Multi-state survey of healthcare-associated infections in acute care hospitals in Brazil[☆]

C. Magno Castelo Branco Fortaleza [a,*], M.C. Padoveze [b], C.R. Veiga Kiffer [c], A.L. Barth [d], Irna C. do Rosário Souza Carneiro [e], H.I. Garcia Giamberardino [f], J.L. Nobre Rodrigues [g], L. Santos Filho [h], M.J. Gonçalves de Mello [i], M. Severino Pereira [j], P. Pinto Gontijo Filho [k], M. Rocha [l], E.A. Servolo de Medeiros [c], A.C. Campos Pignatari [c]

[a] Faculdade de Medicina de Botucatu, Botucatu, São Paulo State, Brazil
[b] Escola de Enfermagem (School of Nursing), Universidade de São Paulo (USP), City of São Paulo, São Paulo State, Brazil
[c] Escola Paulista de Medicina (São Paulo School of Medicine), Universidade Federal de São Paulo (UNIFESP), City of São Paulo, São Paulo State, Brazil
[d] Universidade Federal do Rio Grande do Sul (UFRGS), City of Porto Alegre, State of Rio Grande do Sul, Brazil
[e] Universidade Federal do Pará (UFPA), City of Belém, Pará State, Brazil
[f] Hospital Pequeno Príncipe (HPP), City of Curitiba, State of Paraná, Brazil
[g] Universidade Federal do Ceará, City of Fortaleza, State of Ceará, Brazil
[h] Universidade Federal da Paraíba (UFPB), City of João Pessoa, State of Paraíba, Brazil
[i] Instituto Medicina Integral Prof. Fernando Figueira (IMIP), City of Recife, State of Pernambuco, Brazil
[j] Pontifícia Universidade Católica (PUC) — Goiás, City of Goiânia, State of Goiás, Brazil
[k] Universidade Federal de Uberlândia (UFU), City of Uberlândia, State of Minas Gerais, Brazil
[l] Fundação Instituto Oswaldo Cruz (FiOCruz), City of Rio de Janeiro, Rio de Janeiro State, Brazil

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SUMMARY

Background: Healthcare-associated infections (HCAIs) challenge public health in developing countries such as Brazil, which harbour social inequalities and variations in the complexity of healthcare and regional development.
Aim: To describe the prevalence of HCAIs in hospitals in a sample of hospitals in Brazil.
Methods: A prevalence survey conducted in 2011—13 enrolled 152 hospitals from the five macro-regions in Brazil. Hospitals were classified as large (≥200 beds), medium (50—199 beds) or small sized (<50 beds). Settings were randomly selected from a governmental database, except for 11 reference university hospitals. All patients with >48 h of admission to the study hospitals at the time of the survey were included. Trained epidemiologist nurses visited each hospital and collected data on HCAIs, subjects' demographics, and invasive procedures. Univariate and multivariate techniques were used for data analysis.
Findings: The overall HCAI prevalence was 10.8%. Most frequent infection sites were pneumonia (3.6%) and bloodstream infections (2.8%). Surgical site infections were found in

1.5% of the whole sample, but in 9.8% of subjects who underwent surgical procedures. The overall prevalence was greater for reference (12.6%) and large hospitals (13.5%), whereas medium- and small-sized hospitals presented rates of 7.7% and 5.5%, respectively. Only minor differences were noticed among hospitals from different macro-regions. Patients in intensive care units, using invasive devices or at extremes of age were at greater risk for HCAIs.

Conclusion: Prevalence rates were high in all geographic regions and hospital sizes. HCAIs must be a priority in the public health agenda of developing countries.

Introduction

There is compelling evidence that the burden of healthcare-associated infections (HCAIs) is greater in developing countries [1,2]. However, a recent systematic review pointed out that the quality of data from those settings is often poor [2]. One could add to this scenario the scarcity of national surveillance systems and of comprehensive prevalence surveys conducted in poor and middle-income countries [3].

In previous decades, prevalence surveys have been carried out in several countries, with the objective of providing a 'snapshot' picture of HCAIs in an extensive area [4—6]. Their main advantage over prospective surveillance systems lies in the possibility of accurate and comprehensive collection of data. It is even possible to employ trained teams for active data collection, thus avoiding heterogeneity in the accuracy of local surveillance. Therefore, prevalence surveys may provide information that is consistent and reliable [7].

In Brazil, the only previous multi-state prevalence survey was conducted in the early 1990s by Prade *et al*. and included 99 tertiary-care hospitals [8]. Those authors found the overall prevalence of HCAIs to be 15.5%. In spite of the importance of these findings, that survey did not assess the burden of HCAIs in middle or small-sized hospitals. It is worth noting that most hospitals in Brazil have <50 beds [9]. Even though those hospitals care for less complex diseases, they perform many surgical and obstetric procedures [10]. Since those procedures pose infection risks, small hospitals must be addressed in infection control surveillance and policies.

In this study, we describe the results of a prevalence survey conducted throughout 18 months during 2011—13, enrolling hospitals with different sizes from 10 states located in the five macro-regions in Brazil. The study grew out of a project aimed at identifying the burden of HCAIs and the resources for infection control in Brazilian hospitals (Project 'IRAS-Brasil').

Methods

Study design and settings

A prevalence survey was conducted from November 2011 through April 2013 (an 18-month period), enrolling a sample of hospitals from 10 states in Brazil. There was an attempt to include states from the five Brazilian macro-regions: North, one state (Pará); Northeast, three (Ceará, Paraiba, and Pernambuco); Midwest, one (Goiás); Southeast, three (Minas Gerais, Rio de Janeiro, and São Paulo); South, two (Paraná and Rio Grande do Sul).

Eleven 'reference hospitals' (two in São Paulo and one in each of the above 10 states) were enrolled and co-ordinated the study in each state. A further 141 acute care hospitals were randomly selected from the national registry of health-care settings [Cadastro Nacional de Estabelecimentos de Saúde (CNES), http://cnes.datasus.gov.br]. The total number of hospitals from the study states recorded in that database was 4176. The study enrolled public, private, and non-profit hospitals.

The selection of hospitals was based on the proportionality among states and size categories. Hospitals were classified as large (≥200 beds), medium (50—199 beds) or small (<50 beds). Briefly, a database containing every hospital in the study states was generated. The sample for each state was calculated according to its representativeness in the total number of hospitals, and stratification within that sample was performed according to the proportionality of size categories (large, medium or small hospitals) in that state. The participation of hospitals in the study was voluntary. Whenever a hospital declined to participate, another hospital from the same state and size category was randomly selected and included in the study.

Data collection and definitions

Data were collected by a team of nurses with experience in infection control and surveillance of HCAIs. That team was constituted uniquely for the purpose of this research and did not include local infection control professionals from study hospitals. All these nurses were submitted to additional training on surveillance definitions and methods, as well as to supervision by the study co-ordination, regarding operational procedures and results. A written guideline with strict procedures for data collection was developed.

The survey was performed in visits to each hospital on Tuesdays, Wednesdays, and Thursdays, in order to avoid bias due to concentration of severe cases near weekends [11]. Visits and data collection in individual hospitals took from one to nine days, according to hospital size and complexity. The study was strictly observational, and no intervention for infection control (e.g. education, provision of resources) was performed by the research team in the hospitals before or during the survey.

Data were obtained from patients' charts, laboratory files, and — when necessary — through direct examination of the patient. All patients who were admitted for two days before the visit were included in the study. The collected data comprised demographics, comorbidities, procedures, invasive devices, and use of antimicrobials, as well as the presence of HCAIs.