



Stepwise introduction of the ‘Best Care Always’ central-line-associated bloodstream infection prevention bundle in a network of South African hospitals

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SUMMARY

Background: Healthcare-associated infection (HCAI) remains a major international problem.

Aim: The ‘Best Care Always!’ (BCA) campaign was launched in South Africa to reduce preventable HCAI, including central-line-associated bloodstream infection (CLABSI).

Methods: The intervention took place in 43 Netcare Private Hospitals, increasing later to 49 with 958 intensive care units (ICUs) and 439 high-care (HC) beds and 1207 ICUs and 493 HC beds, respectively. Phase 1, April 2010 to March 2011, ICU infection prevention and control (IPC) nurse-driven change: commitment from management and doctors and training of IPC nurses. Bundle compliance and infections per 1000 central-line-days were incorporated as standard IPC measures and captured monthly. Phase 2, April 2011 to March 2012, breakthrough collaborative method: multiple regional learning sessions for nursing leaders, IPC nurses and unit managers. Phase 3, April 2012 to May 2016: sustained goal-setting, benchmarks, ongoing audits.

Findings: A total of 1,119,558 central-line-days were recorded. Bundle compliance improved significantly from a mean of 73.1% [standard deviation (SD): 11.2; range: 40.6–81.7%] in Phase 1 to a mean of 90.5% (SD: 4.7; range: 76.5–97.2%) in Phase 3 ($P = 0.0004$). The CLABSI rate declined significantly from a mean of 3.55 (SD: 0.82; range: 2.54–5.78) per 1000 central-line-days in Phase 1 to a mean of 0.13 (SD: 0.09; range: 0–0.33) ($P < 0.0001$).

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Conclusion: This intervention, the first of its kind in South Africa, through considerable motivation and education, and through competition between hospitals resulted in significant decreases in CLABSI.

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Introduction

Infection prevention has been identified as a priority by the South African National Department of Health, particularly in the intensive care unit (ICU) where healthcare-associated infections (HCAIs) in developing countries are up to triple that of the USA [1]. One of the most prevalent are central-line-associated bloodstream infections (CLABSI) which are an avoidable complication of venous access, to the extent that in the USA these infections are no longer reimbursed by the Centers for Medicare and Medicaid Services [2,3].

In general, insufficient care is taken with asepsis at insertion, and/or with care of the insertion site and with administration of medications and nutrition, increasing potential for CLABSI, antibiotic exposure, length of stay, healthcare costs, and mortality [4,5]. Risk factors associated with CLABSI include duration of catheterization, location of the catheter, use of parenteral nutrition and multi-lumen catheters, experience of healthcare personnel, inadequate barrier precautions, type of dressings, care after insertion, and the presence of systemic sepsis or central venous catheter (CVC)-related thrombi [6–8].

Therefore, care bundles have been developed that address many of these factors. These have, however, been associated with variable success, perhaps because efficacy appears to be related to overall compliance with each element of the bundle, and this is not always audited and monitored [9,10].

In general, CLABSI rates vary among institutions and within units in the hospital as described recently, where, after implementation of bundles, CLABSI incidence still varied considerably although infections did decrease from a median of 6.4 (interquartile range: 3.8–10.9) to 2.5 episodes per 1000 catheter-days (1.4–4.8) [9].

Successful implementation of any bundle requires that measures be embedded, recorded, evaluated, and followed to ensure compliance by all participants and recognition that by reducing sepsis, patient safety is improved and antibiotic consumption reduced [11].

The 'Best Care Always!' (BCA) campaign was launched in South Africa in August 2009 with the aim of reducing the most frequent preventable HCAI as far as possible [11]. This initiative was voluntary and driven by a small committee of individual health professionals. Thereafter frontline health professionals were recruited from the private and subsequently the public sector. The BCA campaign was endorsed by private hospital groups as well as by the National Department of Health. The process involved implementation of quality improvement methodology and one or more of the infection bundles as published by the USA Institute of Healthcare Improvement (IHI) '100,000 lives' and the Canadian 'Safer Healthcare Now' campaigns [12,13]. All materials for implementation were freely available on the BCA website which was funded by Discovery Health, a South African Healthcare funder (<http://www.bestcare.org.za>). Private hospital groups (including Netcare) implemented these bundles using internal

resources as part of their annual quality improvement and nursing budget, and in individual hospital budgets in terms of time allocated for training and implementation. In the public sector, the BCA committee of professionals supported formal learning sessions for some provincial hospital initiatives.

This article describes the implementation and impact of a bundle to reduce CLABSI in the Netcare group of private hospitals in South Africa.

Methods

This study took place over the period from April 2010 to May 2016. Certain process measures that have previously been associated with a reduction in CLABSI were identified and introduced in a stepwise fashion to the Netcare group of hospitals over this period [14]. A CLABSI was defined as a primary bloodstream infection occurring in a patient with a central line *in situ*; or where infection occurred within 48 h of the removal of the line and no other source of the bloodstream infection was identified.

The staged implementation of the intervention occurred over 74 months and the results were retrospectively recorded and linked to the interventions used. Bundles were selected from the IHI and Canadian 'Safer Healthcare Now' campaigns as described above.

Ethics approval was obtained from Pharma Ethics; Registration number: 161115386.

Introduction of the CLABSI bundle

Phase 1: April 2010 to March 2011. Infection prevention and control (IPC) officer-driven change

The process was initiated following commitment from hospital management and doctors to the principles espoused by BCA as detailed on the BCA website (www.bestcare.org.za). Thereafter training and guidelines were provided to dedicated IPC nurses at each hospital by the National IPC Manager for Netcare hospitals who also served on the BCA infection prevention working group. All Netcare hospitals were required to implement the CLABSI bundle in at least one unit and to expand implementation over time. No additional staff were employed at hospital level. The intervention was actively supported by Netcare leadership and a National IPC manager and IPC Specialist nurse who were in overall management of the BCA initiatives.

This specific intervention did require additional time allocation, initially by the IPC staff, but it was then incorporated into the daily nursing care programme. Ongoing monitoring was also integrated into the hospital IPC nurses' roles and responsibility.

The initial interventions were focused on familiarizing ICU unit managers and staff with the measurement of central-line-days and bundle implementation through training sessions, use of BCA posters in ICU wards, and implementation of a central-

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