

The journal has had 5 points in Ministry of Science and Higher Education parametric evaluation. § 8. 2) and § 12. 1. 2) 22.02.2019.

© The Authors 2019;

This article is published with open access at Licensee Open Journal Systems of Nicolaus Copernicus University in Torun, Poland

Open Access. This article is distributed under the terms of the Creative Commons Attribution Noncommercial License which permits any noncommercial use, distribution, and reproduction in any medium, provided the original author (s) and source are credited. This is an open access article licensed under the terms of the Creative Commons Attribution Non commercial license Share alike. (<http://creativecommons.org/licenses/by-nc-sa/4.0/>) which permits unrestricted, non commercial use, distribution and reproduction in any medium, provided the work is properly cited.

The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 10.12.2019. Revised: 15.12.2019. Accepted: 04.01.2020.

Knowledge of Nursing Personnel of the Świętokrzyskie Voivodeship Hospitals on Nosocomial Infections

Poziom wiedzy pielęgniarek województwa świętokrzyskiego na temat zakażeń szpitalnych

**Marzena Wrześniewska¹, Jakub Gruszka², Karolina Komar-Gruszka³,
Beata Bąk⁴, Olga Adamczyk-Gruszka⁴**

- 1. Uniwersytet Jana Kochanowskiego w Kielcach. Collegium Medicum. Katedra Pielęgniarstwa, Położnictwa i Medycyny Ratunkowej**
- 2. Warszawski Uniwersytet Medyczny, II Katedra i Klinika Położnictwa i Ginekologii**
- 3. Oddział Okulistyki, Szpital Dziecięcy im. Prof. Jana Bogdanowicza w Warszawie**
- 4. Uniwersytet Jana Kochanowskiego w Kielcach. Collegium Medicum. Katedra Ginekologii i Położnictwa.**

Abstract

Introduction:

Nosocomial (also known as hospital-acquired) infections are understood as infections which develop during patient's stay in hospital, but are not the direct cause of hospitalisation.

The aim of the study:

The purpose of the paper was to determine the knowledge of the nursing personnel from Świętokrzyskie Voivodeship on nosocomial infections, prevention and methods of combating them. Other addressed issues included the analysis of the work years and education level as related to the state of nurses' knowledge on nosocomial infections, and what are the reasons for insufficient prevention of diseases.

Material and methods:

The study included 208 nurses from Świętokrzyskie Voivodeship. Out of 208 questionnaires, 180 were completed correctly, the remaining 28 were answered incorrectly or incompletely,

which resulted in their rejection. The statistical analysis was conducted using the Pearson Chi-squared method, with the significance level $p > 0.01$ assumed to be insignificant.

The study involved 124 women and 56 men. The youngest respondent was 23 years old and the oldest was 59 years old. There were 36 respondents below 30 years of age (20%), 88 in the 31-40 age group (48.9%), 56 in the 41-60 age group (31.1%).

Results

1. The knowledge of the intermediate personnel about hospital-acquired infections is satisfactory.
2. Job seniority is not statistically significant with regard to the knowledge level on nosocomial infections.
3. The research revealed a statistically significant correlation between the knowledge level of the secondary staff and their education.
4. The study results show that the most common causes of insufficient knowledge on preventing hospital-acquired infections are staff shortages and inadequate financial resources.

Key words: Knowledge; Nursing Personnel

I. Introduction:

Nosocomial (also known as hospital-acquired) infections are understood as infections which develop during patient's stay in hospital, but are not the direct cause of hospitalisation. This is an issue modern medicine has to face. Infections contracted in hospitals contribute to a deterioration of patients' health, prolonged hospitalisation and the occurrence of post-treatment complications. The infections constitute a negative aspect of the functioning of hospital facilities and represent one of the greatest threats to patients.

Being a nurse that has a direct contact with patients requires responsible methods of care that comply with current medical procedures. It is the responsibility of nursing personnel to know and apply in practice the medical procedures that contribute to the prevention and control of nosocomial infections. According to the World Health Organization (WHO), nosocomial infections are those that result from hospital treatment or hospitalisation. They can affect patients and medical staff, they are secondary to the patient's condition before hospitalisation, and occur 48-72 hours after admission or discharge [1]. In neonatal wards, a nosocomial infection is an infection that occurred in a newborn baby within 48 to 72 hours after birth, provided that the newborn baby's mother was healthy at the time of admission to a hospital. In the case of a surgical procedure on a patient who has not been infected prior to the treatment, the infection developed within one month of surgery is considered to be a nosocomial one. In the case of patients after foreign body implantation, e.g. orthopaedic implants, the nosocomial infection is considered to be an infection that occurred within one year after the surgery [2]. In the case of infections with a long incubation period caused by the hepatitis virus (HBs, HCV), acquired immunodeficiency virus (HIV) or tuberculosis mycobacteria, it is assumed that they are of hospital origin when they occur between 2 weeks and up to several years.

In Poland, the term of nosocomial infections is defined in the Act of 5 December 2008 on the Prevention and Control of Infections and Infectious Diseases in Humans. It specifies the principles of hospital-acquired infections and the rules of conduct in order to combat and prevent them [4].

Pursuant to the Act, a nosocomial infection is an infection which occurred in the course of providing health services in a situation where, at the time of providing health services, the disease did not remain in its incubation period or it occurred after providing health services in a period not longer than its longest incubation period [4,5]. The epidemiology-based division of nosocomial infections includes endemic infections connected with the therapeutic

specificity of a given hospital ward, and epidemic infections which depend on the occurrence of non-hospital infections, i.e.: chickenpox, salmonella.

Another criterion refers to the source of microorganisms. Endogenous infections are those caused by microorganisms that are part of patients' own bacterial flora, and the exogenous ones are acquired from the external, hospital environment, e.g.: personnel, surfaces, objects, other patients, water, food, air. Taking into account the duration, the infections may be divided into pre-hospital and the post-hospital ones. The former occur when the patient admitted to a hospital had already had an infection in his or her body, but it was in its incubation and the first symptoms occurred during hospital stay. The post-hospital infections are those which patients acquired during hospitalisation, but their incubation period was long and first clinical symptoms were visible after the patient has left the hospital. There are also so called implanted infections, which occur during organ transplantation procedures[5,6,7,].

A variety of nosocomial infections depends on the specificity of a ward where patients are treated, patients' age, type of disease and the range of medical procedures that have been performed.

The main hazard in surgical wards are urinary tract infections (31-48%) most often caused by *Escherichia Coli* [8,10,11]. The following are the infections of surgical wounds caused by *Enterococcus* and *Staphylococcus aureus*, occurring in surgical wards and representing 28-31% of patients [9]. Respiratory tract infections affect 18% of hospitalized patients and constitute a high mortality rate in surgical wards. The most common pathogens in this type of infections include *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Klebsiella pneumoniae* [2,13]. Blood infection is another hospital-acquired infection in the hierarchy. The cause of this infection is extensive surgery, long-term hospitalization, vascular access, antibiotic therapy, haemodialysis or the presence of other infections [13].

Microorganisms may spread through the direct contact between patient and medical personnel or between two patients. Patients staying in the hospital room inhale contaminated air [10,13]. An indirect transmission occurs when medical equipment contaminated by pathogenic microorganisms is in contact with the patient's wounds or mucous membranes. Another route of infection is the airway - pollen, and the cross-infections- i.e. personnel - personnel, personnel - patient, patient - patient [7,14].

Procedures for dealing with patients, medical equipment and the environment are implemented in the hospital environment. Chemical agents are used, the equipment is sterilized and the used materials are sorted [13].

An essential component of infection prophylaxis is to prevent and block the airborne spread of pathogens. An important role here is played by proper use of various types of medical equipment, moisturizing devices, isolation of infectious diseases and hygiene of health-care personnel. It is important to inhibit the transmission of microorganisms through the digestive tract, adequate preparation of the surgical field, peri-operative antibiotic therapy, proper handling of equipment, preparation of medical personnel, clothing, post-surgical patient care [13,15].

The main carrying vehicle for microorganisms are hands of the health-care personnel. Washing and disinfecting hands is the basis of everyday hospital life. Most pathogenic microorganisms are transmitted by the hands of the medical staff. Any changes, break in the continuity of the skin is the gateway to infection of the personnel and patients [10].

Familiarity and application of the principles of asepsis and antiseptics allow for a quick diagnosis, effective treatment, and thus faster recovery of patients [10,16,17]. Depending on the disinfectants used, the disinfection methods are divided into: chemical, thermo-chemical and thermal [21]. To ensure the effectiveness of the disinfection process, the disinfectant must be of adequate concentration, be in direct contact with the disinfection object and react for a specified period of time and at an appropriate temperature [18,19]. The sterilization process is

an extremely important part of the fight against infections. It removes all microorganisms and their spore forms [19]. Properly trained personnel follow all the procedures related to observance of aseptic and antiseptic principles, which may significantly limit the development and spread of nosocomial infections [20].

The key function in the Hospital Infection Control Team is epidemiological nurse. [10]. It is their responsibility to supervise and monitor the control procedures and prevent the spread of nosocomial infections [21]. Their task is to organise courses and trainings on nosocomial infections. They keep records of patients and medical staff that have been infected in hospital. They are also responsible for planning the care of patients with nosocomial infections, and the actions aimed at eliminating the outbreak of infection [10,22,23].

II The aim of the study

The purpose of the paper was to determine the knowledge of the nursing personnel from Świętokrzyskie Voivodeship on nosocomial infections, prevention and methods of combating them. Other addressed issues included the analysis of the work years and education level as related to the state of nurses' knowledge on nosocomial infections, and what are the reasons for insufficient prevention of diseases.

III Material and methods

The study included 208 nurses from Świętokrzyskie Voivodeship. Out of 208 questionnaires, 180 were completed correctly, the remaining 28 were answered incorrectly or incompletely, which resulted in their rejection. The statistical analysis was conducted using the Pearson Chi-squared method, with the significance level $p > 0.01$ assumed to be insignificant.

IV Results

The study involved 124 women and 56 men. The youngest respondent was 23 years old and the oldest was 59 years old. There were 36 respondents below 30 years of age (20%), 88 in the 31-40 age group (48.9%), 56 in the 41-60 age group (31.1%).

Of all the respondents, 29.9% had master's degree, 53.4% were with bachelor's degree and 16.7% with secondary education. Forty-six respondents declared their job seniority to be longer than 20 years, 36 respondents were employed for up to 5 years, whereas 98% of the respondents declared to have worked between 5 and 20 years.

Only 134 persons gave the correct answer to the question concerning the definition of nosocomial infection. As many as 11% of the respondents said that using gloves may be a substitute for hand disinfection, while 82% of the survey participants said that bacterial physiological flora may be a source of infection. Among the respondents, 158 observe the principles of wearing protective gloves, washing and disinfecting hands, and 8.9% do not always observe these standards. Seventy-eight respondents take off their entire jewellery before commencing work, 60 respondents remove some of it, whereas 42 respondents replied that they do not take off jewellery at all before commencing duty.

There were 130 respondents claiming to have contact with the patients' body fluids, blood and excretions several times during their duty, and 50 respondents said to have such contact several times a week. There were no respondents who would not have such contact at least once per week. In the event medical clothing is dirty, as much as 25.5% respondents said that they use it until the end of duty, 45.5% take it straight to the hospital laundry and 29% take the medical clothing home after duty. Single-use protective clothing is always worn by 75.5% of the respondents when they wash patients, whereas 20% do not use it at all. Approximately 43.3% of the respondents admit to have been punctured with an infected needle or other sharp medical instrument. If such event did occur, 51.1% of the respondents

ticked in the questionnaire the possibility of HBV infection, 38.9% indicated at possible HIV infection, whereas 10% did not provide any reply to this question.

Out of all the respondents, 87.7% claim that the role of the health-care personnel in preventing nosocomial infections is extremely important, whereas 12.2% state that it is insufficient.

Table 1 Presents the summary of the knowledge of the medical personnel.

The Summary of knowledge of the medical personnel.		Sex		Total
		Women	Man	
Low level	N	14	8	22
	%	11,3	14,3	12,22
Medium level	N	34	22	56
	%	27,4	39,3	31,11
High level	N	76	26	102
	%	61,3	46,4	56,67
Total	N	124	56	180
	%	100	100	100

Chi² value 1,766 , df 2 , Rc 0,14

The study revealed that there is a statistically insignificant low power relation between the quality of knowledge and respondents' gender. ($p > 0.001$).

Table 2 Presents the relation between the respondents' knowledge level and age.

The Summary of knowledge of the medical personnel.		Age respondents			Total
		23-30	31-40	41-65	
Low level	N	10	6	6	22
	%	27,8	6,8	10,7	12,1
Medium level	N	12	28	16	56
	%	33,3	31,8	28,6	31,2
High level	N	14	54	34	102
	%	7,8	61,4	60,7	56,7
Total	N	38,9	88	56	180
	%	100	100	100	100

Chi² value 6,017 , df 4 , Rc 0,25

The study showed a clear but statistically insignificant low power relationship between the summary of the quality of knowledge up to the age of the respondents ($p > 0.001$).

Table 3 Shows the knowledge level of nursing staff in relation to their education.

The Summary of knowledge of the medical personnel.		Education of the respondents			Total
		Secondary education	Higher education licenciante	Higher education master's degree	
Low level	N	6	14	2	22
	%	20	14,6	3,7	12,2
Medium level	N	20	18	18	56
	%	66,7	18,7	33,3	31,1
High level	N	4	64	34	102
	%	13,3	66,7	63	56,7
Total	N	30	96	54	180
	%	100	100	100	100

Chi² value 17,066 , df 4 , Rc 0,40

The study showed a statistically significant relationship of sufficient power between the summary of the knowledge quality the respondents' education ($p < 0.01$)

Table 4 Presents the impact of job seniority upon the knowledge level of health care personnel"

The Summary of knowledge of the medical personnel.		Impact of job seniority in years			Total
		Under 5 years	5-20 years	Over 20 years	
Low level	N	8	6	8	22
	%	22,2	6,1	17,4	12,2
Medium level	N	18	18	20	56
	%	50	18,4	43,5	31,1
High level	N	10	74	18	102
	%	27,8	75,5	39,1	56,7
Total	N	36	98	46	180
	%	100	100	100	100

Chi² value 16,190 , df 4 , Rc 0,39

The research showed a statistically insignificant relationship with a clear but low power between the summary of the knowledge quality and the respondent's job seniority ($p > 0.01$)

Conclusions

1. The knowledge of the intermediate personnel about hospital-acquired infections is satisfactory.
2. Job seniority is not statistically significant with regard to the knowledge level on nosocomial infections.
3. The research revealed a statistically significant correlation between the knowledge level of the secondary staff and their education.
4. The study results show that the most common causes of insufficient knowledge on preventing hospital-acquired infections are staff shortages and inadequate financial resources.

References

1. WHO Working Group. Quality Ace In Heath Care. Qual Assur Health Care 1989; 1 (2-3): 79-95.

2. Dzierżanowska D, Jeljaszewicz J. Zakażenia szpitalne. Alfa Medica Press. Bielsko-Biała 1999.
3. Reiss J, Grzybowski J. Definicje zakażeń szpitalnych. Polskie Towarzystwo Zakażeń Szpitalnych. Kraków 1997.
4. Ustawa z dnia 5 grudnia 2008 r. o zapobieganiu oraz zwalczaniu zakażeń i chorób zakaźnych u ludzi (Dz.U.2016, poz. 1866).
5. Kayser F, Bienz K, Eckert J, Zinkernagel R, tłum. Heczko B, Pietrzyk A. Mikrobiologia lekarska. Wydawnictwo Lekarskie PZWL. Warszawa 2007.
6. Ciuruś M. Zapobieganie zakażeniom w gabinetach zabiegowych, a jakość usług medycznych. Podręcznik praktyczny. Adi. Łódź 1999.
7. Jabłoński L, Karwat I. Epidemiologia zakażeń szpitalnych- wiadomości podstawowe. W: Podstawy epidemiologii ogólnej, epidemiologia chorób zakaźnych. Red. Jabłoński L, Karwat I. Czelej, Lublin 2002;335-336,343-360.
8. Bulanda M. Zakażenia szpitalne. W: Mikrobiologia, podręcznik dla pielęgniarek i ratowników medycznych. Red. Heczko P. Wydawnictwo Lekarskie PZWL, Warszawa 2006; 333-346.
9. Dutkiewicz S, Romek E. Zakażenia szpitalne na oddziałach zabiegowych – wyniki badań bakteriologicznych. Przewodnik Lekarza 2009; 6/114:63-67.
10. Fleischer M, Bober- Gheek B. Podstawy pielęgniarstwa epidemiologicznego. Urban & Partner. Wrocław 2006.
11. Kamińska W. Zakażenia szpitalne układu moczowego. W: Zakażenia szpitalne. Red. Dzierżanowska D. Alfa Medica Press, Bielsko Biała 2008;359-360.
12. Heczko P, Wójkowska J. Zakażenia szpitalne. Wydawnictwo Lekarskie PZWL. Warszawa 2009.
13. Przondo- Mordarska A. Zakażenia szpitalne. Etiologia i przebieg. Continuo. Wrocław 2000.
14. [http://www.esculap.pl/forumortopedyczne/wiadomości/zakażenia szpitalne a liczba pielęgniarek na oddziale/id.3b3e79085530616f0a910ec51a9cfa92/-2019.04.10](http://www.esculap.pl/forumortopedyczne/wiadomości/zakażenia_szpitalne_a_liczba_pielęgniarek_na_oddziale/id.3b3e79085530616f0a910ec51a9cfa92/-2019.04.10)
15. Grzesiowski P, Olczak A. Prewencja i kontrola zakażeń związanych ze świadczeniami zdrowotnymi w ambulatoryjnej opiece lekarskiej. Nowa klinika 2006;7-8/13:735-737.
16. Wierczyńska J, Dzierżanowski D. Zakażenia szpitalne - specyfika oddziałowa, zapobieganie. Nowa klinika 2003; 3-4/9:304,307.
17. Wierzyńska M. Techniki właściwej aseptyki. Magazyn pielęgniarki i położnej 2008;3/117:27.
18. Magdzik W, Naruszewicz-Lesiuk D. Zakażenia i zarażenia człowieka. Wydawnictwo PZWL. Warszawa 2001.
19. Nosowska K. Podstawy sterylizacji i dezynfekcji w zwalczaniu zakażeń szpitalnych. Czelej. Warszawa 2000.
20. Hugonnet S, Pittet D. Hand hygiene- beliefs or science? Clin. Microbiol. Infect. 2000; 6:348-354.
21. Bajor I, Warchoł-Sławińska E, Włoch K i WSP. Rola pielęgniarki epidemiologicznej w zapobieganiu zakażeniom szpitalnym w opinii personelu medycznego. Zdrowie Publiczne 2007;117/4:415-418.
22. [http://www.esculap.pl/wiadomości/zjazd_polskiego_towarzystwa_pielęgniarek epidemiologicznych/id.cdbfca34c67af06428dfcab8c4728ael/-2019.03.04](http://www.esculap.pl/wiadomości/zjazd_polskiego_towarzystwa_pielęgniarek_epidemiologicznych/id.cdbfca34c67af06428dfcab8c4728ael/-2019.03.04).
23. <http://zielonalinia.gov.pl/default.aspx?docId=2071&dictword=884-2018.05012>.