

## Adherence to Hand Hygiene in Health Care Workers in a Tertiary Care Hospital

S. Manick Dass<sup>1,\*</sup>, Vinayaraj E.V.<sup>2</sup>, Kavya Koneru<sup>3</sup>, K. Pavavni<sup>4</sup>,  
Prasanth Venela<sup>5</sup>, M. Srinivas Rao<sup>6</sup>

<sup>1</sup>Prof. & HOD, <sup>2</sup>Tutor, <sup>3</sup>2<sup>nd</sup> MBBS Student, <sup>4</sup>Assistant Professor, <sup>5</sup>Infection Prevention Specialist,  
<sup>6</sup>Associate Professor, Dept. of Microbiology, Apollo Institute of Medical Sciences & Research, Telangana

**\*Corresponding Author:**

Email: sripathimdass@yahoo.co.in

### ABSTRACT

**Background and Objective:** Hand hygiene is an important practice to prevent various kinds of infections. It is of utmost importance in health care workers to prevent Nosocomial infections. Various health care individuals like doctors, nurses and other paramedical staff are responsible for the spread of Nosocomial infections. In order to prevent this hand hygiene should be practiced at all levels. Observation of hand hygiene compliance of health care workers helps in assessing their knowledge and also provides ground for further improvements in hand hygiene. By improving their hand hygiene compliance Nosocomial infections can be prevented which is growing at an alarming rate throughout the world.

**Methodology:** This is a cross sectional study conducted at Apollo General Hospital, Hyderabad. Health care workers such as doctors, nurses and other paramedical staff of various departments were observed for hand hygiene compliance. For assessing their knowledge, and perception about hand hygiene a survey was conducted by giving a questionnaire.

**Results:** 100 health care workers from ward 6, ward 4, gynaecology, paediatrics, ICU and surgery departments were considered for the study. Paediatrics department had the highest compliance rate of 56% and surgery had the lowest compliance rate of 31%. WHO hand washing moment 3 had the highest compliance of 83.3% while before touching the patient (moment 1) had the lowest compliance of 12%.

**Conclusion:** The overall compliance rate observed is at average of 41.1%. Health care associated infections can be prevented by effective hand hygiene practices. This research provides a framework to measure the hand hygiene compliance of medical and paramedical staff working in Health care setting. Direct observation remains a widely used, easily reproducible method for monitoring compliance.

**Key words:** Hand hygiene, Nosocomial infection, WHO

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### INTRODUCTION

Infections acquired in health care settings are among the major causes of death and increased morbidity among hospitalized patients especially in developing countries. Healthcare Associated Infections (HAIs) are a significant cause of patient mortality & morbidity. Hand hygiene is the most effective and best way to prevent Nosocomial infection but unfortunately it is not being practiced effectively by the health care workers, leading to increased incidence of Nosocomial infections.

Hand hygiene is an important practice to be followed by every individual in their day to day life. Hand hygiene is essential to prevent the occurrence of many infections. Although many local, national, and international initiatives have been launched to improve hand hygiene practices, high compliance remains an elusive goal, with compliance rates

among healthcare workers averaging less than 50%<sup>3,7</sup>.

Microorganisms responsible for Health Care Associated Infections (HCAI) can be viruses, fungi, parasites and, more frequently, bacteria. HCAI can be caused either by micro-organisms already present on the patient's skin and mucosa (endogenous) or by micro-organisms transmitted from another patient or health-care worker or from the surrounding environment (exogenous)<sup>10</sup>.

The hands of Health Care Workers (HCW) are commonly colonized with pathogens like methicillin resistant *S. aureus* (MRSA), Vancomycin resistant *Enterococcus* (VRE), MDR-Gram Negative bacteria (GNBs), *Candida* spp and *Clostridium difficile*, which can survive for as long as 150h<sup>10</sup>. Approximately 10<sup>6</sup> skin epithelial cells containing viable microorganisms are shed daily from the normal skin<sup>7,9</sup>, which can contaminate the patient's immediate environment articles .

Fortunately, most Nosocomial infections in healthcare facilities can be prevented with readily available, relatively inexpensive strategies. Hand washing is the single most important procedure for the prevention of hospital acquired infections. In the wake of the growing burden of HCAs, health care

practitioners (HCPs) are reversing back to the basics of infection prevention by simple measures like hand hygiene. Hand hygiene can reduce the occurrence of infections in healthcare facilities.

However, hand hygiene compliance by health care workers is suboptimal.<sup>4,5</sup> Time constraints, irritation in skin, inadequate resources have been few of the identified barriers to compliance with hand hygiene.<sup>3</sup> Improved compliance has been reported following education activities,<sup>12</sup> introduction of alcohol gels/rubs,<sup>7</sup> audit and feedback, and promotion of local activities.

WHO-WAPS as a part of "CLEAN CARE IS SAFER CARE" initiative developed guidelines for hand hygiene in 2006. Direct observation is the gold standard method for measuring the hand hygiene compliance described by the World Health Organisation (WHO)<sup>9</sup>. Observation involves directly watching and recording the hand hygiene behavior of health care workers and the physical environment.

Enforcement on the practice of hand hygiene is necessary. This requires motivation and cooperation from HCW at various levels. Measuring adherence to hand hygiene practice is fundamental to demonstrating improvements both at an organization and a national level. Despite the knowledge in importance of effective hand washing, not all health care workers and students are compliant to it. They would be either fail to wash their hands or fail to follow the correct steps in effective hand washing for preventing Nosocomial infections.

This research provides a framework to help health care workers make necessary decisions about hand hygienic conditions. This study will enlighten the importance and of hand hygiene adherence in reducing the Nosocomial infection and thereby improve the hand hygiene compliance among health care workers in our local practice. We hope that through this research project, more measures can be identified to improve the awareness among Health care workers. It allows Health care facilities to establish a base line and target educational and promotional activities.

### AIMS AND OBJECTIVES

1. To know staff knowledge about hand hygiene conditions.
2. To assess the performance of individual staff members.
3. Measure the thoroughness of cleansing.
4. Staff competence such as use of appropriate technique when cleansing hands.
5. To compare health care organizations performance to that of others.

### MATERIALS AND METHODOLOGY

**Study design:** Cross sectional study

**Sample size:** 100 health care workers

**Study population:** Health care workers (Medical & Paramedical Staff) working in the Apollo hospital at different points.

**Study:** A total of 100 health care workers working in different important Hospital location will be monitored for Hand hygiene compliance.

**1. Direct observing:** Direct observation of the hand hygiene behavior of health care workers is considered the "gold standard" of measurement methods.

It allow us to directly see and record the hand hygiene behavior of various categories and also help us to monitor which hand hygiene products are used, the thoroughness of cleansing, and whether the staff are performing hand hygiene whenever there is an opportunity to do so.

**2. Conducting surveys:** A survey of health care workers reveal what they know and think about hand hygiene and gives us an idea about why they adhere or do not adhere to National guidelines for reducing Nosocomial infections. Survey can reveal perceptions of Health care workers on their own hand hygiene compliance.

### RESULTS

The WHO methodology<sup>6</sup> was adopted for undertaking hand hygiene observational audits with a sample size of 100. Healthcare workers (Doctors, Nurses and Paramedical staff) working across Ward-4, Ward 6, Gynecology, Pediatrics, ICU and General Surgery units were observed for their compliance against the WHO 5 moments of hand hygiene .

The following formula is used for calculating Hand Hygiene compliance rate among health care workers.

**Compliance rate =**

**Number of times hand hygiene performed x 100**  
**Number of hand hygiene opportunities**

The audit was carried out in 6 selected wards (Ward-4, Ward-6, Gynaecology, Pediatrics, ICU and General Surgery). The results were analyzed and classified in to 2 different categories.

**Category 1:** Over all Hand Hygiene compliance in the selected wards.

**Category 2:** Hand hygiene compliance according to WHO 5 moments of Hand Hygiene.

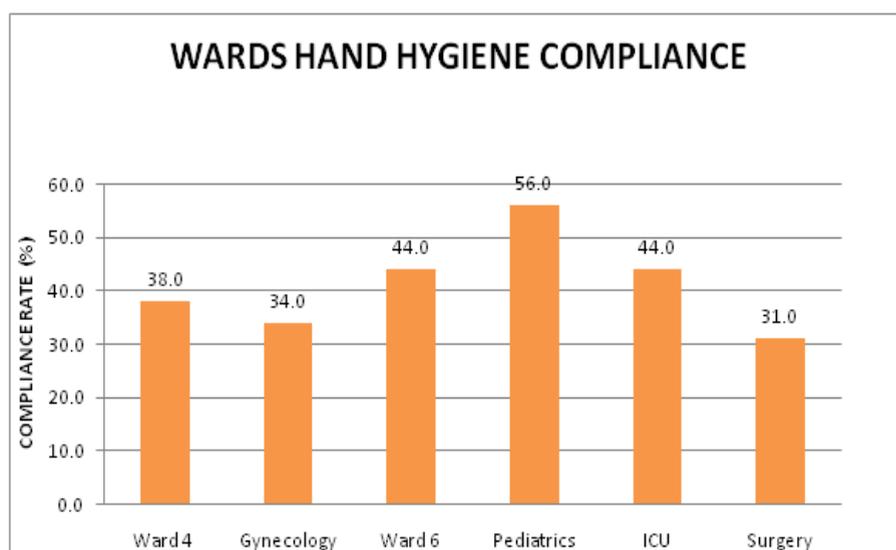
### WARDS:

For the audit purpose healthcare worker hand hygiene compliance was measured against 256 (64 (Ward 4) + 64 (Gynaecology) + 32 (Ward 6) + 32(Pediatrics) + 32 (ICU) + 32 (Surgery)) Hand Hygiene opportunities for each of the 6 selected wards. For the 256 hand hygiene opportunities the total of hand hygiene actions performed are only 102 ((24 (Ward 4) + 22 (Gynaecology) + 14 (Ward 6) + 18 (Pediatrics) + 14 (ICU) + 10 (Surgery)).

The details of the cumulative Hand Hygiene opportunities Vs cumulative Hand hygiene actions are given below in the table 1.

**Table 1: Wards-Hand Hygiene compliance**

WARDS	Hand Hygiene Opportunities	Hand Hygiene actions	Percent compliance
Ward 4	64	24	38
Gynecology	64	22	34
Ward 6	32	14	44
Pediatrics	32	18	56
ICU	32	14	44
Surgery	32	10	31
<b>Total</b>	<b>256</b>	<b>102</b>	<b>41.1(Avg.)</b>



Compliance to Hand Hygiene by healthcare workers across different wards varied from 31% to 56%.The highest compliance was observed in Pediatrics and lowest compliance was observed in Surgery unit.

#### WHO 5 Moments across all wards

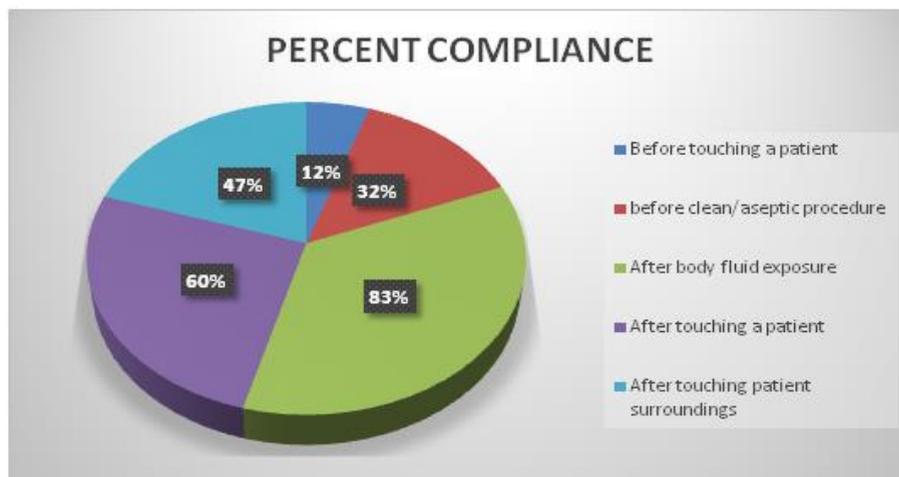
Compliance with hand hygiene can be divided into the five WHO moments:

1. Before touching a patient
2. Before clean/aseptic procedure
3. After body fluid exposure risk
4. After touching a patient
5. After touching a patient surroundings

The details of the cumulative Hand Hygiene opportunities Vs cumulative Hand hygiene actions in relation to WHO 5 Moments of Hand Hygiene are given below in the table 2.

**Table 2: WHO 5 Moments-Hand Hygiene compliance**

WHO 5 Moments	Hand Hygiene Opportunities	Hand Hygiene actions	Percent Compliance
Before touching a patient	91	11	12
Before clean/aseptic procedure	34	11	32.3
After body fluid exposure risk	12	10	83.3
After touching a patient	102	62	60.7
After touching patient surroundings	17	8	47
<b>Total</b>	<b>256</b>	<b>102</b>	



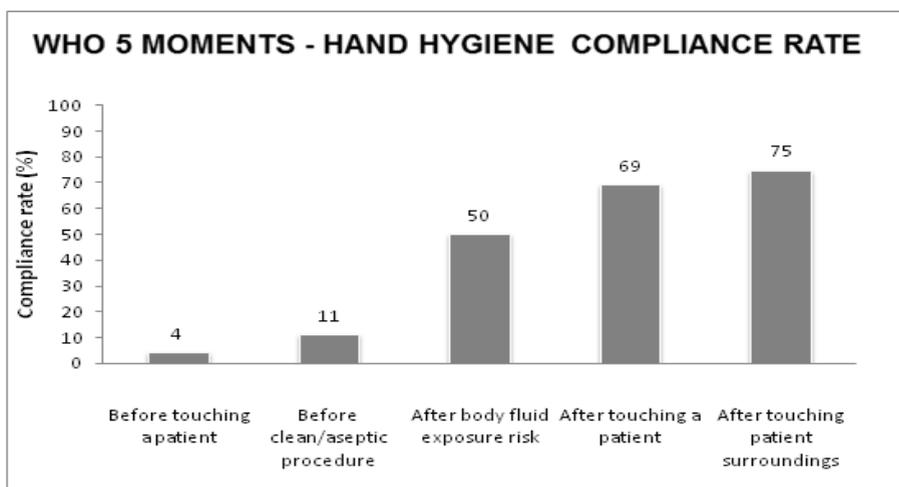
The WHO Hand washing moment 1 (**Before touching a patient**) had the lowest compliance rate among all the wards observe data 12%. Highest compliance was observed for moment 3 was 83.3%. (**After body fluid exposure risk**)

**I. Individual Ward Wise Hand Hygiene Compliance Rate**

**WARD 4:** For the audit purpose healthcare worker hand hygiene compliance was measured against 64 Hand Hygiene opportunities. For the 64 hand hygiene opportunities the total of hand hygiene actions performed are only 24. Over all Hand Hygiene compliance rate stands at 37.5%.

**Compliance to Whom 5 Moments of Hand Hygiene**

WHO 5 Moments	Hand Hygiene Opportunities	Hand Hygiene actions	Percent Compliance
Before touching a patient	23	1	4
Before clean/ aseptic procedure	9	1	11
After body fluid exposure risk	2	1	50
After touching a patient	26	18	69
After touching pt. surroundings	4	3	75
<b>Total</b>	<b>64</b>	<b>24</b>	

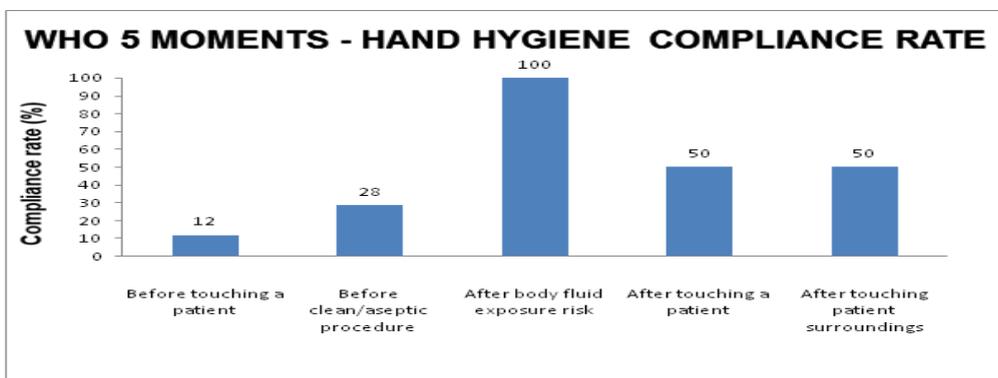


Lowest compliance was observed for moment 1 (Before touching patient) at 4%. Highest compliance was observed for moment 5 (After touching patient surroundings) at 75%.

**Gynaecology:** For the audit purpose healthcare worker hand hygiene compliance was measured against 64 Hand Hygiene opportunities. For the 64 hand hygiene opportunities the total of hand hygiene actions performed is only 22. Over all Hand Hygiene compliance rate stands at 34%.

**Compliance to Who 5 Moments of Hand Hygiene**

WHO 5 Moments	Hand Hygiene Opportunities	Hand Hygiene actions	Percent Compliance
Before touching a patient	25	03	12
Before clean/aseptic procedure	07	02	28
After body fluid exposure risk	02	02	100
After touching a patient	26	13	50
After touching pt. surroundings	04	02	50
<b>Total</b>	<b>64</b>	<b>22</b>	

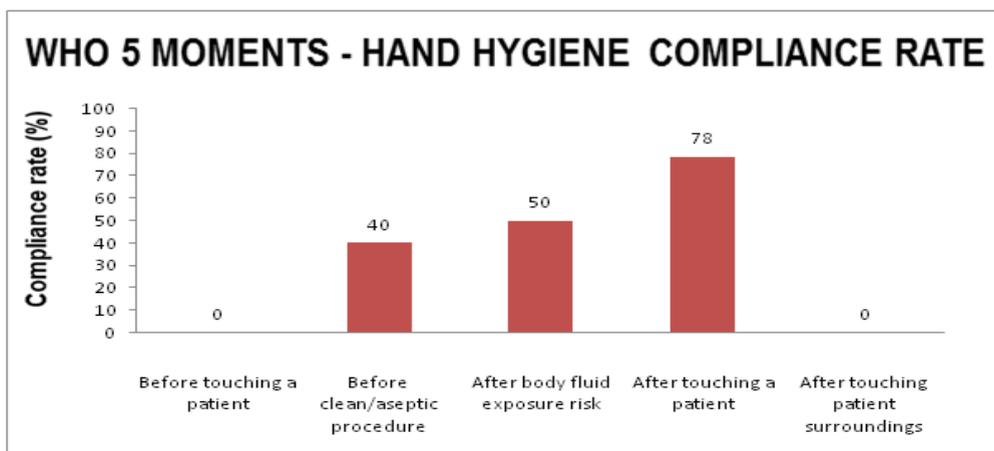


Lowest compliance was observed for moment 1 (Before touching a patient) at 12%. Highest compliance was observed for moment3 (After body fluid exposure risk) at100%.

**WARD 6:** For the audit purpose healthcare worker hand hygiene compliance was measured against 32 Hand Hygiene opportunities. For the 32 hand hygiene opportunities the total of hand hygiene actions performed are only 14. Over all Hand Hygiene compliance rate stands at 43.7%.

**Compliance to Whom 5 Moments of Hand Hygiene**

WHO 5 Moments	Hand Hygiene Opportunities	Hand Hygiene actions	Percent compliance
Before touching a patient	10	0	0
Before clean/ aseptic procedure	05	2	40
After body fluid exposure risk	02	1	50
After touching a patient	14	11	78
After touching pt. surroundings	01	0	0
<b>Total</b>	<b>32</b>	<b>14</b>	

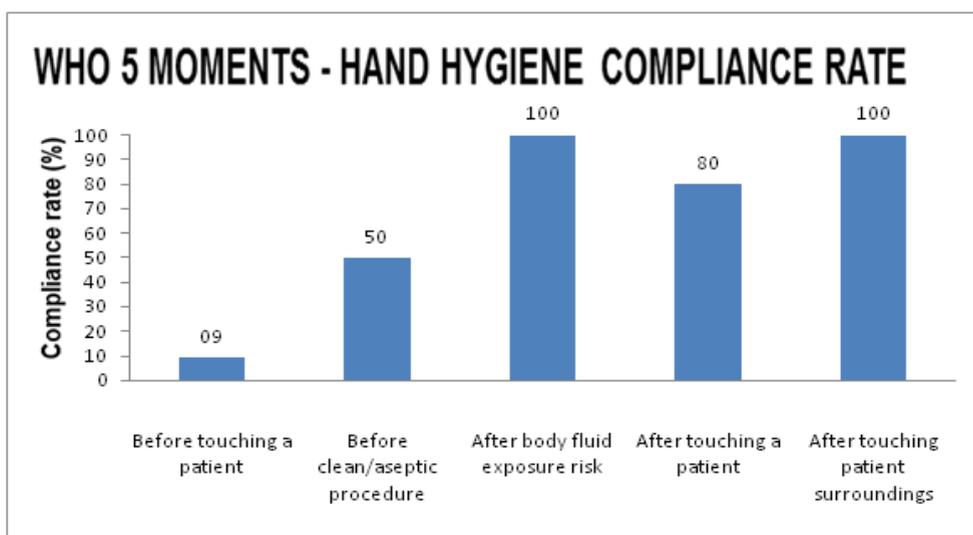


Lowest compliance was observed for moment 1 & 5 at 0%. Highest compliance was observed for moment 4 (After touching the patient) at 78%.

**PAEDIATRICS:** For the audit purpose healthcare worker hand hygiene compliance was measured against 32 Hand Hygiene opportunities. For the 32 hand hygiene opportunities the total of hand hygiene actions performed are only 18. Over all Hand Hygiene compliance rate stands at 56%.

#### COMPLIANCE TO WHO 5 MOMENTS OF HAND HYGIENE

WHO 5 Moments	Hand Hygiene Opportunities	Hand Hygiene actions	Percent compliance
Before touching a patient	11	01	09
Before clean/ aseptic procedure	04	02	50
After body fluid exposure risk	04	04	100
After touching a patient	10	08	80
After touching pt. surroundings	03	03	100
<b>Total</b>	<b>32</b>	<b>18</b>	

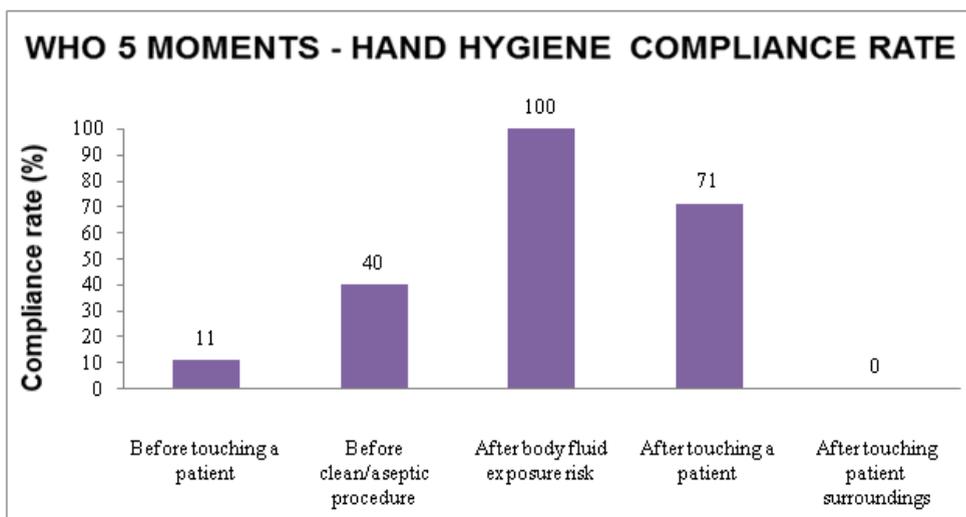


Lowest compliance was observed for moment 1 (Before touching patient.) at 9%. Highest compliance was observed for moment 3 (After body fluid exposure risk) & moment 5 (After touching patient surrounding) at 100%.

**ICU:** For the audit purpose healthcare worker hand hygiene compliance was measured against 32 Hand Hygiene opportunities. For the 32 hand hygiene opportunities the total of hand hygiene actions performed are only 14. Over all Hand Hygiene compliance rate stands at 43.7%.

#### Compliance to who 5 moments of hand hygiene

WHO 5 Moments	Hand Hygiene Opportunities	Hand Hygiene actions	Percent compliance
Before touching a patient	09	01	11
Before clean/aseptic procedure	05	02	40
After body fluid exposure risk	01	01	100
After touching a patient	14	10	71
After touching pt. surroundings	03	0	0
<b>Total</b>	<b>32</b>	<b>14</b>	

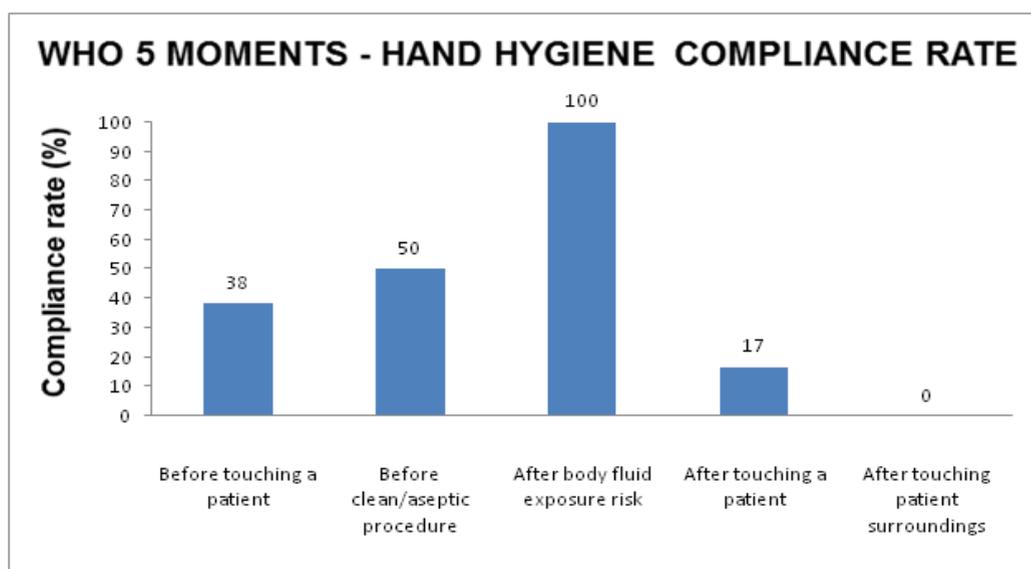


Lowest compliance was observed for moment 5 (After touching patient surrounding) at 0%. Highest compliance was observed for moment 3 (After body fluid exposure risk) at 100%.

**SURGERY:** For the audit purpose healthcare worker hand hygiene compliance was measured against 32 Hand Hygiene opportunities. For the 32 hand hygiene opportunities the total of hand hygiene actions performed is only 10. Over all Hand Hygiene compliance rate stands at 31%.

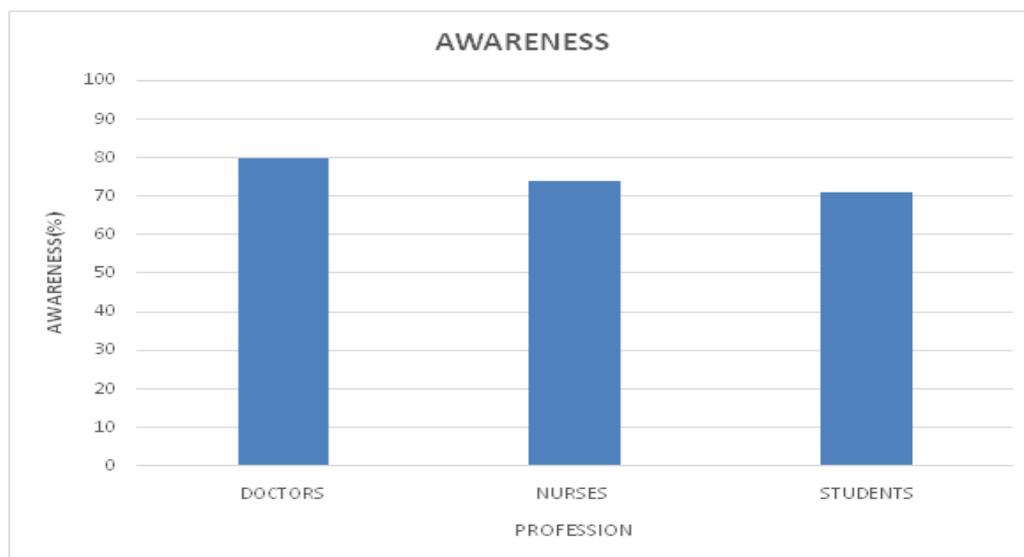
Compliance to who 5 moments of hand hygiene

WHO 5 Moments	Hand Hygiene Opportunities	Hand Hygiene actions	Percent compliance
Before touching a patient	13	05	38
Before clean/ aseptic procedure	04	02	50
After body fluid exposure risk	01	01	100
After touching a patient	12	2	17
After touching pt. surroundings	02	0	0
<b>Total</b>	<b>32</b>	<b>10</b>	



Lowest compliance was observed for moment 5 (After touching patient surrounding) at 0%. Highest compliance was observed for moment 3 (After body fluid exposure risk) at 100%.

**AWARENESS:** 100 health care workers were assessed for their knowledge about hand hygiene through a questionnaire. Doctors, nurses and medical students of different departments working at APOLLO GENERAL HOSPITAL were considered for the study. Survey was conducted through a questionnaire. Through this survey we came to know that doctors had knowledge of 80%, nurses had knowledge of 74% and students around 71%. So we can conclude that doctors have higher knowledge about hand hygiene. Nurses and students require more awareness programmes about moments of hand hygiene.



Doctors have the highest knowledge of 80% and students have the lowest knowledge of 71%.

## DISCUSSIONS

Health care associated infections are one of the major causes of patient mortality. Health care associated infections can be prevented by effective hand hygiene practices. This research provides a framework to measure the hand hygiene compliance of medical and paramedical staff working at Apollo General Hospital, Hyderabad.

In this research doctors, nurses and various paramedical staff working in different departments were observed. Later survey was conducted through a questionnaire to assess their knowledge about hand hygiene.

The results of the present study indicate an overall compliance of 41.1%. It is measured based on WHO 5 moments of Hand hygiene.

The lowest compliance across all wards was observed for moment 1 (Before touching patient) at 12%. Highest compliance was observed for moment 3 (After body fluid exposure risk) was 83.3%.

Compliance to Hand Hygiene by healthcare workers across different wards varied from 31% to 56%. The highest compliance was observed in Pediatrics and lowest compliance was observed in Surgery unit.

The purpose of hand washing is to mechanically remove soil and debris from the skin and reduce the number of transient microorganisms and thereby reducing the chance of getting Nosocomial infections. To encourage hand washing, program managers should make every effort to

provide soap and a continuous supply of clean water, either from the tap or a bucket, and single-use towels.

Hand washing should be done using soap and water or any other antimicrobials. Since antiseptic hand rub do not remove soil or organic matter, if hands are visibly soiled or contaminated with blood or body fluids, hand washing with soap and water should be done first Use of an antiseptic hand rub is more effective in killing transient and resident flora than hand washing with antimicrobial agents or plain soap and water. This method is quick and convenient to perform, and gives a greater initial reduction in hand flora.

### Hand washing should be performed

#### Before:

1. examining (direct contact with) a patient
2. putting on sterile or high-level disinfected surgical gloves prior to an operation,
3. Examination gloves for routine procedures such as a pelvic examination.

### Hand washing should be done

**After:** any situation in which hands may become contaminated, such as

1. handling soiled instruments and other items
2. touching mucous membranes, blood or other body fluids
3. having prolonged and intense contact with a patient
4. Removing gloves

Study	Results	Opportunities
Present study	41.1%	256
Ahmed A Mahfouz <sup>1</sup>	41%	536
Creedon <sup>4</sup>	44%	1737
Pittet <sup>3</sup>	45%	12,216
Vicki Erasmus <sup>8</sup>	40%	20,082

The following interventions can contribute effectively for improving hand hygiene compliance rate among health care workers in a hospital setting

1. Increased access to alcohol based hand rubs or soap and a continuous supply of clean water, either from the tap or a bucket, and single-use towels
2. Calibrated bedside bottle holders and wall mounted bottle holders to be made available.
3. Increased awareness through training programs
4. Support from senior management/clinicians
5. Involve hospital administrators in promoting and enforcing the guidelines
6. By Demonstrating hand washing policy through actions
7. Presence of robust system for monitoring hand hygiene compliance

#### LIMITATIONS

The compliance rate which was mentioned here may not be reflective of health care worker compliance at all times. It is well recognized that workers will change their behavior, if aware that they are being observed (Hawthorne effect). Observer bias (such as the Hawthorne effect) is difficult to eliminate

The sample size taken has a margin of error of 7%. A larger sample size would provide proportions with a narrower margin of error. Measuring product use (involves calculating the volume, quantity, or frequency) were not measured in this study which are important aspects of good hand hygiene practice.

#### CONCLUSIONS

The overall compliance rate observed is at average of 41.1%. Following are factors observed which are affecting compliance to Hand Hygiene: This research provides a framework to measure the hand hygiene compliance of medical and paramedical staff working in Health care setting. Direct observation remains a widely used, easily reproducible method for monitoring compliance.

1. Wearing gloves and gowns will substitute for Hand hygiene
2. Hand washing agents are causing irritation and dryness of hands
3. Sinks are inconveniently located in the wards/ inadequate availability of alcohol based Hand rubs
4. Patient overcrowding leading to insufficient time

5. Belief of low risk of acquiring infection from the patient
6. Belief of hand hygiene interferes with healthcare worker relationships with the patients
7. Inadequate knowledge on guidelines and protocols
8. Lack of role models among colleagues or superiors

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