals in Uttar Pradesh

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## ABSTRACT

**Topic:** - A study to assess the Knowledge, And Practice of Hand Hygiene among Nursing Staff in different department of the Hospitals in Uttar Pradesh.

**Background of the study:** - Health care associated infections persist as a major problem in health care settings especially Intensive Care Units. Hand hygiene is the most simple and effective method for the prevention of these healthcare associated infections. So, assess the reported hand hygiene practices and observing is very much important to find out gaps, plan remedial measure to reduce HAIs. Hand hygiene practice is still burdened by inadequate compliance, whether in the professional sphere by health professionals or in the non-professional sphere by lay population

### Aims of the study:

- A. To assess the hand hygiene practices among nurses
- B. To assess the reason for non-compliance.

### Material and method: -

This study was conducted in different department of Fatima hospital. It was an observational, study 50 different professional categories nurses were taken for observational study, 50 for assess the reported hand hygiene practices. Questionnaire and observation tool were used for data collection.

**KEYWORDS:** Hand hygiene, knowledge, Practice, Nursing Staff, Hospital, Mean, Infection, Prevention, Sample, Questionnaire, Observation tool, Data collection, Corelation, Non compliance

**Result:** The study revealed that there is a correlation between the knowledge and the practices of hand hygiene among the nurses. The overall observed compliance was 58 % (50 nurses included in observation study, 308 number of opportunities are given only 180 opportunities of hand hygiene being performed). The BSc nurses shows higher compliance rate (93.4%). The GNM nurses show 64% and the ANM show low rate (60%). The reported hand hygiene compliance among (Questionnaire given to 50 Nurses they were may or may not be included in observation study).

**Conclusion:** There were two studies conducted by the investigator. The observational study and reported study. The observational study shows that the overall hand hygiene compliance was 58% and the reported study give more than 93.4% of compliance among different categories of nurses. The investigator found that the overall observed hand hygiene compliance among nurses was 58.4%, from that BSC Nurses have performed better. They reported the reason for noncompliance was that they were too busy (64%).

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**List of abbreviations**

Sr. NO	ABBREVIATIONS	Full form of abbreviations
1	HCW	Health care worker
2	WHO	World health organisation
3	HAI	Health care associate infection
4	IPC	Infection prevention and control
5	AMR	Antimicrobial resistance
6	HH	Hand hygiene
7	OR	Odds ratio
8	CI	Confidence interval
9	IC	Infection control
10	PK	Present level of Specific knowledge
11	BSc	Bachelor of science
12	GNM	General Nursing and Midwifery
13	ANM	Auxiliary Nurse and Mid wife
14	MICU	Medical intensive care unit
15	SICU	Surgical intensive care unit
16	Bef-pat	Before touching patient
17	Bef-asept	Before aseptic procedure
18	Aft-pat	After touching patient
19	Aft -pat surr	After touching patient surroundings
20	H.rub	Hand rub

**1. INTRODUCTION:****Background of study**

Hand hygiene is recognized as the leading measure to prevent cross-transmission of microorganisms and to reduce the incidence of health care associated infections. Despite the relative simplicity of this procedure, compliance with hand hygiene among health care providers is as low as comparing the recommended compliances. To address this problem, continuous efforts are being made to identify effective and sustainable strategies. One of such efforts is the introduction of an evidence-based concept of “My five moments for hand hygiene” by World Health Organization. These five moments that call for the use of hand hygiene include the moment before touching a patient, before performing aseptic and clean procedures, after being at risk of exposure to body fluids, after touching patient, and after touching patient surroundings. This concept has been aptly used to improve understanding, training, monitoring, and reporting hand hygiene among healthcare workers. Nurses constitute the largest percentage of the health care workers and they are the “nucleus of the healthcare system”. Because they spend more time with patients than any other HCWs, their compliance with hand washing guidelines seems to be more vital in preventing the disease transmission among patients. Hospital acquired infections are infections acquired in hospital by a patient who was admitted for a reason other than that infection. Hospital acquired infections are one of the important public health problems in many countries

throughout the world. A WHO study, have also shown that the highest prevalence of nosocomial infections occurs in intensive care units and in acute surgical and orthopaedic wards. Hospital acquired infections results in higher morbidity, mortality, and additional costs. It is well recognized that the risk of transmission of pathogens when providing medical care and the incidence of Hospital acquired infections can be kept low through appropriate standardized prevention procedures. However, it has been well documented that the level of compliance with the use of proven HAI measures by healthcare workers has been disappointing. In order to overcome this problem, it is vital to implement and practice prevention and control strategies with demonstrated value consistently and rigorously. Among the different strategies, the adherence to guidelines for disinfection is an essential ingredient for activities aimed at preventing the Hospital acquired infections. Most nosocomial infections are thought to be transmitted by the hands of health care workers. It has long been known that hand hygiene among health care workers plays a central role in preventing the transmission of infectious agents. Hand washing is the most effective way of preventing the spread of infectious diseases. But despite a Joint Commission requirement that Centres for Disease Control and Prevention hand hygiene guidelines be implemented in hospitals, compliance among health care workers remains low. The reasons of lack of compliance to hand washing include: lack of appropriate equipment, low staff to patient ratios, allergies to hand washing

products, insufficient knowledge among staff about risks and procedures, the time required and casual attitudes among HCWs towards bio-safety (Pittet 2006). Hand hygiene is a core element of patient safety for the prevention of Health Care Associated Infection (HAIs) and spread of anti-microbial resistance. Its promotion represents a challenge that requires a multimodal strategy. Hand hygiene prevents cross infection in hospitals, but Health Care Workers (HCWs) adherence to hand hygiene guidelines is poor. Easy, timely access to both hand hygiene and skin protection is necessary for satisfactory hand hygiene behaviour. Alcohol based hand rub may be better than traditional hand washing as they require less time, acts faster, are less irritating, and contribute to sustained improvement in compliance associated with decreased infection rates (Pittet, 2011).

Hand hygiene is the simplest, most effective measure for preventing HAIs. Despite advances in infection control and hospital epidemiological, Semmelweis' message is not consistently translated in to clinical practice, and adherence to recommended hand hygiene practice is unacceptably low. Average compliance with hand hygiene recommendations varies between hospital wards, among professional categories of HCWs, and according to working conditions, as well as according to the definitions used in different studies. (Asare A et al. 2009). Compliance with hand hygiene recommendations is the most important measure in preventing health care-associated infections. Transmission of microorganisms from the hands of healthcare workers is the main source of cross-infection in hospitals and can be prevented by hand washing (Akyol AD; 2007).

The use of alcohol-based hand rub solutions (ABHRs) in health care settings has been associated with increased hand hygiene compliance and reduced rates of nosocomial infection (Ahmed-Lecheb et al. 2011.) Adherence to hand hygiene recommendations in the intensive care unit (ICU) is variable and moderate, at best. (Qushmaq et al. 2008).

The hand hygiene practices of health care workers (HCWs) have long been the main vector for nosocomial infection in hospitals. So study to examine influences on risk judgment from the individual differences in knowledge levels and health beliefs among HCWs is important (McLaughlin 2011). Hand hygiene is the practice, which keeps the hands free from pathogens or decrease the amount prior to any procedure or touching the patient.

Hand hygiene prevents cross – infection in hospitals, but HCWs adherence to hand hygiene is poor. Easy, timely access to both hand hygiene and skin

protection is necessary for satisfactory hand hygiene behaviour (Pittet, 2011). Hand hygiene compliance rates among HCWs rarely exceeds 50% contact precaution are thought to increase HCWs hand hygiene awareness (Gilbert, 2010). Health Care Associated infections (HCAIs) are the major cause of morbidity and mortality. Hand hygiene is an effective preventive measure (Gould, 2010).

Hospital acquired infections possess a very real and serious threat to all who are admitted in hospitals? Pathogens are readily transmitted through the hands of HCWs, and hand hygiene substantially reduces the chance this transmission. Evidenced based guidelines for HCWs, hand hygiene practice exist, but compliance with these are internationally low.

(Creedon, 2005). Transmission of microorganisms from the hands of HCWs is the main source of cross infection in hospital and can be prevented by hand washing. Compliance with hand washing is moderate. Variation across hospital wards and types of HCWs suggests that targeted educational programme may be useful. The association between non-compliance and intensity of care suggest that understaffing may decrease the quality of patient care. (Pittet, 1999). Nosocomial infections are a leading complication in ICUs. Although hand hygiene is the single most efficient preventive measure, compliance with simple action remains low. Nosocomial infection can be transmitted from microorganisms on the hand of HCWs to patients. Hand Washing is has a proven benefit in preventing transmission of infection, yet compliance with hand washing, especially in intensive care unit is very important (Lipsett, 2011).

### **My 5 moments of hand hygiene (WHO)**

The My5 Moments for Hand Hygiene approach defines the key moments when health-care workers should perform hand hygiene.

This evidence-based, field-tested, user-centered approach is designed to be easy to learn, logical and applicable in a wide range of settings.

This approach recommends health-care workers to clean their hands;

1. Before touching the patient
2. Before clean / aseptic procedures
3. After body fluid exposure / risk
4. After touching the patient and,
5. After touching patient surroundings.

(HAIs) affect 1.4 million patients at any time worldwide, as estimated by the World Health Organization (WHO). In Intensive Care Units, the burden of HAIs is greatly increased, causing additional morbidity and mortality. Multidrug Resistant pathogens are commonly involved in such

infections and render effective treatment challenge. Proper hand hygiene is the single most important, simplest, and least expensive means of preventing HAIs. According to Centres for Disease Control and Prevention and WHO guidelines on hand hygiene in health care, alcohol – based hand rub should be preferred means for routine hand antisepsis. (Tschudin-sutteretal. 2010.). Health care workers are the most common vehicle for the transmission of HAIs from patient to patient and within the health care environment (Allegranzi2009). A large proportion of the infection acquired attributed to cross contamination and transmission of microbes from hands of HCWs to patients. Many studies have consistently shown that improved hand hygiene has reduced nosocomial infections and cross contamination of multi resistant infection in hospitals (Mathai etal. 2011) Most of nosocomial infections are thought to be transmitted by the hands of HCWs. So assess the knowledge, attitude and practice of hand washing among HCWs is important (Khaled etal 2006) Hospital acquired infections poses a very real and serious threat to all who are admitted to hospital. Pathogens are readily transmitted though HCWs hands, and hand hygiene practice substantially reduce the transmission. So, study to assess HCWs hand hygiene practices is important (Creedon, 2005).

Transmission of microorganisms from the hands of HCWs is the main sources of cross – infection in hospitals and can be prevented by hand washing. So, identifying predictors of non-compliance with hand washing during routine patient care is important (Hugonnet 2002). Health care associated infections persist as a major problem in most Intensive Care Units. Hand hygiene is the most simple and effective method for the prevention of these. So assess the reported hand hygiene practices and observing is very much important to find out gaps, plan remedial measure to reduce HAIs. From this point of view the researcher decide to assess the hand hygiene practices among HCWs.

### 1.1. Statement of the problem: -

A study to assess the Knowledge, And Practice of Hand Hygiene among Nursing Staff in different department of the Hospitals in Uttar Pradesh.

### 1.2. Aim of the study: -

Aim of the study is to assess the Knowledge, And Practice of Hand Hygiene among Nursing Staff in different department of the Hospitals in Uttar Pradesh.

### 1.3. Objectives of the study: -

- To assess the knowledge of staff nurses regarding the Hand hygiene

- To assess the practice of staff nurses regarding Hand hygiene
- To find out the reason for noncompliance in hand hygiene practices with Selected demographic variables among staff nurses.
- To find out the association knowledge and practice among the nurses.

### 1.4. Need for the study

Most nosocomial infections are thought to be transmitted by the hands of health care workers. It has long been known that hand hygiene among health care workers play a central role in preventing the transmission of infectious agents. Hand washing is the most effective way of preventing the spread of infectious diseases. But despite a Joint Commission requirement that Centres for Disease Control and Prevention hand hygiene guidelines be implemented in hospitals, compliance among health care workers remains low. The reasons of lack of compliance to hand washing include: lack of appropriate equipment, low staff to patient ratios, allergies to hand washing products, insufficient knowledge among staff about risks and procedures, the time required and casual attitudes among HCWs towards bio-safety (Pitted2006). Hand hygiene is a core element of patient safety for the prevention of Health Care Associated Infection (HAIs) and spread of antimicrobial resistance. Its promotion represents a challenge that requires a multimodal strategy. Hand hygiene prevents cross infection in hospitals, but Health Care Workers adherence to hand hygiene guidelines is poor Easy, timely access to both hand hygiene and skin protection is necessary for satisfactory hand hygiene behaviour. Alcohol based hand rub may be better than traditional hand washing as they require less time, acts faster, are less irritating, and contribute to sustained improvement in compliance associated with decreased infection rates (Pitett,) Hospital acquired infections results in higher morbidity, mortality, and additional costs. It is well recognized that the risk of transmission of pathogens when providing medical care and the incidence of Hospital acquired infections can be kept low through appropriate standardized prevention procedures. However, it has been well documented that the level of compliance with the use of proven HAI measures by healthcare workers (HCWs) has been disappointing [11]. In order to overcome this problem, it is vital to implement and practice prevention and control strategies with demonstrated value consistently and rigorously. Among the different strategies, the adherence to guidelines for disinfection is an essential ingredient for activities aimed at preventing the Hospital acquired infections.

### 1.5. Scope of the study:

This study will impart the view to assess the knowledge and skill of the staff nurses regarding the effectiveness of Hand hygiene and to assess the nursing staff 's Knowledge after a self-structured questionnaire regarding Hand hygiene.

- In the age group of 22-40 yrs.

### 1.6. Delimitations of the study:

- The study was conducted to those who were,
- Available during data collection period
- Willing to participate with study
- Able to co-operate and respond to the study

### 1.7. Research Question

What will be the hand hygiene compliances among nurses who work in health care facility?

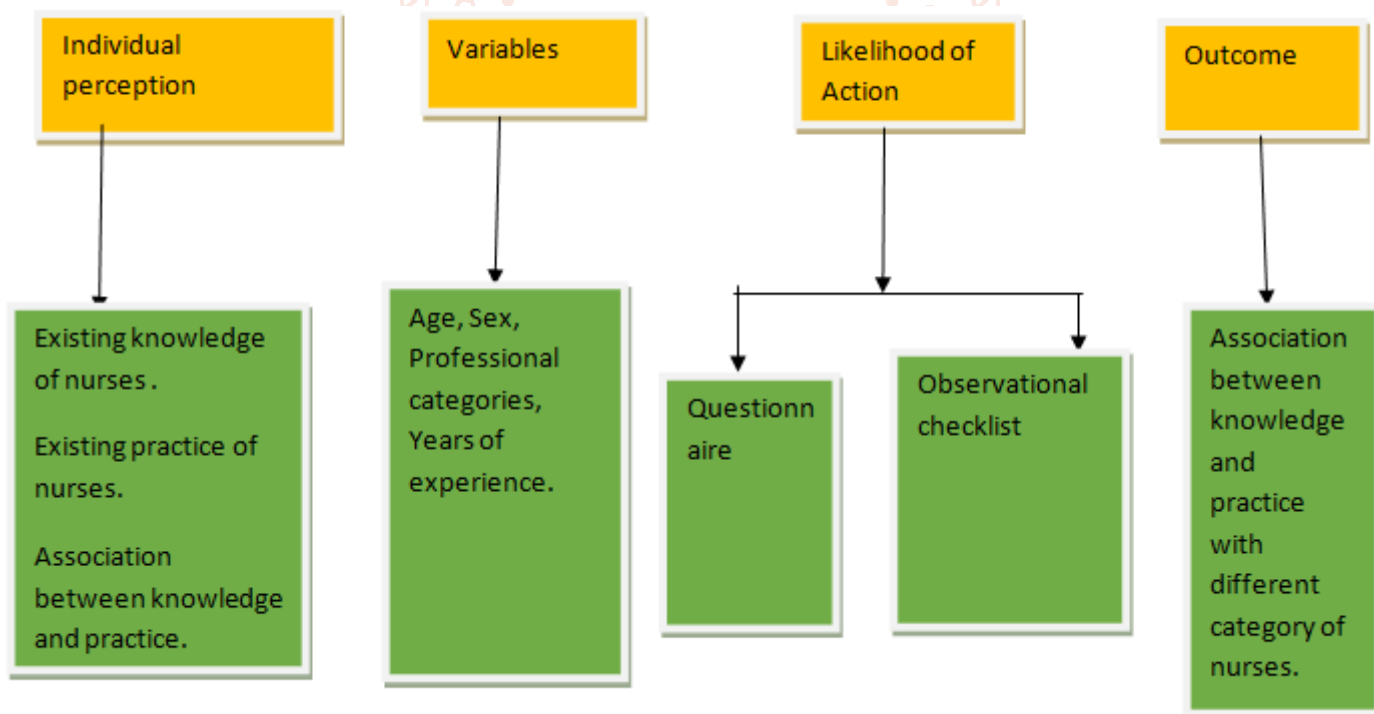
### 1.8. Assumptions

There will be significant difference between knowledge and practice with selected demographic variables.

There will be significant association between knowledge and practice with selected variables such as age, sex, experience, professional qualification.

- **Research approach :a quantitative research**
- **Research methodology: Descriptive study.**

- **Area of study:** Different department of the Hospital Uttar Pradesh
- **Sample :50**
- **Techniques:** -A convenient sampling technique will be used for selecting the sample for study.
- **Tools:** Part A: Structured demographic variable. Part B: Self –structured knowledge questionnaire. Part C: Hand hygiene practice check list.
- **Data processing:** Permission from concerned authorities will be taken before data collection. Purpose of the study would be explained to the subjects & written consent will be taken by them.
- **Analysis and estimation:** - The collected data would be planned, organized tabulated and analysed based on the objectives of the study by using descriptive and inferential statistics.
- **Testing Hypothesis:** Hypothesis is to be proved with the help of inferential statistics.
- **Expected outcomes:** -The knowledge and practise of the sample population will be enhanced.
- **Relevance of expected outcome:** Relevance will be supported with accurate reviews of literature.



## CONCEPTUAL FRAMEWORK

### Organization of the report

Chapter 1 deals with the introduction, background of the study, and statement of the problem, Need and significance of the study, objectives, operational definitions and delimitation. Chapter 2 deals with review of literature, Chapter 3 deals with the

methodology, Chapter 4 presents analysis and interpretation of data and chapter 5 include summery, discussion, conclusion, recommendation, reference and appendices are given towards the end.

## 2. Review of literature

### 2.1. Introduction

Review of literature is a key step in research process. Nursing research may be considered a continuous process in which knowledge gained from earlier studies is an integral part of research in general. One of the most satisfying aspects of the literature review is the contribution it makes to the new knowledge, insight and general scholarship of the researchers. 'A literature review is a compilation of resources that provide the ground work for future study.' Review of literature is defined as a broad, comprehensive, in depth, systematic and critical review of scholarly publications, unpublished scholarly print materials, audio visual materials and personal Communications.

The literature reviewed has been presented under the following headings:

- A. Studies related to incidence and opportunity of Hand hygiene
- B. Studies related to knowledge about importance of Hand hygiene.
- C. Studies related to structured teaching program in Hand hygiene.

### 2.2. A. Studies related to incidence and opportunity of hand hygiene.

Dr. Didier Pittel (2017). This study conducted to emphasis on the importance of prevention and control of nosocomial infections. Hand hygiene is the cornerstone of infection prevention and control (IPC). When optimally performed, hygiene reduces healthcare-associated infections (HAI) and the spread and antimicrobial resistance (AMR). Poor compliance with hand hygiene practices remains a challenge for IPC practitioners all over the world. Both the quality and quantity of research on hand hygiene have increased tremendously over the past two decades, guiding our better understanding of the topic and pushing all of us to actions.

**D Gould, D Moraleo N Drey. (2018)** Journal An article presents highlights from a recently updated systematic Cochrane review evaluating the effectiveness of interventions to improve hand hygiene compliance in patient care. It is an advance on the two earlier reviews we undertook on the same topic as it has, for the first time, provided very rigorous synthesis of evidence that such interventions can improve practice. In this article, we provide highlights from a recently updated Cochrane systematic review. We identify omissions in the information reported and point out important aspects of hand hygiene intervention studies that were beyond the scope of the review.

**M Hoffiman, G Sendhofer V Gombotz (2020)** Journal Health care-associated infections along with

antibiotic resistance are a leading risk for patient safety in intensive care units. Hygienic hand disinfection is still regarded as the most effective, simplest, and most cost-effective measure to reduce health care-associated infections. To improve hand hygiene compliance and to prevent health care-associated infections, interventions of the "German Clean Hands Campaign" were implemented in a university hospital.

**Asare A et al (2009 Jun)** Conducted a study to assess the hand hygiene practices in a neonatal intensive care unit in Ghana. Unobtrusive observation of patient contact, hand hygiene practices, and hand washing technique among nurses and physicians attending randomly selected newborn for five hours daily for two weeks. Patient contact categorized as low-risk or high-risk. Hand hygiene practice before and after patient contact categorized as clean uncontaminated, clean decontaminated, new gloves, unchanged gloves. Compliance to alcohol rub use assessed. The result of the study was that the patient to nurse/physician ratio varied from 9:1 to 12:1. There were 97 patient contacts of which 49 were high risk and 48 low-risk. Most (73%) patient contacts were from nurses. Compliance to hand hygiene recommendations before versus after patient contact was 15.4% versus 38.5% for physicians and 14.1% versus 9.9% for nurses. Gloves were used for 60.8% patient contacts (85.7% high-risk, 35.4% low-risk); however, compliance to recommended procedure occurred in only 12.2% of high-risk contacts and none of the low-risk contacts. Gloves were not changed between patients in 43.7% of high-risk contacts and 88.2% of low-risk contacts. Hand washing protocol was generally followed. Alcohol hand rub was always available but was not used for hand hygiene. The researcher concluded that hand hygiene compliance of physicians and nurses was low. Gloves and alcohol rub were not used according to recommended guidelines. Incorporating effective education programs that improve adherence to hand hygiene guidelines into the continuing education curriculum of health professionals is recommended. Gilbert et al (2010) conducted a study to assess the hand hygiene practices among health care workers in Atlanta Vetrence Affairs Medical center, to determine any differences in hand hygiene compliance rates for HCW between patients in contact precaution and those not in any isolation. The study was done in a hospital's medical (MICU) and surgical (SICU) intensive care units, a trained observer directly observed hand hygiene by the type of room (contact precaution or non-contact precaution) and the type of HCW (nurse or doctor). The result of the study was that the SICU had similar compliance rates (36/75 [50.7%]) in contact

precaution rooms vs. 223/431 [51.7%] compliance in non-contact precaution rooms,  $P > .5$ ); the MICU also had similar hand hygiene compliance rates (67/132 [45.1%] in contact precaution rooms vs. 96/213 [50.8%] in non-contact precaution rooms,  $P > .10$ ). Hand hygiene compliance rates stratified by HCW were similar with 1 exception. The MICU nurses had a higher rate of hand hygiene compliance in contact precaution rooms than in rooms with non-contact precautions (66.7% vs. 51.6%, respectively). Finally, the authors concluded that Compliance with hand hygiene among HCWs did not differ between contact precaution rooms and rooms with non-contact precautions with the exception of the nurses in the MICU.

**Dedrick et al (2007)** conducted an observational study to identify characteristics of encounters between healthcare workers (HCWs) and patients that correlated with hand hygiene adherence among HCWs. The study was conducted in Intensive care unit in a Veterans Affairs hospital including all HCWs. The result of the study was there were 767 patient encounters observed (48.6% involved nurses, 20.6% involved physicians, and 30.8% involved otherwise); 39.8% of encounters involved patients placed under contact precautions.

HCW contact with either the patient or surfaces in the patient's environment occurred during all encounters; direct patient contact occurred during 439 encounters (57.4%), and contact with environmental surfaces occurred during 710 encounters (92.6%). The median duration of encounters was 2 minutes (range, <1 to 51 minutes); 33.6% of encounters lasted 1 minute or less, with no significant occupation-associated differences in the median duration of encounters. Adherence with hand hygiene practices was correlated with the duration of the encounter, with overall adherences of 30.0% after encounters of  $\leq 1$  minute, 43.4% after encounters of  $>1$  to  $\leq 2$  minutes, 51.1% after encounters of  $>2$  to  $\leq 3$  minutes, and 64.9% after encounters of  $>3$  minutes ( $P < .001$  by the  $\chi^2$  for trend). In multivariate analyses, longer encounter duration, contact precautions status, patient contact, and nursing occupation were independently associated with adherence to hand hygiene recommendations. The authors concluded that in this study, adherence to hand hygiene practices was lowest after brief patient encounters (ie,  $<2$  minutes). Therefore, improving adherence after brief encounters may have an important overall impact on the transmission of healthcare-associated pathogens and may deserve special emphasis in the design of programs to promote adherence to hand hygiene practices. As are A et al (2009 Jun) conducted a study to assess the

hand hygiene practices in a neonatal intensive care unit in Ghana. Unobtrusive observation of patient contact, hand hygiene practices, and hand washing technique among nurses and physicians attending randomly selected new-borns for five hours daily for two weeks. Patient contact categorized as low-risk or high-risk. Hand hygiene practice before and after patient contact categorized as clean uncontaminated, clean decontaminated, new gloves, unchanged gloves. Compliance to alcohol rub use assessed. The result of the study was that the patient to nurse/physician ratio varied from 9:1 to 12:1. There were 97 patient contacts of which 49 were high risk and 48 low-risk. Most (73%) patient contacts were from nurses. Compliance to hand hygiene recommendations before versus after patient contact was 15.4% versus 38.5% for physicians and 14.1% versus 9.9% for nurses. Gloves were used for 60.8% patient contacts (85.7% high-risk, 35.4% low-risk); however, compliance to recommended procedure occurred in only 12.2% of high-risk contacts and none of the low-risk contacts. Gloves were not changed between patients in 43.7% of high-risk contacts and 88.2% of low-risk contacts. Hand washing protocol was generally followed. Alcohol hand rub was always available but was not used for hand hygiene. The researcher concluded that hand hygiene compliance of physicians and nurses was low. Gloves and alcohol rub were not used according to recommended guidelines. Incorporating effective education programs that improve adherence to hand hygiene guidelines into the continuing education curriculum of health professionals is recommended. Gilbert et al (2010) conducted a study to assess the hand hygiene practices among health care workers in Atlanta Veterans Affairs Medical centre, to determine any differences in hand hygiene compliance rates for HCW between patients in contact precaution and those not in any isolation. The study was done in a hospital's medical (MICU) and surgical (SICU) intensive care units, a trained observer directly observed hand hygiene by the type of room (contact precaution or non-contact precaution) and the type of HCW (nurse or doctor). The result of the study was that the SICU had similar compliance rates (36/75 [50.7%] in Contact precaution rooms vs. 223/431 [51.7%] compliance in non-contact rates (67/132 [45.1%] in contact precaution rooms vs. 96/213 [50.8%] in noncontact precaution rooms,  $P > .10$ ). Hand hygiene compliance rates stratified by HCW were similar with 1 exception. The MICU nurses had a higher rate of hand hygiene compliance in contact precaution rooms than in rooms with non-contact precautions (66.7% vs. 51.6%, respectively). Finally, the authors concluded that Compliance with hand hygiene among

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**Khaled M et al. (2006)** Conducted a cross sectional descriptive and observational study to assess the knowledge, attitude, and practices of hand washing among health care workers (HCW) in Ain-Shams University hospitals and to assess its different wards for facilities required for hand washing (HWs). Study was conducted for six months from June till November 2006. It included preparatory phase, observational phase for practice and assessment of knowledge & attitude through self-administered questionnaire to HCW in 10 different departments. 2189 opportunities among HCW were observed. The result of the study was that Doctors showed a significantly higher compliance (37.5%)

observational than other groups of HCW ( $P=0.000$ ), however only 11.6% of them had done the HW in an appropriate way. The most common type of Practiced among HCW was the routine HW (64.2%) and the least was the antiseptic HW (3.9%). Having a short contact time and improper drying (23.2%) was the most common form of inappropriate HW. Most of the wards had available sinks (80%) but none of them had available paper towels. The mean score knowledge was higher in nurses than in doctors ( $42.6 \pm 11.7$  versus  $39.1 \pm 10.5$ ). 97.3% of the nurses believe that administrative orders and continuous observation can improve hand-washing practices. Finally, the authors concluded that Compliance to hand washing was low. Implementation of multifaceted interventional behavioural hand hygiene program with continuous monitoring and performance feedback, increase supplies necessary for HW and institutional support is important for improving the compliance of hand hygiene guidelines. An De Mortel et al. (2011), Conducted a study to examining the hand hygiene knowledge, beliefs and practices of Italian nursing and medical students with the aim of informing undergraduate curricula. A questionnaire was administered to a convenience sample of 117 nursing and 119 medical students in a large university in Rome, Italy, to determine their hand hygiene knowledge, beliefs and practices. The result of the study was that Nursing students' hand hygiene knowledge ( $F = 9.03(1,230)$ ;  $P = 0.003$ ), percentage compliance ( $Z = 6.197$ ;  $P < 0.001$ ) and self-reported hand hygiene practices ( $F = 34.54(1,230)$ ;  $P < 0.001$ ) were significantly higher than that of medical students. There were no statistically significant differences between hand hygiene beliefs. Mean scores on the knowledge questions were low for both groups, reflecting primarily a knowledge deficit in relation to the use of alcohol-based hand rubs to decontaminate hands in the healthcare setting. Finally, the authors concluded that significant disciplinary differences in hand hygiene knowledge and self-reported practices were apparent among undergraduate Italian healthcare students. Bukhari et al (2009- 2010), Conducted an observational, prospective, longitudinal study to motivate healthcare professionals, with a focus on improving hand hygiene compliance. Study was conducted on the evaluation of hand hygiene compliance at Hera General Hospital, Makkah, and Kingdom of Saudi Arabia from May 2009 to May 2010. Four components to improve hand hygiene compliance were implied; daily audit, monthly staff education; quarterly workshops of hand hygiene and education material distribution. The compliance rate was calculated by its adherence with number of



opportunities. The result of the study was that Results Of total 163 healthcare professionals were surveyed for hand hygiene compliance; 57 (35%) were doctors, 92 (56.4%) nurses, and (8.6%) patient care technicians. The overall compliance rate was 50.3%, and its distribution among staff was as follows; doctors 49.1%, nurses 52.2%, and technicians 42.8%. The highest compliance rate among doctors and nurses was found in surgical units. A low compliance in high intensity patient care area was observed such as in the Emergency Room and outpatient department the patient care technicians showed highly variable results, as their compliance rate was 100% in medical units while 0% in various other clinical areas. Finally, the authors concluded that the overall hand hygiene compliance rate of healthcare professionals reached 50% after a long education campaign, and was highest among the nurses. Further study is needed to explore the reasons for noncompliance.

**Creed on S A** (2005) conducted a quasi-experimental study on health care workers decontamination practice from behavioural perspective.

A quasi-experimental design with a convenient sample was used. The result of the study was that Implementation of the multifaceted interventional behavioural hand hygiene programme resulted in an overall improvement in compliance with hand hygiene guidelines (51-83%,  $P < 0.001$ ). Furthermore, healthcare workers believed that their skin condition improved ( $P < 0.001$ ). An increase in knowledge about hand washing guidelines was also found. The researcher concluded that in order to be effective, efforts to improve compliance with hand washing guidelines must be multifaceted. Alcohol hand rubs (with emollients) need to be provided at each patient's bedside. Issues surrounding healthcare workers' skin irritation need to be addressed urgently.

**Lipsett (2011) et al** conducted an observational study to assess the hand washing compliance depends on professional status. The study was conducted in surgical intermediate care unit in large university teaching hospital. HW compliance was observed among all health care workers (HCW): physicians (MD; N = 46), nurses (RN; N = 295), and nursing support personnel (NSP; N = 93). Over an 8-week period, unidentified, trained observers documented all HCW interactions in 1-h random blocks. HW opportunities were classified into low and high risk of pathogen acquisition and transmission. The result of the study was a total of 493 HW opportunities were observed, of which 434 involved MD, RN, and NSP. Two hundred and sixty-one low-risk (MD 35, RN 171, NSP55) and 173 (MD 11, RN 124, NSP 38) high-risk interactions were observed. Overall HW

rates were low (44%). Significant differences existed among HCW, with MDs being the least likely to wash (15% versus RN 50%, NSP 37%,  $p < 0.01$ ). In adjusting for high-risk situations, MDs (odds ratio [OR] 5.58, 95% CI 2.49–12.54; NSP, OR 1.73, 95% CI 1.13–2.64; RN, OR 0.98, 95% CI 0.77–1.23) were significantly less likely to perform HW when compared to RNs. Nursing 14 groups were significantly less likely to wash in low-risk versus high-risk situations (MD 9.2% versus 17.1%; RN 69.4% versus 39.6%; NSP 85% versus 23.3%), suggesting individual discrimination of the importance of HW. Although nurses were less likely to wash in high-risk situations compared to NSP, the overall number of opportunities was greater, suggesting that improvement in HWs the level of NSP could have a major impact on infection transmission. Finally, the authors concluded that Significant opportunities exist for quality improvement, novel educational strategies, and assessment of reasons why MD and, to a lesser extent, RNs fail to follow simple HW practices.

**Mathai et al, (1993)**, conducted a before – after prospective, observational, intervention study in a mixed medical surgical ICU of a tertiary level hospital. The author's aim was to investigate the HCWs' hand hygiene compliance rate in ICU and to assess the reason of hand hygiene non – compliance. All Health care workers in ICU all come in contact with patient were observed before and after a multi model interventional strategy. (Education, posters, verbal reminders, and easy availability of products). A self-reported questionnaire circulated to assess perception regarding compliance. Results shows that hand hygiene compliance among medical personnel working in the ICU was 26% and the most common reason for cited non – compliance was lack of time (37%). The overall compliance improved significantly followed by the intervention to 57.36% ( $p < 0.000$ ), Nursing students (9.8- 33.33%,  $< 0.0000$ ), Resident trainees (21.62 – 60.71%,  $p < 0.0000$ ), Visiting consultant 922-57.14%,  $p = 0.0001$ ,

Physiotherapist 75.95%,  $p = 0.413$ ) and premedical staff (10.71- 55.45%,  $p < 0.0000$ ). The authors concluded that hand hygiene compliance among healthcare workers in the ICU is poor; however; intervention strategies, such as the one used, can be useful in improving the compliance rate significantly. 15 Al – Wazzan et al (2011) conducted a cross-sectional study to assess the compliance with hand hygiene guidelines among nursing staff in secondary care hospitals in Kuwait. The researcher uses direct observation using the Lewis ham

observation tool and self-administered questionnaire in six major public secondary care hospitals in Kuwait. scale was considered as indications for hand hygiene while any attempt for hand. A self-administered questionnaire was prepared and pilot tested and then distributed to nursing staff at each ward immediately after conducting the inspection; 550 were distributed and 454 were completed and returned. Among 204 observation sessions, a total of 935 opportunities and 312 hand hygiene practices were recorded. The Result of the study was that the overall compliance was 33.4%. The observed compliance

significantly varied between different ward categories from 14.7% in emergency to 55% in medical wards. Of the 454-nursing staff that participated in self-reported compliance, 409 (90%) indicated that they always washed their hands upon practicing patient care activities. Nurses consistently reported higher compliance after conducting patient care activities rather than before Being busy with work (42.2%), having sore/dry hands (30.4%) and wearing gloves (20.3%) were the most frequently reported hindrances to improving hand hygiene. Finally the authors concluded that observed hand hygiene compliance among nursing staff in secondary care hospitals in Kuwait was poor. High self-reported compliance may reflect a high level of awareness of hand hygiene but may also suggest that improving compliance through increasing awareness has probably reached saturation. Gould et al (2010) conducted a study to assess to assess the short and longer-term success of strategies to improve hand hygiene compliance and to determine whether a sustained increase in hand hygiene compliance can reduce rates of health care-associated infection. The researcher conducted electronic searches of: the Cochrane Central Register of Controlled Trials; the Cochrane Effective Practice and Organization of Care Group specialized register of trials; MEDLINE; Pub Med;

**EMBASE; CINAHL; and the BNI. All databases were searched to July 2006;** MEDLINE was searched from 1980, CINAHL from its inception, and the remainder from 1990 until July 2006. The data collection analysis done by two reviewers independently extracted data and assessed data quality. The result of the study was that two studies met the criteria for review. One was a randomized controlled trial. The other was a controlled before and after study. Both were poorly controlled. Statistically significant post intervention increase in hand washing was reported in one study up to four months after the intervention. In the other there was no post-intervention increase in hand hygiene compliance.

Finally, the authors concluded that there is little robust evidence to inform the choice of interventions to improve hand hygiene. It appears that single interventions based on short, 'one off' teaching sessions are unlikely to be successful, even short-term. There is a need to undertake methodologically robust research to explore the effectiveness of soundly designed interventions to increase hand hygiene compliance Suchitra J B(2007) et al, conducted a study to assess the to identify predictors of noncompliance with hand washing during routine patient care. The participants in the study were Health Care Workers (HCWs). Doctors, nurses and ward aides working in different wards of the hospital who were observed for compliance with hand washing. The result of the study was that in 270 observed opportunities for hand washing, average compliance was 63.3%. Noncompliance was highest among doctors followed by nurses. Finally, the authors concluded that compliance with hand washing was moderate. Variation across the hospital ward and type of HCW suggests that targeted educational programs may be useful. Noncompliance suggests that understaffing may decrease quality of patient care.

Patarakul (2005) et al, conducted an observational study to determine the baseline compliance and assess the attitudes and beliefs regarding hand hygiene of HCWs and visitors in intensive care units (ICUs) at KCMH. Observed hand hygiene compliance of HCWs and visitors in ICUs before patient contact for eight 17 hours. A self-administered questionnaire was employed to measure attitudes and beliefs about hand hygiene for two-week period. The result of the study was that Overall hand-hygiene compliance obtained from this observational study was less than 50% and differed markedly among various professional categories of HCW and visitors. In questionnaire-based study, patient needs perceived as a priority (51.2%) was the most common reason for non-compliance, followed by forgetfulness (35.7%), and skin irritation by hand-hygiene agents (15.5%). Subjects believed to improve their compliance by multiple strategies including available low irritating hand-hygiene agents (53.4%), information of current nosocomial infection rate (49.1%), and easily accessed hand-hygiene supplies (46.3%). Almost all subjects (99.7%) claimed to know correct hand-hygiene techniques. Hand washing with medicated soap was perceived to be the best mean of hand decontamination (37.8%). Authors concluded that Hand-hygiene compliance of HCWs and visitors is unacceptably low. Their knowledge, behaviour attitudes, and beliefs toward hand hygiene need to be improved by the multimodal and multidisciplinary approach.

### 2.3. Studies related to knowledge on hand hygiene:

**Pederson, D., Keithly, S. and Brady, K. 2009.** Effects of an observer on conformity to hand washing norm. Study on development of hand hygiene questionnaire to determine the reliability and validity of hand hygiene practices Thea F van de Mortel; Eleni A Apostolopoulou; Georgios L Petrikkos American Journal of Infection Control profession.

**Nasiruddin (2012)** Hand hygiene is an important means of preventing nosocomial infections. Studies have shown a <50% compliance rate for hand hygiene among health care workers. A hand hygiene survey was administered to nursing students in a tertiary institution in Singapore. The results of this survey strongly indicate that nursing students understand the importance of hand hygiene compliance and perceive clinical internship programs and practical laboratory sessions to be effective methods of hand hygiene education.

Anne foote Maher L Masri (2015) Limited research has investigated the hand hygiene practices of undergraduate nursing students. A descriptive self-report survey explored the predictors of self-perceived hand hygiene compliance using a convenience sample of 306 undergraduate nursing students enrolled at a southwestern Ontario university. Compliance was defined as the performance of hand hygiene at least 90% of the time in the moments both before and after direct patient contact. Logistic regression analysis revealed that the independent predictors of hand hygiene compliance included concern about reprimand or discipline (odds ratio (OR) 4.324; 95% confidence interval (CI) 1.465–12.758); motivation to protect patients from infection. The findings of this study provide research-based evidence that could be used by educators to understand a better hand hygiene practices among undergraduate nursing students.

**Bargellini A, Borella P, Ferri P, Ferranti G, Marchesi (2012).** Aim Hand hygiene practice is still burdened by inadequate compliance, whether in the professional sphere by health professionals or in the non-professional sphere by lay population. Aim of this study was to map the hand hygiene knowledge and its compliance in the monitored group of people. Methods The research was conducted at the Jessenia's Faculty of Medicine in Martin of Comenius University in Bratislava (JFM CU) among seventy 3rd year students of General Medicine (medical study program), and Nursing, Midwifery and .Public Health (non-medical study programs). Knowledge of hygienic hand washing according to the WHO guidelines from 2009 was investigated, as

well as differences in the level of microbial contamination of hands after routine hand washing between the group that had been acquainted with hand hygiene protocols and the group that had not sufficiently. Results The results have shown that 32.9% of the students did not perform hygienic hand washing properly. The differences between the groups of students with and without the proper hand hygiene compliance in routine hand washing were not statistically significant. Conclusion The results of our survey have suggested that the reasons for decreased compliance with hand washing protocols may be related to forgetting to wash the hands or not being acquainted with hand washing protocols at all. The strategies focused only on one aspect of hand hygiene are, according to scientific literature, ineffective in the long term. Nurses undertake important responsibilities in patient care and the prevention of hospital-acquired infections. However, adherence to hand hygiene practices among nurses has been reported to be low. This study aims to evaluate the effectiveness of hygienic hand washing training on hand washing practices and knowledge. The study design was a nonrandomized, quasi-experimental study, with pretest-posttest for one group. Pre- and post-observations were also conducted using an observation form on any 5 workdays to evaluate the effectiveness of hygienic hand washing training on hand washing practices. The study was conducted with 63 nurses working at a hospital in Istanbul. Hand Hygiene Knowledge Form scores after hygienic hand washing training were higher than the prôt raining scores. The number of the nurses' hand hygiene actions after hand hygiene training increased significantly compared with that before training. The results indicate that training in proper hand washing techniques and hygienic hand washing practices positively affects the knowledge.

**Graveto JM, GDN, Rebola RIF, Fernandes EA, Costa PJDS (2007).**

There is only limited understanding of why hand hygiene improvement strategies are successful or fail. It is therefore important to look inside the 'black box' of such strategies, to ascertain which components of a strategy work well or less well. This study examined which components of two hand hygiene improvement strategies were associated with increased nurses' hand hygiene compliance.

A process evaluation of a cluster randomised controlled trial was conducted in which part of the nursing wards of three hospitals in the Netherlands received a state-of-the-art strategy, including education, reminders, feedback, and optimising materials and facilities; another part received a team

and leaders-directed strategy that included all elements of the state-of-the-art strategy, supplemented with activities aimed at the social and enhancing leadership. This process evaluation used four sets of measures: effects on nurses' hand hygiene compliance, adherence to the improvement strategies, contextual factors, and nurses' experiences with strategy components. Analyses of variance and multiple regression analyses were used to explore changes in nurses' hand hygiene compliance and thereby better understand trial effects. Both strategies were performed with good adherence to protocol. Two contextual factors were associated with changes in hand hygiene compliance: a hospital effect in long term ( $p < 0.05$ ), and high hand hygiene baseline scores were associated with smaller effects ( $p < 0.01$ ). In short term, changes in nurses' hand hygiene compliance were positively correlated with experienced feedback about their hand hygiene performance ( $p < 0.05$ ). In the long run, several items of the components 'social influence' (i.e., addressing each other on undesirable hand hygiene behaviour  $p < 0.01$ ), and 'leadership' (i.e., ward manager holds team members accountable for hand hygiene performance  $p < 0.01$ ) correlated positively with changes in nurses' hand hygiene compliance. This study illustrates the use of a process evaluation to uncover mechanisms underlying change in hand hygiene improvement strategies. Our study results demonstrate the added value of specific aspects of social influence and leadership in hand hygiene improvement strategies, thus offering an interpretation of the trial effects.

#### 2.4. C. Studies related to structured teaching program in Hand hygiene.

**Denise Marie and Leodoro Labrague (2017)**  
Background: Hand hygiene competence is one of the critical outcomes in nursing education. Ensuring nursing students recognize the what, when and how of hand hygiene is critical in the light of the increasing rates of healthcare-associated infections. Aim: To systematically appraise and synthesize articles on hand hygiene knowledge and compliance among nursing students. Methods: This is a systematic review of scientific articles published from 2006 to 2016. The 6 primary databases used were as follows: PubMed, Embase, Cumulative Index to Nursing & Allied Health Literature, ProQuest and Psych Info. Key search terms utilized were as follows: 'hand washing', 'hand hygiene', 'compliance', 'knowledge', 'practice' and 'nursing students. Findings: Nineteen studies met the review criteria. The findings revealed a low-to-moderate knowledge of and compliance with hand hygiene among nursing students. In addition, there were significantly higher rates of hand hygiene compliance

in nursing students when compared to medical students. Relatively few studies attempted to identify predictors of hand hygiene knowledge and compliance. Conclusion: This review demonstrated suboptimal knowledge and compliance to hand hygiene among student nurses. In addition, The findings of this review emphasized the role of nurse educators in enhancing hand hygiene competence in nursing students. Implementation of empirically tested strategies such as utilizing multidimensional interventions, scenario-based hand hygiene simulation activities and hand hygiene education programmes that would enhance nursing students' hand hygiene knowledge and compliance is an asset. Hospital and nursing administrators should ensure continuous support and monitoring to guarantee that hand hygiene programmes are institutionalized in every healthcare setting by every healthcare worker.

**American Journal of Infection control (1992)** A questionnaire survey was carried out anonymously among 2557 health care workers in Denmark and Norway to identify and quantify factors that affect the handwashing behaviour of physicians, nurses, and other staff groups who perform direct patient care. For number of daily patient contacts physicians reported significantly fewer instances of hand hygiene (HH) per day than did those in other medical professions. Male physicians reported significantly fewer HH per day than did their female colleagues. Significant differences were found among staff groups in emphasis on factors motivating and discouraging HH. The main motivating factor for all groups, however, was an awareness that HH is important for the prevention of infection. Skin problems from frequent hand washing and the use of agents that irritate and dry the skin were the main reasons for disinclination toward HH. The number of points given to these statements correlated well with the stated frequency of HH in staff groups with relatively many (9 to 24) patient contacts per day. Many studies have revealed low standards of HH in health care settings. Whenever HH is taught, the significance of HH for the prevention of infection is always stressed. The participants in this survey were well aware of this significance, but there is still a discrepancy between theory and practice. Goal-specific strategies to improve HH practices would probably be more effective if more were done to minimize the factors that health care workers find detrimental to HH. Continual evaluation of the possibly detrimental effects of current hand washing agents should also be carried out.

**Sreejith Sasidharan Nair,<sup>1</sup> Ramesh Hanumantappa,<sup>2</sup> Shashidhar Gurushantwamy**

**Hiremath,<sup>2</sup> Mohammed Asaduddin Siraj,<sup>2</sup> and Pooja Raghunath(2011).** Hand hygiene is recognized as the leading measure to prevent cross-transmission of microorganisms and to reduce the incidence of health care associated infections [1, 2]. To address this problem, continuous efforts are being made to identify effective and sustainable strategies. One of such efforts is the introduction of an evidence-based concept of “My five moments for hand hygiene” by World Health Organization. These five moments that call for the use of hand hygiene include the moment before touching a patient, before performing aseptic and clean procedures, after being at risk of exposure to body fluids, after touching a patient, and after touching patient surroundings.

Even though proper hand washing is the most effective and easiest way to prevent many diseases, unfortunately many people do not practice hand washing correctly. The worldwide Global Hand Washing Day campaign which targets school children as the most effective agents for behaviour change is both evidence of this problem and an attempt to address it. In this study the researcher **Aimed:** to assess the effectiveness of structured teaching programme on hand washing techniques to prevent gastrointestinal infections among school going children. **Research design:** adopted for this study was quasi experimental design, samples for the study was selected through convenient sampling technique. Total sample size for the study was 100. Pre-test was done to the subjects in both group and Experimental group subjects received structured teaching programme regarding hand washing techniques to prevent gastrointestinal infections. Control group subjects do not receive any special interventions. On the seventh day from the pre-test researcher took post-test among subjects in both the group to assess the effectiveness of the effectiveness of structured teaching programme on hand washing techniques to prevent gastrointestinal infections. Data collected were analysed with the help of descriptive and inferential statistics. **Results:** Mean post-test score in experimental and control group was 25.72 and 13.71 respectively. The mean difference score was 12.01. The standard deviation scores in experimental group was 2.170 and for control group 9.131. The ‘t’ value was 59.524 which was statistically significant at the ‘P’ value 0.000. **Conclusion:** This study imposes importance of suitable health teaching intervention through proper structure to the school children, for enhancement concerning hand hygiene among them, all over the country.

**Nivetha, R (2016)** *Effectiveness of structured teaching programme on knowledge, practice and*

*attitude regarding hand washing among school children at a selected school, Serkadu in Vellore district.* Masters’ thesis, KarpagaVinayaga College of Nursing, Kancheepuram.

Keeping hands clean through improved hand hygiene is one of the most important steps one can take to avoid getting sick and spreading germs to others. A study was conducted to assess the effectiveness of structured teaching programme on knowledge, practice and attitude regarding hand washing among school children at a selected school, Serkadu in Vellore District”. The objectives were, to assess the knowledge, practice and attitude of school children regarding hand washing, to evaluate the effectiveness of structured teaching programme (STP) on knowledge, practice and attitude regarding hand washing among school children, to associate the selected demographic variables with knowledge, practice and attitude regarding hand washing among school children. A quantitative research approach of pre-experimental with one group pre and post-test design was chosen for this study. By using stratified random sampling technique, a total of 100 samples were included for the study. The structured teaching programme was given by researcher. Pre and post test was conducted by multiple choice questions, observation check list and modified Likert attitude scale. Data were recorded and coded. The data analysis was done by using descriptive and inferential statistics. The result revealed that there was a statistically significant difference between pre and post-test knowledge, practice and attitude scores regarding hand washing among school children at  $p < 0.001$ . This study implies that creating awareness on hand washing will prevent the occurrence of infection among school children.

## 2.5. Summary

The review of literature shows that the studies conducted by different investigators at different hospitals about the hand hygiene practices and the attitude of HCWs towards the non-compliance. The authors use observational tool and questionnaire for their study. The studies shows that the HCWs had sufficient knowledge about hand hygiene practices and its importance but they do not practice it well. So many studies show the importance of hand hygiene among HCWs. The majority of HAIs occurs because of lack of hand hygiene.

The review of literature is an important aspect of any research study from beginning to end. The chapter covered Introduction, the review of literature related to the studies on hand hygiene practice in critical care units and studies to assess the attitude of HCWs towards hand hygiene practices.

### **3. Research methodology**

#### **3.1. Introduction**

This chapter deals with the research approach, setting, the sample and sampling technique, development of tool, description of tool, pilot study, data collection procedure and plan for analysis.

#### **3.2. Research Approach**

Quantitative approach is used to conduct the study

#### **3.3. Research design.**

My study on the knowledge and practice of hand hygiene among the nursing staff in different department of the hospitals in Uttar Pradesh is descriptive research, it refers to the method that describe the characteristic of the variables and it is part of quantitative study using quantitative variables.

#### **3.4. Setting of the study**

The study was conducted in the different departments of Fatima hospital Gorakhpur. 200 bedded multi and super speciality referral hospital. The study was conducted over 6 months (November 2020- May 2021). There are 3 ICUs and 3 general wards have hand washing facilities. Hand hygiene facilities include wash basins with surgical hand rub solution and soap, hand towel and tissue paper is available for drying hand after washing. Also, there were alcohol-based hand rub in each bedside. There is an infection control department in our hospital. The infection control Nurse take classes for HCWs and also observes the hand hygiene practices of HCWs in each unit.

#### **3.5. Sample and Sampling technique**

The sample was selected from the health care workers in Fatima Hospital. The convenient sampling technique was used to collect the samples. The sample was selected from the health care workers in SICU, MICU, and ICCU and General wards. The researcher collects data by using questionnaire and observational tool. The researcher use 50 nurses for observational study and give questionnaire to 50 nurses for observational study they may or may not be included in observational study. The duration of the study period was from November 2020 to May 2021.

#### **3.6. Inclusion Criteria**

Nurses who involved in direct patient care area like critical care and non-critical care area

#### **3.7. Development of tool**

An extensive study and review of literature helped in preparation of the tool. A validated tool and an observational scale is used as the tool for this study.

#### **3.8. Description of the tool**

Part i: - This part contains items such as demographic data which include age, sex, professional qualification total years of experience.

Part ii: -- A questionnaire was distributed to nurses in order to assess the knowledge of the staff nurses regarding hand hygiene.

Part iii: An observation tool was used to assess the hand hygiene practices of Nurses.

#### **3.9. Pilot study**

Pilot study was done on march 2021. Six staff were taken for the pilot study. The pilot study was conducted to find out the feasibility of the study. The questionnaire and observation tool are used for this study.

#### **3.10. Data collection procedure**

Formal permission obtained from the authorities for collection of data. The data was collected from health care workers in Cardiac surgical ICU, MICU, MEDICAL AND SURGICAL WARDS, GYNAE AND PAEDIATRIC Wards of Fatima hospital. The period of data collection was from November 2020 to April 2021. The assessment of staff done while they were in clinical area. The study was completed over a 6 month period. In this study the investigator uses a questionnaire and an observation tool. The period of observation of hand hygiene compliance was conducted over a period of 4 weeks. Here, observations on activities around individual patient carried out in random 10- minutes period interval during day time, which are the busiest shifts in the ICUs and wards patients were selected randomly, at the start of each observation period and was observed continuously for the entire 10- minute period. All nurses were observed unobtrusively by the observer. In observation the observer gives situations to the samples according to their jobs.

The tools used for questionnaire and observation tool were both well -validated tools invented by the WHO. The special instruction, which accompanied the observation tool, helped us to understand and standardize the tool. There was only one observer. The observer conducted a trail study with 10-observation period. These tools selected for my study were chosen because they were simple, clear and described each observation episode in detail. Immediately after the 4 weeks of observation period was over, the researcher circulated a self-reported questionnaire among, nurses, who were involved in-patient care.

The questionnaire was aimed at evaluating the awareness and self-perception of health care workers hand hygiene compliance and assessed the perceived

barriers to use appropriate hand hygiene measures. The researcher handed the questionnaires to the personnel targeted and collected them back immediately. This was to ensure that other personnel did not influence health care personnel. Through the questionnaire, the researcher aimed to assess the reported practices of Nursing staff. The major limitation of the study was that the researcher couldn't distribute questionnaire to the whole samples who were taken for observational study.

### 3.11. Plan for analysis

The investigator developed a plan of analysis after pilot study. The data were coded, entered in excel sheet and analysed using Epi info Version.

### 3.12. Summary

This chapter includes research approach, setting, population, sample and sampling technique, development and description of the tool, data collection and plan for analysis.

## 4. Analysis and interpretation of data

### 4.1. Introduction

Analysis is categorizing, ordering, manipulating and summarizing the data to an intelligible and

interpretable form, so that research problem can be studied and tested including relationship between variable. Interpretation is a process of making a sense of the result and examining the implication of finding with in a broader context.

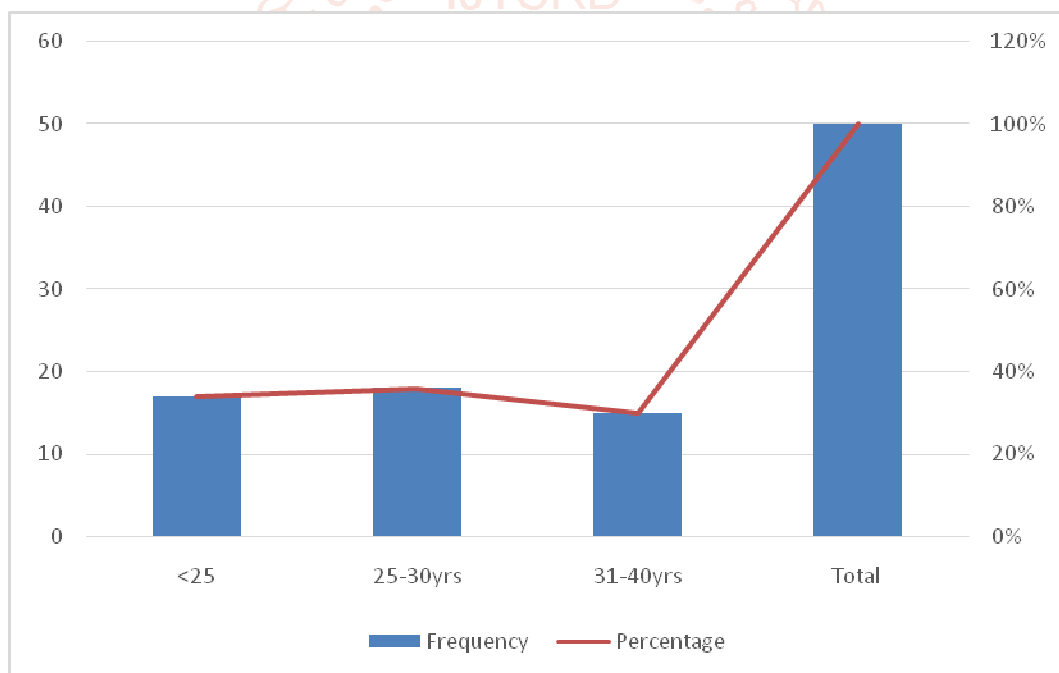
The data in the study was arranged and analysed under the following sections.

- 4.2 Distribution of sample according to demographic data
- 4.3 Distribution of sample according to the knowledge score of hand hygiene compliance.
- 4.4 Distribution of sample according to observation of hand hygiene practices.

### 4.2. Distribution of sample according to demographic data

**Table 1 Distribution According to Age.**

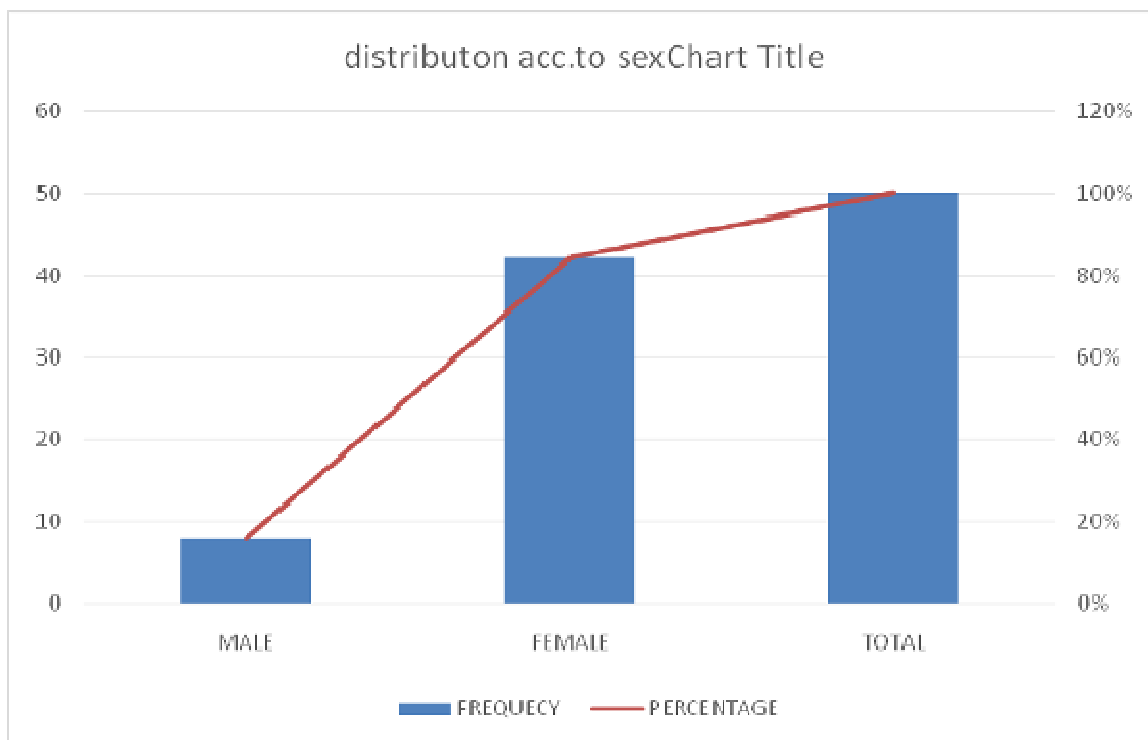
Age group	Frequency	Percentage
<25	17	34%
25-30yrs	18	36%
31-40yrs	15	30%
Total	50	100%



The data given on *table 1* shows distribution of samples according to age range from <25 years to 40 years. The diagram shows that 34% of the nurses were belongs to the age group of below 25 years (17 out of 50). 36% of the nurses belong to the age group of 25-30 (18 out of 50). 30% of nurses were belong to the age group of 31-40 (15 out of 50). Majority were between 25-30 (36%).

### 4.3. Distribution of sample according to Sex -table-2

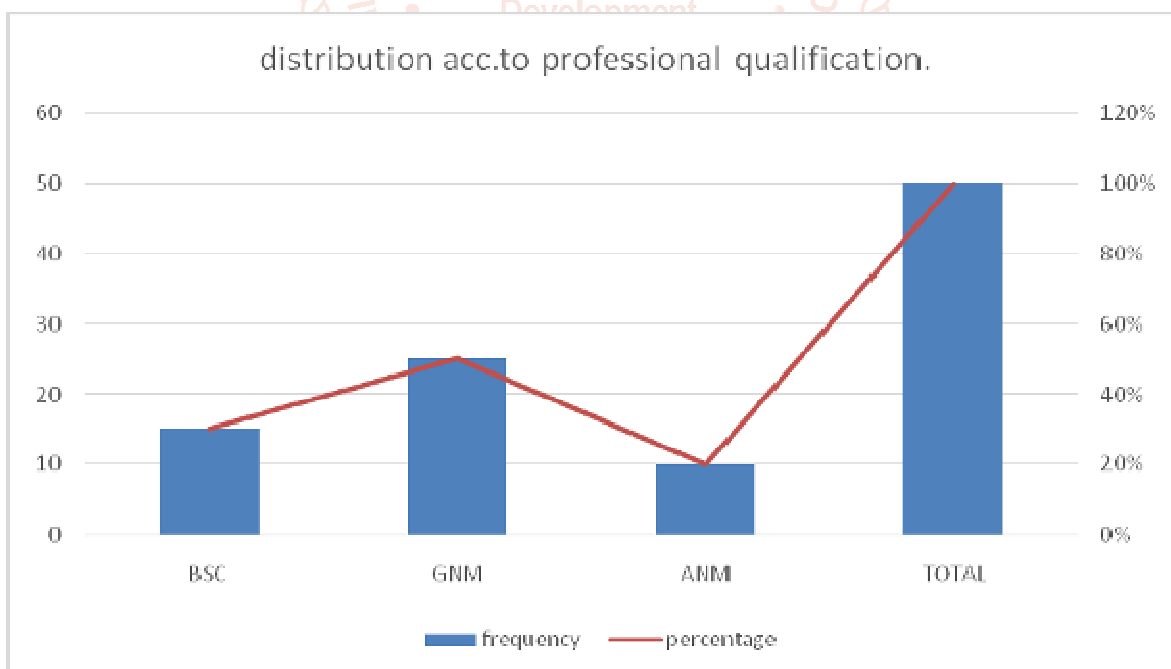
SEX	FREQUENCY	PERCENTAGE
MALE	8	16%
FEMALE	42	84%
TOTAL	50	100%



The data given on **fig.2 (b)** shows that the distribution of sample according to sex. The diagram shows that about 84% (42) of samples are female and 16% of staff nurses were male the majority were female nurses.

**4.4. Distribution of sample according to Profession-table-3**

Professional qualification	Frequency	Percentage
BSC	15	30%
GNM	25	50%
ANM	10	20%
TOTAL	50	100%

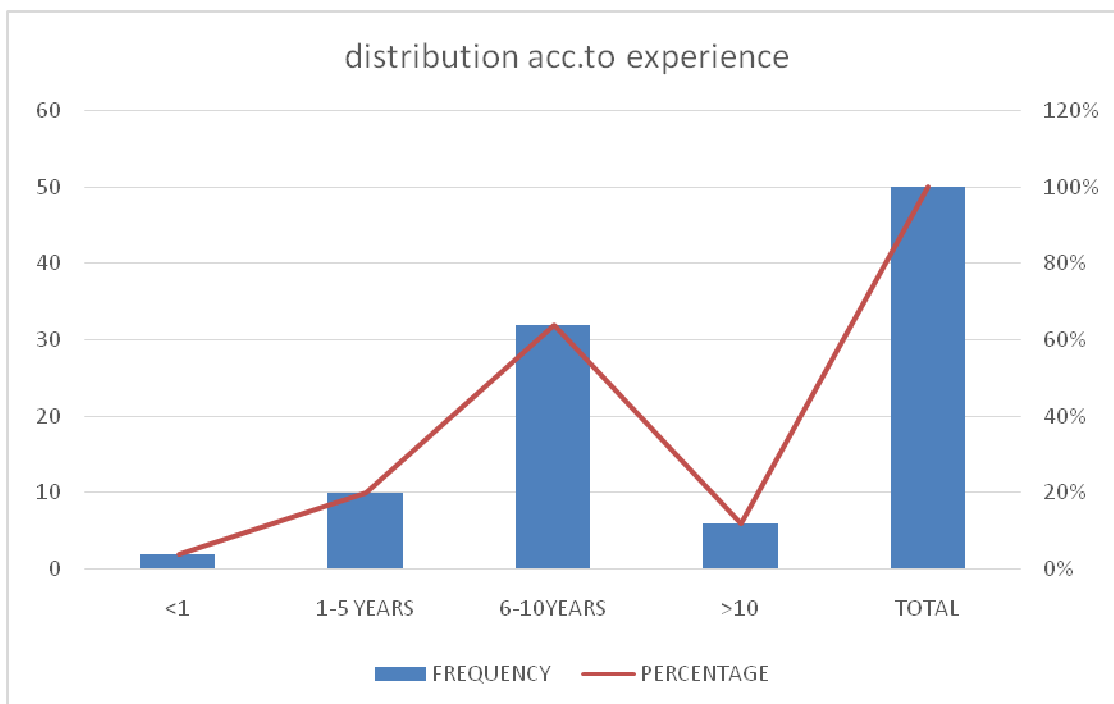


The data given in **table 3** shows that the distribution of sample according to the professional qualification. 30% of the nurses were BSc nurses (15 out of 50) .50% of the nurses were GNM nurses (25 out of 50).20% of nurses were ANM nurses (10 out of 50). Most of the samples are GNMnurses that is 50% (25)



**4.5. Distribution of sample according to Total Experience-table-4**

Total experience in years	Frequency	Percentage
<1	2	4%
1-5 YEARS	10	20%
6-10YEARS	32	64%
>10	6	12%
TOTAL	50	100%



The data given in **table 4** shows that distribution of data according to professional experience about 64% of staff nurses were having to 6-10 years of experience (32 out of 50).20%of nurses were having 1-5 years’ experience (10 out of 50).12% of the nurses were having >10 years of experience (6out of 50).4% of the nurses were having <1 year experience (2out of 50).

**4.6. Distribution of sample according to knowledge score about hand hygiene compliance with GNM nurses. -table-5**

**TOTALGNMSTAFF (25)**

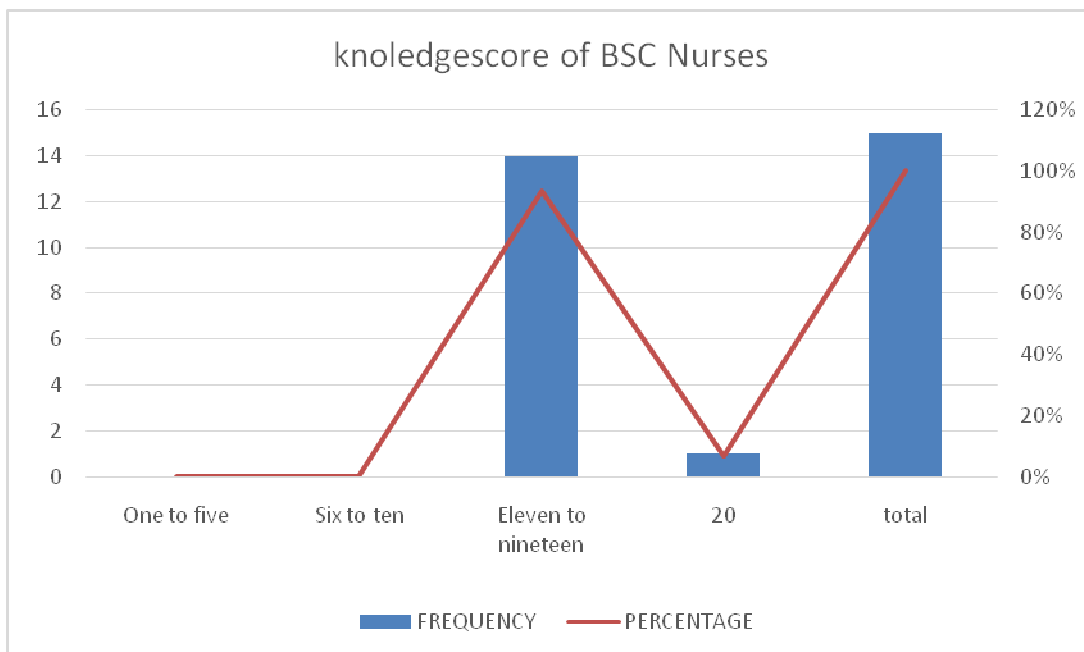
SCORE TOTAL SCORE-20	FREQUENCY	PERCENTAGE
One to five	0	0%
Six to ten	9	36%
Eleven to Nineteen	16	64%
Twenty	0	0%
Total	25	100%

The data given in table-5-shows that9 out of 25 GNM nurses were having the knowledge score of 6-10 out of score20. (36%)16 out of 25 of GNM staff nurses were having 11-19 score out of score 20. (Out of 25 GNM nurses 16 were having the highest score 64%).

**4.7. Distribution of sample according to knowledge score about hand hygiene compliance with BSC nurses.**

**TOTAL BSC STAFF (15) TABLE-7**

SCORE TOTAL SCORE-20	FREQUENCY	PERCENTAGE
One to five	0	0%
Six to ten	0	0%
Eleven to nineteen	14	93.4%
20	1	6.6%
Total	15	100%

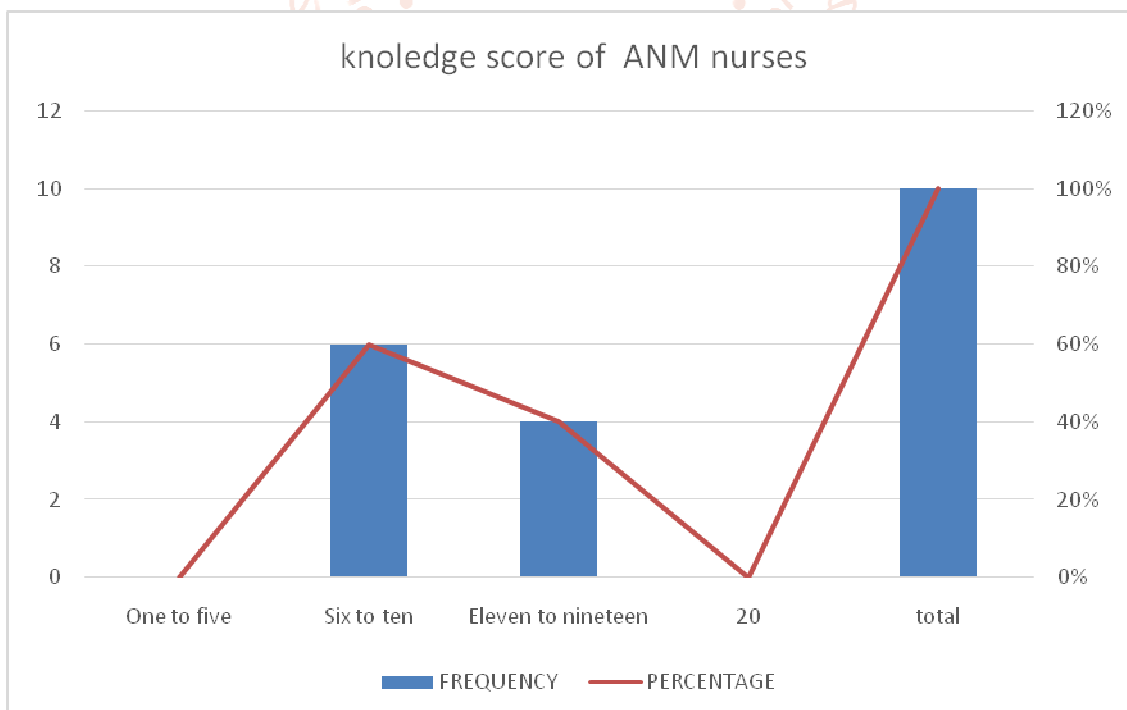


The data given in table-7 - shows that out of 15 BSC nurse 14 are with highest knowledge 11-19 score (93.45%). 1 nurse out of 15 BSc nurse scored 20 out of 20 score. 100% knowledg score (6.6%)

**4.8. Distribution of sample according to knowledge score about hand hygiene compliance with ANM nurses.**

**TOTL ANM Staff (10)-table-8**

SCORE TOTAL SCORE-20	FREQUENCY	PERCENTAGE
One to five	0	0%
Six to ten	6	60%
Eleven to nineteen	4	40%
Twenty	0	0%
Total	10	100%

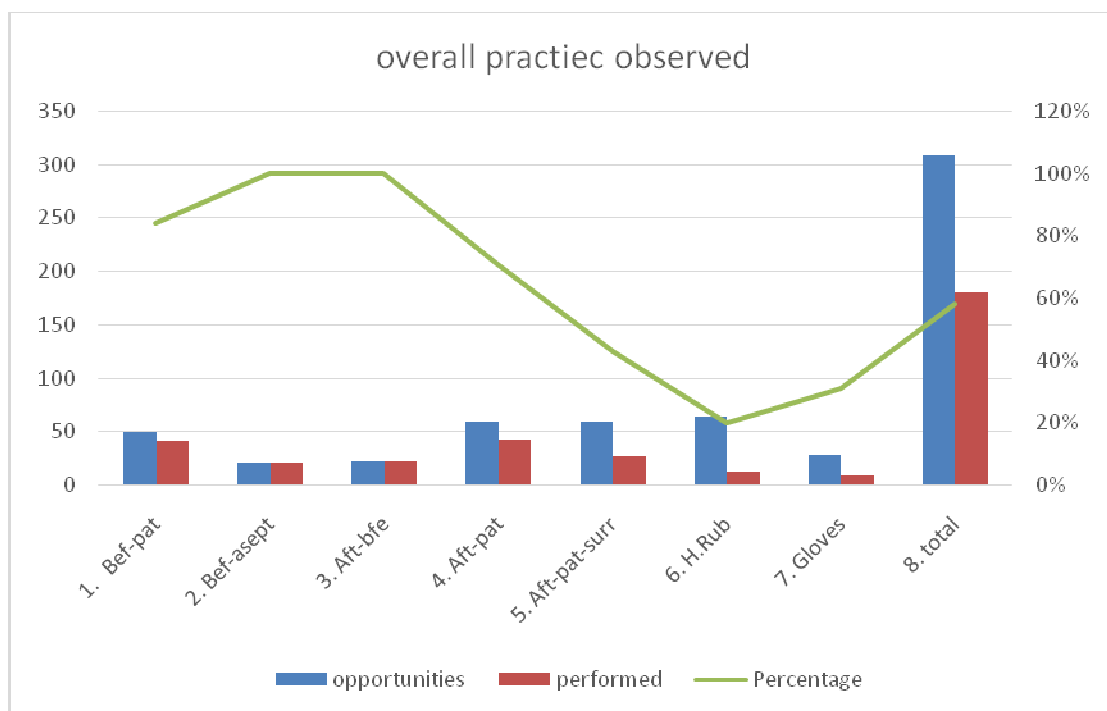


The data given in table-8- shows that out of 10 ANM nurses 4 ANM nurses are with highest knowledge that 11-19 out of 20 score and 6 of them having 6-10 score out of 20 score.

**4.9. Distribution of sample according to observation of hand hygiene practices on the basis of 5 moments of hand hygiene.**

**Table -9-Observed Hand hygiene compliance specific to each opportunity (Overall)**

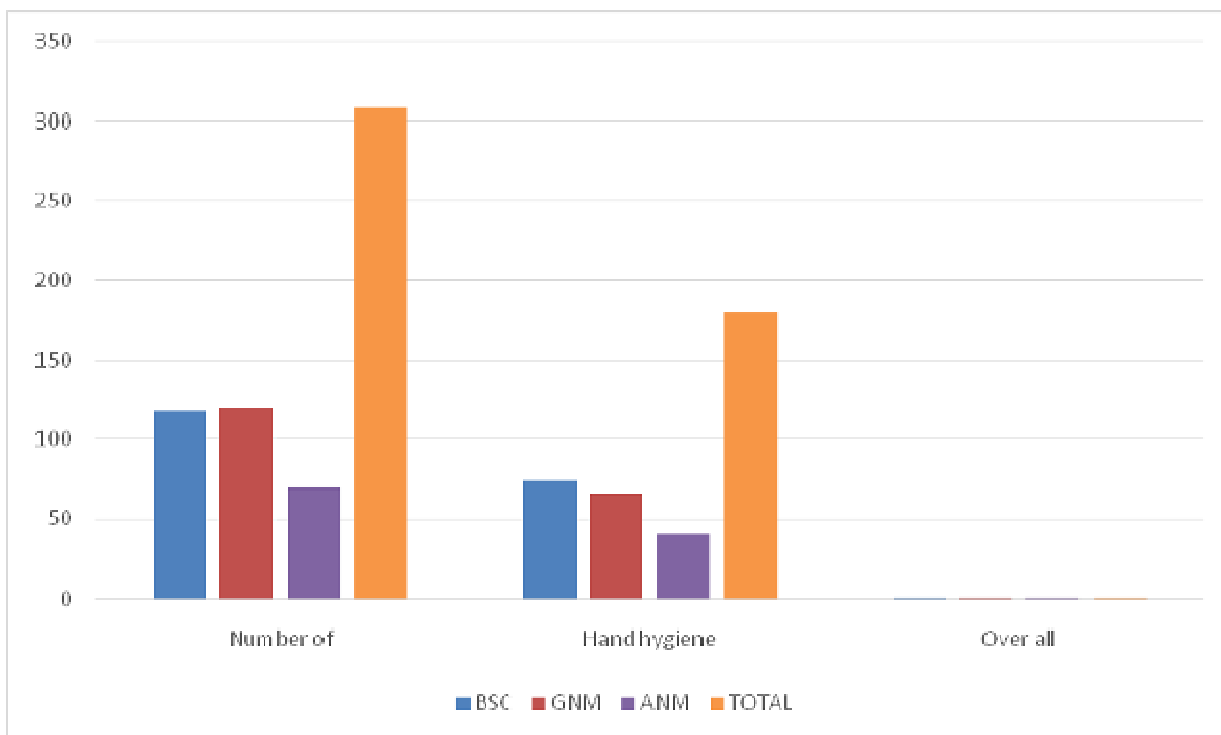
Situations	opportunities	performed	Percentage
1.Bef-pat	50	42	84%
2. Bef-asept	22	22	100%
3. Aft-bfe	23	23	100%
4. Aft-pat	60	43	71%
5. Aft-pat-surr	60	28	43%
6. H.Rub	64	13	20%
7. Gloves	29	09	31%
8. total	308	180	58%



The data given in table 9-shows the 100% of hand hygiene observed before aseptic technique and after body fluid exposure. Before touching patient there were 50 opportunities and performed 42(84%). After touching patients there were 60 opportunities and performed only 43(71%). After touching surroundings there were 60 opportunities and performed only 28(43%) there were 60 opportunities of use of hand rub but performed 13 times (20%). opportunities for use of gloves 29 but performed only 9 (31%). Total opportunities were 308 and performed only 180 overall percentage of hand hygiene practices are 58%

**4.10. Table 10-Observed Hand hygiene compliance among different professional qualifications of nurses.**

Professional qualifications	Number of opportunities observed	Hand hygiene performed	Over all Compliance
BSC	118	74	62.7%
GNM	120	66	55%
ANM	70	40	57.1%
TOTAL	308	180	58.4%

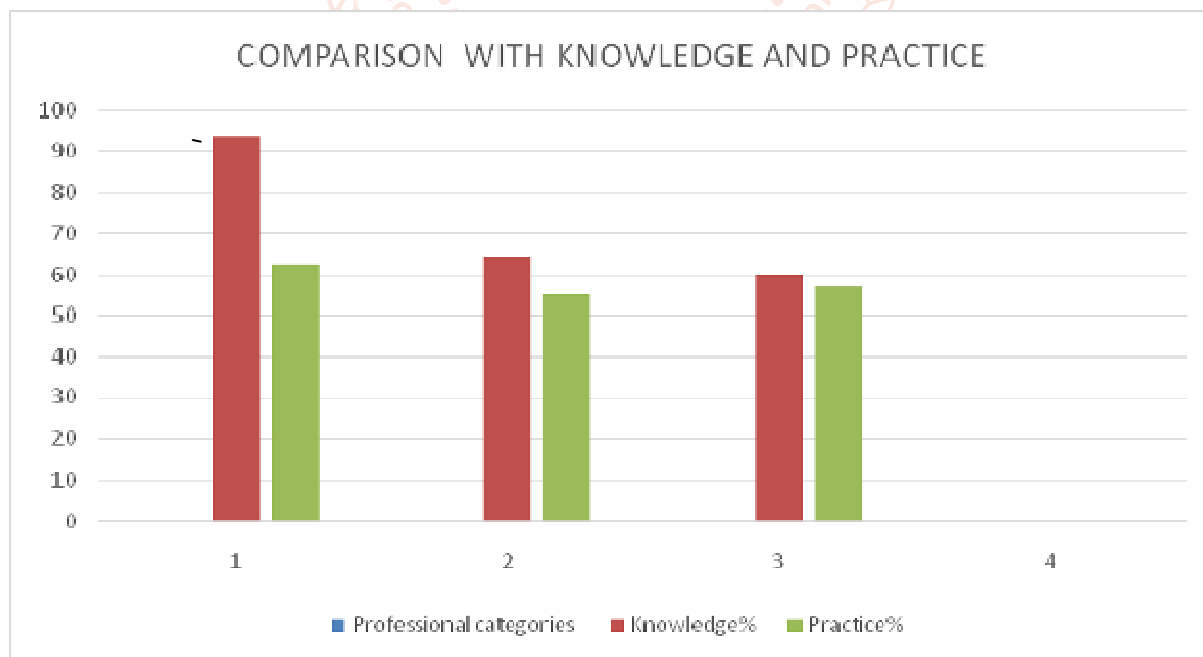


The data gives in table-10 shows the maximum compliance by BSC Nurses (62.7%). Opportunities for BSc nurses were 118 and performed 74.

GNM nurses were having the opportunities 120 and performed 66 times (55%). ANM nurses were having the opportunities 70 and performed only 40 times (57.1%)

**4.11. TABLE- 11 Comparison chart of knowledge and practice of different professional categories**

Professional categories	Knowledge %	Practice %
BSC	93.4	62.7
GNM	64	55
ANM	60	57.1



The data gives in table 11 shows the comparison between knowledge and practice. The researcher concludes with that there is disparity in the knowledge and practice though there is knowledge about the importance of hand hygiene when the they put into practice there are some major reasons that limits them to put into practice the theory.

## 5. Summary, conclusion, limitation and recommendations

### 5.1. Introduction

This chapter gives a brief account of the present study including conclusion drawn from findings are possible application of the result and suggestions for improving the present study are also included.

### 5.2. Summary

This study was undertaken to assess the hand hygiene practices among nurses in different departments.

The specific objective of the study was;

- A. To assess the hand hygiene practices among nurses
- B. To assess the reason for noncompliance in hand hygiene practice.

The questionnaire includes 12 questions based on various aspect of hand hygiene and an observation tool is also used to find out the hand hygiene practices. It includes 11 situations for hand hygiene.

The sample of the reported study was 50 and the observed samples are 50 The observed and reported sample were may or may not be same

Tables and bar diagram are used to illustrate the findings of the study.

### 5.3. Major findings of the study

There was total 50 nurses out of 25 staff nurses were GNM Nurses 15Nurses were BSC nurses and 10 Nurses were ANM Nurses.

A self-structured questionnaire was distributed to all 50 samples to check the knowledge among the different categories of nursing staff were collected and analysed. The maximum knowledge score was 93.4% by the BSc staff nurses.

I had 50 observation period with 308 hand hygiene opportunities. I found that the bedside nurses involved in patient care maximum opportunities for hand hygiene (308 opportunities and perform only 180 opportunities i.e.; 58.4%)

The investigator found that the overall observed hand hygiene compliance among nurses was 58.4%, from that BSC Nurses have performed better.

They reported the reason for noncompliance was that they were too busy (64%).

### 5.4. Discussion

A large proportion of the infection acquired in the ICU have been attributed to cross contamination and transmission of microbes from hand of health care workers to patients Many studies have consistently shown that improved hand hygiene practice reduced nosocomial infections and cross transmission of

multidrug resistant infections in hospital. Despite this, present-day data suggest that hand hygiene compliance among nurses due to poor nurse patient ratio and quality of nurses recruitment criteria also overcrowding of patients high intensity patient care insufficient time, lack of institutional priority etc were some of the risk factors for poor hand hygiene compliance.

Many attempts have been made in the past to improve hand hygiene compliance such as educational intervention, motivational programmes etc. However, most of these met with little or temporary success. Hence several multi-faceted interventions, which include behavioural, environmental and social changes, have been suggested and tried to sustain improvement in hand hygiene compliance.

questionnaire –based study, due to busy-51.2%, the most common reason for noncompliance, followed by forgetfulness -35.7% and other reasons like skin irritation by hand hygiene agents product and availability at convenient location are -15.5%).

During the observation period the opportunities for hand hygiene were most in the areas of “before/after equipment contact” The investigator found that the overall observed hand hygiene compliance is poor.

### 5.5. Conclusion

The researcher concluded that there was disparity in hand hygiene compliance among nurses on account of knowledge and practice. In our study highlights the urgent need for introducing measures in order to increase the knowledge, and practices Teaching Hospital, which may play a very important role in increasing hand hygiene compliance among the staff and reducing cross transmission of infections among patients.

### 5.6. Limitation

There was disparity in the result from observational study because of covid protocol all were wearing gloves it very difficult and time consuming for the observation of five moments samples involved in observational study may or may not be included in the questionnaire – based study.

### 5.7. Recommendation

This study reveals only the hand hygiene compliance rate. There is an option for conduct further studies on hand hygiene to demonstrate reduction in HAIs, as well as reduced mortality and morbidity in our healthcare settings. And there is another option for doing an interventional study focussing on the quality nursing education, staff recruitment and the staffing ratio in the critical care area to improve the quality care and to practice what they are expected to do.

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**TOOL.NO-1  
HAND HYGIENE QUESTIONNAIRE**

**Socio Demographic Data**

**Fill or tick mark appropriately**

1. Age: Years
2. Sex: M/F Department-----
3. Qualification: GNM(N)/ B. Sc (N)/ M. Sc (N) Others
4. Total professional experience: \_\_\_\_\_ years
5. Did you receive formal training for hand hygiene?  
(a) Yes (b) No
6. Is there is any hand hygiene protocol in the ICU or hospital that you are aware of ?  
(a) Yes (b) No
7. If there is any protocol for hand hygiene compliance surveillance and feedback?  
(a) Yes (b) No
8. Why do you not use hand rub when you are supposed to sanitise your hands?  
A. Too Busy  
B. Forgot  
C. Unsure of need  
D. Out of products  
E. Products not in convenient location  
F. Other\_\_\_\_\_
9. What are the five moments of hand hygiene asper the WHO guideline (enlist)  
1-----  
2-----  
3-----  
4-----  
5-----
10. The recommended timings of Surgical hand hygiene is-----
11. types of hand hygiene are:  
a-----  
b-----  
c-----
12. The ideal percentage of alcohol used in hand rub to destroy the organism is-----

**Observation Form-TOOL-2**

<b>Facility:</b>		<b>Period Number*:</b>		<b>Session Number*:</b>	
<b>Service:</b>		<b>Date: (dd/mm/yy)</b>	/ /	<b>Observer: (initials)</b>	
<b>Ward:</b>		<b>Start/End time: (hh:mm)</b>	: / :	<b>Page N<sup>o</sup>:</b>	
<b>Department:</b>		<b>Session duration:(mm)</b>		<b>City**:</b>	
<b>Country**:</b>					

Prof.cat			Prof.cat			Prof.cat			Prof.cat		
Code			Code			Code			Code		
N°			N°			N°			N°		
Opp.	Indication	HH Action	Opp.	Indication	HH Action	Opp.	Indication	HH Action	Opp.	Indication	HH Action
1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	1	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves
2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	2	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves
3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	3	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves
4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	4	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves
5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	5	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves
6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	6	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves
7	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	7	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	7	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves	7	<input type="checkbox"/> bef-pat. <input type="checkbox"/> bef-asept. <input type="checkbox"/> aft-b.f. <input type="checkbox"/> aft-pat. <input type="checkbox"/> aft.p.surr.	<input type="checkbox"/> HR <input type="checkbox"/> HW <input type="radio"/> Omissed <input type="radio"/> Ogloves

\* To be completed by the data manager.