Research Article

A SIMPLE AND EFFECTIVE APPROACH TO PATIENT SAFETY

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A R T I C L E   I N F O

A B S T R A C T

Prevention of Healthcare associated infections is an important aspect of patient safety. Each and every healthcare establishment and the clinician strive to achieve this goal. Aiming at this key element, a prospective study was carried out in a tertiary care hospital to study the impact of hand hygiene as a patient safety intervention on the rate of central line associated bloodstream infections (CLABSI). The intervention was a refresher training on hand hygiene with improvement in hand hygiene facilities. 463 patients in pre-intervention and 521 patients in post intervention phase were observed and the difference in both phases was observed to be statistically significant.

INTRODUCTION

Patient safety is a fundamental element of health care and the key point is that no patient is harmed unnecessarily while providing health care to him/her. Patient safety is a representation of quality care along with accessibility, acceptability, effectiveness, efficiency and team approach.[1] It involves different aspects of healthcare delivery starting from medication safety to safe injection practices, safe surgical procedures including device safety, proper bio-medical waste management disposal & prevention of hospital acquired infections. As Florence Nightingale stated "The very first requirement in a hospital is that it should do the sick no harm". Centre for Disease control and Prevention (CDC) has taken a serious view of infection prevention and control activities and has prepared various modules for the same.[2] Although extensive literature is available for infection control activities but ground level implementation is very difficult among trained infection control nurses (ICN) and health care workers (HCWs) due to highly labour intensive and time consuming procedures/activities.[3] Hand hygiene and adherence to care bundle approach is an important healthcare issue. HH and bundle care approach is significantly associated with reduction in rate of HAI.[4]

Aims and Objectives

The study was aimed at assessing the impact of care bundle approach and hand hygiene as a patient safety intervention on the central line associated bloodstream infections rate (CLABSI) in patients admitted in a tertiary care hospital.

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MATERIALS AND METHODS

A prospective study using WHO Hand Hygiene observation form & NHSN CLABSI form [Figure I] was conducted from Jun 2017 to Dec 2017. The study assessed the impact of bundle approach and hand hygiene practices on rate of CLABSI in various wards of a tertiary care hospital.

In the initial three months of our study we observed the bundle approach and hand hygiene practices being adopted by healthcare workers, assessed their motivation level for the same by regular interaction and took note of the difficulties faced by them especially for performing hand hygiene. Thereafter, hospital infection control committee reinforced the existing knowledge of healthcare workers. HCWs were given exhaustive lectures including audiovisual aids, motivational videos and practical demonstration on infection prevention strategies including hand hygiene practices. Besides, availability and accessibility of hand wash/hand rub facilities was also improved. In the acute care areas, each and every bed was provided with 2% Chlorhexidine/70% Alcohol hand rub solutions in addition to being available at nursing station. At all the hand washing areas posters for hand washing technique were also pasted.

A checklist comprising CLABSI Insertion bundle elements namely cleaning the insertion site with antiseptic solution, barrier precautions, avoiding femoral site for insertion, single lumen catheter use, use of sterile, semi permeable dressing was also prepared. In the same checklist, maintenance bundle elements enumerating aseptic techniques especially hand hygiene before accessing the device, daily inspection of site for signs of infection, cleaning injection port with alcohol

wipes, change of dressing whenever soiled, review the need for removal and prompt removal after physician advice were also mentioned. We also discouraged blood sampling and parenteral nutrition through central line. Bundle care checklist comprised part of patient case sheet and was completed by operator and in-charge nurse. Introduction of bundles in the patient care areas was supported by administrative authorities with active involvement of paramedical and nursing staff and close supervision by infection control team.

The infection control training and hand hygiene practices were emphasised repeatedly through lectures and motivational videos for another three months. Besides, availability of hand wash/hand rub was ensured during the entire period of our study.

463 patients were observed for 2700 central line days pre-intervention and 521 patients were observed for 3600 central line days post intervention.

As stated in CDC guidelines Jan 2017, following terminologies were adhered to label the CLABSI and to find out its rate.

Central line - An intravascular catheter which either terminated close to the heart or was in one of the great vessels and was used for infusion, withdrawal of blood, or hemodynamic monitoring.

CLABSI - Any Laboratory confirmed blood stream infection (LCBI) where a central line was in place for >2 calendar days (CL) and date of event (DOE) occurred on or after 3 CL (day of device placement is counted as day 1)

LCBI - To be labelled as LCBI, it must meet one of the following criteria:

LCBI 1: The patient is of any age and has a recognized pathogen cultured from one or more blood culture specimen, and organism cultured from blood is not related to an infection at any other body site.

LCBI 2: Patient is >1year of age and has the following one sign or symptom: fever (>38°C), chills, or hypotension, and the blood culture grows same common commensal organism on two or more separate occasions. Besides, positive culture results are not related to an infection at any other body site.

LCBI 3: Patient is >1year of age and has the following one sign or symptom: Apnoea, bradycardia, fever (>38°C), hypothermia and the blood culture grows same common commensal organism on two or more separate occasions. Besides, positive culture results are not related to an infection at any other body site

Central Line Days - The daily count of the number of patients with a central line under care in various acute care areas during the specified time period. Any patient with multiple central lines for a day, was counted as one for central line day.

Patient Days - The daily count of the number of patients in the hospital during specified time period.

Device Utilization Ratio – The number of central line days divided by the number of patient days was defined as Device Utilization Ratio.

Hand Hygiene Rate: No. of hand hygiene actions/Total number of opportunities X100

CLABSI Rate: Number of CLABSIs / Number of central line days x 1000

RESULTS

The Table [1] depicts hand hygiene. It was observed that in the month of Jun 2017 hand hygiene rate was 34.12% and CLABSI rate was 17.3/1000 central line days. An intensive training and awareness on hand hygiene was carried out in the subsequent days and months. As the hand hygiene compliance improved, CLABSI rate fell down which is evident from the Table [1].

Hand hygiene practices and CLABSI incidence in pre-intervention phase were observed to be practiced on 34% occasions and 17.41 per 1000 central line days (95% CI: 12.94– 22.95) respectively.

The busy schedule (48%), difficult access to hand hygiene facilities (29%), inadequate maintenance of facilities (9%), lack of incentives/punitive action by administrative authorities (8%),non-compliant senior physicians (3%) and lack of awareness (3%) were found to be the major reasons for not adhering to hand hygiene practices by healthcare workers.

Hand hygiene practices were 72% and CLABSI incidence was 2.22 per 1000 central line days (95% CI: 1.03 – 4.22) in post intervention phase. The difference in hand hygiene practices and CLABSI incidence in pre and post intervention phase was observed to be statistically significant (p value < 0.01).

DISCUSSION

The present research presents a broad outlook on the current status of research on CLABSI and relevant interventions. Hand washing is a time tested, evidence based simple step towards quality care and patient safety. The intervention included aggressive training sessions of resident doctors, nurses including trainee nursing students, paramedical staff and housekeepers on hand hygiene steps, five moments of hand hygiene and prevention of HAI through adequate hand hygiene. Hand hygiene is performed by either through hand wash with soap and water or hand rub with 2% Chlorhexidine/ 70% alcohol based preparations.

Laboratory confirmed blood stream infection (LCBI) occurring in the presence of central line with other clinical features like fever, chills, hypotension, leucocytosis, neutropenia & apnoea, bradycardia and hypothermia for infants below one year of age were also included.[3] The presence of these signs and symptoms their frequency is depicted in Graph I. Patients on high frequency ventilation or extracorporeal life support were excluded from the study being a different category of patients.[5]

As evident from our study there is statistically significant difference in the rate of CLABSI whenever improvement in hand hygiene rates occur. It is also clear that low hand hygiene (34.12%) is associated with higher rates of CLABSI (17.3%) hence hand hygiene is an important patient safety measure. Zingg *et al* [6] have also observed that educational teaching programs on hand hygiene and catheter care are evidence based interventions in reducing catheter related blood stream infections.As observed by Semmelweis in 1847 and Trampuz A *et al* in 2004 [7], just washing hands with soap & water is inefficient in preventing pathogen transmission through health care workers' hands. Although, some studies suggest hand

washing as an adequate measure in preventing pathogen transmission but some other studies have revealed use of soap and water fails to remove the risk but can paradoxically increase the bacterial counts on the skin of hands as compared to baseline counts presumably because of contamination by the soap, faucet, or sink [8, 9]. However, in our study no comparison of effectiveness of hand washing with soap and water versus use of hand rubs was conducted. But the alcohol based hand rubs with a frequency of one per bed especially in acute care areas was made available which has also been enumerated by V. Anargh *et al* [10] as one of the reasons for low compliance of HH. To summarise we can state that by strictly adhering to this simple step a significant reduction in rates of hospital acquired infection can be achieved. It will not only improve clientele satisfaction but will also decrease the cost of treatment.

We have also observed that most of the LCBI cases were found to be after seven CL days. However, two patients developed LCBI after 3 & 5 CL days also. Although statistically confirmed in some studies, [11] CL days 1–2 have a lesser infection risk than CL days 14–15. It may be due to biofilm formation by microorganisms with added effect of gaps in infection prevention strategies. Hence, short duration of central line insertion is step in infection prevention.

CONCLUSION

To conclude, our study clearly depicts that by changing the behaviour of HCWs with respect to hand hygiene we can go a long way in infection prevention and patient safety.

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