



Performance of Students and Nursing Staff in Nosocomial Infection Control in Behbahan City

Hadi Mashali¹, Mohamad Kheibar¹, Leila Dehghani² and Nasrin Kheibar^{3,*}

¹Student Research Committee, Behbahan University of Medical Sciences, Behbahan, Iran

²Department of Public Health, Behbahan University of Medical Sciences, Behbahan, Iran

³Department of Nursing, Behbahan University of Medical Sciences, Behbahan, Iran

*Corresponding author: Instructor, Department of Nursing, Behbahan University of Medical Sciences, Behbahan, Iran. Email: nas.kheibar@gmail.com

Received 2020 July 04; Revised 2020 October 18; Accepted 2020 October 27.

Abstract

Background: Considering the fundamental role of nursing staff and students in patient care and nosocomial infection control.

Objectives: This study aimed to evaluate and compare the performance of students and nursing staff in nosocomial infection control in Behbahan city in 2019.

Methods: This is a descriptive-analytical study. The participants were 217 nursing staff and students of three hospitals in Behbahan who were selected by random sampling. The data gathering tool was a questionnaire that consisted of demographic information and five common nursing procedures. The performance measurement criterion was based on fulfilling or not fulfilling standards. After gathering the data, they were analyzed by statistical tests, including ANOVA and Pearson correlation in SPSS 16 software.

Results: The participants were 157 nursing staff and 60 nursing students. In line with the main objective of the study, the results showed that the average performance scores of students (152.9 ± 12.5) and nursing staff (15.5 ± 13.2) were at a good level, and there was no statistically significant difference between the performance of students and nursing staff ($P = 0.08$). Also, there was no statistically significant difference between the nursing staff of three hospitals ($P = 0.76$). However, there was a statistically significant difference between the performance scores of staff in different wards ($P < 0.001$). The CCU and NICU personnel outperformed other wards' personnel.

Conclusions: Based on these findings, it can be concluded that nurses at different levels of education, with different demographic characteristics, and different work environments have a good performance in controlling infections. This is a strong point in the nursing profession.

Keywords: Infection Control, Nosocomial Infection, Nursing Staff, Nurse, Student

1. Background

Nosocomial infections are one of the fundamental health problems in all societies (1). These infections do not exist at arrival to the hospital but occur within 48 to 72 hours or more after hospitalization. If an infection occurs within less than 48 hours, the person is likely to be in the latency stage before being admitted to the hospital (2). According to the World Health Organization (WHO), 1,400,000 people suffer from complications of nosocomial infections annually. The prevalence of nosocomial infections is estimated at 40% or more in developing countries (3). However, the rate of nosocomial infections in Iran was reported as 9.4% (4). Risk factors associated with nosocomial infections are the length of stay, misuse of antibiotics, improper use of suction catheters, refusal of health care personnel to wash their hands, and lack of use of sterile

techniques during treatment (5). These infections increase the length of hospitalization, disability, and discomfort of patients. They also noticeably accelerate complications and mortality rates and impose high costs on patients (6, 7).

Regarding the harmful effects of nosocomial infections on the individual and society, it is necessary to make decisions to control infections. One of the appropriate solutions in infection control is to improve the performance of personnel (8). Researchers believe that given the caring role of nurses and nursing students and their frequent exposure to clients and families that require their caring role, more opportunities are provided for the propagation of organisms, so nurses and nursing students play a key role in the cycle of infection control (9-11). Hence, the awareness of the personnel's performance and providing necessary training, which is part of the main infection control

strategies at the national and international levels, will enable staff to provide accurate and adequate scientific information on the types of nosocomial infections and procedures (10,12). Nurses can protect patients from nosocomial infections by using this information on corrective and preventive care interventions (10,12).

Studies on assessing the performance of personnel in nosocomial infection control have shown different results. A study by Yousefi et al. claimed that the performance scores of personnel regarding nosocomial infection control were in good condition (13). In a study by Alavi Moghaddam et al. at Imam Hossein Hospital in Tehran, the performance of subjects regarding nosocomial infection control and hand hygiene observation was not appropriate (14). Although studies have been performed to evaluate the performance of nosocomial infections in personnel (15-17), due to the inconsistency in the results of different studies, more studies need to be done to evaluate the performance of nursing staff and students in the control of infections. The hospitals need more investigations in this vein. Therefore, in this study, we compared the performance of students and nursing staff of different wards of hospitals in the control of nosocomial infections.

2. Objectives

In this study, we compared the performance of students and clinical ward staff in the control of nosocomial infections.

3. Methods

This cross-sectional analytical study aimed to compare the performance of students and staff of clinical wards in nosocomial infection control in Behbahan city in 2019. The research population included nurses and field training students of nursing in Shahidzadeh, Farideh Behbahani, and Shahid Mustafa Khomeini public hospitals. The population size was 500 people; thus, according to the Morgan table, the sample size was 217, which was selected using stratified random sampling. Participants were provided with the necessary information about the study and signed consent forms consciously. Staff was required to have a practical nursing diploma, bachelor of nursing and midwifery, and at least one-year work experience, and students were required to pass at least six semesters as the inclusion criteria.

The data collection tool was a researcher-made questionnaire designed by Yousefi et al. Part one included demographic characteristics such as age, gender, place of work, hospital ward, work experience, field, education

level, and passing related workshops. Part two included the performance questionnaire in five representative daily nursing procedures, including 1) Before doing anything, 2) Bandaging, 3) Peripheral venous catheter insertion, 4) Intravenous injections, and 5) Suctioning. A Likert-scale scoring system was used that included always (3), sometimes (2), and never (1). Performance measurement criteria were divided into three levels based on whether each of the standards is met or not, and after summing the scores, the performance scores were categorized as poor (1-58), moderate (59-116), and good (117-174). The split-half method was used to determine the content validity and reliability of the performance section. The Pearson correlation coefficient was calculated as 0.84.

Data were analyzed using ANOVA, t-test, and Pearson correlation coefficient in SPSS 16 software. The Pearson correlation coefficient was used to calculate reliability by test-retest ($r = 0.84$). The independent t-test was used to compare the performance scores of the two groups based on gender and passing training courses, as well as to compare the performance scores of the two groups (students and staff). One-way analysis of variance was used to compare the mean performance scores of the two groups (students and staff) based on age, work experience, hospital, and ward in SPSS 16 software.

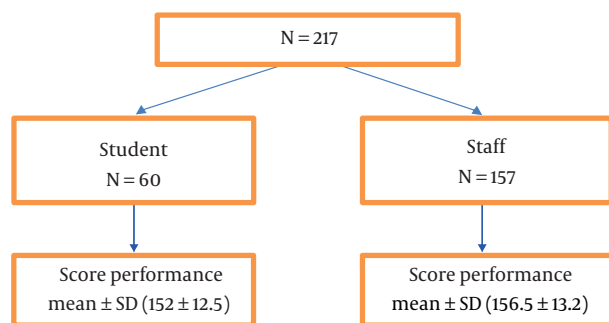
4. Results

In this study, the performance of 157 nursing staff (11% males and 89% females) and 60 students (30% males and 70% females) regarding nosocomial infection control was assessed using a questionnaire. In terms of education, 12% of the staff were nurse aides, and 88% were bachelor of nursing graduates.

The mean performance score of students and nursing staff was at a good level, and in both groups, the performance score was almost good (Table 1). Also, there was no statistically significant difference between the two groups of nursing staff and students ($P = 0.08$) (Figure 1). There was no statistically significant difference between the mean scores of students and nursing staff in different age groups ($P > 0.05$). Therefore, it can be said that there was no relationship between age and performance. There was no statistically significant difference between the performance scores of students regarding sex. However, the performance score of female medical personnel was higher than that of male personnel, and this difference was statistically significant ($P = 0.011$). There was no statistically significant difference between the performance scores of trained and untrained individuals ($P > 0.05$). In both groups, the performance score was almost good (Table 2).

Table 1. Comparing the Performance of Nursing Staff and Students in Nosocomial Infection Control

Group	Number	Mean \pm Standard Deviation	P Value
Nursing staff	157	156.5 \pm 13.2	0.08
Students	60	152 \pm 12.5	
Total	217		

**Figure 1.** Diagram of Comparing Students and Staff by Performance Score**Table 2.** Performance of Nursing Staff and Students in Nosocomial Infection Control in Terms of Age, Sex, and Passing Training Workshops

Variable	Mean \pm Standard Deviation	
	Students	Nursing Staff
Age, y		
20-30	153.4 \pm 12.1	154.7 \pm 13.7
31-40	148.7 \pm 15.7	157.7 \pm 13.2
41-60	-	156 \pm 11.5
P value	0.44	0.38
Sex		
Male	148 \pm 12.5	149.2 \pm 17.7
Female	154.8 \pm 12.1	157.5 \pm 11.7
P value	0.075	0.011
Passing training workshops		
Yes	153.3 \pm 10.9	156.1 \pm 13.5
No	152.8 \pm 13.3	157.3 \pm 12.5
P value	0.89	0.59

There was no statistically significant difference between the mean score of nursing staff performance ($P = 0.36$). Therefore, it can be said that there was no relationship between work experience and performance. There was no statistically significant difference between the staff performance scores of the three hospitals ($P = 0.76$); however, there was a statistically significant difference between the scores of staff performance in different wards (P

< 0.001). This difference was because of the difference between the performance scores of CCU and NICU staff and those of people in other wards (Table 3).

Table 3. Performance of Nursing Staff in Nosocomial Infection Control in terms of Work Experience, Hospital, and Ward

Score Variable	Number	Mean \pm Standard Deviation	P Value
Work experience, year			0.36
Less than one	20	160.4 \pm 10.3	
1-10	74	155.1 \pm 14.9	
More than 10	63	156.9 \pm 12.5	
Total	157	156.5 \pm 13.2	
Hospital			0.76
Shahidzadeh	90	155.9 \pm 15.2	
Farideh Behbahani	37	154.8 \pm 12.2	
Shahid Mustafa	30	160.2 \pm 8.2	
Total	157	156.5 \pm 13.2	
Ward			< 0.001
Emergency Room	33	156.7 \pm 14.5	
Internal	26	156.7 \pm 10	
Surgical	31	157.2 \pm 12.9	
ICU	11	159.5 \pm 12.4	
CCU	10	168.8 \pm 5.6	
Pediatric	16	140.3 \pm 12.1	
Clinical	4	158.7 \pm 16.1	
Dialysis	3	161.7 \pm 14.2	
Nursery	18	156.5 \pm 12.5	
NICU	5	164 \pm 4.1	
Total	157	156.5 \pm 13.2	

5. Discussion

In line with the main objective of the study, comparing the performance of students and clinical ward staff in nosocomial infection control, the results showed that the mean performance scores of students and nursing staff were good among the three levels of poor, moderate, and good. There was no statistically significant difference between the two groups (nursing staff and students) ($P = 0.08$). This is consistent with the results of most studies, including studies by Fashafsheh et al. (18), Darawad et al. (19), Ghalya (20), Sharif et al. (21), Alexandria et al. (22), and AL Rawajfah et al. (23), but is not consistent with studies by Yaghoubi et al., Ghanbari et al. (7, 24), and Shinde et al. that declared the performance of nursing staff was

lower than the performance of students. The reasons for the inconsistency and poorer performance of the staff in these studies were factors such as considerable work stress, poor knowledge, lack of training, having too much workload, and avoiding hand contact with cleaners and disinfectants.

There was no significant relationship between staff performance and age, work experience, and passing training courses. This is consistent with research by Fashafsheh et al. (18), Hamid et al. (25), and Gijare et al. Similarly, AL Rawajfah et al. (23) noted that there was no significant relationship between performance and having long work experience. However, the relationship between work experience and performance regarding nosocomial infections was significant in Sharif et al.'s study (21). There was no statistically significant difference between the performance scores of staff from three hospitals. However, there was a statistically significant difference between the scores of personnel from different wards in which, CCU and NICU personnel outperformed people from other wards. This could be explained by the fact that patients in these wards have general weaknesses due to illnesses, a weakened defense system, and long hospitalization; thus, these patients are highly susceptible to infections. Therefore, the staff of these wards are more sensitive and careful in their work.

5.1. Limitation

One of the limitations of this study was the method of self-reporting in data collection, which could be influenced by the characteristics of individuals in reporting their performance.

5.2. Conclusion

In this study, the performance of medical staff and students was at a good level. Also, there was no significant difference between the performance of medical staff and students. In addition, it was not related to demographic components, and only people from CCU and NICU departments scored higher. Based on these findings, it can be concluded that nurses at different levels of education, with different demographic characteristics, and different work environments have a good performance in controlling infections. This is a strong point in the nursing profession.

Acknowledgments

This article was derived from a research project approved by Behbahan Faculty of Medical Sciences under code IR.BHN.REC.1398.005, which has been confirmed by the Ethics Committee. The authors thank the Behbahan

Faculty of Medical Sciences that sponsored this research project, as well as the nursing staff and nursing students participating in the study.

Footnotes

Authors' Contribution: Author Contributions: Study concept and design: N.KH., H.M., and M.KH.; Analysis and interpretation of data: L. D. and H.M; Drafting of the manuscript: H.M., and M.KH.; Critical revision of the manuscript for important intellectual content: N.KH. Statistical analysis: L.D.

Conflict of Interests: There is no conflict of interest.

Ethical Approval: IR.BHN.REC.1398.005.

Funding/Support: This article is derived from a research project approved by the Research Assistant of Behbahan Faculty of Medical Sciences under code IR.BHN.REC.1398.005.

Informed Consent: Participants were provided with the necessary information about the study and signed consent forms consciously.

References

- Shinde MB, Mohite VR. A study to assess knowledge, attitude and practices of five moments of hand hygiene among nursing staff and students at a tertiary care hospital at Karad. *International Journal of Science and Research (IJSR)*. 2014;3(2):311-21.
- Amini M, Sanjary L, Vasei M, Alavi S. Frequency evaluation of the nosocomial infections and related factors in Mostafa Khomeini Hospital" ICU" based on" NNI" system. *JAUMS*. 2009;7(1):9-14.
- World Health Organization. *Improved hand hygiene to prevent health care associated infections*. 2007. Available from: https://www.who.int/gpsc/tools/faqs/evidence_hand_hygiene/en/.
- Askarian M, Yadollahi M, Assadian O. Point prevalence and risk factors of hospital acquired infections in a cluster of university-affiliated hospitals in Shiraz, Iran. *J Infect Public Health*. 2012;5(2):169-76. doi: 10.1016/j.jiph.2011.12.004. [PubMed: 22541264].
- Allah-Bakhshian A, Moghaddasian S, Zamanzadeh V, Parvan K, Allah-Bakhshian M. Knowledge, attitude, and practice of ICU nurses about nosocomial infections control in teaching hospitals of Tabriz. *Iran journal of nursing*. 2010;23(64):17-28.
- Habibzadeh S; et al. [Nosocomial Infections and related factors in traumatic hospitalized patients in ICU, Iran]. *J Infect Dis Trop Med*. 2010;15(48):43-7.
- Ghanbari MK, Shamsi M, Farazi AA, Khorsandii M, Eshtrati B. The survey of knowledge, self-efficacy and practice of nurses astandard precautions to prevent nosocomial infections in hospitals of Arak University of Medical Sciences in 2013. *Journal of Arak University of Medical Sciences*. 2013;16(7):45-54.
- Lee MK, Chiu CS, Chow VC, Lam RK, Lai RW. Prevalence of hospital infection and antibiotic use at a university medical center in Hong Kong. *J Hosp Infect*. 2007;65(4):341-7. doi: 10.1016/j.jhin.2006.12.013. [PubMed: 17275959]. [PubMed Central: PMC7114647].
- Ward DJ. The infection control education needs of nursing students: an interview study with students and mentors. *Nurse Educ Today*. 2011;31(8):819-24. doi: 10.1016/j.nedt.2010.12.017. [PubMed: 21239089].

10. Kim KM, Jeong JS, Park HR. Infection control nurse specialist education in Korea. *Am J Infect Control*. 2010;**38**(5):413-5. doi: [10.1016/j.ajic.2009.08.018](https://doi.org/10.1016/j.ajic.2009.08.018). [PubMed: [20022404](https://pubmed.ncbi.nlm.nih.gov/20022404/)].
11. Brunner LS. *Brunner & Suddarth's textbook of medical-surgical nursing*. 1. Lippincott Williams & Wilkins; 2010.
12. Saberi M, Khazaie Nezhad S. Comparison of nurses and nursing students' knowledge and practice about prevention and control of nosocomial infection. *Journal of Research Development in Nursing and Midwifery*. 2012;**9**(1):76-83.
13. Yusefi AR, Sadeghi A, Kavosi Z, Barhaghtalab RH. Knowledge, attitude, and practice of nurses in affiliated hospitals of Shiraz University of medical sciences about infection control in 2016. *The J Urmia Nurs Midwifery Fac*. 2017;**15**(9):667-79.
14. Nabavi M, Alavi-Moghaddam M, Gachkar L, Moeinian M. Knowledge, Attitudes, and Practices Study on Hand Hygiene Among Imam Hossein Hospital's Residents in 2013. *Iran Red Crescent Med J*. 2015;**17**(10). e19606. doi: [10.5812/ircmj.19606](https://doi.org/10.5812/ircmj.19606). [PubMed: [26568858](https://pubmed.ncbi.nlm.nih.gov/26568858/)]. [PubMed Central: [PMC4640061](https://pubmed.ncbi.nlm.nih.gov/PMC4640061/)].
15. Paudyal P, Simkhada P, Bruce J. Infection control knowledge, attitude, and practice among Nepalese health care workers. *Am J Infect Control*. 2008;**36**(8):595-7. doi: [10.1016/j.ajic.2007.10.026](https://doi.org/10.1016/j.ajic.2007.10.026). [PubMed: [18926315](https://pubmed.ncbi.nlm.nih.gov/18926315/)].
16. Ghafouri M, Shakeri A, Shahsavand S, Aghamohammadi M. Knowledge, attitude, and practice of medical team about nosocomial Infections control and ways to protect against them in 6- educational hospitals of North Khorasan University Of Medical Sciences in Bojnurd , 2013. *Journal of North Khorasan University of Medical Sciences*. 2014;**5**(5):953-8. doi: [10.29252/jnkums.5.5.S5.953](https://doi.org/10.29252/jnkums.5.5.S5.953).
17. AGHAKHANI NADER, SHARIF NIA HAMID, GHANA SAMIEH, EMAMI ZEYDI AMIR, SIYADAT PANAH ABOLGHASEM, RAHBAR NARGES, et al. Surveying prevention of nosocomial infections among nurses in educational hospitals of Uremia in 2009. (*JOURNAL OF HEALTH BREEZE*) FAMILY HEALTH. 2013.
18. Fashafsheh I, Ayed A, Eqtaif F, Harazneh L. Knowledge and Practice of Nursing Staff towards Infection Control Measures in the Palestinian Hospitals. *Journal of Education and Practice*. 2015;**6**(4):79-90.
19. Darawad MW, Al-Hussami M. Jordanian nursing students' knowledge of, attitudes towards, and compliance with infection control precautions. *Nurse Educ Today*. 2013;**33**(6):580-3. doi: [10.1016/j.nedt.2012.06.009](https://doi.org/10.1016/j.nedt.2012.06.009). [PubMed: [22789874](https://pubmed.ncbi.nlm.nih.gov/22789874/)].
20. Ghalya HA, Ibrahim Y. Knowledge, attitudes and sources of information among nursing students toward infection control and standard precautions. *Life Science Journal*. 2014;**11**(9):249-60.
21. Sharif A, Arbabisarjou A, Balouchi A, Ahmadidarrehshima S, Kashani HH. Knowledge, Attitude, and Performance of Nurses toward Hand Hygiene in Hospitals. *Glob J Health Sci*. 2016;**8**(8):53081. doi: [10.5539/gjhs.v8n8p57](https://doi.org/10.5539/gjhs.v8n8p57). [PubMed: [27045398](https://pubmed.ncbi.nlm.nih.gov/27045398/)]. [PubMed Central: [PMC5016353 publication of this paper](https://pubmed.ncbi.nlm.nih.gov/PMC5016353/publication-of-this-paper/)].
22. Yousefi N, Khodadadi M, Madmoli M, Madmoli Y, Azizi M, Eskandari P. Evaluation of Nursing Students' Performance in Controlling Healthcare-associated Infections in Southwest of Iran. *Journal of Pharmaceutical Research International*. 2019:1-6. doi: [10.9734/jprij/2019/v28i330206](https://doi.org/10.9734/jprij/2019/v28i330206).
23. A. L-Rawajfah OM, Tubaishat A. Nursing students' knowledge and practices of standard precautions: A Jordanian web-based survey. *Nurse Educ Today*. 2015;**35**(12):1175-80. doi: [10.1016/j.nedt.2015.05.011](https://doi.org/10.1016/j.nedt.2015.05.011). [PubMed: [26043655](https://pubmed.ncbi.nlm.nih.gov/26043655/)].
24. Yaghubi M, Sharifi SH, Abbaspour H. Knowledge, attitude, and practice of intensive care units nurses about nosocomial Infections control in hospitals of Bojnurd in 2012. *Journal of North Khorasan University of Medical Sciences*. 2014;**5**(5):943-50. doi: [10.29252/jnkums.5.5.S5.943](https://doi.org/10.29252/jnkums.5.5.S5.943).
25. Hamid MZA, Aziz NA, Anita AR, Norlijah O. Knowledge of blood-borne infectious diseases and the practice of universal precautions amongst health-care workers in a tertiary hospital in Malaysia. *South-east Asian journal of tropical medicine and public health*. 2010;**41**(5):1192.