

# Knowledge, attitude and self-efficacy of nursing staffs in hospital infections control

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## Abstract

**Aims:** Medical team members, especially nurses can play an active role in prevention and control of nosocomial infections. The aim of this study was evaluating the knowledge, attitude and self-efficacy of nursing staff in controlling nosocomial infections.

**Methods:** This Cross-sectional study was done in 2010 on 135 nursing staff working in selected hospitals of Mashhad selected by census and purposive method. The data collection tool was a researcher-made questionnaire evaluating knowledge, attitude and self-efficacy in controlling hospital infections. Data was analyzed by SPSS 16 software using descriptive statistical methods and Chi-square and Mann-Whitney tests.

**Results:** 67.9% of the nursing staff had average knowledge and 29.9% had good knowledge about infection control. 90.4% had positive attitude towards the perceived threats of nosocomial infections, 17.2% were agreed with the perceived barriers of infections' prevention and control and 36.2% were agreed with the perceived benefits of infection control. 25.2% had average self-efficacy and 74.8% had good self-efficacy. There was not significant relationship between knowledge and self-efficacy. In addition, there was no correlation between attitude and efficacy but there was a significant relationship between knowledge and gender ( $p < 0.05$ ).

**Conclusion:** Nurses do not have appropriate knowledge about controlling nosocomial infections based on the findings of this study. Considering the important role of nurses in nosocomial infection control, training is necessary to increase nurses' knowledge and attitude in order to adopt appropriate health behaviors with positive attitude and more ability.

**Keywords:** Knowledge, Attitude, Self-Efficacy, Nursing Staff, Nosocomial Infections

## Introduction

Nosocomial infections are of the main health problems in all societies. These infections do not exist at the time of patients' admission and they appear for the first time after 72 hours or more of hospitalization. Recently, much attention has been paid to these infections because of mortality and losses caused by them [1, 2]. The WHO has changed the name of nosocomial infections into infections resulting from healthcare centers. This means that these infections not only develop in hospitals, but also in any place providing medical services [3]. Based on conducted studies, nosocomial infections happen in 10% of hospitalized patients [4]. In addition, occupation related infections that appear among the hospital staff are among these infections that increase the patient's disability and stress and lead to the increase in hospitalization period; treatment costs and cause major problems for patients [5, 6]. Nosocomial infections have been a problem for a great number of patients from the onset of using medical services and although many advances have been made in their control since more than a century before, still they are important

sources of pathogenicity and mortality [7]. Based on the statistics of the WHO, 1.7 million cases of nosocomial infections happen annually and one out of 20 hospitalized patients, experience nosocomial infection. These infections cause 99000 cases of mortality each year and impose 26 to 32 billion USD on the society [3]. Almost 5 to 10% of hospitalized patients in the United States experience these infections. This figure is higher in developing countries and annually 2 to 4 million nosocomial infections happen in these countries. Nosocomial infections are the eleventh cause of mortality and the fifth cause of hospital deaths [7]. The amount of these infections in Iran has been reported from the minimum of 1.9% to the maximum of 25% [8] that cause increase in patients' stay in hospital up to 24 days. This fact not only causes problem for hospitalized patients and all the staff of medical centers, but also causes a lot of problems for other people and their families. This happens because these patients are nosocomial infection transmission factors after their discharge and they cause a vicious cycle [7]. At present, complete removal of these infections is not possible and they only be reduced by appropriate

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measures [8]. People with nosocomial infections have longer hospitalization period, higher mortality rate and more organ dysfunction compared to other patients; therefore, these infections are the most important side effects of treatment [9, 10]. One-third of these infections can be prevented since the main way of their transmission is the hands of the healthcare personnel that this way of transmission can be prevented by washing hands. Nurses are more emphasized because they play the main role in patient care [11]. The hospital staffs play an important role in the spreading of infections and they are the key members in management and controlling of nosocomial infections. With emphasis on prevention of the disease, infection control should be considered by nurses as a main responsibility and the nurses should have enough information and essential related skills [12].

Considering the importance of this issue, a lot of studies have been conducted on this domain that the following cases can be mentioned:

In 2010, a research was conducted by Munnings et al. with the purpose of investigating the effects of replacement of intravenous catheters on the prevention of permanent effects of these catheters. In this study 362 patients who had these catheters were chosen. The catheters were replaced in 177 patients routinely every 3 days and were replaced in 185 patients whenever there was a problem and in case of need. The expected complications in this study were phlebitis, local inflammation, blood infection and local infection. Based on the obtained results, the complication of catheters was 68 in 1000 cases in the method of replacement with clinical observation was 66 in 1000 in routine replacement method and no local or blood infection was observed in the two groups. Therefore, it was concluded that routine replacement method has no advantage over the method of changing the catheter in case of observing problems [13]. In another study that was conducted by Parmeggiani for investigating the knowledge and attitude of nurses about the standard percussions, the results showed that their awareness is 58.8% and 80% of nurses have positive attitudes towards threats of nosocomial infections [14]. A research was conducted by Jayanth et al. in 2009 about the needle stick injuries in 30 hospitals based on a one-year supervision and observation of the reports of staff from 2006 to 2007. During a year, these injuries were reported for 296 people that 84 of them (4.28%) were nurses, 64 people (6.21%) were physicians and 24 people (1.8%) were health technicians. The injuries were in the form of needle stick in 25 people (5.8%) and were in the form of sharp objects for 55 people.

Therefore, it was suggested that essential training classes must be held about vaccination, reporting strategies and the correct method of removing the needle cap for increasing the safety of the staff [15]. In addition, a study was conducted by Kang in 2009 in Korea with the aim of investigating the knowledge of nurses about drug resistant microorganism guidelines on 306 nurses. The results showed the awareness of nurses was in the intermediate level (87.33%) and showed weakness in their obedience of the standard guidelines. 30% of nurses mentioned the lack of time and 9.48% of them mentioned not having knowledge about this issue as the main reason of not washing their hands. In the results of the mentioned study, it has been suggested that besides washing hands and using protective devices it is essential that their knowledge about the infection cycle, their perception of infections, the way of transmission and the quality of managing the environment for infection prevention increase [16]. In another study conducted in 2001 by Dr. Farokhshahi, with the aim of investigating the range of applying the principles of hand hygiene in infection control in 50 nurses and nurse-aids in randomly selected hospitals affiliated to the Social Security Organization in Kermanshah. The results showed that hand hygiene practice is in "intermediate" level in 100% of the nursing staff and in 16% of nurse-aids and is in "weak" level in 8% of nurse-aids. The result of this research, evaluated the operation of staffs in hand hygiene and the control of infection in low level. Since the most important way for controlling and prevention of infection, is hygiene behavior of staffs, holding training sessions and increasing the educational facilities for recognition and control of infection has been recommended [17]. In health education, the most important issues related to observing the sanitary patterns are being aware or not being aware, being agree or disagree and doing or not doing the regulations. Therefore, the awareness of beliefs in sanitary behaviors is of the main issues. Obtaining knowledge or awareness is not an achievement by itself, but the important point is transforming the knowledge into practice [18]. Prevention of nosocomial infections is an issue that needs the three concepts of knowledge, attitude and self-efficacy. Factors such as incentives, perceptions and personal values besides emotional tendencies are essential in creation of sanitary behaviors [19]. Since nurses as the main hospital administrators play a very important role, increasing the quality of their operation in performing nursing cares is an important factor that can accelerate the recovery of the patients and their return to home and family [20]. Nurses can prevent the

incidence of nosocomial infections by measures such as appropriate disinfection of skin, putting on gloves and masks, changing the infusion sets, appropriate isolation of patients, applying standard percussion principles, observing sanitary precautions of hand, preventing accidental needling, avoiding the contact with secretions and obeying preventive regulations [10]. In addition, self-efficacy is the mediator between knowledge and behavior and is defined as the confidence of a person in his/her ability to perform a behavior. Therefore, the feeling of efficacy is a prerequisite for changing the behavior [21]. Awareness, attitude and self-efficacy are prior to the change of behavior and they provide essential reason and incentive for performing a behavior [22].

This study was conducted with the purpose of determining the amount of awareness, attitude and self-efficacy of the nursing staff in nosocomial infection control.

## Methods

This research is a cross-sectional study which was conducted in 2010. The research population was all the nursing staff in the wards of two of Mashhad hospitals. The study subjects included 135 nursing staff that were chosen based on census and purposive sampling methods. The sample volume was determined based on related formula. Having at least healthcare diploma and having at least three years of job experience in hospital wards were considered as the inclusion criteria.

The data collection tool was a researcher-made questionnaire designed in two parts; the first part was related to demographic characteristics and the second part had three sections included:

- A) Questions related to knowledge that included 23 questions about the nature of infection, the ways of infection transmission, sources of infection, prevalence of infections, the prevention method and the role of nurse, 8 questions about safe injections and awareness of standard precautions, 5 questions about hand washing and 5 questions about dressing up.
- B) Questions related to the attitudes that included 11 questions regarding the nurses' perceived threats (perceived sensitivity and intensity) about the complications of nosocomial infections related to the nurse, patients and the hospital, 9 questions about the nurses' perceived benefits of observing the standard precautions and 9 questions regarding

the obstacles in performing the established principles in this domain.

- C) Questions related to self-efficacy that included 11 questions about the amount of self-confidence in controlling and preventing nosocomial infections and measuring the ability in dressing and injection affairs, washing hands, needle sticks or the ability of resisting the obstacles in controlling nosocomial infections.

For determining the scientific validity and the validity of the questionnaire the content validity was used. After studying related books and articles, the primary questionnaire was designed and presented to 15 medical university professors of Mashhad, Sabzevar and Tarbiat-Modarres. Their suggestions and reforms were collected and the final questionnaire were set and confirmed by the professors after considering their ideas and changing some parts of the questionnaire. For measuring the reliability of the questionnaire, test-retest method was used. After distribution of questionnaire with 10-day intervals and conducting test-retest method, the consistency of answers was calculated and the correlation coefficient of  $r=0.83$  confirmed the reliability of the questionnaire.

The researcher referred to different wards of the selected hospitals in different work shifts and distributed the questionnaires. Then the researcher collected them after an hour or the questionnaires were distributed after finishing the training classes in the morning shift so that the questionnaires could be distributed in that place far from the ward stress. Considering the effects of physical and psychological factors on the amount of care and the way of replying the questions (that their complete control was not possible), the researcher tried to relatively control these limitations. In addition, moral principles such as obtaining the permission of authorities for performing the research, introducing the researcher to the supervisors of the wards for cooperation, expressing the purposes and the method of study along with obtaining the consent of research units, assuring the study units that the information remain confidential, observing sincerity and honesty and special observation of the usefulness for patient were observed.

The Likert scale was used for data analysis. The maximum scale was considered for the "agree" attitude. Therefore, "totally agree" had the maximum score (4), "totally disagrees" had the minimum score (0) and "I have no idea" had intermediate score (2). Also for the options "I rather disagree" score 1 and for the option "I rather agree" score 3 were considered

respectively. The opposite method was used if the maximum scale was allocated to the “disagree” attitude. Then, with consistency in the scoring method, each subject’s score was calculated and ranked based on the obtained scores in three levels of good, intermediate and weak. After coding the collected data, they were computerized and analyzed with SPSS 16 statistical software and descriptive statistical indexes such mean and standard deviation. For investigating the correlation between the subjects’ characteristics and the studied dimensions, Chi-square test and Mann-Whitney test were used.

### Results

From 135 participants, 62 subjects (45.9%) were men and 73 subjects (54.1%) were women and among these subjects 19 (14.1%) were single and 116 (85.9%) were married. 101 subjects (74.8%) were nurses, 23 (17%) were nurse-aids and 11 (8.1%) were supervisors. 42 subjects (31.1%) worked in morning shifts, 17 subjects (12.65) worked in evening shifts and 40 subjects (29.6%) worked in turning shifts at the time of study. 29 subjects (21.5%) had diploma and 113 subjects (83.7%) had BA.

General knowledge for recognition and nosocomial infection control in 67.9% of nurses was in intermediate level (Table 1).

Investigating the attitudes of research subjects, the amount of perceived threats in the results of nosocomial infections was evaluated in good level in the nursing staff (Table 2). The most perceived obstacles in observing the standard safety precautions and prevention of nosocomial infections included lack of enough time and supervision of authorities and lack of enough facilities in the hospital. In addition, the most perceived benefits were related to the health of nurses and their families and patients’ rapid improvement. Determining the rate of nurses’ self-efficacy in observing standard safety precautions and prevention of nosocomial infections, 34 subjects (25.2%) were in intermediate level and 101 subjects (74.8%) were in good level.

Most of the study units washed their hands before eating meals and after using rest room and the least hand washing rate was related to before and after using gloves and injections. 70% of the subjects used water and soap for sanitary washing of hands and 37% used alcohol. 53.3% of the study units used tissues for drying their hands and 10% did not dry their hands at all. 47.6% of the subjects did not recap needle after use and 2.5% recapped the needle after injection. 57 subjects (42.2%) mentioned that they had received

necessary vaccines and 35 subjects (26%) mentioned that they checked their antibody titers every 6 months.

**Table 1-**The situation of nurses’ awareness in controlling nosocomial infections

The knowledge rate→ Dimensions of knowledge↓	Weak	intermediate	Good
	Number (Percent)	Number (Percent)	Number (Percent)
<b>General knowledge</b>	3(2.2)	71(52.6)	61(45.2)
<b>Precautions related to injections</b>	20(14.9)	86(64.2)	28(20.9)
<b>Precautions related to dressing</b>	3(2.2)	66(48.9)	66(48.9)
<b>Hand washing</b>	9(6.7)	61(45.5)	64(47.8)
<b>Total knowledge</b>	3(2.2)	91(67.9)	40(29.9)

**Table 2-** Situation of nurses’ attitudes regarding nosocomial infection control

The attitude→ Dimensions of attitude↓	Disagree	Neutral	Agree
	Number (Percent)	Number (Percent)	Number (Percent)
<b>Perceived threat</b>	0	13(9.6)	122(90.4)
<b>Perceived obstacles</b>	38(28.4)	73(54.5)	23(17.2)
<b>Perceived benefits</b>	0	86(63.7)	49(36.5)

There was no significant statistical relationship between the amount of awareness with variables such as age, marital status and job experience. However, the statistical relation between awareness and gender was significant in the way that the awareness of men was less than women ( $p < 0.05$ ). In addition, there was significant statistical relationship between awareness and participation of training courses ( $p < 0.05$ ).

### Discussion

The obtained results from the first purpose of the study based on determining the awareness of nursing staff about nosocomial infections and the controlling methods showed that most of the research units had intermediate awareness level. These results are in accordance with the presented results in most studies such as Parmeggiani’s study in 2010 in Italy that investigated the awareness and attitude of nurses regarding standard precautions [14], the study of Kang in 2009 in Korea the investigated the knowledge and obedience of nurses regarding the drug resistant microorganisms infection control guidelines [16] and the study of Abdollahi which investigated nurses’ awareness of nosocomial infections. In the research of Taheri, the awareness of nurses and nursing students of nosocomial infections was reported in average level (68.1%) [11]. Janjua in Pakistan investigated the awareness of nurses of nosocomial infections transmitting through blood that this study reported the

awareness of nurses in intermediate level [24]. However, the results of this research has no consistency with study of Nasrollahzadeh investigating the amount of awareness of nurses of nosocomial infections in Rasht which had evaluated their awareness in weak level [25] and with the presented results from the study of Mahmoodi in Zahedan on the awareness level of nurses [26].

The most reported cases of research units was related to washing hands after contacting with the patient and before eating lunch and after use of rest room. 15.6% of nurses washed their gloves before and after use that was not in accordance with the study of Alahbakhshian in Tabriz [27]. In addition, 10.4% washed their hands before injections that this result was not in accordance with the study of Zigheymat and Mehtar [20, 28].

The awareness level of nursing staff about nosocomial infections depends on many factors such as personal and educational specifications, holding training classes and management and motivational factors and it can be mentioned that most nurses act less than what they have learned during training courses. He emphasizes the continuity of training courses [29]. Therefore, the difference in the results of such studies is interpretable.

Considering the second purpose of the current study in investigating the attitudes of research units toward nosocomial infections and their prevention, the results showed high perceived threats and positive attitudes in most research units. This finding was in accordance with the study of Karimi and Khademian [30] and Alahbakhshian in Tabriz [27]. In a study aimed at investigating the awareness, attitude and acts of nursing students in comparison with medical students regarding hand washing conducted in Greece, the awareness and positive attitudes of nursing students was more than medical students [31]. The studies show that despite of existing high perceived threats of infections in nurses, most of them mentioned the existence of obstacles in controlling nosocomial infections. In order to create positive attitudes in nursing staffs and strengthening their sanitary beliefs (due to their exposure to the danger because of their occupation, dealing with patients and dangerous behaviors), creating the sense of being vulnerable to infection, aggrandizing the benefits for the nurse, emphasizing the decrease of costs for the patients and hospitals and reducing the perceived obstacles in all hospital staff especially nurses seem to be essential. Most obstacles are related to the shortage of time and lack of authorities' supervision on this domain that

was in accordance with the results of the studies of Masood Hussein in Karachi [32].

Regarding the third purpose of the present study that was measuring the self-efficacy or self-confidence in nurses in having sanitary caring behaviors, most of the study units had good self-efficacy and there was a significant relationship between self-efficacy and attitude and perceived threat. This result is in accordance with the obtained results in the study of Morovati that showed relationship between self-efficacy and sanitary beliefs [33].

There was no significant relationship between variables such as age, marital status and job experience, but there was significant statistical relation between awareness and sex in the way that female nurses had more awareness compared to male nurses. In the study of Nasrollahzadeh in Chamran hospital, there was no significant statistical relationship between the awareness level and job experience that is consistent with the present study [34].

## Conclusion

Most nurses do not have enough awareness about controlling nosocomial infections. Therefore, the nursing staff need to receive correct and complete trainings about nosocomial infections and the method of preventing them, especially for the advantages that the prevention of nosocomial infections have for protecting the health of these people, their families and other patients and society. Therefore, periodic and in-service trainings in this domain are suggested.

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