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Development and validation of the guidelines for preventing Nosocomial infections in the intensive care units: The evidence-based approach

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ABSTRACT

Aims: Nosocomial infections are one of the most important problems in health care centers and intensive care unit patients. Developing evidence based guidelines for the prevention of nosocomial infections can have a great impact in reducing these infections. The aim of this study was to develop and validate the evidence based guidelines for prevention of nosocomial infections in the intensive care units.

Methods: This developmental study method was performed in the intensive care unit. The quality of 32 guidelines was assessed with the valid and reliable check list. Then Evidence based new guidelines based on Stetler model were designed for prevention of nosocomial infections. The quality of designing guidelines was assessed with the same check List. Data analysis was performed using descriptive statistic and $SPSS_{17}$.

Results: The quality of 32 available guidelines was poor (84.37%) and the quality of 15.63% was moderate. Eighteen nosocomial infections preventive guidelines were designed that 100% of them had good quality.

Conclusions: Given the importance prevention of nosocomial infections and since the quality of available guidelines are not good; evidence-based guidelines can reduce the risk of infection in patients.

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1. Introduction

Nosocomial infections (henceforth referred to as NIs) are the most important problems within therapeutic-health centers all over the world. NIs does not develop once entering the hospital, but they occur after 48 hours or more from being hospitalized [1].

Based on the already conducted studies, NIs develops in 10 percent of hospitalized patients. According to the statistics of the World Health Organization, 1.7 million NIs occur annually and one out of 20 patients acquires them, which incurs about 26 to 32 billion dollars on society

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[2]. The occurrence rate of NIs in Iran is at least 20 percent. Although Intensive Care Unit (ICU) beds include less than 10 percent of all beds in most hospitals, more than 20 percent of NIs occurs in ICUs [3].

The results of studies indicate that the prevalence rate of NIs is much higher in ICUs than public wards. In Nadi's study, 10.2 percent of patients hospitalized at ICUs acquired hospital pneumonia [4].

Nurses can play an important role in reducing NIs by proper disinfecting of their hands, wearing gloves and mask, proper isolation of patients, applying standard caution principles, following hand hygiene and incorporating preventive measures [5].

One of the most effective measures in preventing NIs is implementing the manuals and guidelines that are based on scientific resources and research findings.

Evidence-based nursing is an issue that has been raised as a method for therapeutic-health cares according to the findings and pieces of evidence.

The conducted researches in this field indicate that nurses are faced with problems regarding evidence-based performance [6].

The definition of evidence-based nursing is different among nurses; however, the accepted definition is "implementation of best research evidence and clinical expertise or skills and considering the patient's needs and situation [7].

The most problematic cases for nurses were accessing the best evidences, identifying appropriate resources, using efficient searching methods and evaluating evidence and generally implementing the aforementioned literacy skills [8, 9].

After examining nurses' viewpoints and needs concerning evidence-based performance, Melnyk et al. (2004) reported that nurses admit to this fact that if clinical practices are done according to research evidences, the quality of care would be increased. Still, only 46 percent of nurses saw their clinical practices to be based on research evidences [10].

Meanwhile, guidelines and protocols have a special status for presenting solutions and standardizing methods.

The best and foremost reasons for implementing these guidelines within therapeutic centers are promoting the quality of services, reducing costs, promoting the health level of society and coordinating national standards with international standards [11]. Despite the fact that there are a few caring guidelines within hospital settings, it is often observed that these processes are vague and general and related standardization has not been efficiently carried out.

With regard to the already mentioned issues, developing the preventive guidelines for NIs must be seriously taken into account.

Moreover, regarding the significance of NIs, the present study was conducted in order to validate the preventive guidelines for NIs through evidence-based approach in ICUs.

2. Methods

This is a developmental study with an evidence-based approach. This study was carried out according to Stetler model in ICUs in 2013.

Designing the preventive guidelines for NIs was done according to evidence-based method and through executing the four phases within Stetler model.

This model consists of five phases (Stetler, 2001, p. 276): Phase

I: Preparation; Phase

II: Validation; Phase

III: Comparative Evaluation/Decision Making; Phase

IV: Translation/Application Phase

V: Evaluation

1. Preparation: at this phase, the objectives and problems with preventing NIs at ICU were identified and in order to solve this problem, authoritative papers and textbooks were examined. These papers were selected according to levels of being evidence-based which included review papers, RCT, same-group studies, evidence-based studies, and

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descriptive studies. They were retrieved from credible websites as full-text papers within 2006 up to 2012.

2. Validation: commenting and examining the papers and developing the guidelines based on the most recent textbooks and soliciting the viewpoints of faculty members, infectious disease specialist, educational mentors and specialists in ICUs.
3. Comparative Evaluation/Decision Making: identifying the scientific nature of guidelines in the ward and exploring the benefits and dangers for patients; in this regard, 15 nurses, who directly or indirectly provided clinical care in ICUs were consulted with.
4. Translation/Application: at this phase, it is made clear that how these guidelines can be implemented in clinical settings.

The inclusion criteria for the subjects (papers) were as follows: they must have dealt with preventing and controlling NIs, especially in ICUs; they must have relied on nursing care in ICU; the papers must have been published from 2006 to 2012; the papers must have been retrieved from authoritative websites.

By attending to the inclusion criteria of this research, 82 papers were selected from 178 papers as evidences for guidelines in a selective manner and based on levels of being evidence-based.

Following the development of guidelines, the researchers received the viewpoints of faculty members (10 individuals), and experienced nurses working in ICUs (15 individuals) in order to identify the scientific validity and applicability of guideline in clinical settings. In order to collect the data, we used Nezamzadeh et al.'s checklist [12] for examining the quality of preventive guidelines for NIs.

Accordingly, we analyzed the data by using descriptive statistics and the SPSS software, version 17.

3. Results

This study was conducted based on the Stetler model of evidence-based practice.

The Stetler model has five stages. In this the first of four phases was applied.

Initially, we collected 32 preventive guidelines for NIs from 3 ICUs. The quality of 84.37 percent of the mentioned guidelines was at a weak level while 15.63 percent of them had an mean quality. Afterward, 18 guidelines were developed. At this phase, in order to identify the scientific validity of the guidelines, the viewpoints of faculty members were solicited through Delphi technique. Only one of these guidelines is presented due to lack of presenting all guidelines within this paper. In the third phase of the study, to determine the feasibility and usability of the practice and clinical, written instructions was given to fifteen experienced nurses working in ICUs in hospitals of the Baqiyatallah University of Medical Sciences, in the form a focus group. Their comments were considered in drafting

404. Risk for Respiratory infection (NANDA)

Nursing diagnosis
Probability of respiratory infection due to: Aspiration of nutritional materials Aspiration of oral secretions
Evaluation criterion
ABG, normal findings in lung percussion, rate of blood oxygen saturation, color and amount of tracheal and oral secretions, vital signs, rib cage x-ray, respiratory sounds
Nursing interventions
1. Examining the remaining amount of gavage (force-feeding) liquid before each gavage (95, 85) 2. Examining frequently if NGT is at stomach and ascertaining its lack of movement 3. Frequent examination of bowel sounds and the liquids in the stomach for preventing reflex (91, 95). 4. Telling patient to be in semi-Fowler's position (96) 5. Refraining from liquids gavage instantly after changing patient's position (88, 97) 6. Putting patients at semi-Fowler position after garbage (85, 87)

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and revising the guidelines (Table 1). All in all, throughout the second and the third phases, we solicited the viewpoints of 25 individuals from among the faculty members and nurses working in ICUs. In this study, we asked the viewpoints of 15 nurses working in ICUs and 10 faculty members. The mean age of the individuals in the focus group and faculty members was 41.3 years old. The mean work record for nurses working in ICUs, who was in the focus group, was 14.3 years old.

Among them, 17 individuals from the focus group and faculty members were male and 8 were female. Nine individuals, i.e. %36, of individuals in the focus group and the faculty members held a Doctoral degree, 5 individuals, i.e. %20, in the focus group and faculty members had a Master's degree while 11 individuals, i.e. %44, in the focus group and among the faculty members had a Bachelor's degree. In the fourth phase of the study, the quality of the developed guidelines was assessed by the checklist used in the first phase, which indicated that 100 percent of the designed guidelines had a good quality. In the fourth stage of the study, the quality of written instructions with checklists used in the first stage was compared. All the design guidelines have good quality.

4. Discussion

The available guidelines on preventing NIs in ICUs had a weak quality of the present research. Also, the preventive guidelines for NIs in ICU were designed and validated according to evidence-based approach.

In the first phase of the study, the preventive measures for NIs which were available in ICUs were gathered. A total number of 32 preventive guidelines for NIs were gathered in the mentioned wards which did not have a good quality. The results of this study about the available guidelines are congruous with Nezamzadeh's study. Similarly, in Nezamzadeh et al.'s study, the guidelines in CCU did not have a good quality. In this study, which had been done in 2011, evidence-based nursing care guidelines were designed for patients suffering from angina pectoris and the guidelines were developed according to evidence-based pyramid. In addition, the papers in their study were selected from 2005 to 2010 and the designed guidelines were validated by faculty members and nurses within cardiac critical care (CCU) [12].In the second phase of the study, the preventive guidelines for NIs were designed according to evidence-based approach and Statler model. Totally, 18 preventive guidelines for NIs were developed.

Table 1: Quality of Nursing Care Instructions in the status quo and the design

	The present situation		After the design	
Abundance	Number	Percent	Number	Percent
Weak	27	84.37	0	0
Middle	5	15.63	0	0
Suitable	0	0	18	100
Total	32	100	18	100

The quality of the designed guidelines was enhanced to %100 by implementing evidence-based approach after examining through the employed checklist.

Numerous studies have presented and developed caring guidelines.

With regard to the significance of the evidence-based care, a large number of these researches have re-examined and updated the guidelines according to the most recent and valid research findings.

Anita Max et al. (2003) developed and applied nursing care guidelines for Hodgkin patients. In this study, 99 guidelines were designed and

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applied for giving care to Hodgkin patients [13].

Neil et al. (2001) presented 12 caring guidelines for patients receiving mechanical ventilation. In this study, the designed guidelines were developed according to evidence-based approach. Furthermore, the emphasis in this study was on the standards for detaching patients from ventilator [14].

Shawn Dawson et al. presented the process for developing the best evidence-based guidelines for preventing urinary infection among women with urinary catheters.

They initially carried out a systematic review over authoritative websites and then selected the evidence-based guidelines with highest quality.

This study was carried out through systematically reviewing the papers related to the research subject from 1980 to 2011 [15]. The guidelines presented by the aforementioned studies did not have good quality while the developed guidelines that are in line with the results of this study enjoyed good quality.

Louri et al. (2010) presented the process for developing the best evidence-based guidelines for preventing urinary infection. Initially, a systematic review over authoritative websites was conducted and then, the evidence-based guidelines with the best quality were selected. In this study, the systematic review over relevant papers was carried out from 1980 to 2010 [16].

In the third phase of the study, standardized clinical nursing care guidelines were designed and they were compared with the quality of previous guidelines.

The quality of the designed evidence-based guidelines was enhanced to %100 after examining with the employed checklist.

A large number of studies have been done about the effect of different guidelines on increasing the quality of nursing cares and increasing the output of clinical care.

In the following section, we present some cases related to these studies which are congruent with the present study.

Barnaby Young et al. explored the effect of evidence-based guidelines on the prevalence rate of wound infection.

After applying these guidelines, the amount of wound infection was noticeably decreased [17].

Behnam et al. (2011) examined the effect of evidence-based care of oral phlegm inflammation of infants receiving chemotherapy.

Applying the caring standards for oral phlegm led to the reduction of its inflammation [18].

Abedini et al. investigated the education of evidence-based principles to nursing students through a qualitative study.

In this study, nursing students carried out their own clinical cares during apprenticeship based on research evidences.

The results of this study indicated that evidence-based care leads to an increase in capability for problem solving, self-efficiency, group interaction and combining theoretical and empirical concepts [19].

Lewis Smith et al. (2011) examined spirometery guidelines on lung functioning in a longitudinal study.

In this study, positive changes were observed in lung function and respiratory system after applying spirometery standard guidelines [20].

5. Conclusions

With regard to the results of this study, preventive guidelines for NIs did not have good quality and it was found that up-to-date resources are used less in developing clinical and caring guidelines.

The present guidelines have not been derived from the most up-to-date and valid scientific and research resources in a systematic manner. Hence, by attending to the fact that evidence-based approach can provide the possibility for nurses to act according to scientific resources and it also prevents them to act according to their personal interests and viewpoints. Developing guidelines for preventing NIs according to evidence-based approach can decrease the length of patients' hospitalization

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in ICU, the rate of mortality and the costs incurred on society.

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