

# **A STUDY ON HAND HYGIENE COMPLIANCE AMONG HEALTHCARE WORKERS AT A MULTI- SPECIALTY HOSPITAL IN COIMBATORE**

**Ms.Bhavana Nair,**

*Research Scholar, Department of Management Studies, Dr.N.G.P. Arts and Science College,  
Coimbatore*

**Dr.S.Mohan,**

*Professor and Head, Department of Management Studies, Dr.N.G.P. Arts and Science  
College, Coimbatore*

## **ABSTRACT:**

Maintaining good hand hygiene is essential for preventing diseases linked to Hospital-Acquired Infections (HAIs). Hand hygiene plays a crucial role in preventing morbidity associated with communicable disease. It also improves the quality of life by reducing the exposure to infectious diseases. Through hand wash in healthcare setting prevents the pathogenic cycle of events by destroying the primary source of infection. Maintaining good hand hygiene minimizes the likelihood of infection by inhibiting the spread of bacteria. This study aims to enhance hand hygiene compliance among healthcare workers by identifying obstacles and implementing effective solutions. This study involved observing hand hygiene behaviors, discussing with healthcare professionals, and carrying out focused interventions were all part of the study. The findings showed that there are several important barriers, such as forgetfulness and busyness, and that compliance rates differ throughout healthcare settings and professional categories. In conclusion, improved compliance rates resulted from the study implementation of strategies like alert systems, training materials, and appropriate automatic hand sanitizers.

**Key words:** Barriers, Interventions, Hand hygiene, Healthcare workers, Compliance, and Infection control.

## **INTRODUCTION:**

Hand hygiene is essential in healthcare settings to prevent the spread of infectious diseases and protect patients, healthcare workers and their family. Hand hygiene is the act of either hand washing with soap and water or hand disinfection to eliminate viruses, bacteria, and other microorganisms(Toney-Butler et al., 2024). Healthcare facilities are high risk environments where patients and caregivers are frequently exposed to microbes (Ay et al., 2019).In healthcare settings, hand hygiene (HH) is achieved by using alcohol-based hand rubs or washing hands with soap and water. It is regarded as the most crucial infection prevention strategy (Chavali et al., 2014). But studies indicate that the prevalence and compliance of hand hygiene in healthcare settings is low (Bharara et al., 2020; Chavali et al., 2014; Musu et al., 2017a).

The World Health Organization states that practicing good hand hygiene is important at five key moments in the healthcare process: before contact with the patient, before an aseptic treatment, after contact with the patient, after contact with bodily fluids, and after touching the patient's surroundings (Chavali et al., 2014; *WHO Guidelines on Hand Hygiene in Health Care*, 2009). The prevalence of healthcare-associated infections found by the World Health Organization in 2010 to be 15.5 per 100 patients [95% CI 12.6–18.5] in low- and middle-income nations (Ojanperä et al., 2020). This is significantly higher than the rates recorded in the USA (4.5 per 100 patients) and Europe (7.1 per 100 patients) (Musu et al., 2017a). In critical care units for adults and neonates, the prevalence of these infections is especially high (Lambe et al., 2019). ICU patients are high risk category patients for chance of exposure to more pathogenic organisms. Hand hygiene compliance has long been a problem worldwide, impacting both high and low-resource settings. In our nation, the burden of HAIs is rapidly increasing. Antimicrobial resistance (AMR) among pathogenic bacteria is important for public health and has made the situation worse. Despite its critical role, healthcare workers (HCWs) often fail to adhere to hand hygiene protocols consistently. This study aims to enhance hand hygiene compliance among healthcare workers by identifying key barriers to adherence, measuring current compliance levels, investigating contributing factors to non-compliance, and implementing effective solutions to overcome these barriers, thereby reducing healthcare-associated infections and improving patient safety.

### **OBJECTIVES:**

- To identify the key barriers preventing healthcare workers from adhering to hand hygiene protocols.
- To measure the levels of hand hygiene compliance among healthcare workers in various healthcare settings.
- To investigate the factors contributing to non-compliance, including organizational, environmental, and individual elements.
- To implement effective interventions and strategies aimed at overcoming identified barriers.

### **REVIEW OF LITERATURE:**

- A study conducted in India by (Chavali et al., 2014) showed that overall adherence to WHO guidelines was 78%. Allied personnel had compliance of 86.5% when compared to Nurses 63%. Compliance was 93% after patient contact versus 63% before patient contact. The study was a cross-sectional observational study using direct observation technique. A single observer collected all HH data. During this analysis, 1500 HH opportunities were observed. HH compliance was tested for all 5 moments as per WHO guidelines.
- (Tyagi et al., 2018) conducted a study in India showing a non-participatory observation in labor rooms and infant care units from public and private secondary and tertiary level hospitals as part of an assessment of quality improvement collaboration in two southern states of India. Observed compliance with hand hygiene was low overall, although better in private than public facilities in both newborn units and labor rooms. Glove usage was a particular problem in newborn care units. There was no significant difference in the percentage of contacts with newborns in private versus public newborn units (44% vs. 12%,  $p < 0.001$ ), or in tertiary versus

secondary units (33% vs. 12%,  $p < 0.001$ ). However, there was no difference in the facility's case load (low load–28%, intermediate load–14%, high load–24%,  $p = 0.246$ ). Glove usage where indicated had the lowest compliance rate (20%). In private facilities, hand hygiene compliance prior to delivery was universal, whereas in public facilities, it was observed in only approximately 25% of observations (100% vs. 27%,  $p = 0.012$ ). There was no discernible variation in hand hygiene compliance between facilities types, with an average of 35% across all examinations conducted vaginally.

- A study conducted by (Sharma et al., 2011), a Cross-sectional study in 42 bedded Medical (Pulmonary, Medicine and Stroke) intensive care units (ICU) of a tertiary care hospital in India showed an Overall compliance was 394 out of 911 chances, or 43.2%. Intensivists accounted for 68.9% (31/45), attending physicians for 56.3% (18/32), postgraduate residents for 40.0% (28/70), and nurses for 41.3% (301/728). The activity index had an adverse relationship with compliance. Compliance rates were 38.8% (67/170), 43.8% (175/401), and 44.7% (152/340) for high, medium, and low risk of cross-transmission, respectively. Their study concluded that the activity index (number of opportunities encountered per hour) and professional standing have an impact on the study group's compliance. Among the factors influencing HH, according to the HCWs, were greater workload, lack of desire, and less knowledge.
- Another cross-sectional survey conducted at four university-affiliated hospitals in Korea by (Kim et al., 2023) states that the survey comprised seven parts with 49 items, including self-reported HH compliance, knowledge, attitudes, behaviors, barriers to HH, and improvement strategies. Self-reported HH and optimal HH compliance rates were 84.0% and 74.0%. Among 14 barriers, the top five were “HH is difficult in an emergency,” “HH makes your hands painful and dry,” “It is hard to tell my colleagues to do HH,” “HH wastes time for more important things,” and “It is difficult to do HH if a superior does not do HH.” They concluded suggesting that targeted interventions tailored to the specific needs of different occupational groups may effectively improve HH compliance in healthcare settings.
- An observational study conducted by (Marra et al., 2010) in a 40-bed medical-surgical intensive care unit to compare three methods of assessing hand hygiene (HH) adherence: direct observation, product usage, and electronic counting devices. Direct observation revealed an overall HH adherence rate of 62.3% across 2,249 opportunities, corresponding to 1,402 cleansing episodes. Electronic counting devices recorded 76,389 dispensing episodes of alcohol-based hand rub, averaging 53.8 episodes per patient-day. Product usage measurements showed 64.1 mL of alcohol-based hand rub and 33.8 mL of chlorhexidine used per patient-day. The study found no significant correlation ( $r = 0.18$ ,  $P = .59$ ) between observed HH adherence and total product usage, suggesting limitations of direct observation as a sole metric. Consequently, the study concluded that direct observation should not be considered the gold standard for HH assessment. They advocated for integrating electronic devices and product usage metrics to enhance monitoring accuracy in ICUs.
- (Lam et al., 2004) conducted a study aimed at improving hand hygiene (HH) practices and reducing healthcare-associated infections (HAIs) in a neonatal intensive care unit (NICU) through a multimodal intervention program. HAIs remain a significant concern in NICUs, with HH identified as pivotal in infection prevention despite persistently low compliance among healthcare workers (HCWs). The study employed non-invasive observation to assess baseline

HH compliance and techniques among HCWs during patient interactions. The intervention included problem-based HH education, enhanced minimal handling protocols, clustering of nursing care, increased availability of alcohol-based hand antiseptic, improved HH facilities, regular audits, and infection surveillance over a year. Results showed notable improvements post-intervention: HH compliance increased from 40% to 53% before patient contact and from 39% to 59% after contact. High-risk procedure compliance rose from 35% to 60%. The average patient contacts per hour decreased significantly from 2.8 to 1.8. Moreover, there was a reduction in HAI rates from 11.3 to 6.2 per 1000 patient-days. Study concluded that targeted education and environmental modifications effectively enhance HH compliance and reduce HAIs in NICUs. Regular audits and ongoing feedback mechanisms were emphasized to sustain these improvements. Future research focusing on long-term sustainability and scalability of such interventions across different healthcare settings to further mitigate HAIs and improve patient safety.

- Healthcare-associated infections (HAIs) significantly impact morbidity, disability, quality of life, mortality, and healthcare costs. Effective prevention strategies are crucial in mitigating HAI risks. This study, conducted by (Musu et al., 2017b) aimed to evaluate infection control procedures and hand hygiene (HH) adherence among healthcare workers in six ICUs. A prospective observational study assessed compliance with HH practices and standard precautions, and the availability of infection control protocols. Results revealed that 73 of 142 required protocols were available, including 59 of 79 for general risk control, 12 of 15 for HH, and 24 of 48 for standard precautions and isolation measures. Adherence to HH practices varied widely, with compliance rates ranging from 3% to 100%. Overall, the ICUs demonstrated low adherence to optimal hygiene practices, highlighting the need for immediate strategies to enhance infection control. A multidisciplinary intervention could be effective in preventing HAIs. Additionally, periodic assessments of healthcare workers' knowledge and training on HH and infection prevention are recommended to address knowledge gaps and improve compliance with preventive measures.
- Another study by (Diwan et al., 2016) aims to describe self-reported practices and assess knowledge and attitudes regarding hand hygiene among healthcare workers in a rural Indian teaching hospital. Conducted in the district of Ujjain, India, the study surveyed physicians, nurses, teaching staff, clinical instructors, and nursing students using self-administered questionnaires based on the WHO Guidelines on Hand Hygiene in Healthcare. Out of 489 healthcare workers, 259 participated (response rate = 53%). The proportion of healthcare workers reporting to 'always' practice hand hygiene in various situations ranged from 40–96% among categories. Reported barriers included high workload, scarcity of resources, lack of scientific information, and low prioritization of hand hygiene. Previous training on hand hygiene showed a statistically significant association with self-reported practice ( $p = 0.001$ ), and 93% of respondents expressed willingness to attend future training. The findings indicate that while knowledge and adherence vary, there is potential for improved hand hygiene practices if the identified barriers are addressed. Future training should emphasize the importance of consistent hand hygiene practices across all situations. The study underscores the need for institutional support and resource allocation to enhance hand hygiene adherence.

## MATERIALS AND METHODS:

This is a single-center cross-sectional study conducted in 2023 at a private multispecialty hospital. The study encompassed multiple healthcare settings, including critical and non-critical care areas. Hand hygiene practices were observed using the WHO Hand Hygiene Observation Form, and compliance rates were calculated. Hand hygiene compliance is typically calculated using a simple formula based on the number of hand hygiene opportunities and the frequency of hand hygiene actions performed.

$$\text{Hand Hygiene Compliance} = \frac{\text{Number of Hand Hygiene actions}}{\text{Number of Hand Hygiene opportunities}} \times 100$$

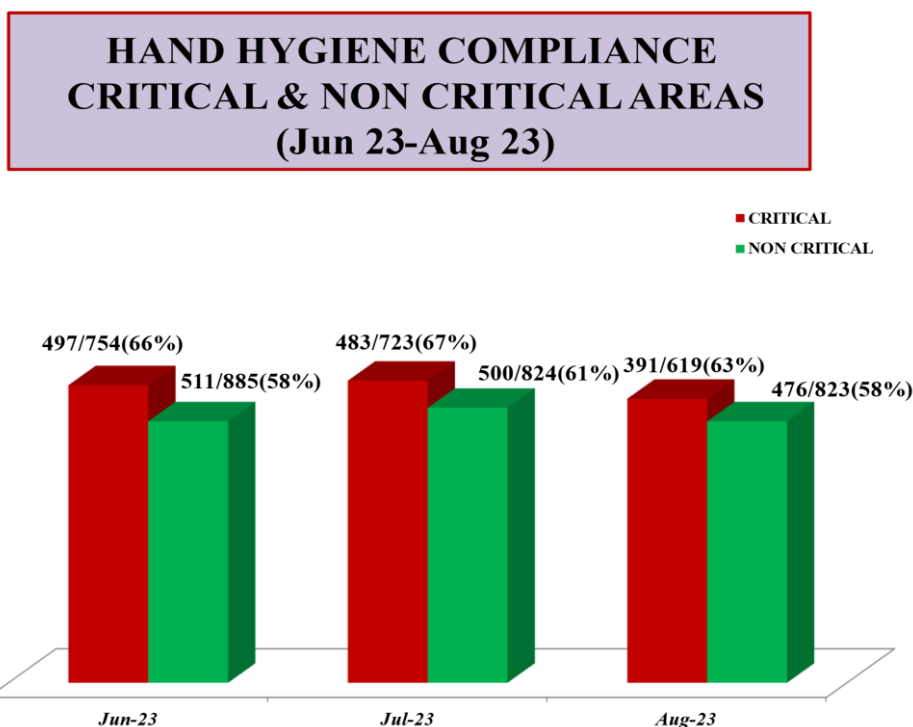
Where:

- **Number of Hand Hygiene Actions:** The instances where healthcare workers perform hand hygiene (using soap and water or alcohol-based hand rubs).
- **Number of Hand Hygiene Opportunities:** The total instances where hand hygiene should be performed according to guidelines (e.g., before patient contact, after touching patient surroundings).

Healthcare workers were interviewed with a structured questionnaire to identify reasons for non-compliance. The statistical analysis was done in excel.

## FINDINGS:

The healthcare workers comprised of doctors, nurses and other healthcare workers. In critical areas the compliance rates were 66% in June, 67% in July, and 63% in August. In non-critical areas, compliance rates were 58% in June, 61% in July, and 58% in August (**Figure1**).



**Figure 1: Hand Hygiene compliance rates in critical and non-critical areas- August to September**

The hand hygiene compliance in critical care areas like ICUs and OTs less than the benchmark (80%) (Figure 2).

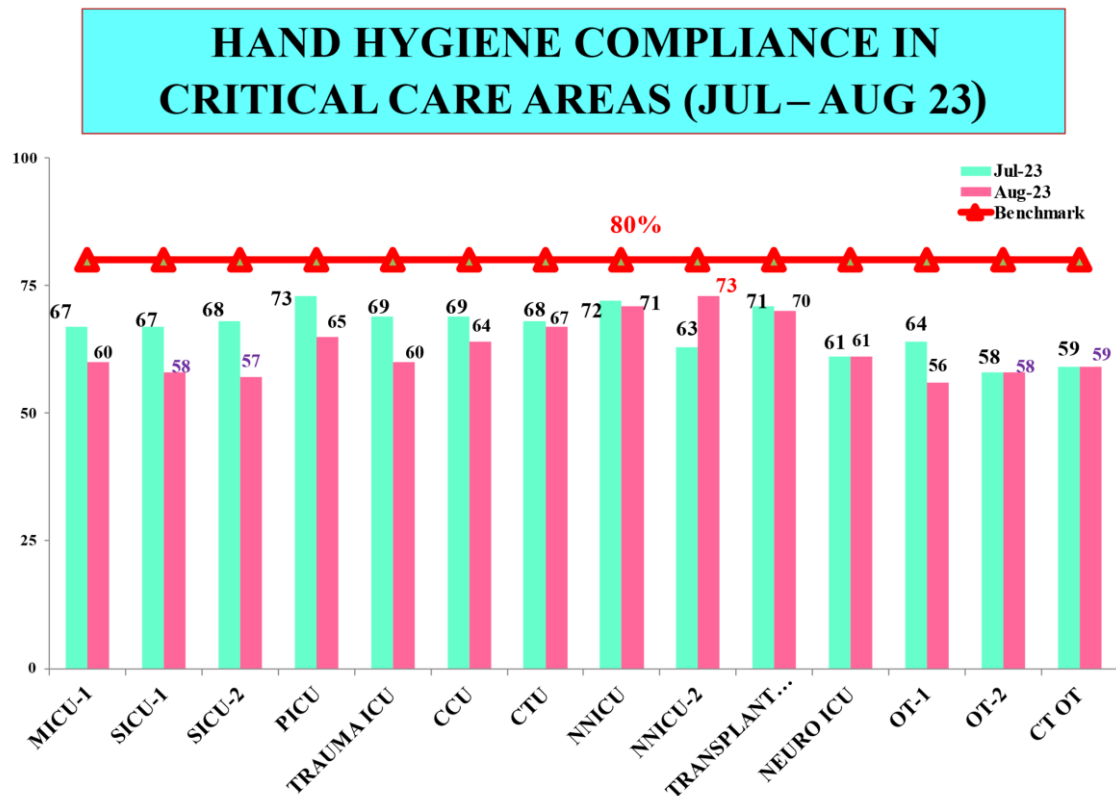


Figure 2: Hand Hygiene compliance rates in critical areas July to August. And in non-critical care area different wards are less than the benchmark (70%) (Figure 3).

### HAND HYGIENE COMPLIANCE IN NON CRITICAL CARE AREAS (<60%) JUL - AUG 23 2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> Floor

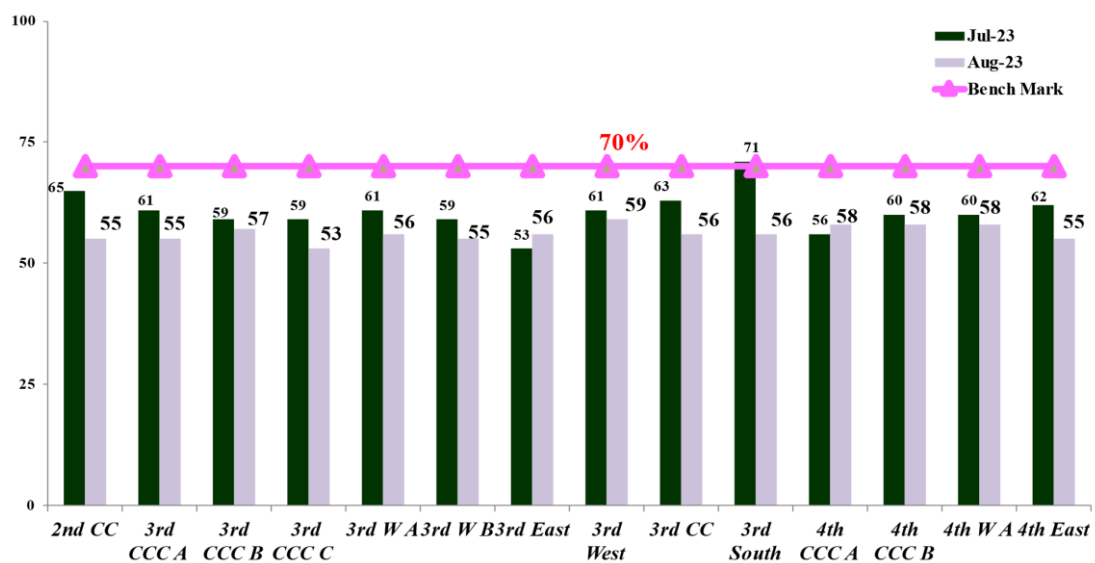


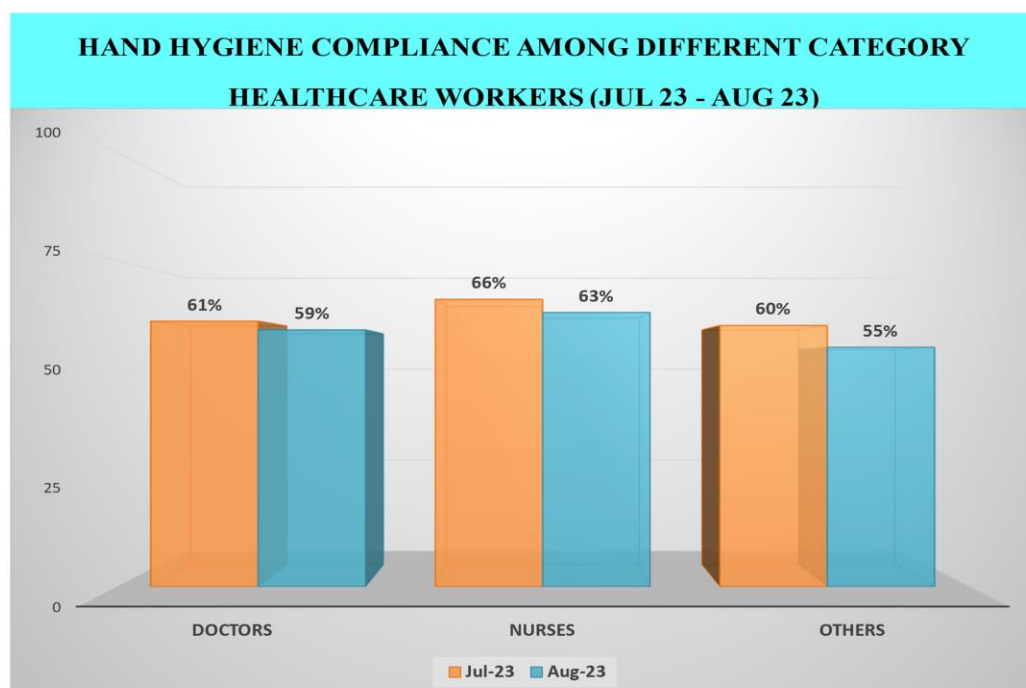
Figure 3: Hand Hygiene compliance rates in non-critical areas July to August

- Benchmark indicates the minimum acceptable level of adherence to hand hygiene that healthcare facilities aim to achieve.

Doctors had a compliance rate of 61% in July and they had an opportunity of 431. Doctors had a compliance rate of 59% in August where the opportunity was 399. Nurses had a compliance rate of 66% in July and opportunity was 827 and 63% in August opportunity was 766. Other healthcare workers had a compliance rate of 60% where the opportunity was 307 in July and 55% in August with an opportunity of 277 (Table 1 and Figure 4).

**Table 1: Hand Hygiene compliance among different category healthcare workers**

| PROFESSIONAL CATEGORY | JUL-23               |                      |          | AUG-23               |                 |      |
|-----------------------|----------------------|----------------------|----------|----------------------|-----------------|------|
|                       | Doctors              | 261<br>(Action)      | *10<br>0 | 61%                  | 236<br>(Action) | *100 |
| 431<br>(Opportunity)  |                      | 399<br>(Opportunity) |          |                      |                 |      |
| Nurses                | 545<br>(Action)      | *10<br>0             | 66%      | 479<br>(Action)      | *100            | 63%  |
|                       | 827<br>(Opportunity) |                      |          | 766<br>(Opportunity) |                 |      |
| Others                | 185<br>(Action)      | *10<br>0             | 60%      | 152<br>(Action)      | *100            | 55%  |
|                       | 307<br>(Opportunity) |                      |          | 277<br>(Opportunity) |                 |      |

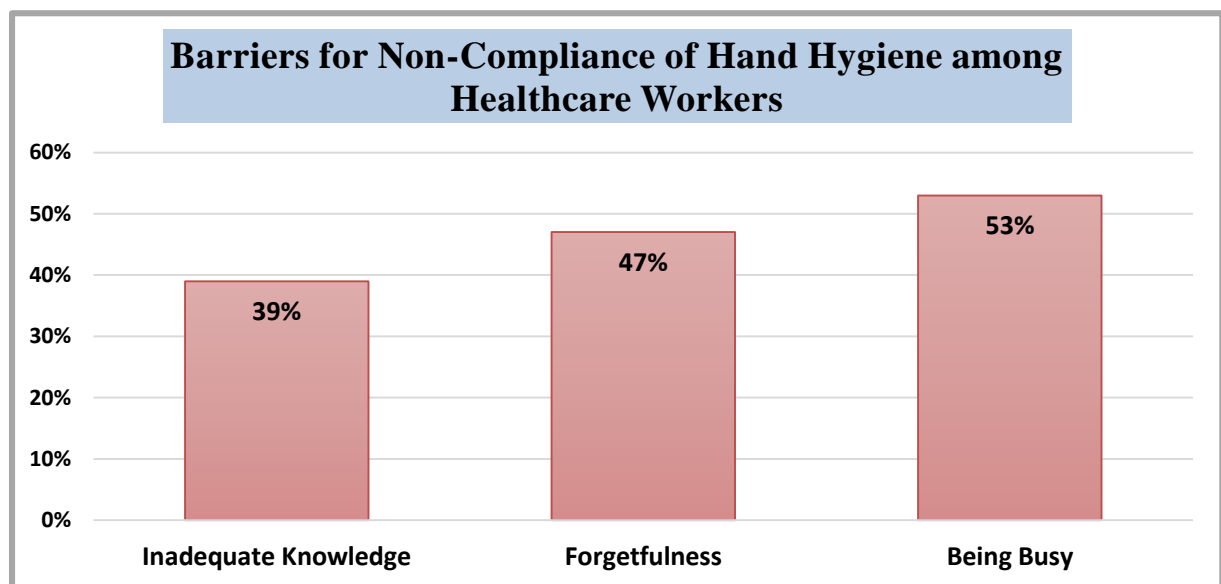


**Figure 4: Hand Hygiene compliance among different category healthcare workers**

Among the 191 healthcare workers interviewed, majority (74) had inadequate knowledge. The main barriers identified were forgetfulness (47%) and being busy (53%) (Table 2 and Figure 5).

**Table 2: Barriers for Non-Compliance of Hand Hygiene among Healthcare Workers**

|   |            |
|---|------------|
| <b>Number of Healthcare Workers Interviewed</b> | <b>191</b> |
| <b>Inadequate Knowledge</b>                     | <b>74</b>  |
| <b>Forgetfulness</b>                            | <b>90</b>  |
| <b>Being Busy</b>                               | <b>101</b> |



**Figure 5: Barriers for Non-Compliance of Hand Hygiene among Healthcare Workers**

Nearly half of the surveyed healthcare workers reported that inattentiveness or forgetfulness is a significant reason for not adhering to hand hygiene practices. This suggests a need for reminders and systems to reinforce the habit of handwashing. Over half of the respondents responded being busy as the primary reason for non-compliance. This indicates that the demanding nature of their work often leads to neglecting hand hygiene, underscoring the importance of integrating hand hygiene practices seamlessly into their work. Missed infection control training sessions were 16% in March, 14% in April, 36% in May, 27% in June, and 24% in July and 24% in August (Table 3).



**Table 3: Infection Control Training**

| Training Session                          | Mar-23             | Apr-23             | May-23              | Jun-23             | Jul - 23           | Aug - 23          |
|---|--------------------|--------------------|---------------------|--------------------|--------------------|-------------------|
| HCW who missed Infection control training | 51/328*100<br>=16% | 36/266*100<br>=14% | 108/300*100<br>=36% | 94/343*100<br>=27% | 71/296*100=<br>24% | 79/32*100<br>=24% |

Formula=  $\frac{\text{Staffs who have not attended infection control training class for that month}}{\text{Number of staff who had training scheduled for that month}} * 100$

**SUGGESTIONS:**

- **Alarm Systems:** Implementing an hourly alarm system can serve as a frequent reminder for healthcare workers, addressing the issue of forgetfulness and inattentiveness.
- **Educational Activities:** Engaging healthcare workers through quizzes and poster presentations can keep hand hygiene at the forefront of their minds, even amidst a busy schedule. Conducting these activities every six months can ensure continued awareness and compliance.
- **Strategic Placement of Automatic Hand Sanitizer Dispensers:** Automatic dispensers can be placed at strategic locations such as critical areas like operating theatres, ICUs, and infectious disease units, as well as non-critical areas such as general wards, patient rooms, outpatient departments, corridors, entry and exits making it easy for healthcare workers to sanitize their hands frequently without interrupting their workflow.
- **Flexible Scheduling:** Offer multiple training sessions at different times to accommodate varying work schedules of healthcare workers.
- **Online Training Modules:** Provide online training options to ensure that healthcare workers can complete the training at their convenience.
- **Reminders and Alerts:** Implement reminder systems through emails, messages, or alarms to alert healthcare workers about upcoming training sessions.
- **Incentives for Attendance:** Introduce incentives for complete attendance, such as recognition, certificates, or small rewards, to encourage participation.
- **Recognition Programs:** Establishing monthly recognition for individuals or areas with the best compliance can motivate healthcare workers to prioritize hand hygiene.
- **Use of Glow Germ Kits:** These kits can be used for both training and surveillance, offering a visual and interactive method to highlight the importance of thorough hand washing and identify areas for improvement.

## CONCLUSION:

The study identified significant barriers to hand hygiene compliance among healthcare workers, including forgetfulness and being busy. By implementing targeted interventions such as alarm systems, educational activities, and the strategic placement of automatic hand sanitizers, compliance rates will improve. Continuous efforts are required to maintain and further enhance hand hygiene practices to reduce healthcare-associated infections. Effective hand hygiene is crucial for patient and employee safety, as it significantly reduces the transmission of infectious agents, thereby preventing illness and promoting a healthier healthcare environment. Conversely, non-compliance with hand hygiene protocols can lead to increased healthcare-associated infections, putting both patients and healthcare workers at greater risk of illness and complicating treatment outcomes. Furthermore, the success of these interventions highlights the importance of a multi-faceted approach to improving hand hygiene practices. Future efforts should include ongoing education, regular feedback, and the integration of hand hygiene protocols into daily routines. Continuous monitoring and adaptation of strategies will be essential to address emerging challenges and sustain high compliance rates. Ultimately, fostering a culture of safety and accountability within healthcare settings will be key to minimizing the incidence of healthcare-associated infections and ensuring the well-being of both patients and healthcare workers.

## REFERENCES:

- Ay, P., Teker, A. G., Hidiroglu, S., Tepe, P., Surmen, A., Sili, U., Korten, V., & Karavus, M. (2019). A qualitative study of hand hygiene compliance among health care workers in intensive care units. *The Journal of Infection in Developing Countries*, 13(02), 111–117. <https://doi.org/10.3855/jidc.10926>
- Bharara, T., Gur, R., Duggal, S., & Chugh, V. (2020). Evaluation of hand hygiene compliance over the years, in an intensive care unit of a north Delhi hospital preparing for accreditation: A 3-year study. *Journal of Family Medicine and Primary Care*, 9(4), 1939. [https://doi.org/10.4103/jfmpe.jfmpe\\_1050\\_19](https://doi.org/10.4103/jfmpe.jfmpe_1050_19)
- Chavali, S., Menon, V., & Shukla, U. (2014). Hand hygiene compliance among healthcare workers in an accredited tertiary care hospital. *Indian Journal of Critical Care Medicine: Peer-Reviewed, Official Publication of Indian Society of Critical Care Medicine*, 18(10), 689–693. <https://doi.org/10.4103/0972-5229.142179>
- Diwan, V., Gustafsson, C., Klintz, S. R., Joshi, S. C., Joshi, R., Sharma, M., Shah, H., Pathak, A., Tamhankar, A. J., & Lundborg, C. S. (2016). Understanding Healthcare Workers Self-Reported Practices, Knowledge and Attitude about Hand Hygiene in a Medical Setting in Rural India. *PLOS ONE*, 11(10), e0163347. <https://doi.org/10.1371/journal.pone.0163347>
- Kim, J., Yu, S. N., Jeong, Y. S., Kim, J. H., Jeon, M. H., Kim, T., Choo, E. J., Lee, E., Kim, T. H., & Park, S. Y. (2023). Hand hygiene knowledge, attitude, barriers and improvement measures among healthcare workers in the Republic of Korea: A cross-sectional survey exploring interprofessional differences. *Antimicrobial Resistance & Infection Control*, 12(1), 93. <https://doi.org/10.1186/s13756-023-01296-y>

- Lam, B. C. C., Lee, J., & Lau, Y. L. (2004). Hand hygiene practices in a neonatal intensive care unit: A multimodal intervention and impact on nosocomial infection. *Pediatrics*, *114*(5), e565-571. <https://doi.org/10.1542/peds.2004-1107>
- Lambe, K. A., Lydon, S., Madden, C., Vellinga, A., Hehir, A., Walsh, M., & O'Connor, P. (2019). Hand Hygiene Compliance in the ICU: A Systematic Review. *Critical Care Medicine*, *47*(9), 1251. <https://doi.org/10.1097/CCM.0000000000003868>
- Marra, A. R., Moura, D. F., Paes, Â. T., Santos, O. F. P. dos, & Edmond, M. B. (2010). Measuring Rates of Hand Hygiene Adherence in the Intensive Care Setting: A Comparative Study of Direct Observation, Product Usage, and Electronic Counting Devices. *Infection Control & Hospital Epidemiology*, *31*(8), 796–801. <https://doi.org/10.1086/653999>
- Musu, M., Lai, A., Mereu, N. M., Galletta, M., Campagna, M., Tidore, M., Piazza, M. F., Spada, L., Massidda, M. V., Colombo, S., Mura, P., & Coppola, R. C. (2017a). Assessing hand hygiene compliance among healthcare workers in six Intensive Care Units. *Journal of Preventive Medicine and Hygiene*, *58*(3), E231–E237.
- Ojanperä, H., Kanste, O. I., & Syrjala, H. (2020). Hand-hygiene compliance by hospital staff and incidence of health-care-associated infections, Finland. *Bulletin of the World Health Organization*, *98*(7), 475–483. <https://doi.org/10.2471/BLT.19.247494>
- Sharma, S., Sharma, S., Puri, S., & Whig, J. (2011). Hand Hygiene Compliance in the Intensive Care Units of a Tertiary Care Hospital. *Indian Journal of Community Medicine*, *36*(3), 217. <https://doi.org/10.4103/0970-0218.86524>
- Toney-Butler, T. J., Gasner, A., & Carver, N. (2024). Hand Hygiene. In *StatPearls*. StatPearls Publishing. <http://www.ncbi.nlm.nih.gov/books/NBK470254/>
- Tyagi, M., Hanson, C., Schellenberg, J., Chamarty, S., & Singh, S. (2018). Hand hygiene in hospitals: An observational study in hospitals from two southern states of India. *BMC Public Health*, *18*(1), 1299. <https://doi.org/10.1186/s12889-018-6219-6>
- *WHO Guidelines on Hand Hygiene in Health Care: First Global Patient Safety Challenge Clean Care Is Safer Care.* (2009). World Health Organization. <http://www.ncbi.nlm.nih.gov/books/NBK144013/>