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Original research article

A comparison of nurses' knowledge of nursing care for central vascular catheters

Petra Podrazilová^{a,*}, Andrea Hudáčková^b^a Technical University of Liberec, Department of Health Studies, Liberec, Czech Republic^b University of South Bohemia in České Budějovice, Faculty of Health and Social Studies, Department of Nursing and Midwifery, České Budějovice, Czech Republic

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ABSTRACT

The aim of the research was to compare the knowledge of nursing care for central vascular catheters (which hereinafter will be referred to as CVC) among general nurses from intensive care units and standard departments. In general, we can say that the aim was also to map the extent of nurses' knowledge on infections associated with providing care in healthcare-associated infections (which hereinafter will be referred to as HAI), and aseptic care for central vascular catheters, including catheter sepsis. Part of the research was a content analysis and a comparison of standards of nursing care in three medical facilities concerning the issue of central vascular catheters (with an emphasis on HAI).

The quantitative research was conducted in four medical facilities: Regional Hospital Liberec, Masaryk Municipal Hospital in Jilemnice, Hospital České Budějovice, and Hospital Semily. The chosen research method was a standard questionnaire, which used different kinds of questions and assessment scales. The respondents were selected by purposive sampling. The statistical processing was drawn from 290 completed questionnaires. The statistical methods used were the χ^2 test and the two-sided Student's t-test.

The research identified various and serious information deficits in nurses (both in intensive care units and standard units). One example might be underestimating the issue of HAI; the majority of respondents perceived the term HAI as an abbreviation for infections arising only in connection with the hospitalization of patients. Staff who are unaware of the risk of HAI in connection with outpatient or basic nursing care in social institutions will hardly be able to apply preventive procedures. Several serious deficiencies were detected in the knowledge of nurses regarding the aseptic approach to nursing care for central vascular catheters, such as a poor description of the procedure of disinfecting the injection site, non-complex tools for dressing the CVC and a very problematic thinning of heparin plugs.

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* Corresponding author at: Technical University of Liberec, Department of Health Studies, Studentská 1402/2, 461 17 Liberec 1, Czech Republic.

E-mail address: petra.podrazilova@tul.cz (P. Podrazilová).

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Introduction

Infections associated with providing care are a major concern in 21st century medicine. The discovery of antibiotics in the 1930s was accompanied by great enthusiasm and visions of the complete eradication of bacteria. However, bacteria have created resistance to excessively used antibiotics and resistant bacterial strains are constantly on the increase. The development of antimicrobial drugs is very limited and the number of new products being introduced into practice is declining. Now the only effective defence against HAI is targeted to prevent their occurrence in the context of meaningful and targeted antimicrobial therapy.

A retrospective study from 2011, conducted in the USA [1], showed that 81% of blood infections in adults arose due to an inserted intravascular catheter. That is why we focused our research on the prevention of HAI in nursing care for central vascular catheters in adults. This technique of parenteral application of drugs and nutrition has long been assigned only to intensive care units. Nowadays, this method of intravenous administration can also often be found in standard units. Therefore, one of the goals of this study was to explore and compare the knowledge and experience of nurses, in terms of nursing care for central vascular catheters, on standard wards and departments that provide intensive care. According to the respondents' knowledge deficit, we also inferred the occurrence of the most common mistakes in nursing care for central vascular catheters. As part of the research, we examined the management of the prevention of HAI, pre-described in the local standards of nursing care. Taking into consideration the absence of clearly defined central clinical practice guidelines in the Czech Republic, we conducted a comparison of three local standards of nursing care, dealing with nursing care for patients with central vascular catheters. Only well-defined standards of nursing care and their adherence will ensure safe and high quality nursing care, which as a result will eliminate the risk of HAI.

Materials and methods

To map and compare the knowledge and experience of nurses (in terms of the nursing care for central vascular catheters) on standard wards and departments that provide intensive care, we used quantitative research methodology. The aim of the research was to determine the extent of nurses' knowledge of HAI and the extent of their knowledge and experience with aseptic care for central vascular catheters. Another objective of this research was to compare nurses' knowledge of standard workplaces and workplaces providing intensive care, including mapping the potential occurrence of errors in nursing care for central vascular catheters in connection with a proven knowledge deficit. The last goal was to map the structure of the content of the standards of nursing care for central vascular catheters, and their subsequent analysis and comparison.

The main research method was a non-standard questionnaire, which was created specifically for the research investigation on the basis of studied law and literature,

including foreign sources such as the "Guidelines for the Prevention of Intravascular Catheter-Related Infections", issued by the Centre for Disease Control and Prevention [2]. The questionnaire is sorted into three main areas, focusing on the respondents' knowledge of infections in terms of providing care, on nursing care for patients with central vascular catheters, and the issues of nursing practice when using intravenous drugs and care for infusion lines. The questionnaire contains closed, half-closed and open questions. The majority of the questions are polytomic. The validity, reliability and objectivity of the non-standardized questionnaire were verified in the pilot study, which was conducted in November 2013 in the Regional Hospital Liberec. Later, we carried out the final corrections to the non-standardized questionnaire and started the proper research.

The quantitative research was carried out at four health facilities. These facilities were chosen intentionally. We contacted two smaller hospitals of urban character – Hospital and Polyclinic in Semily and Masaryk Municipal Hospital in Jilemnice. We also contacted two hospitals of regional character – Regional Hospital in Liberec and Hospital in České Budějovice. The cooperation with the respective health facilities was provided with their consent to this research survey, including three consents to publicize and revise local standards of nursing care under anonymous conditions of the respective medical facilities. The content analysis and comparison of standards of nursing care were carried out in compliance with available expert recommendations and current legislation.

The actual distribution of non-standardized questionnaires was carried out in the context of the deliberate selection of a research sample of respondents, from the ranks of nurses working at bedsides in departments that provide both standard and intensive care wards. The questionnaire survey was carried out in December 2013 and January 2014. The respondents were allowed to insert each completed questionnaire in an enclosed envelope. This not only protected the anonymity of the individual respondents, but also increased the validity of the obtained results as we prevented the possibility of accessing already completed questionnaires.

In total, 350 forms of non-standardized questionnaires were distributed. The rate of return of the questionnaires in the survey was 84.7% (a total of 298 questionnaires). Only questionnaires that were less than 50% complete were excluded from this number. Three questionnaires were excluded from the subsequent analysis. We also deliberately used the questionnaires in which the respondents did not answer one, or a maximum of two questions. In this quantitative research study, we processed a total of 295 non-standardized questionnaires. The obtained data was statistically assessed using two statistical methods: χ^2 test and Student's t-test.

The research sample consists of a total of 295 respondents from the nursing ranks who work at bedsides. The main criterion we used for the differentiation of the basic sample was the workplace. 45% of the respondents (absolute frequency 135) operate in standard units and 55% of the respondents (absolute frequency of 160) said they work in intensive care units.

The obtained results show the influence of nursing education reforms. 38% of the respondents have a higher

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