



## Impact of an International Nosocomial Infection Control Consortium multidimensional approach on central line-associated bloodstream infection rates in adult intensive care units in eight cities in India



Namita Jaggi<sup>a</sup>, Camilla Rodrigues<sup>b</sup>, Victor Daniel Rosenthal<sup>c,\*</sup>, Subhash Kumar Todi<sup>d</sup>, Sweta Shah<sup>e</sup>, Narinder Saini<sup>f</sup>, Arpita Dwivedy<sup>g</sup>, F.E. Udwardia<sup>h</sup>, Preeti Mehta<sup>i</sup>, Murali Chakravarthy<sup>j</sup>, Sanjeev Singh<sup>k</sup>, Samir Sahu<sup>l</sup>, Deepak Govil<sup>k</sup>, Ashit Hegd<sup>b</sup>, Farahad Kapadia<sup>b</sup>, Arpita Bhakta<sup>d</sup>, Mahuya Bhattacharyya<sup>d</sup>, Tanu Singhal<sup>e</sup>, Reshma Naik<sup>e</sup>, Vatsal Kothari<sup>e</sup>, Amit Gupta<sup>f</sup>, Suvin Shetty<sup>g</sup>, Sheena Binu<sup>g</sup>, Preethi Pinto<sup>g</sup>, Aruna Poojary<sup>h</sup>, Geeta Koppikar<sup>h</sup>, Lata Bhandarkar<sup>h</sup>, Shital Jadhav<sup>h</sup>, Neeraj Chavan<sup>h</sup>, Shweta Bahirune<sup>h</sup>, Shilpa Durgad<sup>h</sup>, Gita Nataraj<sup>i</sup>, Pallavi Surase<sup>i</sup>, B.N. Gokul<sup>j</sup>, R. Sukanya<sup>j</sup>, Leema Pushparaj<sup>j</sup>, Kavitha Radhakrishnan<sup>k</sup>

<sup>a</sup> Artemis Health Institute, New Delhi, India

<sup>b</sup> PD Hinduja National Hospital & Medical Research Centre, Mumbai, India

<sup>c</sup> International Nosocomial Infection Control Consortium, Corrientes Ave #4580, Floor 12, Apt D, Buenos Aires, 1195, Argentina

<sup>d</sup> AMRI Hospitals, Kolkata, India

<sup>e</sup> Kokilaben Dhirubhai Ambani Hospital, Mumbai, India

<sup>f</sup> Pushpanjali Crosslay Hospital, Ghaziabad, India

<sup>g</sup> Dr L.H. Hiranandani Hospital, Mumbai, India

<sup>h</sup> Breach Candy Hospital Trust, Mumbai, India

<sup>i</sup> Seth GS Medical College, Mumbai, India

<sup>j</sup> Fortis Hospitals, Bangalore, India

<sup>k</sup> Amrita Institute of Medical Sciences & Research Center, Kochi, India

<sup>l</sup> Kalinga Hospital, Bhubaneswar, India

### ARTICLE INFO

#### Article history:

Received 18 March 2013

Received in revised form 14 June 2013

Accepted 11 July 2013

**Corresponding Editor:** Eskild Petersen, Aarhus, Denmark

#### Keywords:

Catheter-related infections

Bundle

International Nosocomial Infection Control Consortium

Multidimensional approach

Hand hygiene

Developing countries

### SUMMARY

**Objective:** To evaluate the impact of the International Nosocomial Infection Control Consortium (INICC) multidimensional infection control approach on central line-associated bloodstream infection (CLABSI) rates in eight cities of India.

**Methods:** This was a prospective, before-and-after cohort study of 35 650 patients hospitalized in 16 adult intensive care units of 11 hospitals. During the baseline period, outcome surveillance of CLABSI was performed, applying the definitions of the CDC/NHSN (US Centers for Disease Control and Prevention/National Healthcare Safety Network). During the intervention, the INICC approach was implemented, which included a bundle of interventions, education, outcome surveillance, process surveillance, feedback on CLABSI rates and consequences, and performance feedback. Random effects Poisson regression was used for clustering of CLABSI rates across time periods.

**Results:** During the baseline period, 9472 central line (CL)-days and 61 CLABSIs were recorded; during the intervention period, 80 898 CL-days and 404 CLABSIs were recorded. The baseline rate was 6.4 CLABSIs per 1000 CL-days, which was reduced to 3.9 CLABSIs per 1000 CL-days in the second year and maintained for 36 months of follow-up, accounting for a 53% CLABSI rate reduction (incidence rate ratio 0.47, 95% confidence interval 0.31–0.70;  $p = 0.0001$ ).

**Conclusions:** Implementing the six components of the INICC approach simultaneously was associated with a significant reduction in the CLABSI rate in India, which remained stable during 36 months of follow-up.

© 2013 International Society for Infectious Diseases. Published by Elsevier Ltd. All rights reserved.

\* Corresponding author. Tel./fax: +54 11 4861 5826.

E-mail address: [victor\\_rosenthal@inicc.org](mailto:victor_rosenthal@inicc.org) (V.D. Rosenthal).

URL: <http://www.inicc.org>

## 1. Introduction

Central line-associated bloodstream infections (CLABSIs) are responsible for increased lengths of hospital stay and increased attributable mortality in high-income countries<sup>1</sup> and in limited-resource countries,<sup>2</sup> including India.<sup>3</sup> CLABSIs are also responsible for increased health care costs, as reported in studies from high-income countries<sup>1</sup> and from some limited-resource countries in Latin America;<sup>2,4</sup> however, no data on costs of CLABSIs are available from India.

The incidence of CLABSI is many times underestimated in limited-resource countries, as basic infection control programs are not systematically implemented.<sup>5</sup> Device-associated healthcare-acquired infection (DA-HAI) rates in the intensive care units (ICUs) of limited-resource countries are three to five times higher than in high-income countries, as reported by the International Nosocomial Infection Control Consortium (INICC) in pooled studies,<sup>5</sup> and particularly in India.<sup>3</sup>

In developing countries, the socioeconomic level of the country has an impact on DA-HAI rates in the pediatric<sup>6</sup> and neonatal<sup>7</sup> ICU settings. However, far too little attention has been paid to this, as only two studies addressing this issue have been published. The results of one of the studies showed that lower-middle-income countries had higher CLABSI rates than upper-middle-income countries in pediatric ICUs (12.2 vs. 5.5 per 1000 central line (CL)-days).<sup>6</sup> Similarly, in the other study, CLABSI rates were significantly higher in neonatal ICU patients from low-income countries than in those from lower-middle-income countries or upper-middle-income countries (37.0 vs. 11.9 ( $p < 0.02$ ), and vs. 17.6 ( $p < 0.05$ ) CLABSIs per 1000 catheter-days, respectively).<sup>7</sup> Unfortunately, no studies from developing countries that have analyzed this issue in adult ICUs (AICUs) are available.

In developed countries, it has been demonstrated that surveillance is fundamental to the prevention of CLABSIs, which can be reduced by more than 30%.<sup>8</sup> Implementing infection control bundles, including the five interventions (1) hand hygiene, (2) skin antisepsis with chlorhexidine, (3) maximal barriers, (4) insertion into the subclavian vein, and (5) timely CL removal, has been associated with a reduction in the incidence density of CLABSI in developed countries.<sup>9</sup>

The present study was designed to determine the effect of a multidimensional program for CLABSI prevention in 16 AICUs of 11 hospitals, in eight cities of India. Our program was implemented from September 2004 to February 2012 and included six simultaneous interventions: (1) practice bundle, (2) education, (3) outcome surveillance, (4) process surveillance, (5) feedback of CLABSI rates, and (6) performance feedback on infection control practices. The design of the INICC multidimensional approach follows the basic recommendations published in the guidelines of the Society for Health Care Epidemiology of

America (SHEA) and the Infectious Diseases Society of America (IDSA) in 2008.<sup>10</sup>

So far there has been no systematic research on the effect of such an approach in India, the second most populous country in the world, with a population of around 1 300 000 000 people. This provided sufficient ethical and theoretical justification for conducting this particular study, and through its publication, increase and spread awareness of this public health burden in India.<sup>11</sup>

## 2. Methods

### 2.1. Background on INICC

Founded in Argentina in 1998, the INICC was the first multinational research network established to control and reduce HAIs at the international level through the analysis of data collected on a voluntary basis by a pool of hospitals worldwide.<sup>12</sup> The goals of the INICC include the development of a dynamic global hospital network that applies systematic surveillance of HAIs with standardized definitions and methodologies, the promotion of evidence-based infection control practices, and the performance of applied infection control research to reduce rates of HAIs, the associated mortality, excess lengths of hospital stay, costs, and bacterial resistance.<sup>13</sup>

### 2.2. Setting and study design

The study was conducted in 16 AICUs in 11 hospitals, all members of the INICC, in eight cities of India. Each hospital had been actively participating in the INICC surveillance program for a minimum of 6 months, with an infection control team (ICT) comprised of infection control professionals (ICPs) and a medical doctor with a formal education and background in internal medicine, critical care, infectious diseases, and/or hospital epidemiology.

This prospective, before-and-after study was performed over two time-periods: the baseline period and the intervention period. The institutional review board at each hospital approved the study protocol (Figure 1).

### 2.3. Baseline period

The baseline period included only the performance of outcome surveillance and process surveillance. The length of the baseline period was 3 months for the following three reasons: (1) This is the time needed to conduct the following activities at INICC headquarters in Argentina on a monthly basis: receiving those case report forms (CRF) completed at all participating ICUs from India; conducting a validation process of filled CRFs; sending

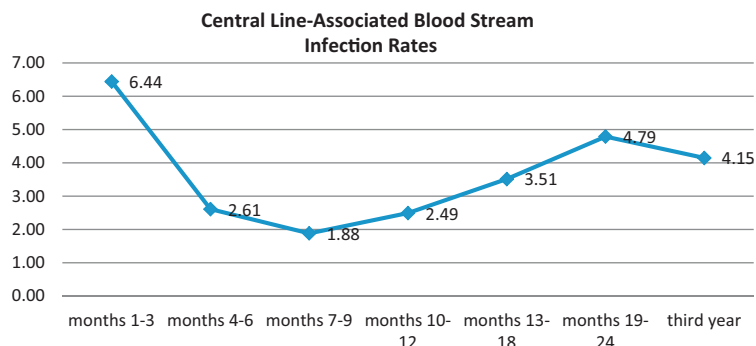


Figure 1. Central line-associated blood stream infection rates by period.

Download English Version:

<https://daneshyari.com/en/article/6118632>

Download Persian Version:

<https://daneshyari.com/article/6118632>

[Daneshyari.com](https://daneshyari.com)