



IMPACT OF KNOWLEDGE AND PRACTICE OF HAND HYGIENE IN HEALTH CARE WORKERS TOWARD INFECTION CONTROL MEASURES IN A TERTIARY CARE HOSPITAL IN INDIA

Microbiology

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KEYWORDS

INTRODUCTION

Hospital acquired infections (HAIs) are a major concern in the intensive care units (ICU) and postoperative wards. HAIs prolonged the stay of patient in hospital and increase the cost of treatment and morbidity. In ICU, stroke unit, neurosurgery ward burn unit patients are prone to have a variety of nosocomial infections. The World Health Organization (WHO) has described HAIs as one of the infectious diseases which have a huge economic impact on health industry.

(1). many health workers like Staff Nurses, resident doctors and housekeeping are in direct or indirect contact with the Patients and surrounding in wards around the clock. These HCW play major role in preventing and controlling HAIs. In overpopulated country like India majority of public hospitals are overcrowded.

In these hospitals it is important to identify the areas of knowledge and practice deficit in infection control measures and to strengthen them by establishing appropriate measures to strictly follow hospital infection control policy. In overcrowded hospitals patients are prone to health care associated infections in all level of health care facility primary, secondary and tertiary.

according to World Health Organization (WHO) 7-12% of hospitalized patient acquire health care associated infection worldwide however some studies estimated that 7 of every 100 hospitalized patients in developed and 10 in 100 in low and middle income countries suffer at least one healthcare associated infection [1] In 2007 International Nosocomial Infection Control Consortium had reported that overall HAI incidence rate of 4.4% corresponding to 9.06 infections per 1000 Intensive Care Units (ICU) days from 7 big Indian cities.[2]

by WHO a metaanalysis was conducted in the year 2010 that estimated that the pooled prevalence of HAIs is 15.5 per 100 patients in low- and middle-income countries that is more than that reported in Europe (7.1 per 100 patients) and the USA (4.5 per 100 patients) [3]. The burden of such infections is particularly high in intensive care units for adults [4] and newborns [5].

Patients in the ICUs, high dependency unit (HDU) stroke unit, neurosurgery ward are more likely to be colonized or infected during their hospital stay. There are so many studies reported that most of these infections are transmitted to the patients by carriage of microorganisms on the hands of health-care workers (HCW) while handling patients.[1]

Hand hygiene (HH) is one of the most important measures to prevent HAIs. HH includes handwashing, alcohol-based hand rub, antiseptic hand wash and surgical HH/antisepsis.[6] These measures are simple and inexpensive. Hand washing with soap and water can play major role to reduce HAIs and save millions of lives and reduce the cost of treatment. But compliance of proper hand hygiene is still low in developing countries like India. [7]

This may be due to lack of proper knowledge and recognition of HH opportunities during patient care.[8] To overcome this problem, continuous efforts are being made to identify effective and sustainable strategies.

My five moments for HH" by WHO is a good effort for implementation

of good infection control practices. These moments are use of HH 1. before touching a patient, 2. before performing aseptic and clean procedures, 3. after being at risk of exposure to body fluids, 4. after touching a patient, and 5. after touching patient surroundings.[6]

In developing country like India direct observation remains the gold standard rather than continuous monitoring by technology due to lack of resources. In this study we studied HH compliance among HCW

MATERIALS AND METHODS

This study was a cross-sectional observational study and a part of a biggest evaluation of a quality improvement project in our hospital. Participants are the health care worker posted in MBS hospital Kota. HCW that included resident doctors, nursing staff and allied health-care personnel, posted in the Medical ICU, Neurosurgery ICU, Surgical ICU, Burn Unit, , Gynecology ICU, stroke unit, Orthopedic ICU Post-operative ward of Gynecology, post-operative ward of surgery, neonatal ICU (NICU) and post neonatal ICU (PICU) of a tertiary care hospital in Rajasthan by direct observation method.

After taking consent in small training session of all the staff were told about the current HH practices and five moments of HH by WHO which included use of HH 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 as per WHO guidelines before starting the study. [7]

A training session was conducted which included lectures on important topics of hospital infection control ,such as sterilization and disinfection in wards and Operation Theatre(OT) concept of standard precautions, practical application of this knowledge ,safe injection practice, concept of Central line associated blood stream infection (CLABSI), Catheter associated urinary tract infection (CAUTI). Before training session, a survey was done, before the study, by filling a questionnaire to access the perception, knowledge and attitude toward HH, standard precautions, safe injection practices, sterilization and disinfection and blood spill management. A. The HCW was observed for HH compliance by a single observer for 1 h/working day for 3 months. The observations were noted for all five moments of HH as opportunity utilized or missed in a checklist where a tick was placed if the HH practice was adhered to by the HCW when the opportunity for the same is there. The kind of HH practice (hand wash, hand rub, or wearing gloves) which was practiced by the HCW was also noted. To reduce Hawthorne effect, the observer visits ICU randomly with no fixed schedule. Then we start to organized infection control training sessions. After sessions we again start the observation for hand hygiene for 3 months similar to pre-session. [8]

During the study, a total of 55 HCW were observed over 90 h of observation period, spread over 3 months, which created 1590 HH opportunities. The HCW comprised of 17 resident doctor, 23 nursing staff members and 15 are housekeeping staff.

RESULT

Total opportunities are 1590 out of this 965 was compliance. Total HH opportunities during the study period were 921 with 45% compliance before session and 82.5% after session. Maximum hand-hygiene compliance among health care staff was seen after fluid exposure which is moment 3 of HH moments.

Analysis of the questionnaire study showed that almost all health-care staff had knowledge about HH methods. However, only 52% of HCW had knowledge about the correct method of performing HH. Only 31% had knowledge about the timing of performing hand wash and hand rub. 49% of HCW were found wearing jewelry and wrist watches while washing hands. Except for before aseptic procedure and after fluid exposure for all the other opportunities, hand rub was the most common HH practice. Before aseptic procedure, wearing gloves was the most common practice.

In response to question about safe injection practices the pre-test knowledge was 40% for the participants. 49% correctly responded to the correct use of single-use medication vials, correct methods of administering fluids and injections to patients, while only 29% knew the correct methods of cleaning site before invasive procedures. After session knowledge improve up to 56%. The knowledge of standard precautions in prevention of HAI was also quite low, only 43% gave correct answers. 37% had a correct knowledge of definition of sterilization while 17% were aware of commonly used disinfectants and 29% correctly knew the various methods of sterilization. The overall correct response rate increased from 37% in pre-test to approximately 69% in post-test.

The correct response rate in pre-test about OT sterilization was low (29%). Very few participants (15%) were aware of acceptable bacterial load in major operation theatres and 41% knew the correct method of disposal and pre-cleaning of equipment. After attending the training 58% correctly responded to O.T sterilization methods.

DISCUSSION

In infection control measures proper HH is the single most important, simplest, and least expensive measure to reduce the prevalence of HAIs and the spread of antimicrobial resistance, but seems to be the most neglected step [9] Several studies have demonstrated that handwashing virtually eradicates the carriage of MRSA which invariably occurs on the hands of HCW working in ICUs.

In our study it was found out that frequency of hand washing per shift was not expected and there was low level of compliance (45%) with hand washing, particularly before touching the patient, after touching of patients surrounding and also in between examination of two patients. Chandak et al 2018 reported the some factors mentioned by the nursing staff for poor compliance for hand hygiene such as overcrowding, understaffing, hectic schedule, lack of hand washing facility at working places and . However, a good hand hygiene knowledge and compliance was seen in some studies [10] . some studies reported low compliance of HH. [11,12]

In most of government health-care facility, adherence to recommend handwashing practices remains unacceptably low, rarely exceeding 40 percent of situations in which HH is indicated. Patients in the ICUs and stroke unit where patient stay is prolong, are more likely to be colonized or infected by harmful and multidrug- resistance microorganisms carried on the HCW hands. HH compliance after session was estimated as 82% [Table 3]. Which is higher as compared to other studies in India. [13] Compliance rate was lower in housekeeping staff as compared to hospital nursing staff and resident doctor In another study HH compliance was more in resident doctors (50.8%) than staff nurses (41.3%).[12] In contrary, Pittet et al. observed compliance of 48% and nurses had the highest handwashing adherence rates (52%), while physicians were the worst offenders (23%).[11] Maximum compliance was seen after body fluid exposure, that is, the staffs were very careful after body fluid contact as it was perceived important for self- protection Almost all the HCW included in the study perceived HH as useful measure to prevent HAI; yet, the knowledge was not converted to actions. In response to the questionnaire, all of the health-care staff claimed to have knowledge about HH methods. However, only 50% had knowledge about the correct timing of performing hand wash and hand rub. About 49% of HCWs were found wearing jewelry and wrist watches while washing hands. Hand rub was the most common HH practice for most of the opportunities except before aseptic procedure and after fluid exposure for which the participants preferred washing hands over using hand rub. Use of sterile gloves was the most common practice before aseptic procedure as it is considered safe and less time-consuming in emergency conditions by the participants. There is some factor that encourage use of gloves such as emergency, lack of proper HH knowledge, and allergy to soap/hand rub were the most common reasons given by the participants for lack of compliance. [14]

The reason for the lower performance on these question about infection control measures in pre session questionnaire may be that most health worker do not have sufficient knowledge of infection control. They cannot understand the importance of adherence of hospital infection control policy in day to day working. It is advised that all doctors, especially residents, are made to participate in regular infection control sessions and take part to monitor the cases of HAI in our hospital especially ICUs, burn unit and high dependency units. (15)

In present study there is good improvement in HH compliances 82.5% after the session of importance of hand hygiene in infection control measures.

Though the participants were aware of the difference between sterilization and disinfection, commonly used hospital disinfectants, pre-cleaning procedures, storage of sterile items, but knowledge regarding correct application of disinfectants on equipment, various methods of OT sterilization was poor.[16] Knowledge in sterilization and disinfection procedure was quite low There was a lack of concept of correct use of disinfectants on instruments. Jain M et al(14) and Sadeghi N et al(17) also showed findings on similar lines [12,13]

There is some limitation in our study like direct observation is time-consuming, hospital is overcrowded, workforce intensive, lack of technology to monitor continuously. They probably provide information about a very low percentage of all HH opportunities. If staff is aware, direct observation may affect health-care personnel behavior (Hawthorne effect). We have tried to limit these difficulties by engaging a single trained observer. However, there could be opportunities that were missed. The sample size in our study was very low which may have affected the overall results.

CONCLUSION

The average level of compliance with recommended HH techniques among health-care personnel was 93.1% which is appropriate for critical care areas. Routine observation of HCW can also help in evaluation of HH technique and can check compliance rates among different health-care personnel.

Table 2: Observed compliance WHO's 5 moments for HCW before session

	Observation	Opportunity	Compliance
Before patient contact	109	231	47%
Before aseptic procedure	39	67	58
After fluid exposure	35	51	69
After patient contact	123	341	36
After contact with patient surroundings	96	253	38
Total	413	921	45

Table 3: Observed compliance WHO's 5 moments HCW after session

	Observation	Opportunity	compliance
Before patient contact	198	209	95
Before aseptic procedure	41	56	73
After fluid exposure	25	29	86
After patient contact	85	105	81
After contact with patient surroundings	203	270	75
Total	552	669	82.5

Table 1Frequency and percentage of item pertaining to knowledge and practice of nursing staff on infection control measures (N=

S no	Knowledge of items	Correct response	Percentage of correct response
1	Hospital acquired infections are the result of self-infection, cross infection & environmental infection	Yes	34
2	The single most important measure for preventing HAI is hand washing	Yes	76
3	HAIs are transmitted through body fluids, staff hands and reusable equipment	Yes	39

4	The most important factor involved in hand washing is friction	Yes	11
5	Moisture enhances the transmission of micro-organisms	Yes	23
6	If a person doesn't show sign and symptoms of disease, he can't transfer a disease	No	7
7	Alcohol is an effective disinfectant when rubbed on skin	Yes	79
8	Do you know the name of the disinfectants mainly used to clean surfaces	Yes	67
9	Do you know the name of the hand disinfectant used	Yes	74
10	Do you wear gloves when there is potential for exposure to blood?	Yes	98

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