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Original Article

Knowledge of “Guidelines for the prevention of intravascular catheter-related infections (2011)”: A survey of intensive care unit nursing staffs in China



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ABSTRACT

Aims and objectives: To evaluate intensive care unit (ICU) nurses' knowledge of the updated guidelines for the prevention of intravascular catheter-related infections; to identify the factors that affect the nurses' knowledge and to explore the barriers to adherence to evidence-based guidelines in clinical practice in China.

Methods: Cross-sectional surveys were carried out in Chinese ICUs from January 2013 to March 2014. The nurses' demographic information, knowledge of the guidelines, and barriers to adherence were assessed by a validated questionnaire and then analyzed statistically.

Results: The questionnaires were completed by 455 ICU nurses from 4 provinces of China. The mean score was 8.17 of 20, and higher scores were significantly associated with province, years of experience, and years of ICU experience. Forty-nine (10.7%) nurses had not heard of the guidelines, whereas 231 (50.7%) nurses heard of the guidelines but did not receive training for them. Trained nurses' scores were higher than untrained nurses' scores. The three main barriers to compliance with the guidelines were an unfamiliarity with them, an excessive workload due to a shortage of nurses, and a lack of training.

Conclusions: ICU nurses' knowledge of the updated guidelines is quite low, which could be a potential risk factor for patient safety. Multidisciplinary interventions and continuous

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educational programs are needed to improve the knowledge of and adherence to the guidelines.

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1. Introduction

Intravascular catheters are commonly used in the intensive care unit (ICU) for infusion and drug administration, as well as for nutritional and hemodynamic monitoring [1]. However, using an intravascular catheter inappropriately can lead to a catheter-related bloodstream infection (CRBSI) which can increase hospital costs and the length of stay [2–4]. In order to minimize the incidence of CRBSIs, the Centers for Disease Control and Prevention (CDC) has published guidelines for the use of intravascular catheters. These guidelines emphasize education and training, maximal sterile barrier precautions, use of >0.5% chlorhexidine preparations with alcohol for skin antisepsis, avoiding routine replacement catheters, and implementing bundled strategies [3,4].

Compliance with these guidelines is extremely important for reducing the incidence of CRBSIs and their associated healthcare costs, and to improve patient outcomes [3,4]. Several studies have indicated that a lack of knowledge and skills is one of the main barriers to evidence-based medical practice [5–7].

Nurses play important roles in the maintenance and surveillance of intravascular catheters and the control of infections. However, proper procedures are not always applied by nurses. Nurses' lack of knowledge may be a barrier to adherence to evidence-based guidelines for preventing CRBSIs. Although knowledge does not ensure compliance, misconceptions about effective interventions may lead to inaccurate decision-making [8]. Reductions in the CRBSI rate occurred after educational programs were conducted on risk factors and strategies to prevent infection, providing indirect evidence for the value of knowledge [9,10]. A literature review reported that educational interventions greatly reduced CRBSI rates in patients with central venous catheters in the neonatal ICU [11]. Furthermore, the latest CDC guidelines [3] emphasize the importance of staff knowledge in preventing CRBSIs and of educating and training healthcare personnel who insert and maintain catheters. Therefore, higher levels of nurses' knowledge are strongly related with lower CRBSI rates.

A multicenter survey showed that 3045 European ICU nurses' knowledge regarding CRBSIs needed improvement [12]. However, there have been limited studies evaluating Chinese ICU nurses' knowledge of the current CDC guidelines for preventing CRBSIs. Therefore, it is necessary to evaluate ICU nurses' knowledge of the newest guidelines in China.

This survey aims to assess Chinese ICU nurses' knowledge of the CDC's "Guidelines for the Prevention of Intravascular Catheter-related Infections (2011)", and to identify barriers to compliance with evidence-based guidelines.

2. Study design and methods

2.1. Ethics statement

Participation in this study was voluntary. Participants gave written informed consent before data collection and filled out the questionnaire anonymously.

2.2. Study design

This multicenter study was designed as a cross-sectional survey, undertaken from January 2013 to March 2014 in China.

2.3. Setting and participants

Convenience sampling was used in this study. ICU nurses were selected from a class-three teaching hospital and a specialist nurse training class in Jiangsu province, a class-three teaching hospital in Shanxi province, two class-three teaching hospitals in Hunan province, and five class-three teaching hospitals in Xinjiang province.

2.4. Data collection

We distributed questionnaires to the participants and gave them instructions face-to-face. We asked them to fill out and return the questionnaires anonymously by the next day.

2.5. Questionnaires

The questionnaire was developed by our group and consisted of the following four sections:

Nurse identification form. This form concerned the nurse's demographic data, including age, sex, where the nurse worked, years of nursing experience, years of ICU experience, level of nursing education, and so on.

Form of evidence-based knowledge about the prevention of CRBSIs. We designed the questionnaire based on the literature [8,12–16] and the CDC's CRBSI prevention guidelines [3,4], and revised the questionnaire after expert consultation and a pilot survey. The consultants included 10 nurses and 5 doctors in this field. They rated the relevance of each item on a 3-point Likert scale (1 = not relevant; 2 = relevant but not necessary; 3 = absolutely necessary). After we revised the questionnaire according to the experts' ratings, they all agreed with the questionnaire's clarity and content. The revised questionnaire was used in a pilot survey with 25 nurses to determine the difficulty index and discrimination index by item analysis. Detailed interpretation criteria referred to a previous publication [12]. Overall, the difficulty index ranged from 0.35 to 0.8,

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