

A Study on the Infection Exposure Defensive Environment, Infection Recognition, and Infection Prevention Behavior

Mi-Jin Kim¹, Gye-Young Shin² and Young-Soon Choi³

¹Department of Nursing, Shinhan University, 95, Hoam-ro, Uijeongbu-si, Gyeonggi-do, 480-857, Republic of Korea

²Department of Nursing, Shinhan University, 95, Hoam-ro, Uijeongbu-si, Gyeonggi-do, 480-857, Republic of Korea

³Department of Nursing, Kangwon National University, Samcheok-si, Gangwon-do, 25949, Republic of Korea,

¹ kimijin29@daum.net, ² joycey@naver.com, ³ ysc615@hanmail.net

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Abstract

This study is a descriptive research study to investigate Infection Exposure Defensive environment, infection awareness, and performance of infection prevention of nursing assistants. The data was collected from October 1 to October 31, 2018, with the consent of the subjects, and 198 participants were used in the final analysis. The questionnaire consisted of demographic characteristics, defensive environment for infection exposure, infection awareness, and prevention of infection. Collected data were analyzed using descriptive statistics, t-test and ANOVA using SPSS 21.0 statistical program. As a result of this study, the infection protection environment was statistically significant for hospital size, bed size, infection exposure management guideline, education of countermeasures for infection incidents, dedicated nurses, regular infection control education, and experience of injury by instruments or needles. There was a statistically significant difference in the perception of infection exposure in the placement of dedicated nurses and regular infection management education, and the performance of infection prevention activities was statistically significant in the placement of dedicated nurses. Therefore, continuous support from hospital managers and administrators to improve the environment for prevention of infection is necessary, and various systematic training methods should be developed for the site.

Keywords: Infection Control, Environment, Infectious Disease Transmission, Nursing Assistant

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1. INTRODUCTION

In hospitals, medical workers working in special circumstances have many opportunities to interact with infected patients and carriers, they are a high-risk group of infections that are frequently exposed to various samples from patients, the environment of contaminated medical devices, and the contaminated air [1].

Hospital infections were first mentioned in “In-hospital Infections” published by the Hospital Association in 1968. Since 1970, the Public Health Service has defined infections that have not been symptomatic at the time of hospital admission and

are not latent to infectious diseases, as infections occurring after hospitalization or discharge [2].

The study of hospital infections in Korea is estimated to have started since the 1980s. The Korean Hospital Association has implemented the hospital standardization review system since 1981 and recognized the importance of hospital infection management and included it as a main evaluation item [3].

Incidence of hospital infections can be a problem for the safety of patients and the safety of health workers, it is a cause of prolonged hospital stay, death, prevalence and burden of medical expenses,

and is regarded as an important evaluation index for the quality of nursing [4],[5].

Effective infection control should be systematically and systematically managed through education to patients, caregivers, medical personnel and other hospital staff based on hospital infection control guidelines [4].

For effective hospital infection control, infection management should be provided through systematic and organized education to patients, guardians, medical personnel and other hospital staff based on the hospital infection control guidelines [4]. In particular, it is important for the nursing personnel who provide the most direct nursing care to be aware of and carry out the hospital infection management guidelines provided by the hospital in order to protect patients and maintain their health, active participation of nursing personnel is required [4]. In the study on the recognition and performance of hospital infection management in hospital nurses, the recognition and performance showed statistically significant difference, but the performance was reported to be lower than that of awareness [6]. As of 2012, the cumulative number of nurse licensees was 295,496 and the total number of qualified nurse assistants was 521,608, indicating that nurse assistants were 1.8 times more than nurses [7]. Due to the increase in the number of nursing assistants, nurses are working with nurse assistants or delegating a large number of nursing tasks to nurse assistants [8],[9], but the role is gradually expanding.

Since 2017, Medical Law article 80 of 2 has been limited to medical-level medical institutions, and under the guidance of doctors, dentists, and oriental medical doctors, it is possible to provide nursing care and medical assistance for patients. However, at the hospital level, under the guidance of nurses, the nurses can assist the nurses in their work [10]. Therefore, it is necessary for nursing aides as nursing personnel to prevent hospital infections and to reinforce proactive quality management of nursing work [18].

Referring to previous research related to hospital infection management subject for nursing personnel, a study confirming the awareness and practice of infection control for nursing workers in geriatric nursing hospitals [3], a study confirming the incidence of infection according to the size of long-term care facilities and the characteristics of

nursing personnel [11]. Domestic research on the recognition and performance of hospital infection control [4], the study on infection control of visiting nurses in public health centers [12], and the studies on infection control of 119 paramedics [13], but the research on nursing assistants is insufficient.

The purpose of this study is to examine the protective environment, infection awareness, and performance of infection prevention in nursing assistants, it was attempting to utilize as a basis for effective infection control system that can prevent infection exposure of nursing assistants required for the efficient operation and management.

2. RESEARCH METHOD

2.1. RESEARCH DESIGN

This study is a descriptive research study to investigate the defensive environment of infection exposure, infection awareness, and performance of infection prevention of nursing assistants.

2.2. RESEARCH SUBJECT

This study subject is a nursing assistant who visited the training center of the Nursing Assistants Association Training Center in G-do to take conservative education, and the subjects were nursing assistants who received a description of the study and agreed in writing.

The number of subjects was extracted using G power 3.1.9.2 program, and when the significance level was 0.05, the effect size 0.2, and the power 0.9, the number of samples required for correlation study was 175. Although 200 people were excluded in consideration of the dropout rate of 10%, the final 198 parts were excluded, except for two parts with insufficient answers.

2.3. RESEARCH TOOLS

2.3.1. INFECTION EXPOSURE DEFENSIVE ENVIRONMENT: This study is a descriptive research study to investigate the defensive environment of infection exposure, infection awareness, and performance of infection prevention of nursing assistants. Infectious exposure defensive environment is based on the defensive environment measure tool developed by Han, Eun-ok's for radiation workers, the researcher measured and

corrected it for the nursing assistant [14]. The tool consisted of 11 questions, and the 5-point Likert scale was designed to answer from one point of 'not at all' to five points of 'very yes'. Higher scores indicate better infectious exposure defensive environment.

2.3.2. INFECTION EXPOSURE AWARENESS: Infection awareness was developed by Park Na-yeon [15] used a tool to measure the degree of recognition of infection exposure corrected by Yang Yun-ok [16]. The tool consisted of 11 questions, and the 5-point Likert scale was designed to answer from one point of 'not at all' to five points of 'very yes'. Higher scores indicate better infectious exposure awareness. In the Yang's study, the reliability was Cronbach's $\alpha = .96$, and in this study, Cronbach's $\alpha = .763$.

2.3.3. INFECTION EXPOSURE PREVENTION BEHAVIOR: Infection exposure prevention behavior was developed by Park Na-yeon [16], used a tool to measure the degree of recognition of infection exposure corrected by Yang Yun-ok [17]. The tool consisted of 11 questions, and the 5-point Likert scale was designed to answer from one point of 'not at all' to five points of 'very yes'. Higher scores indicate better infectious exposure awareness. In the Yang's study, the reliability was Cronbach's $\alpha = .89$, and in this study, Cronbach's $\alpha = .799$.

2.4. DATA COLLECTION

The data collection period of this study was from January 1, 2019, to February 28, 2019. Before the data collection, explain the purpose of this study, how to collect data, and how to dispose of the data. After receiving the survey was conducted. When the questionnaire was withdrawn during the questionnaire, there was no disadvantage. The average time for completing the questionnaire was about 10 minutes.

2.5. DATA ANALYSIS

The collected data were analyzed using the SPSS 21.0 program. The details are as follows. The general characteristics of the subjects were frequency analysis by number and percentage. The subject's infectious exposure defensive environment, infection exposure awareness, and

infection exposure prevention behavior are analyzed by average, standard deviation. The t-test and ANOVA of infectious exposure defensive environment, infection exposure awareness, and infection exposure prevention behavior according to the general characteristics of the subjects were analyzed by t-test and Scheffe's test.

3. RESEARCH RESULTS

3.1. TEXT FONT OF ENTIRE DOCUMENT General Characteristics of Subjects

The subjects of this study were 197 women (99.5%) and 1 male (0.5%), the marital status was 163 married (82.3%) and 35 unmarried (17.7%). The level of education was 143 (72.2%) graduated from high school, and the degree of education at university or higher was 55 (28.8%). The size of hospital was the highest with 115 people (58.1%) working in the clinics. Their average age was 41.33 (± 8.35) years, their current career was 64.90 (± 70.83) months and their total career was 182.76 (± 137.77) months. (Table 1).

Table 1. General characteristics of subjects. (N=198)

Variables	Categories	n (%) or M $\pm$ SD	
gender	male	1	(0.5)
	female	197	(99.5)
marital status	unmarried	35	(17.7)
	married	163	(82.3)
education	high school graduate	143	(72.2)
	associate degree	36	(18.2)
	bachelor's degree	17	(8.2)
	above master	2	(1.0)
hospital size	local (include clinic)	115	(58.1)
	below 100 bed hospital	13	(6.6)
	101 ~ 200 bed hospital	21	(10.6)
	201 ~ 400 bed hospital	18	(9.1)
	over 401 bed hospital	7	(3.5)
	others	24	(12.1)
age (year)		41.33	± 8.35
hospital experience (month)		117.86	± 81.59

present work place experience (month)	64.90	±70.83
total hospital experience (month)	182.76	±137.77

3.2. INFECTION-RELATED CHARACTERISTICS OF SUBJECT

106 (53.5%) responded that there was an exposure control guideline, 145 (73.2%) were aware of what to do when exposed to an infection. 51 (25.8%) responded that they had been assigned a dedicated nurse, 69 (34.8%) received regular infection management training. 82 (41.4%) had been exposed to infectious diseases during their work, and 40 (20.2%) of them were infected with influenza. There were 139 (70.2%) who had been injured by the instruments or needles they used, and they reported that they experienced damage from 1 to 12 times a year. 78 (39.4%) said they were injured when cleaning up after treatment, and 131 (66.2%) were injured by needles, the reason for the injury was the lack of time in 67 (33.8%) and the next was due to inattention 62 (31.3%). The most common reason for not performing infection prevention activities was 'hassle' 80 (40.4%) (Table 2).

Table 2. Infection related characteristics of subjects.
(N=198)

Variables	Categories	n (%)	
infection Control Guide	Yes	106	(53.5)
	No	92	(46.5)
know how to manage infections	Yes	145	(73.2)
	No	53	(26.8)
placement of dedicated nurses for infection	Yes	51	(25.8)
	No	147	(74.2)
regular Infection control training	Yes	69	(34.8)
	No	129	(65.2)
experience exposure to infectious diseases	Yes	82	(41.4)
	No	116	(58.6)
exposed infectious disease	tuberculosis	15	(7.6)
	viral hepatitis	20	(10.1)
	influenza	40	(20.2)
	other	11	(5.5)
	no experience	112	(56.6)
wound experience by mechanism and needle	Yes	139	(70.2)
	No	59	(29.8)
average number of wounds per year	0	59	(29.8)
	1	69	(34.8)
	2	34	(17.2)

time of injury	3-5	28	(14.1)
	6-10	7	(3.5)
	>10	1	(0.5)
	before treatment	23	(11.6)
	during treatment	15	(7.6)
	after treatment	78	(39.4)
mainly wounding apparatus	when washing utensils	14	(7.1)
	other	9	(4.5)
	no experience	59	(29.8)
	needle	131	(66.2)
	blade	3	(1.5)
reason for wound	the other	5	(2.5)
	no experience	59	(29.8)
	running out of time	67	(33.8)
	wear no protective equipment	5	(2.5)
	carelessness	62	(31.3)
reasons not to prevent infection	other	2	(1.0)
	no experience	62	(31.3)
	costly	22	(11.1)
	hassle	80	(40.4)
	not high risk	15	(7.6)
	lack of time	37	(18.7)
	lack of interest	14	(7.1)
	other	30	(15.2)

3.3. SUBJECT'S INFECTIONS EXPOSURE DEFENSIVE ENVIRONMENT, INFECTION EXPOSURE AWARENESS, AND INFECTION EXPOSURE PREVENTION BEHAVIOR SCORE

The infection exposure environment averaged 3.15 points out of 5 points, the average exposure awareness was 4.63 points out of 5 points, and the performance of infection prevention was 4.66 points out of 5 points. (Table 3).

Table 3. Average score of Infection exposure defense environment, awareness of infection exposure, and prevention behavior for infection exposure. (N=198)

Variables	Mean	±SD	Range
infection exposure defense environment	3.15	±1.02	0~5

infection exposure awareness	4.63	±0.44	0~5
prevention behavior for infection exposure	4.66	±0.43	0~5

3.4. INFECTIONS EXPOSURE DEFENSIVE ENVIRONMENT, INFECTION EXPOSURE AWARENESS, AND INFECTION EXPOSURE PREVENTION BEHAVIOR ACCORDING TO THE GENERAL CHARACTERISTICS OF THE SUBJECT

As a result of comparing the exposure environment of infection with variables, there was a statistically significant difference according to the hospital size ($F = 8.88$, $p < .001$), in post hoc test, 101-200 bed and 201-400 bed were higher than those of the clinic. Depending on whether the exposure management guideline is in place ($t = 8.95$, $p < .001$), between those who know what to do when they are exposed to an infection and those who do not ($t = 5.31$, $p < .001$), depending on the presence

of a dedicated nurse ($t = 8.10$, $p < .001$), depending on whether regularly trained in infection control ($t = 7.79$, $p < .001$), depending on whether injured in instruments or needles used by patients ($t = -3.28$, $p = .001$), the reason for the incidence of injury is between the lack of time and the inadvertent group ($t = -3.05$, $p = .0032$), and the reason for not performing the prevention of infection ($F = 2.70$, $p = .022$) showed statistically significant differences, in the post hoc test, the group responding that the treatment time was longer was lower than the other groups. (Table 4).

Comparing infection exposure awareness with variables, there was a statistically significant difference according depending on the presence or absence of a dedicated nurse ($t = 3.65$, $p < .001$), and whether there is regular infection control training ($t = 2.49$, $p = .014$). (Table 4).

Comparing infection prevention performance with variables, there was a statistically significant difference according to the presence or absence of a dedicated nurse ($t = 2.05$, $p = .043$). (Table 4).

Table 4. Infection exposure defensive environment, perception of infection exposure, and prevention behavior for infection exposure by general characteristics. (N=198)

Variables	Categories	n	infection exposure defense environment			infection exposure awareness			performing infection prevention behavior		
			M±SD	t/F	p	M±SD	t/F	p	M±SD	t/F	p
marital status	married	35	2.97±1.12	-1.12	.264	4.56±0.53	-0.94	.276	4.57±0.49	-1.35	.179
	unmarried	163	3.18±1.00			4.65±0.42			4.68±0.42		
education	high school	143	3.16±1.03	0.26	.853	4.61±0.46	1.12	.342	4.65±0.44	0.44	.726
	associate degree	36	3.21±1.06			4.66±0.37			4.69±0.37		
	bachelor's degree	17	32.95±0.94			4.79±0.27			4.73±0.49		
	>master	2	3.09±0.13			4.41±0.84			4.41±0.84		
hospital bed size	local ^a	115	2.89±0.98	8.88	<.001 a<c, d f<c, d	4.63±0.44	0.40	.852	4.66±0.43	0.77	.576
	<100 bed ^b	13	3.43±0.97			4.62±0.46			4.73±0.47		
	100-200 bed ^c	21	4.03±0.91			4.61±0.38			4.65±0.42		
	201-400 bed ^d	18	3.81±0.64			4.69±0.41			4.77±0.37		
	>400 bed ^e	7	3.77±0.82			4.82±0.31			4.74±0.31		
	others ^f	24	2.76±0.92			4.58±0.54			4.53±0.51		
infection control guide	Yes	106	3.66±0.85	8.95	<.001	4.67±0.38	1.25	.200	4.70±0.42	1.51	.132
	No	92	2.55±0.88			4.59±0.49			4.61±0.44		
know how to manage infections	Yes	145	3.37±0.98	5.31	<.001	4.66±0.39	1.65	.100	4.70±0.40	1.93	.057
	No	53	2.54±0.88			4.55±0.55			4.55±0.49		
placement of nurses for infection	Yes	51	4.01±0.72	8.10	<.001	4.78±0.29	3.65	<.001	4.76±0.35	2.05	.043
	No	147	2.85±0.94			4.58±0.47			4.63±0.45		

regular infection control training	Yes	69	3.82±0.84	7.79	<.001	4.72±0.32	2.49	.014	4.73±0.41	1.61	.109
	No	129	2.78±0.93			4.58±0.48			4.62±0.44		
experience exposure to infectious diseases	Yes	139	2.99±0.99	-3.28	.001	4.63±0.42	0.10	.923	4.66±0.43	-0.15	.883
	No	59	3.50±1.02			4.63±0.48			4.67±0.43		
reason for wound	running out of time	67	2.77±0.78	-3.05	.003	4.65±0.38	0.46	.650	4.65±0.43	-0.13	.900
	carelessness	67	3.26±1.07			4.62±0.44			4.66±0.44		
reasons not to prevention infection	costly ^a	22	3.16±1.12	2.70	.022 d<f	4.52±0.52	0.53	.750	4.60±0.43	0.61	.694
	hassle ^b	80	3.20±0.99			4.63±0.47			4.64±0.46		
	no high risk ^c	15	2.79±0.97			4.66±0.41			4.67±0.53		
	lack of time ^d	37	2.86±0.91			4.60±0.36			4.63±0.38		
	lack of interest ^e	14	2.89±1.17			4.71±0.29			4.75±0.33		
	others ^f	30	3.65±0.97			4.69±0.44			4.76±0.39		

4. DISCUSS

The purpose of this study was to examine the infectious exposure defensive environment, infection exposure awareness, and infection exposure prevention behavior of nursing assistants. And attempts were made to use the basic data necessary for the operation and effective management of effective infection control systems to prevent infection exposure of nursing assistants.

Nursing assistants who participated in the study were 197 women (99.5%) and 1 male (0.5%), were 163 (82.3%) married and 35 (17.7%) unmarried. Many of them were female and married, and were found to be working together with marriage and support for childcare and family life seems to be necessary.

The size of hospital is the largest with 58% of clinics working, and infection control prevention activities are needed for clinic workers. The average age was 41.33 years, and the current work experience was 65 months (5 years 5 months) and the total career was 183 months (15 years 3 months).

In terms of infection-related characteristics, 54% of the respondents said that there were guidelines for infection exposure management, and many hospitals still do not have the basic guidelines for infection control, and the development of guidelines is urgently needed. In addition, 73% of respondents who know how to deal with infections are required for continuous infection education. 26% of the nurses were dedicated to infection, placement of infections dedicated nurses have an important role to play in reducing hospital infections, therefore it

seems necessary to expand the placement of dedicated nurses according to the size of hospitals. 41.4% of the respondents were exposed to infectious diseases at work, and 70% of the respondents said they had been injured by used instruments or needles. Therefore, the education should be strengthened about how to deal with infection incidents. In addition, it is thought that education is necessary for the area around the relevant part because it is often damaged after cleaning the goods.

The degree of defensive exposure of nursing assistants was 3.15 points out of 5 points, The results of the study of the nurses in the emergency department measured 3.99 points [16], which resulted in somewhat lower results than previous studies. This is because nursing assistants in this study are working on a clinic scale, which seems to be different from the study of Ahn in general hospitals [17]. In order to improve the degree of protection of infection exposure, it is necessary to educate and improve the protection environment for prevention of infection, such as the separate collection of medical waste, treatment of damaging waste, wearing protective equipment, and provision of infection exposure protection equipment. In addition, a protective gear is provided near the treatment room to prevent the exposure of infection so that the protective gear provided can be actually used. It is considered that the managers and administrators of hospitals need the willingness to continue to support the defensive environment by providing sufficient number and various kinds of

protective equipment [16]. In addition, 'Our hospital regularly conducts infection prevention education' scored 2.7 points, and 'Our hospital provides regular vaccination for infection control' scored the lowest at 2.7 points. Hospitals need to strengthen infection prevention education and vaccination for staff.

Infection prevention performance averaged 4.66 points out of 5 points. This is similar to 4.38 points [17] and 4.35 points [16] of the study of emergency room nurses.

'Dispose sharp objects such as disposable needles or knives into used containers after use' with 4.9 points, 'be careful not to get stuck in the needle used by the patient' was higher by 4.9 points. On the other hand, the wearing of protective equipment at the time of treatment causing air infection was the lowest, at 4.4 points. This is consistent with previous studies [16],[17]. Therefore, education on prevention of infection should strengthen education on prevention methods for air infection, develop guidelines for wearing protective equipment, and maintain continuous management.

Comparing general characteristics of infection exposure defensive environment, it showed statistically significant result in hospital size. In addition, there were statistically significant results when hospitals were provided with infection exposure management guidelines, when they were aware of how to deal with infection accidents, when they were assigned a dedicated infection nurse, and when they received regular infection control training. This part requires efforts to improve the hospital environment. What is necessary for this is the acquisition of a dedicated nurse and the training of staff infection control. In order to achieve this, continuous attention and support from hospital managers is necessary.

Comparing the infection exposure awareness to general characteristics, there was a statistically significant difference in the placement of the dedicated nurses and whether they regularly receive infection management training. In order to raise the awareness of infection exposure of nursing staff, regular infection management training through dedicated nurses is necessary.

Comparing infection prevention performance with general characteristics, there was a statistically significant difference only in the placement of dedicated nurses. The results showed that the placement of the dedicated nurses affects the exposure environment, the recognition of infection exposure, and the performance of infection

prevention activities. In addition, expected that nursing assistants need to raise awareness of infection exposure through systematic and continuous education to improve the performance of infection exposure, and efforts to develop various educational materials are expected [17].

The purpose of this study was to confirm the protective environment, infection recognition, and performance of infection prevention against nursing assistants' infection exposure. Based on the above research, it can be seen that the protection of infection exposure environment and the awareness of infection exposure prevention behavior have an effect on the performance of nurse exposure. To this end, continuous support from hospital managers and administrators to improve the environment for prevention of infection is required, and various and systematic training methods should be developed for the site.

5. CONCLUSION

The purpose of this study was to examine the infectious exposure defensive environment, infection exposure awareness, and infection exposure prevention behavior of nursing assistants. Moreover, attempts were made to use the basic data necessary for the operation and effective management of effective infection control systems to prevent infection exposure of nursing assistants. Based on the study results to the following suggestions such. First, continuous attention and efforts by hospital managers are needed to improve the performance of infection prevention activities. First of all, it is necessary to arrange dedicated nursing staff. Second, follow-up studies are needed to confirm the relationship between infectious exposure defensive environment, infection exposure awareness, and infection exposure prevention behavior of nursing assistants. Third, it is necessary to repeat research including various influence factors to improve the performance of infection exposure prevention.

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