

## Research Article

# A study of nurses' observance rate of hygienic principles and nosocomial infections control

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## ABSTRACT

**Background:** Health-care personnel's familiarity with infection control methods and pathogen transmission channels play a determining role in reducing nosocomial infections. This study aimed at investigating the nurses' performance in observing hygienic principles and nosocomial infections control.

**Methods:** This descriptive cross-sectional study was conducted on 34 nurses working at Afshar Hospital in Yazd, Iran in 2016. Nurses' performance on infections prevention was surveyed via a checklist using self-reporting by nurses. The gleaned data were analyzed using independent t-test and ANOVA.

**Results:** Our findings suggested that 69.5% of nurses had moderate performance on nosocomial infections control with regard to themselves, 63.2% had it with regard to patients, and 71.5% had it with regard to hospital setting. Also, there was a significant correlation between performance quality and nurses' working experience ( $P=0.01$ ), on the one hand, and participation in an orientation workshop ( $P=0.001$ ), on the other hand.

**Conclusions:** Based on our findings, it is rendered as mandatory for hospital authorities to provide the required conditions for improving nurses' awareness and performance with regard to observing the hygienic principles and nosocomial infections control.

**Keywords:** Nosocomial infections, Nurses, Hygienic principles, Infection control

## INTRODUCTION

While hospitals are intended as safe places for diagnosis and treatment of diseases, they are, paradoxically, converted to centres for creation and transmission of various infections. Hospital-acquired infections, also called nosocomial infections, are defined as infections acquired by in-patients during their hospitalization and demonstration of the disease may occur during hospital stay or after discharge from the hospital. Infections

manifesting after 48-72 hour are usually rendered as nosocomial infections. If they occur less than 48 hour following hospitalization, there is the possibility that the patient may have been in the incubation period of the infection. Today, nosocomial infections are considered as a stubborn medical problem due to high mortality rates, patients' increased hospital stay, and increased costs of long hospital stay, diagnostic procedures, and therapeutic interventions.<sup>1</sup> They are further considered as the most important problems bothering the health-care systems

throughout the world, specifically in the developing countries.<sup>2</sup> These imposed infections threat not only the patients and hospital personnel, but also the whole community.<sup>3</sup> Various factors contribute to increasing nosocomial infections the most important of which are: age (neonates and geriatric patients), surgery, the immune system problems, the use of immunosuppressant drugs, chronic illnesses such as diabetes, hepatic cirrhosis, renal failure, cancer, and the consumption of wide-spectrum pharmaceuticals.<sup>4</sup> Their average rate of incidence is reported to be about 15%, this rate being higher in our country.<sup>2</sup> About 5.7 cases of nosocomial infections occur for each 100 hospital admissions in the US leading to the incidence of at least 2.1 million nosocomial infections in that country. It appears that this rate is stable at this level all around the world. Moreover, the incidence rate of these infections has been 5-10% in Europe and America and they have contributed to the death of 88000 humans round the globe in 1995, i.e., one case of mortality per 6 min.<sup>5-7</sup> The World Health Organization has announced the incidence rate of nosocomial infections to be 5-10% in the developed countries and 25% in some developing countries in 2005. On the basis of this report, more than 1.4 million patients are annually affected by nosocomial infections around the world. The amount of the economic damage imposed for overcoming the problems related these infections in some countries with moderate income is speculated to be around 8 billion US dollars.<sup>8</sup> The WHO has changed the name of these infections from "nosocomial infections" to "health-care associated infections" in 2000. This means that these infections are not specific to hospitals, rather, they may occur in any health facility.<sup>8</sup> The treatment of hospital-acquired infections has imposed a cost of 4.5 billion dollars in 1995.<sup>9</sup> The most important pathogens contributing to these infections are the microorganisms residing the patients' bodies transmitted through patient-to-patient contact or by the hospital health-care personnel.<sup>10</sup> These microorganisms are transferred in the hospital setting by various methods including person-to-person contact, contact with the patients' droplets, spatial transmission, edible substances present in the hospital, and equipment and medical appliances.<sup>11</sup> Regarding organ involvement in nosocomial infections, the urinary system is the first tract to be affected by these infections followed by respiratory system, circulatory system, skin, and other organs.<sup>12</sup> Presently, it is not possible to remove all these infections utterly; rather, they could be just reduced via taking some appropriate measures.<sup>13</sup> The most important of these measures include washing the hands, specially for treatment staff, observing personal hygiene by patients, provision of sanitation in the hospital setting, and prevention of the overuse of antibiotics.<sup>14</sup> Hospital staffs play a significant role in infection transmission. Nurses are one key component in management and control of hospital-acquired infections. Regarding the emphasis given to disease prevention today, infection control must be kept in mind by nurses as a great responsibility resting on their shoulders.<sup>15</sup> Since nurses play a noticeable role as the major directors of hospitals,

promoting the quality of their performance in nursing care is an important factor which can accelerate the healing of patients and sending them back home.<sup>7</sup> Consequently, we embarked on studying the rate of observance of hygienic principles and infection control by nurses.

## METHODS

In this descriptive cross-sectional study, 34 nurses employed at the internal and surgical wards of Afshar Hospital of Yazd, Iran were studied in 2016. The subjects were selected using the simple sampling method. The inclusion criteria of the nurses were: holding a BS or higher degree in nursing, and a clinical experience of at least six months (to possess considerable practical mastery on clinical affairs). The exclusion criterion was nurses' lack of tendency for participation in the research. Nurses' demographic information included: age, gender, marital status, education level, work experience, and history of joining the workshops on nosocomial infections control. The data were further confirmed by checking them in the patients' recorded file after questioning the patients. Each nurse's performance on infection prevention was surveyed through both self-report and checklist. The checklist used in this study was developed using the expert opinion on the basis of similar studies. It consisted of 30 five-point Likert scale items each ranging from 0 to 4. Content validity of the checklist was established on the basis of 12 faculty members' opinions and its reliability was set using the coefficient of agreement among observers. This coefficient was 83% indicating the reliability of the inventory. To study the nurses' performance on control of hospital-acquired infections, the checklist items were subsequently divided into three subdivisions including nurses' infection control with respect to themselves, with respect to patients, and with respect to hospital setting. The obtained scores were categorized in five scales of very weak, weak, moderate, good, and excellent. The gleaned data were analyzed using SPSS. Descriptive statistics were used to investigate the quality of nurses' performance. Moreover, independent t-test and ANOVA were applied to explore the correlation between nurses' demographic information and the quality of their performance.  $P < 0.05$  was considered as significant.

## RESULTS

In this study, of 34 participants, 86.6% were female and 13.4% were male. The mean age of the nurses was  $30.30 \pm 7.68$  years. Only 30% had participated at least once in the infection control workshop. The mean work experience of the nurses was  $10.21 \pm 7.63$  years. The quality of performance of most nurses in nosocomial infections control was moderate with respect to themselves, with respect to patients, and with respect to hospital setting. In other words, 69.5% of nurses had moderate performance in hospital infections control regarding themselves, 63.2% had moderate performance in hospital infections control with respect to patients, and

71.5% had moderate performance in hospital infection control with respect to hospital setting (Table 1). The results of independent t-test and ANOVA indicated that there was a statistically significant correlation between nurses' performance quality and work experience on the one hand ( $P=0.05$ ), and participation in educational workshop, on the other ( $P=0.001$ ) (Table 2).

**Table 1: Frequency of nurses' performance quality in nosocomial infections control with regard to themselves, patients, and hospital setting.**

Performance	Nurse	Patient	Hospital
Very weak	2.2	3.7	4.2
Weak	11.6	9.8	6.1
Moderate	69.5	63.2	71.5
Good	12	13.3	14.2
Very good	4.7	10	4
Percent	100		

**Table 2: Correlation between demographic information of nurses' performance in hospital infection control.**

Variable	Means $\pm$ SD	P-value	Type of test
<b>Age (years)</b>			
25-35	09.35 $\pm$ 5.04		
35-45	108.65 $\pm$ 5.15	0.41	F=5.332
45-55	107.23 $\pm$ 5.12		
<b>Sex</b>			
Male	101.42 $\pm$ 52.3	0.58	t=88.5
Female	107.53 $\pm$ 2.41		
<b>Marital status</b>			
Single	106.28 $\pm$ 2.70	0.63	F=0.462
Married	103.78 $\pm$ 3.34		
<b>Education level</b>			
BS	108.53 $\pm$ 2.44	0.72	t=4.83
MSc	106.56 $\pm$ 4.87		
<b>Work experience</b>			
1-5	117.70 $\pm$ 4.56		
6-10	116.14 $\pm$ 3.72		
11-15	116.18 $\pm$ 3.42		
16-20	114.18 $\pm$ 2.01	0.01	F=8.31
21-25	112.85 $\pm$ 4.51		
2-30	110.72 $\pm$ 2.68		
<b>Workshop participation</b>			
Yes	117.58 $\pm$ 0.46	0.001	t=4.83
No	103.45 $\pm$ 2.44		

## DISCUSSION

Nosocomial infections are a stubborn problem which have a great economical impact on the health system of the countries and is associated with human damages. Nowadays, special committees are formed in any hospital

to solve the problem of hospital-acquired infections. An acceptable cooperation of the hospital personnel as a major source of contamination and transmission of many hospital pathogens with these committees is mandatory.<sup>16</sup> Hence, personnel's awareness of hospital infections, specifically their familiarity with guidelines of standard practices of infection control known as general precautions is necessary. Indeed, the scientific approaches to the disaster of hospital-acquired infections has led to the recommendation that, today, any hospital should establish its own infection control committee which is responsible for planning and managing all programs concerning infection control and performs all decision making in this regard. One important principle of general precautions is that all patients should be rendered as potential sources of infection, so, any patient should be first put under general precautions and then, depending on the type of illness of the patients, more specific conditions should also be observed as taking precautions on the basis of channels of infection transmission. In this way, the transmission of much infection in hospitals is reduced.<sup>17</sup> Moreover, our findings suggested that there was no statistically significant correlation between nurses' performance in hospital infections control, on one hand, and their age, sex, marital status, and education level, on the other. Nonetheless, the quality of nurses' performance in the three mentioned areas was moderate so that 69.5% of the nurses had moderate performance in hospital infection control with regard to themselves, 63.2% had moderate performance in hospital infection control with respect to patients, and 71.5% of them had moderate performance in hospital infections control with regard to hospital setting. Similar to our study, the study by Aghakhani et al demonstrated that the quality of nurses' performance in hospital infections control was 70.6%, 65.1%, and 73.5% with respect to themselves, patients, and hospital setting, respectively.<sup>18</sup> Moreover, Gould's study indicated that the health-care personnel had correct and accurate performance in hospital-acquired infections control only in 30% of cases.<sup>19</sup> Additionally, the study by Mac Bride et al suggested that most nurses (65%) did not have the right performance in hospital infections control.<sup>20</sup> Also, the findings of the study above reported a significant correlation between nurses' performance quality and their work experience ( $P=0.01$ ). This correlation was also found in Aghakhani et al study ( $P=0.006$ ).<sup>18</sup> The reason for this correlation may be assigned to the point that the beginner nurses probably show more interest in learning nursing skills compared to the more experienced ones. On the other hand, the more experienced nurses have less time for learning and studying.<sup>21</sup> Linden et al showed in their study that nurses did not have an acceptable performance despite their proper pertinent knowledge.<sup>22</sup> Moreover, research findings indicated a significant correlation between performance quality and participation in orientation workshops ( $P=0.001$ ). In fact, there was a significant correlation between performance quality and workshop participation in the study by Aghakhani et al ( $P=0.001$ ).<sup>18</sup> Also, workshop participation had an effect

on nurses' performance quality in England.<sup>23</sup> Meilser asserts that passing more hours in educational workshops is necessary for increasing the level of nurses' awareness and knowledge.<sup>24</sup> These findings can collectively indicate the positive effects of the required training and the role of infection control nurses in hospitals.<sup>25</sup>

## CONCLUSION

Regarding the findings of this and similar studies conducted so far in this field, it could be reasonably postulated that the use of educational courses or workshops for improving the nurses' level of knowledge and awareness and promoting their attitudes towards hospital infection control is necessary. This demands the greater concerns and interventions of the authorities involved.

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