



EVIDENCE FOR THE PREVENTION OF INFECTION IN VESICAL CATHETERISM: INTEGRATIVE REVIEW

EVIDÊNCIAS PARA A PREVENÇÃO DE INFECÇÃO NO CATETERISMO VESICAL: REVISÃO INTEGRATIVA

EVIDENCIA PARA LA PREVENCIÓN DE LA INFECCIÓN EN EL CATETERISMO VESICAL: REVISIÓN INTEGRADORA

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ABSTRACT

Objective: to analyze the scientific evidence available for the prevention of infection associated with the vesical catheterism. **Method:** integrative review, with survey data from 2000 to 2010, using a specific form validated in LILACS and MEDLINE databases and SciELO virtual library, using the key words: nursing, nursing care, Catheterism and infection. 12 national and international articles were selected. The data were synthesized in figures and analyzed descriptively. **Results:** technologies were highlighted like the use of different catheters that can promote the reduction of infection. With regard to interventions of nurses, these related generally to the use of aseptic technique, observation of on-call time of catheters, care in handling of these and improvement of knowledge. **Conclusion:** it is believed that this review may provide new information to health care professionals that handle directly the vesical catheter, with the purpose of improving clinical practices and consequently decrease the rates of urinary infection. **Descriptors:** Nursing; Nursing care; Catheterism; Infection.

RESUMO

Objetivo: analisar as evidências científicas disponíveis para a prevenção de infecção associada ao cateterismo vesical. **Método:** revisão integrativa, com levantamento de dados de 2000 a 2010, utilizando-se um formulário específico validado nas bases de dados LILACS e MEDLINE e na biblioteca virtual SciELO, utilizando-se os DECS: enfermagem, cuidados de enfermagem, cateterismo e infecção. Foram selecionados 12 artigos nacionais e internacionais. Os dados foram sintetizados em figuras e analisados de forma descritiva. **Resultados:** foram evidenciadas tecnologias como o uso de diferentes cateteres que podem promover a diminuição de infecção. Quanto às intervenções dos enfermeiros, estas se relacionaram, geralmente, ao emprego da técnica asséptica, observação do tempo de permanência dos cateteres, cuidados na manipulação destes e aprimoramento dos conhecimentos. **Conclusão:** acredita-se que essa revisão poderá proporcionar novas informações para os profissionais de saúde que manipulam diretamente os cateteres vesicais, com a finalidade de aperfeiçoar as práticas clínicas e consequentemente diminuir os índices de infecção urinária. **Descritores:** Enfermagem; Cuidados de enfermagem; Cateterismo; Infecção.

RESUMEN

Objetivo: analizar la evidencia científica disponible para la prevención de la infección asociada al cateterismo vesical. **Método:** revisión integradora, con datos de la encuesta de 2000 al 2010, utilizando un formulario específico validado en LILACS y MEDLINE bases de datos y biblioteca virtual SciELO, usando las palabras clave: enfermería, enfermería de cuidados, laboratorio de cateterismo y la infección. 12 artículos seleccionados eran nacionales e internacionales. Los datos fueron sintetizados en figuras y analizados de forma descriptiva. **Resultados:** fueron destacadas tecnologías como el uso de catéteres diferentes que puede promover la reducción de la infección. Con respecto a las intervenciones de enfermería, estos generalmente relacionados con el uso de una técnica aséptica, observación del tiempo de los catéteres, cuidado en el manejo de estos y la mejora del conocimiento. **Conclusión:** se cree que esta revisión puede proporcionar nueva información a profesionales sanitarios que manejar directamente el catéter vesical, con la finalidad de mejorar las prácticas clínicas y en consecuencia disminuir las tasas de infección de la infección urinaria. **Descriptor:** Enfermería; Atención de enfermería; Cateterismo; Infección.

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INTRODUCTION

The process of care and professional practice of the nurse is suffering changes arising from new technologies, demanding that the attitudes, behaviors and ways of thinking have adjustments. It is necessary to understand the impact that such changes are in care because they provide validation of knowledge, producing evidence that subsidize their application.

Considering the importance of qualified care, essentially based on theoretical-scientific referential, nursing is in constant search for the application of a scientific methodology in its practice.¹ Due to numerous innovations in healthcare, nurses' decision-making needs to be based on scientific principles in order to select the most appropriate intervention for the specific situation of care, since there are differences between hope that these advances have positive results and truly know if they work.²

The incorporation of these assumptions in nursing has expanded the term to Evidence-Based Practice (EBP), which is defined as an approach to clinical care and education, based on the knowledge and application of evidence, with the purpose of promoting the health, quality of services and reducing operating costs.³

The EBP involves the defining of a problem, the investigation and critical evaluation of the evidence available, its implementation in practice and the assessment of the results, by the integration of three elements: the best evidence, the clinical skills and patient preference.¹ In this context, there are the nosocomial infections, i.e. those acquired in the hospital environment. Innovation of complementary examinations and therapeutic procedures of increasingly invasive diagnosis in severe patients contributes to the transmission of hospital-acquired microorganisms, rendering ineffective the classical measures of infection control.⁴

Infections acquired during procedures performed in healthcare, denote a major public health problem in Brazil, both for patients, highlighted by the high rate of infection, as for society, for the considerable consequences, as costly spending to treat such infections. Nursing stands out as the main responsible to fight and the infection control, by exercising direct care to the patient, in order to preserve its integrity.⁵ It should be noted that, among the infections, the incidence of urinary tract related corresponds to 38.5 to 40% of all nosocomial infections, being 70 to 88% directly related to the vesical

and 5 to 10% after cystoscopies or surgical procedures with handling of the urinary tract.

The asymptomatic bacteriuria in patients who make use of catheters varies from 70 to 98%. The frequency of symptomatic urinary tract infection varies from 10 to 35%, being greater in patients with indwelling catheters, if compared to those who use intermittent catheterism.⁷

Vesical probing delays with transitional and temporary use and it is indicated for: urinary drainage, measurement of urine output in critical patients, vesical irrigation in patients with obstruction, urologic surgery and postoperative in patients with interstitial cystitis and immunotherapy in bladder cancer.⁸ It is stand out that in this type of procedure, it is used aseptic technique. By contrast, in intermittent catheterism it is used clean technique and not the aseptic.

It emphasizes the relevance of this study, because it will provide the dissemination of scientific evidence available for the evaluation of options and decisions on patient care in use of vesical catheter. Besides, it can encourage nurses to assess the clinical particularities of each patient, guiding a therapeutic practice, aiming at the prevention and control of urinary tract infections (UTI).

It is expected that the study will contribute to the practice of nurses, to acquire new knowledge about the EBP associated with infection prevention in patients undergoing vesical catheterism.

OBJECTIVE

- To analyze the scientific evidence available for the prevention of infection associated with the vesical catheterism.

METHOD

Integrative review, which consists in the pursuit of researches being summarized and subsequently established conclusions, for the analysis of scientific knowledge produced about a particular topic, enabling its application into practice.³ To guide the integrative review, the following question was formulated: what are the scientific evidence on the prevention of infection in patients undergoing vesical catheterism?

It was used for searching articles databases Latin American literature and Caribbean Health Sciences (LILACS), Medical Literature Analysis and Retrieval System online (MEDLINE) and Scientific Electronic Library Online (SciELO) through the following key words entered in the key words: nursing, nursing care, Catheterism and infection.

The inclusion criteria for the selection of the articles were: approaching the practices for the prevention of infections in patients submitted to the vesical catheterization; articles in Portuguese, Spanish and English; with temporal delimitation between 2000 to 2010. The exclusion criteria were: to address only pharmacological treatment and epidemiological; and not presenting abstract available electronically.

The survey of articles was conducted during the months of August to October 2011, using a specific form already validated.⁹

The results were presented and discussed in descriptive form, allowing the reader to recognize the applicability of the study and raising the evidence for nursing practice.

In relation to the ethical aspects, it is necessary to stress that, in all articles used in the study, the authors and their years of publication were referred, respecting their ideas without necessarily to perform literal quote.

RESULTS

24 articles were identified and from reading the abstract and, subsequently the article in its entirety, 12 were selected, including four of the SCIELO, three of LILACS and five from MEDLINE.

In relation to the level of evidence, just a study, whose design was a systematic review with relevant randomized trials monitored was framed in the level of evidence I. The remaining articles are framed in levels IV, V, VI and VII, represented by a cohort study (level IV); nine studies showed levels V and VI, by obtaining evidence of systematic review articles, descriptive, exploratory studies, observational, and uncontrolled prospective and an article presented level VII, for being of an expert opinion.¹⁰

As for the type of periodical, five articles have been published in a Journal of nursing, two general health magazines and six in medical journals. After reading the articles with the use of the instrument concerned, these were exposed in frames and described according to the database. Figure 1 illustrates the articles of SciELO virtual library.

Title / Year / Country	Results	Conclusions
Clean technique of intermittent vesical auto-catheterize: description of procedure performed by patients with spinal cord injury/2002/Brazil.	Handwashing with soap and water is enough to remove exogenous microbes.	Patients, when well targeted, live a normal life, without complications and infections secondary to spinal cord injury.
Urinary tract infection related to use of vesical Catheter indwelling: results of bacteriuria and studied microbiota/2008/Brazil.	Most patients were male, with an average age of 53.9 years old, negative leukocyte and presence of Comorbidities.	The relatively short catheterization period (on average 3.5 days, produced no UTI, being important to use delay catheter at the lowest possible time interval.
Comparative study on two types of catheters for intermittent clean catheterization in children with stoma/2009/Brazil.	The advantages were evaluated according to the clientele, voiding frequency and type of catheter (pre-lubricated and default).	Statistically significant difference was observed only for direct costs, being superior to catheter pre-lubricated.
Nursing actions for prevention of urinary tract infection bladder catheter-related delay/2009/Brazil.	There was a reduction of risk of infection, standardization of aseptic techniques on vesical catheter insertion and maintenance.	It is essential to invest in prevention strategies and update the knowledge of the team, to optimize the assistance.

Figure 1. Synthesis of articles included in the integrative review-SciELO.

Figure 2 demonstrates the articles identified in the LILACS database.

Title / Year / Country	Results	Conclusions
Behavior taken by nurses, vesical probing procedure-related/2006/Brazil.	The nurses have cited the long duration and the flaws in the handling of the catheter as factors related to the occurrence of the ITU.	The nurses are taking some actions of prevention and treatment of catheter-related UTI.
Construction and validation of evaluation indicators of control practices and infection prevention of catheter-associated urinary tract/2006/Brazil.	Construction and validation of three indicators concerning indication, permanence, maintenance and infrastructure for vesical catheter.	The use of validated assessment indicators in clinical practice is of extreme relevance for the prevention of nosocomial infection.
Urinary catheterization: knowledge and adherence to infection control by nursing professionals/2007/Brazil. Urinary catheterization: knowledge and adherence to infection control by nursing professionals/2007/Brazil.	It was perceived knowledge/practice dichotomy of the measures of prevention and control of ITU nursing technicians. Most nurses know such measures.	There is a need for investment in continuing education to ensure that effective measures for the control of urinary infections are adopted.

Figure 2. Synthesis of articles included in the integrative review.

Figure 3 describes the articles inserted in the MEDLINE database.

Title/Year/Country	Results	Conclusion
Catheter - Associated urinary tract infection and the Medicare rule changes/2009/Estados Unidos.	Relevance of care such as hand hygiene, disinfection of the catheter and drainage system.	Occurrence of more benefits than harm, because hospitals redoubling efforts on prevention of catheter-associated UTI.
Systematic Review: Antimicrobial Urinary Catheters To Prevent Catheter-Associated Urinary Tract Infection in Hospitalized Patients/2006/ Estados Unidos.	Silicone coated catheters were evaluated with nitrofurazone and LaTeX catheters with silver.	Urinary catheters with antimicrobials can prevent bacteriuria in hospitalized patients, depending on the antimicrobial coatings.
Validity, Accuracy, and Predictive Value of Urinary Tract de Infection Signs and Symptoms in Individuals With Spinal Cord Injury on Intermittent Catheterization/2009/ Estados Unidos.	Prevalence of cloudy urine (83.1%), leukocytes in urine (82.6%) and greater specificity for fever (99.0%); 66.2% of patients were able to predict its own ITU accurately.	The study demonstrated more accurate signals of ITU in individuals with spinal cord injury using intermittent catheterization.
Catheter - Associated Urinary Tract Infection /2005/Tailândia.	Incidence of catheter-associated UTI delay in 73.3%; half of the cases occurred in two weeks.	The ITU 's delay catheter related represent evidence of impact on the morbidity and costs.
The Potential clinical and Economic Benefits of Silver Alloy Urinary Catheter in Preventing Urinary tract infections/2000/Estados Unidos	O cateter revestido de prata diminui a incidência de ITU sintomática e de bacteremia em comparação com cateteres padrão. The silver-coated catheter decreases the incidence of symptomatic UTI and bacteremia in comparison with catheters default.	The use of silver alloy catheters in hospitalized patients in probing use reduces the incidence of urinary tract infection, besides generating cost reduction.

Figure 3. Synthesis of articles included in the integrative review.

DISCUSSION

It was observed, from the studies that the catheter-related urinary tract infections still have high incidence, accounting for approximately 80% to 70, which corresponds to an average of 35 to 45% of all infections nasocomial.^{6,11-13}

Several factors collaborate to the increased risk of infection, among them are those related to patients as: female, by the size of the urinary tract, which is more exposed to the colonization of the intestinal flora germs; advanced age; Basic pathology; diabetes mellitus; kidney transplant; patients; burned and immunosuppressed.^{6,12,14}

As for factors associated with the procedure, the most predisposing include: indication of the catheter, improper technique of handwashing, inappropriate execution of the insertion techniques and asepsis and duration of catheter, because the

risk to acquire bacteriuria is around 3 to 10% per day of stay.^{6,11,15} It is important to note that the duration of catheterization should be reduced, although no literature set a maximum dwell time.¹¹ In this context, it is worth noting that, in the short catheterization (less than 30 days), the infections tend to be unimicrobianas, in the long-period (more than 30 days), tend to be polymicrobianas.¹⁶

With regard to the preset period so that the bladder catheter is exchanged, some studies indicate that it is not recommending fixed intervals of exchanges, underscoring how ideal procedure constant assessments, to detect in a timely manner the presence of signs indicating the return of the whole system.^{6,11,15}

Among the main directions for the return of the catheter can be cited: the formation of residues, sepsis, fever of unknown origin, obstruction of the catheter or tube light collector, suspicion or evidence of fouling in

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the lumen of the catheter, the catheter contamination by inappropriate handling and installation, accidental disconnection, malfunction, deterioration of the catheter, tube or bag collector and evidence of piura.⁶

In a practice clinic, the Foley catheter is the most widely used in the catheterism delay, occurring significant improvement in complications when this is made with silicone. Silver-coated catheters are presented as viable solution for showing greater effectiveness in the prevention of UTI when compared to Latex, however there is no clear explanations about its mechanism of action and proof of results.¹⁶

There are reports of benefits of hydrophilic catheter, by virtue of being a single-use catheter, whose technical specificity relates to the need to fill the individual package with water to its lubrication and water connection occurs with urine and with polyvinylpyrrolidone iodine, a flexible film production occurs and slider, reducing friction during the procedure.¹⁷ However, despite the lower incidence of inflammatory processes and hematuria with the use of pre-lubricated catheter, when compared with traditional catheters, due to minor urethral trauma, there are no studies showing that the incidence of infection is related to the type of catheter, either single use or not.¹⁷

Of the five studies in the English language inserted in this research, four emphasis to silver alloy catheters, catheters coated with silicone nitrofurazone and hydrophilic catheters in reducing infection related to use of urethral catheters.^{14,18-20}

The use of silver coated catheter in short-lived catheterization brings benefits both the economic level as for the patient by reducing the incidence of symptoms of UTI and bacteremia, besides the possibility of exorbitant spending with the standard catheter associated with the recovery of a possible UTI.¹³⁻⁴

Research, which reflected on the use of different types of catheters with a focus to the advantages and disadvantages and incidence of infection related to these, points out that the silver alloy catheter and the nitrofurazone are the ones who stand out in relation to the cost-benefit, and the first most prominent features.¹⁸ On the other hand, no difference was observed in the incidence of urinary tract infection in relation to the groups that used the standard catheter versus hydrophilic catheter, because only one study showed ITU on a smaller catheter evidence of hydrophilic coating, indicating the need for further research directed to the comparison of

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the effectiveness of the use of the hydrophilic catheter rather than the standard catheter.¹⁴

It is appropriate to draw attention to the benefits arising from the correct hand hygiene habit by nursing professionals before and after handling the catheter or perform any of the procedures, asepsis and also proper maintenance of the closed urinary drainage system, as fundamental factors to avoid a possible bacteremia.^{12,14-5} Such aspects should be addressed in protocols of hospital-acquired infections, including methods of continuing education, in order to direct nurses to correct handling of catheters.

Reflection is required of nurses on the importance of proper handling of vesical catheter, emphasizing the knowledge about particulars and the risk of this procedure, combined with responsibility in the handling of this device.¹⁵

Evidences were identified in the studies associated with nursing care in prevention of UTI, being critical that these exceed the technique. The risks must be constantly evaluated, the practice of hand hygiene should be done judiciously, anatomical conditions of each patient should always be taken into consideration, as well as the education of the patient and their families.^{6, 11-2,15,20}

Furthermore, verified results reflect the dichotomy between the knowledge and practice of nursing assistants and technicians related to infection prevention and control when handling the bladder drainage system. Considering vesical catheters are often manipulated by these professionals, it is important that the nurse create strategic training measures, which should be based on awareness, commitment and responsibility in implementing practical care, based on scientific evidence.^{6,11-2,15}

In this sense, it should be noted that the control and prevention of catheter-related UTI require a range of measures were, therefore, the competence of the nurse interventions that can keep as primary goal the patient's quality of life.

CONCLUSION

The scientific evidence available on infection prevention practices associated with the vesical catheterization are related to new technologies such as the use of silver alloy catheters, catheters coated with silicone nitrofurazone and hydrophilic catheters, which can promote the reduction of the occurrence of infection.

In relation to the practices carried out by nurses for the prevention of infection in patients submitted to the vesical catheterization, it is highlighted the employment-related care of aseptic technique, the time of permanence of the catheters and its handling and the importance of improvement of knowledge.

Actions considered as simple basic attitude correct washing of hands before and after handling of catheters bring protection against possible microorganisms, which may colonize the collector system, this habit that should be nurtured continuously. Training through courses of continuing education for nursing professionals who directly or indirectly manipulate the vesical catheter is pointed to as an effective way of preventing infections primordial.

It is believed that this review may provide subsidies for integrative healthcare professionals that handle directly the vesical catheter with the purpose of improving clinical practices and consequently decrease the rates of bladder infection.

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