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Original Research

Impact of the International Nosocomial Infection Control Consortium (INICC) Multidimensional Hand Hygiene Approach in five intensive care units in three cities of China

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ABSTRACT

Objectives: To evaluate the impact of the International Nosocomial Infection Control Consortium (INICC) Multidimensional Hand Hygiene (HH) Approach in three hospitals in three cities of China, and analyze predictors of poor hand hygiene compliance.

Study design: A prospective before-after study from May 2009 to December 2010 in five intensive care units members of the INICC in China.

Methods: The study was divided into two periods: a 3-month baseline period and a follow-up period. A Multidimensional HH Approach was implemented, which included the following elements: 1- administrative support, 2- supplies availability, 3- education and training, 4- reminders in the workplace, 5- process surveillance and 6- performance feedback. Observations were done for HH compliance in each ICU, during randomly selected 30-min periods.

Results: A total of 2079 opportunities for HH were recorded. Overall HH compliance increased from 51.5% to 80.1% (95% CI 73.2–87.8; P = 0.004). Multivariate analysis indicated that several variables were significantly associated with poor HH compliance: females vs males (64% vs 55%; 95% CI 0.81–0.94; P = 0.0005), nurses vs physicians (64% vs 57%, P = 0.004), among others.

Conclusions: Adherence to HH was increased significantly with the INICC multidimensional approach. Specific programs directed to improve HH in variables found to be predictors of poor HH compliance should be implemented.

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Introduction

The effectiveness of hand hygiene (HH) before patient contact to prevent cross infection was demonstrated back in the XIX Century.[1] Since then, in the scientific literature it has been widely confirmed that improved HH practice reduces health care-associated infection (HAI) rates.[2–4]

HAIs pose a serious threat to patient safety, causing patient mortality and morbidity.[5] Traditionally, most studies of HAIs were from developed countries,[6–10] and in limited-resource countries; this problem had not been systematically addressed until the International Nosocomial Infection Control Consortium (INICC) started analyzing and publishing HAI rates using standardized definitions and methods.[11–15]

In a recent study by Huang Y et al. conducted at a Chinese teaching hospital, it was reported that, due to deficiencies in learning resources and curricula, there is limited knowledge and practice between Chinese medical students regarding HAIs.[16] In particular, the importance of proper HH procedure to prevent HAI was significantly underestimated, with only 52.9% of the students considering it as the most important preventive measure for infection control.[16] Additionally, it was reported that 58.5% of students did not wash their hands between two different procedures on the same patient, and 78.3% did not follow HH practices before and after touching wounds when they used gloves.[16] The authors thus recommended that surveillance and monitoring of practicing health care workers (HCWs) were a priority for effective infection prevention.[16]

Successful interventions to improve HH have been reported from high-income countries[7–10,17–19] and limited-resource countries.[3,20–27] From the eighties, investigators have analyzed the effectiveness of interventions to improve HH.[8–10,17–19] In 1997, Larson et al. explicitly referred to a multidimensional approach that considered several interventions in a study conducted in the US.[10] Likewise, Rosenthal et al. have implemented programs in Argentina since 1993 combining administrative support, supplies availability, education and training, process surveillance and performance feedback, which produced a sustained improvement in HH compliance,[22] with a reduction in HAI rates.[3] In 2002, the US Centres for Disease Control and Prevention (CDC) published their HH guideline.[28] In 2005, the World Health Organization (WHO) launched the program 'Clean Care is Safer Care' to promote HH worldwide,[29] and four years later, in 2009, the WHO published its guidelines including a combination of previously published data, and a new formulation for alcohol hand rub (AHR) products, among several other recommendations.[4]

Adherence to an appropriate hand hygiene method was described as a critical health problem that remains unsolved among the Chinese adult population.[30] There are no previous publications showing HH compliance by HCWs in hospitals from China. The purpose of this INICC study was to establish the baseline HH compliance rate by HCWs before patient contact, analyze risk factors for poor adherence, and implement and evaluate the impact of an INICC Multidimensional HH Approach (IMHHA) in five intensive care units (ICUs), of three hospitals, of three cities of China, which includes the following elements: (1) Administrative support, (2) Supplies availability, (3) Education and training, (4) Reminders in the workplace (5) Process surveillance and (6) Performance feedback. The resources on the ICU setting is focused, a patient care area with the highest HAI rates.[31] The ICU was the priority, therefore, because critically ill patients hospitalized in ICUs are the most susceptible to acquiring severe and life-threatening HAIs.[31]

Methods

Background on INICC

The INICC is an international, non-profit, open, multicentric HAI surveillance network with a methodology based on the U.S. CDC/National Healthcare Safety Network (NHSN).[32] INICC is the first research network established to measure and control HAIs worldwide in hospitals through the analysis of standardized data collected on a voluntary basis by its member hospitals. Gaining new members since its international inception in 2002, INICC comprises a network of nearly 1000 hospitals in 200 cities of 50 countries in Latin America, Asia, Africa, Middle East, and Europe, and has become the only source of aggregate standardized international data on the epidemiology of HAI internationally.[15]

Study setting

This study was conducted in five intensive care units of three hospitals of three cities of China, which were successively incorporated into the study over a period of 2 years. The types of ICUs participating in this study were one medical surgical, one neurosurgical, one respiratory and two surgical ICUs.

Each hospital has an infection control team (ICT) comprised of at least one infection control practitioner (ICP) and one physician. The ICP is the HCW in charge of process surveillance in the ICU, who has at least two years of infection control experience.

Professional categories of HCWs included nurses, physicians, and ancillary staff (including paramedical technicians, nurse aides, laboratory team members, radiology team members, physiotherapists, patient care technicians, paramedical personnel and patient lift teams).

The study protocol was approved by the institutional review boards at each hospital.

Study design

A prospective, before-after multicentric study was conducted from May 2009 to December 2010. The study was divided into two periods: a baseline and a follow-up period. The baseline period for HH compliance included episodes documented at each hospital during their first 3 months of participation, and the follow-up period included episodes following the fourth month of participation. Each ICU has a different length of follow-up period, because they started to participate in the study at different times; but for all ICUs the length of the baseline period is exactly the same (3 months). For the comparison of compliance rates, the ICUs were aligned for the

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