LITERATURE SYSTEMATIC REVIEW ARTICLE

BLOODSTREAM INFECTION CATHETER-RELATED: A LITERATURE REVIEW INFECÇÃO DE CORRENTE SANGUÍNEA RELACIONADA AO CATETER CENTRAL: UMA ANÁLISE DA LITERATURA

LA INFECCIÓN DE LA CIRCULACIÓN SANGUÍNEA RELACIONADA CON EL CATÉTER: UNA REVISIÓN DE LA LITERATURA

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ABSTRACT

Objective: to conduct a survey of the issues about primary bloodstream infection related to the central venous catheter (CR-BSI), published from 2000 to 2010. **Method:** literature search based on the databases Lilacs and Medline. **Results:** of the 47 articles researched, the highest number of publication occurred in 2007: 23.4% in 2010, 10.63% in 2009, 17% in 2008 and 14.9% in 2007. Brazil was the second country to publish the most number of researches in this matter (21.27%). In these publications, 48.93% evaluated the impact on the prevention of RC-BSI; 36.17% discussed about the epidemiology, risk factors and mortality rate; and 14.9% dealt with the description of recommended preventive measures, diagnosis and/or treatment. It wasn't found, among these issues, any work that effectively evaluated the indicators of care processes. **Conclusion:** based on the increasing interest in learning the process of this infection and the expressiveness of the Brazilian publications added to the recommendations of the Brazilian National Health Surveillance Agency (ANVISA) on the process analysis with the aim of the introduction of a more assertive program to reduce this infection, it is suggested the need of a ceaseless search for new knowledge to ease the problems of prevention and control of RC-BSI. **Descriptors:** infection control; catheter-related infections; health care quality indicators.

RESUMO

Objetivo: realizar um levantamento das publicações produzidas no período de 2000 a 2010 acerca das infecções primárias de corrente sanguínea relacionadas ao cateter central. **Método:** pesquisa bibliográfica às bases de dados Lilacs e Medline. **Resultados:** dos 47 artigos encontrados, a maior produção deu-se a partir de 2007: 23,4% em 2010, 10,63% em 2009, 17% em 2008, 14,9% em 2007. O Brasil foi o segundo país a publicar maior número de trabalhos sobre o assunto (21,27%). 48,93% das publicações avaliaram o impacto de intervenções na prevenção das IPCS-RC, 36,17% discorreram sobre a epidemiologia, fatores de risco e mortalidade e 14,9% enfocaram a descrição de recomendações de medidas preventivas, diagnóstico e/ou tratamento. Dentre a seleção não foram encontrados trabalhos avaliando efetivamente indicadores de processos assistenciais. **Conclusão:** o crescente aumento no interesse em conhecer o processo destas infecções, diante da expressividade de publicações brasileiras somada às recomendações da ANVISA sobre análise de processos, objetivando implantar programas de redução de infecção mais assertivos, aponta a necessidade em manter a busca constante por novos conhecimentos impactantes no problema do controle e prevenção das IPCS-RC. **Descritores:** controle de infecções; infecções relacionadas a cateter; indicadores de qualidade em assistência à saúde.

RESUMEN

Objetivo: realizar una evaluación sobre las publicaciones de las infecciones primarias a cabo en el torrente sanguíneo relacionadas con el catéter central. Estas publicaciones son del periodo 2000 a 2010. **Método:** este documento se basa en los datos de LILACS y MEDLINE. **Resultados:** de cuarenta y siete (47) artículos de investigación, la mayoría de la producción de las infecciones ocurrió por primera vez en 2007: 23,4% en 2010, 10,63% en 2009, el 17% en 2008 y 14,9% en 2007. Brasil fue el segundo país de publicar el mayor número de investigaciones en esta materia (21,27%). En estas publicaciones, 48,93% estimó que el impacto en la prevención de IPCS-RC, 36,17% calificó la epidemia y sus tratamientos, los factores de riesgo y la mortalidad, y un 14,9% frente a la descripción de las recomendaciones de los métodos preventivos de diagnóstico y / o tratamientos. No se encontró, en esta selección, los trabajos efectivamente evaluar el indicador de proceso del asistente. **Conclusión:** el aumento del interés de conocer el proceso de estas infecciones, las publicaciones brasileñas y con las recomendaciones de la ANVISA sobre el proceso de análisis para el objetivo de la creación de programas en la reducción de estas infecciones muestra la necesidad de continuar la búsqueda de nuevos conocimientos en problemas de prevención y control de IPCS-RC. **Descriptor:** control de las infecciones; las infecciones relacionadas con cateter; los indicadores de calidad en la asistencia sanitaria.

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INTRODUCTION

Discussing the occurrence and prevention of hospital infections represents, unquestionably, a concern in offering a safe health care, which is seen in initiatives, such as the National Healthcare Safety Network (NHSN) from the Centers for Disease Control and Prevention (CDC) which monitors those infections and runs campaigns to encourage prevention of such health problems.

According to estimative of CDC (Centers for Disease Control and Prevention), healthcare associated infections (HAI) are related to 1.7 million of infections and 99,000 deaths every year.¹ Of this total, in U.S., 14% are related to bloodstream infection. In Brazil, a study conducted by Nogueira et al revealed that this is the second cause of HAI, which main risk factor is the use of vascular catheters.²

The vascular catheters can make patients prone to the occurrence of infections in the bloodstream, although it is necessary to use them in modern medicine. In fact, the central catheters are responsible for the most severe complications. In the Intensive Care Units (ICU) of the United States, 15 millions of central venous catheters (CVC) are used per day, annually. Considering the local occurrences of 5.3 catheter-related bloodstream infections by 1000 CVC a day, it is estimated 80,000 cases of catheter-related bloodstream infection a year, which generates an annually cost that ranges from 26 million to 2.3 billion dollars to the health system. According to the CDC, in order to minimize these complications and save finance resources, there is a need to implement multilateral efforts, involving health professionals who insert and who handle these vascular catheters, and administrators and patients as well.³

In Brazil, the National Health Surveillance Agency (ANVISA) defines as the current priority supervising the primary bloodstream infection (BSI) indicator, in order to reduce the number of BSI occurrences in ICU patients with CVC by 30%, in the next three years. "Each health care center must re-evaluate care practices provided to patients and introduce programs to minimize this infection, according to the facilities' characteristics". ANVISA also recommends the use of process indicators "that have the objective to evaluate the interventions and/or actions that lead to a bad or good result^{4:4}". "Working and following these indicators can lead to the development of action plans for a better practice^{5:9}". Therefore, the work of the

Hospital Infection Control Committee (HICC) is highlighted by assuming the function of evaluating the quality of care practices regarding prevention and control of hospital infections, mainly through result indicators.⁶ However, new evaluation and qualification practices has been necessary, such as the process indicators recommended by ANVISA as an ally to point out vulnerabilities in the care process.

According to Sao Paulo State Department of Health (SES-SP, in Portuguese), the main causes for the occurrence of central venous catheter-related bloodstream infection are the use of the device and its time of use; and the existence of institutional protocols does not guarantee its proper practice. The maintenance and manipulation of the catheter also constitute a risk factor for the development of BSI.⁷ Based on the campaign, "Protecting 5 Million Lives", it is possible to work with processes of high impact in the prevention of bloodstream infection associated to the venal access, by following a package of measures that is based on scientific evidences "sufficiently established to be considered a standard of care", and result in an improvement in patient care.⁵ One of the measures is to reassess daily the need for maintaining the catheter and the immediate removal of those no longer necessary. In other words, evaluating the careful indication for inserting a CVC, the continuous record of its time of use, as well as the process of maintenance of the device, is an important procedure to identify opportunities of improvement in order to prevent BSI occurrence and complications described above.

OBJECTIVE

- To conduct a survey of the publications about primary bloodstream infection related to the central venous catheter (CR-BSI), published from 2000 to 2010.

METHOD

The purpose of this paper was to carry out a review of literature in which is held a retrospective research to certify that this subject has been studied and analyze the evolution of the subject matter.⁸

In accordance with this author, this research comprehended in first choosing the subject and then determining the objectives, elaborating a work plan, searching and identifying the sources, obtaining the material, reading it, and registering the notes about the main idea, and the significant data.

The reading of this material sought to identify information and material data, to establish relations between data and information and also to analyze the content of this information and the data presented by the authors.

To put together all work to be analyzed, it was surveyed the publications indexed on Lilacs and Medline databases from 2000 to 2010.

First of all, a survey on the defined database was carried out, searching articles to compose the body of work to be analyzed by descriptors: infection control; catheter-related infections; health care quality indicators.

Articles that did not discuss hospital BSI as related to the central catheter as well as those that did not define the catheter-related bloodstream infection as related to hospital care were excluded. From that, the following was the selection and registration in the

catalog entry proposed for this study, consisting of:

1. Data identifying the publication.
2. Data on the used methodology.
3. Summary of the study matter.

The survey and the reading of the articles were conducted in January and February of 2011.

RESULTS AND DISCUSSION

Of a total of 47 articles found, 37 (78.72%) came from Medline database and 10 (21.28%) from Lilacs database.

Analyzing the evolution of topic of discussion in the period proposed, it was verified a greater number of publications in the year of 2010, as follows:

Table I. Number of articles published annually in the period 2000-2010 in the Lilacs and Medline database.

Year	Number of Published Articles	Percentage
2000	03	6,38%
2001	02	4,25%
2002	03	6,38%
2003	01	2,12%
2004	01	2,12%
2005	03	6,38%
2006	03	6,38%
2007	07	14,89%
2008	08	17,02%
2009	05	10,63%
2010	11	23,4%
Total	47	100%

It was verified that 40.4% (19) used a descriptive methodology, 34% (16) an experimental, 21.27% (10) an exploratory and 4.25% a descriptive-exploratory one.

Of the total of studies, 61.7% (29) analyzed the data quantitatively, 14.9% (7) analyzed qualitatively and 23.4% (11) did both.

Those studies came mainly from countries of the American continent, as related in the table below.

Table II. Distribution of articles published in the databases Lilacs and Medline, according to country of origin, in the period 2000-2010.

Country	Number of Publications	Percentage
USA	18	38,29%
Brazil	10	21,27%
England	07	14,89%
Malaysia	02	4,24%
Saudi Arabia	01	2,12%
Argentina	01	2,12%
Canada	01	2,12%
China	01	2,12%
Colombia	01	2,12%
Spain	01	2,12%
Italy	01	2,12%
Japan	01	2,12%
Poland	01	2,12%
Singapore	01	2,12%
Total	47	100,00%

The highest proportion of studies (48.93% - 23) evaluated the impact of interventions on RC-BSI prevention such as, job training,

restructuration of the patient care/assistance, use of different devices/new technologies, and the use o prophylactic antibiotic among

others. 36.17% (17) discussed about the epidemiology of these infections, risk factors and mortality. By analyzing the literature, 14.9% (7) focused on the description of recommendations for preventive measures and/or diagnosis and/or treatment.

Some of those research papers discussed data or situations regarding to care processes, however any study evaluating indicators of care processes was found.

FINAL CONSIDERATIONS

According to this survey it is observed that since 2007 there is an increasing interest in learning the process of these infections and evaluating the impact of actions to try to find new ways to prevent it. However, it is noteworthy the fact that the studies were based basically upon result indicators, denying the use of process indicators which highlight the importance of the human factor rather than the technological one when in safe practice of health care, since the biggest challenge "lies in the work relationships and in the little involvement of the professionals^{9,2}". This becomes even more important before the expressive Brazilian publications in accordance with ANVISA recommendations, which encourage the analysis of care processes, in order to introduce more assertive programs to reduce the infections.

This reflection does not have the pretension of exhausting the subject, on the contrary, it points out the need of continuous search for new knowledge on the problem of prevention and control of BSI associated to the use of a central vascular device.

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