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ORIGINAL PAPER

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The Knowledge, Attitudes and Practices of Nurses Toward Management of Hospital-acquired Infections in the University Clinical Center of Kosovo

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ABSTRACT

Background: Hospital Acquired Infections (HAIs) are called those infections that were not present at the time of patient's hospitalization in a hospital or other medical institutions and have been acquired after hospitalization. **Aim:** The aim of this paper was to investigate the level of knowledge, attitudes, and practices of nurses about preventing the spread and management of HAIs at University Clinical Center of Kosovo (UCCK). **Methods:** The questionnaire was used as a tool for data collection in 6 clinics of UCCK during the November-December 2016. Out of 350 nurses, only 331 returned the questionnaire completed. Data were analyzed with descriptive and inferential statistics using Statistical Package-SPSS, version 22. **Results:** The age of participants was 37.9 ± 9.3 years by the mean. The general level of knowledge of nurses about the spread of HAIs was 90%, about the attitudes was 84.4% and about the nurses' practices was 76.2%. The work experience had a significant impact on the nurses' knowledge about management of HAIs OR = 2.18 (95% CI 1.01-4.71), the attitudes of nurses OR = 3.99 (95% CI 2.14-7.45) and the nurses' practices OR = 2.87 (95% CI 1.65-4.99). The impact of the level of education in the knowledge OR = 0.22 (95% CI 0.10-0.48) was significant ($p < 0.05$), while its impact in the nurses' attitudes OR = 0.59 (95% CI 0.32-1.09) and the nurses' practices OR = 0.8 (95% CI 0.46-1.38) was not statistically significant ($p > 0.05$). **Conclusion:** Nurses stated that they had the necessary competencies to practice safe patient care. However, there are necessary joint efforts of policymakers and managers of UCCK to implement intervention strategies in order to reduce HAIs.

Keywords: nurses, knowledge, attitudes, practices.

1. INTRODUCTION

Hospital Acquired Infections (HAIs) are called those infections that were not present at the time of patient's hospitalization in a hospital or other medical institutions and have been acquired after hospitalization (1). The timeframe definition of an infection as a HAI is at least 48-72 hours after hospitalization, 30 days after leaving the hospital, 30 days after surgery or 1 year after the implant. Numerous epidemiological studies have reported that HAIs are caused by pathogens which are present everywhere, such as bacteria (2), viruses (3) and fungi (4). In 2003, it was published the first article in Kosovo in the field of HAIs, which reported a mortality rate of 31% among newborns (5). The prevalence of hospital infections in UCCK was 17.4%, (5). In 2010, a data report for HAIs cases among 2,473 hospitals showed an increased number of infections associated with the use of medical equipment, most of which were displayed in surgical units (6). Also, other researchers reported that patients who underwent surgical procedures had a greater chance of developing HAIs, compared to other patients (2, 7). Infection Control is the responsibility of the care nurses and represents an integral element of patient safety programs (8). This program includes the processes and activities that identify and reduce the risk of transmission of infections between individuals. Education about infection prevention and control is known as one of the main objectives of infection control programs (9, 10, 11). A study assessed the knowledge of 324 Health Care Workers (HCWs) about infection control practices and found that 65% of HCWs had high condensation to control infections, such as hand hygiene (HH), the infected individuals isolation and to minimize the possibility of pathogens transmitted by air

(12). But the knowledge of HCWs about the causes, spread and prevention of HAIs were poor because less than 37% of them were able to identify that the etiology of HAIs were direct transfer, comorbidity and invasive procedures (12). Poor knowledge about HAIs and their prevention was reported in many other studies (13). Education and staff development activities result in the improvement of nursing care by reducing the emergence and spread of HAIs (14). Lack of proper equipment and supervision systems of HAIs, influence the emergence of these infections (15). Furthermore, the high workload of employees is due of the insufficient number of staff which affects the fatigue of staff and brings poor results of the patients' recovery, increasing the number of HAIs and mortality rate (16, 17). Only 44% of hospitals participating in the survey had a system for monitoring patients with urinary catheter demonstrating a poor infrastructure (15). Besides HH, a more successful prevention method of HAIs as HBV is the vaccination before infection occur (18).

2. METHODS

Methodology: Data collection is done through a structured questionnaire during November-December 2016 at 6 clinics of UCCK. Design consisted of a transversal quantitative study, where variables of the study were not controlled or manipulated but there were analyzed relationships between them. Out of 350 questionnaires distributed, only 331 nurses returned questionnaires completed, which corresponds to a response rate of 94.6%.

Sample: The sample size is determined by the total number of 1818 HCWs at UCCK, 95% confidence level and 5% error. According to this calculation, the minimum size of the sample required for this study was 318 nurses.

Data collection: The data were collected by the questionnaire which explored the knowledge, attitudes and practices of nurses in the prevention and management of HAIs. The questionnaire was developed by Kamunge (19). Five point Likert Scale was used for the questions. The questionnaire had an internal consistency (Cronbach alpha) of 0.66 for the knowledge, 0.60 for attitudes and 0.65 for nurses practices. This meant that the questionnaire was a reliable and valid instrument to explore the knowledge, attitudes and practices. The questionnaire was self-administered and required about 15 minutes to be completed.

Data analysis: Data were analyzed with descriptive and inferential statistics using Statistical Package for Social Sciences (SPSS), version 22. Descriptive data were presented in tables by mean, standard deviation, and percentage where it was needed. Binary logistic regression analysis was used to explore and identify the relations between several variables. The knowledge, attitudes and practices of nurses were taken as dependent variables, while education and work experience of nurses as independent variables. The Confidence level was considered of 95%.

Ethical issues: The permission to conduct the research was undertaken by the competent authorities and the ethics committee within UCCK. All participants had the opportunity to accept or decline their participation in the study. Also they were provided

that their ethical rights would be respected, such as anonymously, confidentiality.

3. RESULTS

Demographic information of participants: A total of 331 nurses fulfilled the questionnaire relevantly. The participants' age was 37.9 ± 9.3 years by mean. The Table 1 summarizes further demographic information.

Demographic variables		n	%
Age			
	21-30 years	56	16.9
	31-40 years	170	51.4
	41-50 years	60	18.1
	51-60 years	45	13.6
Gender			
	Female	274	82.8
	Male	57	17.2
Education			
	High School	234	70.7
	Bachelor	74	22.4
	Master	23	6.9
Clinics			
	Clinic of Anesthesia and Intensive treatment center	77	23.3
	Clinic of Neonatology	54	16.3
	Surgery clinic	37	11.1
	Obstetric clinic	93	28.1
	Clinic of infectious diseases	26	7.9
	Clinic of Neurology	44	13.3
Work experience			
	1-5 years	81	24.5
	6-40 years	250	75.5

Table 1. Demographic information of participants

Knowledge, attitudes and practices of nurses regarding the prevention and management of HAIs: The knowledge level of nurses in preventing the spread of HAIs was 90%. In terms of attitudes, the overall result was 84.4%, while as regards nurses'practices the overall result was 76.2%. In the Table 2 were summarized the results of nurses' knowledge about the spread of HAIs, while in the Table 3 and 4 the results as regards attitudes and practices of nurses.

To identify the relationship between the study'variables was used the binary logistic regression model. In this case, knowledge, attitudes and practices of nurses were taken as dependent variables and the level of education and work experience as independent variables. Odds ratio is the ratio between the variable marked with 1 and variable with 0. The greater odds ratio, the greater is the effect of the independent variable on the dependent variable. Table 5 showed that only work experience impacts on knowledge, attitudes and practices of nurses. Work experience affects significantly the nurses' knowledge OR=2.18 (95% CI 1.01-4.71) which means that with the growth of work experience, also the nurses' knowledge increases. Work experience also affects nurses' attitudes OR=3.99 (95% CI 2.14-7.45) and nurses' practices OR=2.87 (95% CI 1.65-4.99). The impact of the level of education in the knowledge OR=0.22 (95% CI 0.10-0.48) was signifi-

The knowledge	Completely disagree	Disagree	Neutral	Agree	Completely agree
HH	9 2.7%	19 5.7%	17 5.2%	87 26.3%	199 60.1%
The supervision during HH performance	17 5.1%	22 9.7%	23 6.9%	85 25.7%	174 52.6%
The spread of pathogens through HCWs	3 0.9%	8 2.4%	7 2.2%	22 6.6%	291 87.9%
Use of bags with dangerous content	4 1.2%	5 1.5%	8 2.5%	10 3%	304 91.8%
Security measures for HCWs	5 1.5%	11 3.3%	15 4.5%	43 12.7%	257 78%
The spread of HAIs through medical equipment	2 0.6%	5 1.5%	9 2.7%	21 6.4%	294 88.8%
The isolation of patients with infectious diseases	1 0.3%	1 0.4%	5 1.5%	28 8.5%	296 89.4%
HH after removal of sterile and non-sterile gloves	22 6.6%	46 13.9%	31 9.4%	60 18.1%	172 52.0%
Guidelines with HH recommendations	4 1.2%	12 3.6%	6 1.8%	20 6.1%	289 87.3%

Table 2. Nurses knowledge about the prevention of spreading of HAIs

Attitudes	Completely disagree	Disagree	Neutral	Agree	Completely agree
Increase of the hospitalization days, mortality and costs	5 1.5%	11 3.4%	9 2.7%	20 6%	286 86.4%
The nurse can spread infections	9 2.7%	23 6.9%	6 1.8%	28 8.5%	265 80.1%
Negative reaction when a colleague doesn't act as recommended	21 6.3%	52 15.7%	18 5.4%	63 19.1%	177 53.5%
The training of new employees	16 4.8%	43 13%	27 8.2%	75 22.6%	170 51.4%
The nurse as an example for HH	4 1.2%	11 3.4%	7 2.1%	28 8.4%	281 84.9%
Unrealistic expectations that nurses clean their hands after any contact	12 3.6%	17 5.2%	11 3.3%	29 8.7%	262 79.2%
The punishment for non adherence to protocols	31 9.4%	50 15.1%	18 5.4%	68 20.6%	164 49.5%
Remuneration for adherence to protocols	2 0.6%	5 1.5%	5 1.5%	29 8.8%	290 87.6%

Table 3. Nurses' attitudes as regards the prevention of spreading of HAIs

cant ($p < 0.05$) while for attitudes $OR = 0.59$ (95% CI 0.32-1.09) and nurses' practices $OR = 0.8$ (95% CI 0.46-1.38) about HAIs management was not statistically significant.

4. DISCUSSION

Findings from this study indicated that the level of knowledge of nurses about preventing the spread of HAIs was 90%. In terms of nurses' attitudes, the overall result was about 84.4% while for the nurses' practices it was 76.2%. Although most of the study participants had high school degree (70.7%), the results indicated that the educational background of the participants had prepared them to become competent in terms of clinical knowledge and skills that are critical for patient care. The impact of education level on the nurses knowledge was significant ($p < 0.05$). Also, other studies reported a significant relation between the education level and the knowledge that means higher possibility for proper clinical performance in practice. Thus, in one study it was explored the link between nursing education and patient outcomes

Practices	Completely disagree	Disagree	Neutral	Agree	Completely agree
The use of antiseptics before and after each patient contact	6 1.8%	14 4.3%	8 2.4%	32 9.6%	271 81.9%
The use of antiseptics before the equipment preparation for vascular use	5 1.5%	10 3%	9 2.7%	21 6.4%	286 86.4%
The use of antiseptics during the contact from a patient to another patient	7 2.1%	17 5.1%	9 2.7%	48 14.6%	250 75.5%
HH before and after any procedure	9 2.9%	18 5.4%	13 3.9%	32 9.6%	259 78.2%
HH after the use of any contaminated equipment	11 3.3%	17 5.1%	7 2.1%	51 15.5%	245 74%
HH after the contact with body fluids of the patient	2 0.6%	5 1.5%	6 1.8%	19 5.8%	299 90.3%
HH after direct contact with the healthy skin of the patient	5 1.5%	7 2.1%	6 1.8%	47 14.2%	266 80.4%
HH after placing the urinary catheter	4 1.2%	15 4.5%	10 3%	38 11.5%	264 79.8%
HH after the contact with the contaminated skin and before the contact with the healthy skin	1 0.3%	8 2.4%	4 1.2%	43 13%	275 83.1%
Polished nails and artificial nails	78 24%	78 24%	27 8%	52 16%	96 29%
HH after touching objects surfaces in the patient's environment	48 14.5%	79 23.9%	32 9.7%	96 28.9%	76 23%
During patient care, practicing the work in computer with gloves	91 27.5%	65 19.7%	20 6%	78 23.5%	77 23.3%
HH after removal of rings and bracelets	63 19%	55 16.7%	16 4.8%	53 15.1%	144 43.5%

Table 4. Nurses' practices toward the prevention of spreading of HAIs

Variables		Odds Ratio	P value	95 % Lower CI	95 % Higher CI
Nurses' Knowledge	Education	0.12	.000	0.10	0.48
	Work experience	2.18	.048	1.01	4.71
Nurses' Attitudes	Education	0.59	.093	0.32	1.09
	Work experience	3.99	.000	2.14	7.45
Nurses' Practices	Education	0.8	.415	0.46	1.38
	Work experience	2.87	.000	1.65	4.99

Table 5. Binary logistic regression analysis

and showed that patients in the surgery clinic had better outcomes when they were treated by nurses with higher education (university degree) (20). An increase by 10% of nurses with university degree reduced the mortality risk by 5% and 9 % (20; 21). In this context, nursing education should serve as a platform for continuous learning throughout life (22, 23). This paper found that with the growth of work experience, the nurses' knowledge increases, the attitudes and practices improve by transforming into models for younger employees ($p < 0.05$). The literature has shown that HCWs imitated the behavior of their colleagues who had higher work experience (24). Findings revealed that when HCWs with higher work experience failed to apply cognitive powers, younger workers were less manageable in the proper use of their knowledge they had acquired during their academic journey or during their continuing education (24). One study found that HCWs did not perform HH as recommended when others with higher

position as doctors or nurses also didn't practice HH during patient care activities (25). Findings from this study suggested that behavior is influenced by environment and organizational support factors such as the presence of the infection control team, supply of disinfectants within and out the patient's room, the presence of visible leaflets and posters about the spread of HAIs that puts HCWs into reminder about the threats and the impact of HAIs in line with the health beliefs model, increasing "willingness to act" (26).

5. CONCLUSION

Nurses had high knowledge, positive attitudes and practices towards reducing HAIs. Proper nursing practices in preventing the spread of HAIs and their management contribute to promoting and creating an appropriate environment which prevents new infections and controls the existing ones. Nurses stated they had the necessary competences to practice safe patient care. Staff support for continuing professional education didn't lack from the management authority. However, there are necessary joint efforts of policymakers and managers of UCCK to implement intervention strategies in order to reduce HAIs. A limitation of this study was the sample. A larger sample would be more representative. A prospective study about knowledge, attitudes and practices of nurses may consist on adopting another research design relying more into observation than self-administered questionnaire.

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- **Conflicts of interest:** none to declare.

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