International Journal of Research and Review
www.ijrrjournal.com E-ISSN: 2349-9788; P-ISSN: 2454-2237

Original Research Article

Impact of NABH Guidelines on Incidence of Hospital Acquired Infections in Intensive Care Unit of a 500 Bedded Tertiary Care Hospital

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ABSTRACT

Introduction: Hospital-acquired infections cause the length of stay in hospital, morbidity, mortality, and increase the cost of treatment. Aim of this study is to find out impact of NABH guidelines on the incident of hospital acquired infections in intensive care unit of a 500 bedded tertiary care hospital.
Method: All the ICU health care workers were trained in NABH guidelines for hospital acquired infections. An initial evaluation and a monthly re-evaluation of infection control care- bundle-practice and its documentation was done by infection control team.
Results: Incident rate of ventilator associated pneumonia reduced from 40 to 5.5, central line associated blood stream infection incident rate reduced from 46 to zero and catheter related urinary tract infection also significantly dropped from 21 to 3.3 after implementation of NABH guidelines.
Conclusion: Implementation of NABH guidelines significantly reduces the incident rate of HAI.

Key words: NABH guidelines, Hospital acquired infection, Ventilator associated pneumonia

INTRODUCTION

Infections are a problem of serious concern in hospitals all over the world. Not only they add to morbidity and mortality, they also add to financial burden on the patients. Further, they put additional strain on the health care resources by prolonging the patients' hospital stay. Thus, main concern is to reduce hospital infections and need to study and evaluate quality as per standard process to effectively implement quality systems in the entire hospital. [1]

From quality point of view, program of hospital infection control is perhaps, the single most important program of action that deserves all out efforts on parts of administrators, clinicians, nurses as well as all other staff. [(1)]

National Accreditation Board for Hospitals & Healthcare Providers (NABH) is a constituent board of Quality Council of India, set up to establish and operate accreditation programme for healthcare organizations. NABH began the NABH-Safe-Ias the standard for improving patient safety by prevention of infection within the premises of healthcare organizations. Under this program, NABH recommends safe injection and infusion practices, biomedical waste management, healthcare workers safety and sterilization and disinfection. [(2)]

Incidence of hospital acquired infections in the intensive care unit (ICU) is about 2 to 5 times higher than in the general in-patient hospital population. [3-4] We conducted this audit to find out the impact of NABH guidelines on incidence of hospital acquired infections in intensive care unit of a 500 bedded tertiary care hospital.

MATERIALS AND METHODS

With an objective of improving the quality health care delivered, our hospital was enrolled for NABH Safe-I programme in month of September, 2017. After implementation of NABH safe-I program in the hospital, data was collected for 12 months from Nov 2017 to Oct 2018. As this study was considered as audit under quality assurance project, it didn't require approval of the hospital ethics committee. NABH representative trained all the health care workers in infection control practice and guidelines. Compliance of Infection control and care bundles practice by the health care workers were monitored and documented during the infection control team daily surveillance rounds. ICU in-charge nurses were entrusted the duty of completing the data required in the HAI register. Total number of ventilated days, central line days, urinary catheter days, and number of intravenous cannula inserted in one month were calculated. Number of ventilator associated pneumonia (VAP), central line associated blood stream infection (CLABSI), thrombophlebitis and Catheter related urinary tract infections (CAUTI), and bedsore/ pressure sore were documented in the HAI register. Number of needle stick injuries was collected in a separate register as per the NABH protocol. Every month infection control nurse collected the data from the HAI register for analysis and auditing. Data was discussed in the monthly infection control meeting to implement changes if needed before sending it to NABH central office. Following formulae were used:

$$\text{VAP rate/month} = \frac{\text{No of cases of ventilator associated Pneumonia}}{\text{No of ventilator days in a month}} \times 1000$$

$$\text{CLABSI rate/month} = \frac{\text{No of cases of CLABSI}}{\text{No of central line days in a month}} \times 1000$$

$$\text{CAUTI rate/month} = \frac{\text{No of cases of CAUTI}}{\text{No of Urinary catheter days in a month}} \times 1000$$

$$\text{Thrombophlebitis/month} = \frac{\text{No of phlebitis}}{\text{Total no of peripheral cannulation}} \times 100$$

$$\text{Pressure ulcer} = \frac{\text{No of patient developed pressure ulcer}}{\text{No of inpatient days in a month}} \times 1000$$

$$\text{Needle stick injury} = \frac{\text{No of needle stick injury}}{\text{No of peripheral cannulation in a month}} \times 1000$$

RESULTS

After implementation of NABH safe-I program in the hospital, data was collected for 12 month from Nov 2017 to Oct 2018(Table-I). In the month of Nov 2017, total ventilated days were 125 and 5 patients (incident rate 40) developed VAP (Table 1, & 2, Fig-1). Three months after implementation of infection control practices that's in the month of Feb 2018 out of 131 ventilated day's only one patient (incident rate 8)) developed VAP. Since then no of patients who developed VAP was continuously showing decreasing trends despite increase in total ventilatory days (Table-1& 2).

During same period, central line associated blood stream infection fell from 4 for 87 central line days (incident rate 46) to 1 for 64 central line days(incident rate 16). None of the patient had CLBSI in the month of May, June, Sept and Oct, 2018(Table-1& 2, Fig-2)

In our audit, there was significant drop in the urinary catheter associated infection from 5 for 239 urinary catheter days (incident rate 21) to none in the month of

July from 326 catheter days.(Table-1 &2, Fig-3)

Thrombophlebitis is a measure of prevention taken during peripheral line cannulation. In the month of Nov 2017, there were 25 cases of thrombophlebitis (20%) for 125 cannulation performed. This dropped significantly to 4 for 125 cannulation (3.2%) in the month of July and thereafter. (Table 1)

Similarly occurrence of Needle stick injury dropped from one to none and bed sore dropped from three to nil after implementation of NABH safe program (Table-1& 2, Fig-4)

Table-I: HAI data

	Data/Month	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
1	Ventilator days	125	191	144	131	203	181	129	131	211	181	186	185
2	VAP	5	7	4	1	2	2	1	1	2	1	1	1
3	Central line days	87	108	77	64	82	55	36	73	63	77	64	66
4	CLABSI	4	5	3	1	1	1	0	0	1	1	0	0
5	Urinary catheter days	239	244	293	217	296	263	292	298	326	292	302	324
6	UTI	5	4	4	4	3	2	1	1	0	0	0	0
7	Peripheral IV Cannulation	125	143	137	121	141	132	137	142	125	119	134	123
8	Thrombophlebitis	25	22	15	11	12	10	11	9	4	3	4	3
10	NSI	1	0	1	0	0	0	0	0	0	0	0	0
11	Pressure ulcer	2	3	1	0	1	0	0	0	0	0	0	0

VAP (Ventilator associated Pneumonia); CLABSI (Central line associated blood stream infection); UTI (Urinary catheter associated infection); NSI (Needle stick Injury)

Table-2: Incident rate

Month	VAP	CLABSI	CAUTI	Bed sore	NSI
Nov 2017	40	46	21	1.1	8
Dec 2017	37	46	16	2	0
Jan 2018	27	39	14	0.5	7
Feb 2018	8	16	18	0	0
Mar 2018	10	18	10	0	0
Apr 2018	11	0	8	0	0
May 2018	8	0	3	0	0
Jun 2018	8	16	3	0	0
Jul 2018	9	13	0	0	0
Aug 2018	5.5	0	0	0	0
Sept 2018	5	0	0	0	0
Oct 2018	5.5	0	0	0	0

VAP (Ventilator associated Pneumonia); CLABSI (Central line associated blood stream infection); UTI (Urinary catheter associated infection); NSI (Needle stick Injury)

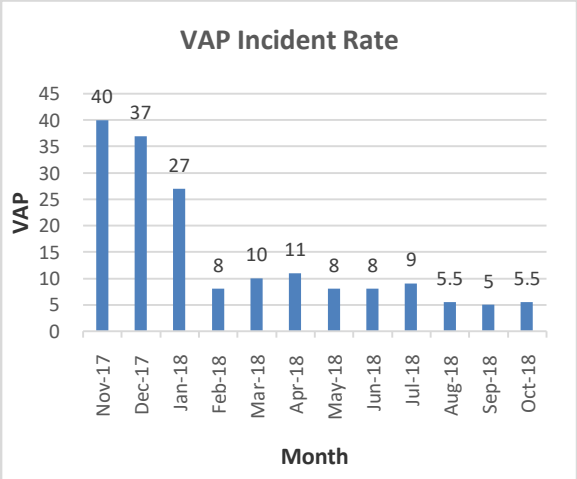

Fig-1: Ventilator Associated Pneumonia rate

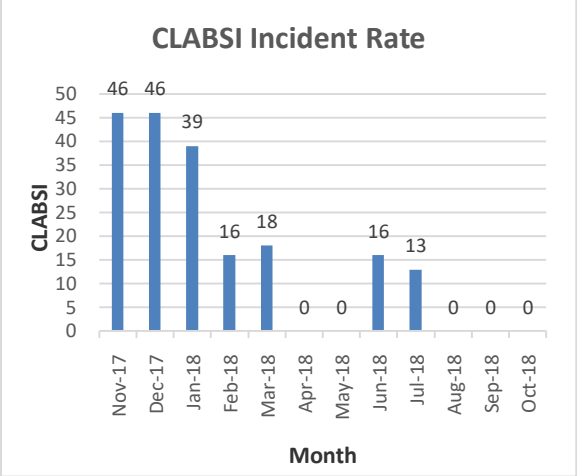

Fig: 2: Central line associated blood stream Infection rate

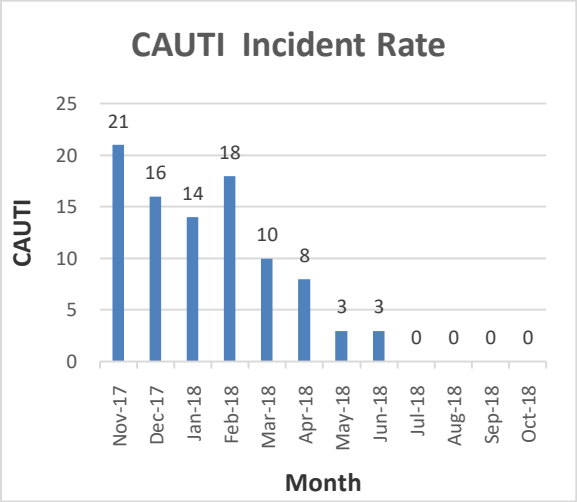

Fig: 3: Catheter Associated Urinary Tract Infection

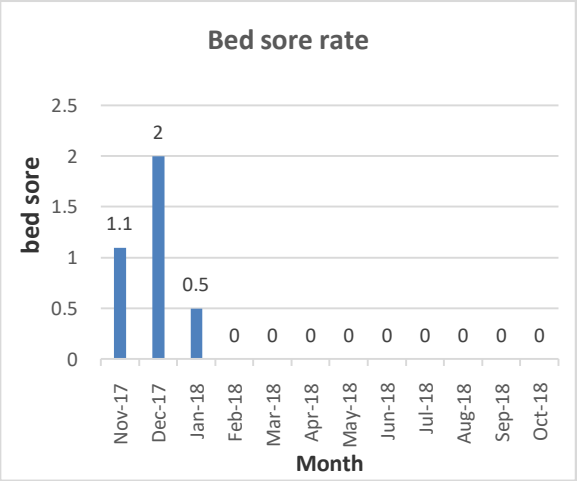

Fig: 4: Bed Sore rate

DISCUSSION

Hospital acquired infection is a term used for the infections developing 48 hours or more after hospitalization, in the first 10 days after discharge, or in the first 30 days after operation. [5] The incidence of HAI is particularly high in intensive care units (ICUs) compared to non-ICU wards in the hospital as ICU patients have a range of severe comorbidities and the use of invasive devices during their management is very common. [6]

Delivery of quality care in the hospital demands universally accepted, evidence based, easy to follow robust system. With an effective program for nosocomial infection surveillance, infection rates can be reduced by approximately one-third. [7] This study was conducted to see impact of NABH guidelines on incidence of hospital acquired infection. NABH Safe-I program was implemented in the organization in the month Nov. 2017. NABH safe-I program has a well-defined tool-kit on infection control which was mainly focussed on six parameters like safe injection and infusion practices, biomedical waste management, healthcare workers safety and sterilization and disinfection. Precaution to be taken during various interventions is standardized by NABH as care bundles. For example VAP, UTI, CLRBI care bundles. NABH consultant trained all the health care workers on these care bundles which was essential during management of ventilator associated pneumonia, CVP line insertion, peripheral venous cannulation, surgical wound care and back care. Compliance of Infection control practices and care bundles practice by the health care workers were monitored and documented during the infection control team daily surveillance rounds.

Incident rate of VAP was significantly reduced in our study after implementation of Safe I program from 5 per 125 ventilator days (incident rate 40) to 1 per 181 (incident rate 8) ventilatory days (table 1& 2, Fig-1). Similarly, catheter related blood stream infection and urinary catheter related urinary tract infection was also significantly reduced despite increased in increase in urinary catheter days. Our finding also corroborate with results of Kadur et al who reported significant reduction in the VAP, CABSI and CAUTI rate after implementation of NABH safe –I program. [4]

CONCLUSION

Reduction in the incidence of HAIs could be directly attributed to implementation and practice of NABH guidelines. Evidence based, structured, streamlined, systematic guidelines provided by NABH are tailor made for different tier of hospitals for the provision of best quality care and prevent infections.

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How to cite this article: Sharma SD, Kumar R, Popli V. Impact of NABH guidelines on incidence of hospital acquired infections in intensive care unit of a 500 bedded tertiary care hospital. International Journal of Research and Review. 2018; 5(12):337-341.

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