

Knowledge and Source of Information among Health Care Students on Nosocomial Infections

Petrit Biberaj, Migena Gega, Indrit Bimi

Faculty of Medical Technical Sciences of Medical University of Tirana
pbiberaj@gmail.com

Abstract:

Background: No previous studies have reported the knowledge of Albanian medical students about infection control.

Objectives: The objectives of this study were to assess medical and nursing students' knowledge in clinical years at Medical University of Tirana about infection control.

Methods: Two hundred twenty undergraduate health care students from four academic programs participated in the study. The infection control standardized questionnaire was used to assess the knowledge of students about three main domains, hand hygiene, nosocomial infections, and standard precautions.

Results: A total of 251 students were included.

Overall mean percentage score of the students was 63.2 ± 1.9 . Mean percentage scores in all domains were 69.3 ± 0.6 for medical, 63.1 ± 1.8 for physiotherapy, 59.8 ± 1.6 radiography, and 60.6 ± 2.5 for nursing. The main source of information about the prevention of nosocomial infections as cited by participants was their routine formal training in class. There was no significant association between course of study and knowledge of students about preventive measures for nosocomial infections, $p < 0.05$.

Conclusion: The results of this study demonstrate that knowledge of nosocomial infection isolation precautions was moderate among most of the health care students training curriculum.

Keywords: knowledge, prevention, nosocomial infections

1. INTRODUCTION

Hospital-associated infections are those infections acquired during the patient's stay in hospital. They form a major worldwide public health problem despite advances in our understanding and control of these infections [1,2]. The best clinical care in the world can be worthless if patients pick up other infections while they are in the hospital. Hospital-associated infections also include occupational infections which occur in health care workers due to occupational hazard [2].

Health care-associated infections have long been recognized as crucial factors undermining the quality and outcomes of health care delivery [3]. An infection is considered nosocomial if it becomes evident 48 hours or more after hospital admission or within 30 days of discharge following inpatient care [2]. Reported cases of nosocomial infection assumed such terrifying proportions in 2002 that World Health Organization member states approved a World Health Assembly resolution on patient safety. Developing countries were reported to have up to 20 times the risk of contracting a nosocomial infection compared with developed countries [4]. Thus, spread of infection serves as a major source of worry for managers in health care practice, particularly in developing countries where the health care system is already overstretched.

Although infection is most prevalent in patients upon admission, health care workers also act as potential vectors for pathogenic agents. Hospitals provide a favorable transmission pathway for the spread of nosocomial infections, owing partly to poor infection control practices among health workers on one hand and overcrowding of patients in most clinical settings on the other [2]. The importance of hospital-acquired infections goes beyond its impact on morbidity and mortality figures in any country, and has profound economic implications. Acquisition of a nosocomial

infection can prolong duration of hospitalization, increase the costs of health care, and place a serious economic burden on patients and their families [5].

Standard precautions are designed to reduce the risk of acquiring occupational infection from both known and unexpected sources in the healthcare setting [6]). Strict application by health staff, including students, of standard precautions may prevent a percentage of these risks [7]. 2006). Standard precautions have two objectives namely to protect health care workers from percutaneous injuries and to prevent transmission of nosocomial infection. Due to their limited experience in performing invasive procedures, medical students are at particular risk of exposure to blood-borne pathogens [8]. Medical and nursing students should have adequate knowledge before their initial training period at hospital which is a pre-requisite for compliance. Moreover, specialized training must be received before a health care student undertakes any patient procedure involving sharp devices [9]. Physicians' knowledge of standard precautions has been reported to be insufficient [10-12]. Few studies have reported on medical students' knowledge of standard precautions or sharp injuries and noted a lack of adequate knowledge of standard precautions [9,13-15]. The observance of hygiene recommendations by students is reported as being weak: medical students rarely wash their hands after examining patients [16,17]. Poor compliance may have its roots in a failure to learn this simple, essential behavior at medical school [16]. Learning practices are indispensable for improving student knowledge of nosocomial infection and the prevention of infection transmission [18-20]. Assessing medical students' knowledge towards standard precautions will aid in prevention of nosocomial infections and can provide the foundations for curricular reform necessary to provide them with adequate knowledge and skills.

This scenario should alert clinical instructors and supervisors to the need to pay adequate attention to imparting knowledge to students throughout their training period about measures to prevent nosocomial infections [10]. In one survey, 27% of participating health care students reported insufficient emphasis on teaching about infection control in their training program, whilst 50% expressed a desire for more emphasis on isolation procedures during their training [7]. Renewed effort geared towards education in terms of training and retraining about standard infection control, as well as strict adherence by health care staff and students to aseptic practice, can reduce the extent of these risks [7].

Considering the lack of information describing students' knowledge of the preventive measures necessary to limit the spread of nosocomial infections, this study provides insight into knowledge about nosocomial infection among health care students undertaking different training programs in medical and nursing faculty. The objectives of this study were to assess medical and nursing students' awareness and knowledge at Medical University, in Tirana about standard precautions and to explore their attitudes toward the current curricular/training in providing them with effective knowledge and necessary skills with regard to infection control.

2. METHODOLOGY

2.1. Participants

The research was a cross-sectional survey. The study was carried out at the medical faculty and faculty of medical technical sciences of Medical University of Tirana. Students were selected from each academic program using a simple random sampling technique. Overall, 220 students from medicine, physiotherapy, radiology, and nursing who were in their first and second year were selected for study.

2.2. Survey Instrument

The standardized infection control questionnaire prepared by infection control experts according to international guidelines on standard isolation precautions and hand hygiene was used in this study. The questionnaire consisted of three main domains, with 25 close-ended questions: students' knowledge about nosocomial infection with five items, standard precautions with 12 items, and hand hygiene with eight items. Response to each item was coded and scored as a correct answer (2), don't know (1), or incorrect answer (0). Also, data on the subjects' sociodemographic characteristics, their definition of nosocomial infection, and their main source of information were collected from students.

2.3. Statistical Analysis

Data were analyzed using SPSS 16.0 software. Descriptive statistics were used to summarize the data obtained. Association between courses of study and knowledge about nosocomial infections was tested using the chi-square test, and the ANOVA test to compare differences in the knowledge between the different student groups. A p-value ≤ 0.05 was considered significant. All tests are two tailed.

3. RESULTS

All the participants completed and returned the questionnaire, giving a response rate of 100%. Two hundred twenty clinical students were randomly sampled to participate in the study. They comprised 85 (34%) males and 166 (66%) females. Their mean age was 22.3 ± 1.1 years. Eighty participants each were sampled from nursing students and medical students, while 30 each were sampled from physiotherapy and radiology students. A response rate of 100% was achieved through close follow-up and the personal interest in nosocomial infection among the participants.

3.1. Knowledge Distribution

The overall mean percentage score for the standardized infection control question was $63.2 \pm 1.9SD$. Medical students recorded a mean score of $69.34 \pm 0.6SD$, physiotherapy students scored $63.1 \pm 1.8SD$, radiography students scored $59.8 \pm 1.6SD$, and nursing students scored $60.6 \pm 2.5SD$ (Table 1). Comparison of mean percentage scores among the four programs using the ANOVA test did not show any statistically significant difference in knowledge about hand hygiene domains, $p=0.8$. However, there was a statistically significant difference in mean percentage scores, in the standard precautions domain of the questionnaire between the different student categories, $p=0.01$.

Table1. Comparison of knowledge of different student groups on nosocomial infection, standard precautions, and hand hygiene

Domain	Nursing	Physiotherapy	Imagery	Medicine	P
Nosocomial	47.6 ± 2.0	45.5 ± 2.7	49.4 ± 1.4	64.8 ± 1.9	0.8
Standard precaution	79.9 ± 1.9	87.3 ± 1.9	83.2 ± 2.6	90.3 ± 1.1	0.01*
Hand hygiene	56.6 ± 2.5	62.0 ± 1.1	61.6 ± 2.0	56.6 ± 1.1	0.8
Total	60.6 ± 2.5	63.1 ± 1.8	59.8 ± 1.6	69.3 ± 0.6	

*statistically significant

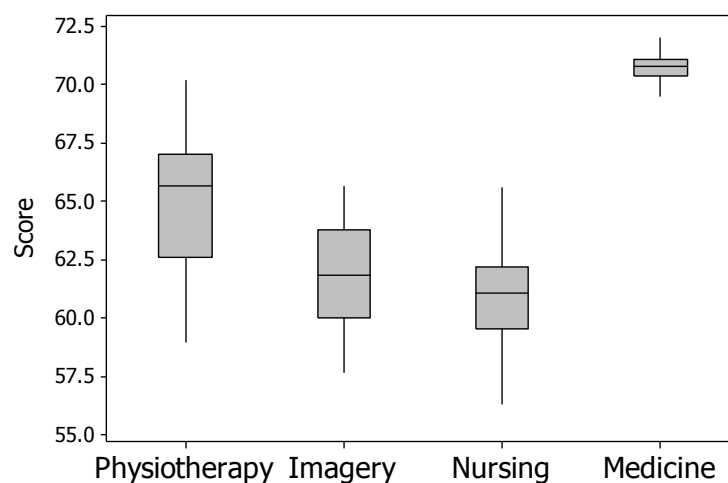


Fig1. Comparison of knowledge of different student groups

The principal source of information for most students was formal training in class, referred by 91 students, representing 41% of the students' population in the study.

Course of study and knowledge about prevention. The students were assessed on the basis of their knowledge in relation to their courses of study. No statistical significant association was found

between their courses of study and knowledge on the prevention of nosocomial infection on the three domains, $p=0.6$.

4. DISCUSSION

Exposure to infectious diseases is one of the most frequently identified occupational hazards facing health care workers. Awareness and adequate knowledge are important requirements for all health care workers. The study identified and compared knowledge about nosocomial infection and sources of information among 251 health care students.

The scores on the knowledge and hand hygiene domain did not differ significantly between the student categories. Medical students had a higher score in the standard precautions domain with a significant difference with other students. The main source of information was reported the formal training in class.

Awareness and background knowledge about nosocomial infections among the selected students were moderate and was most evident among medical students. Formal training (41%) in class was shown to be the main source of information influencing students' knowledge about preventive measures for nosocomial infections. The results of our study are lower compared with a study that reported in a study in which 92% of sampled students citing formal training in class as their main source of information [8]. Methodological and environmental factors might have influenced the discrepancy in outcome between studies. The previous study involved a much larger number of students than our study. Also, the study location might have influenced the differences in outcome of the studies. Teaching infection control to health care students is a challenge both with respect to developing a cohesive program and encouraging students to adopt correct attitudes early in their careers. The reference made to formal training in both studies was suggestive of a more theoretical approach to campaign about nosocomial infection control.

Although there were differences in the standard precautions knowledge domain between the four branches of studies, there was no significant association between the type of study and knowledge amongst the students. This means that, although the students recorded different overall percentage mean scores in the domains of the questionnaire, they did not get more knowledge from a particular type of study. The performance of each student category was different across the domains. Medical students had the highest mean scores for the infections and standard precautions domain whereas physiotherapy students had the highest score on the hand hygiene domain but recorded the lowest score for the nosocomial infection domain. These results were similar as that reported by another study, although the difference in the present study was not substantial enough to be of statistical significance [21]. Further, the knowledge of the students about hand hygiene in the prevention of nosocomial infection did not show any statistically significant difference between the training courses. This result was different with findings by a study which reported that nursing students expectedly had the highest score on all three domains of the questionnaire [22]. Students need more knowledge of basic infection control principles before they go into practice. You can reinforce it once they are in practice, but it should be there beforehand. In maintaining infection control standards, the staff - particularly nurses - need better understanding of how infections spread if they are to combat them. Students don't always have the opportunity to put their theory into practice for some time. Sometimes the first signs of infection are more apparent to nurses than to doctors [23]. There is a need to strengthen the nursing curriculum on infection control, given that nurses are likely to have more contact with patients than any other health care professionals. Many factors potentially influenced the response of participants in this study, ranging from different levels of entry into the clinical phase of each program, extent of physical contact with patients, training in hands-on techniques, and general patient handling practices. In conclusion, the results of this study demonstrate a moderate knowledge of nosocomial infection isolation precautions among most of the health care students in the study. The health care curricula should adjust the infection control teaching in faculties' programs. Other authors also have recommended that future educational approaches should include rigorous curricular reform with pragmatic presentation of effective hand hygiene and standard precautions, feedback from teachers at the bedside, and inclusion of hygiene scores for students in all clinical training courses [22,24]. This is the first study to report the knowledge and source of information regarding the nosocomial infections and infection control among clinical health care students in Albania. Previous studies conducted in Albania reported final year dental

students' knowledge about the oral lesions associated with Human Immunodeficiency Virus infection and Acquired Immunodeficiency Syndrome, barrier dentistry, and their perception, knowledge and attitude toward infected patients. In this study only half claimed to have adequate knowledge on post-exposure protocol, while 83% had never heard of post-exposure prophylaxis [25]. In another study conducted among a representative sample of medical students to assess the knowledge and attitudes on tuberculosis, students' knowledge on tuberculosis was deemed not satisfactory, despite 87% could detect the presence of the disease [26].

Another study to assess the association between knowledge about sexually transmitted infections and consistent condom use among university students reported an overall significant association of knowledge about sexually transmitted infections with consistent condom use [27].

REFERENCES

- [1] Horan TC, Gaynes RP (2004). Surveillance of nosocomial infections. In: Hospital Epidemiology and Infection. 3rd ed. Mayall CG, editor. Philadelphia, PA: Lippincott, Williams & Wilkins;
- [2] Samuel SO, Kayode OO, Musa OI, et al.(2009) Nosocomial infections and the challenges of control in developing countries. *Afr J Clin Exp Microbiol.*;11:102–110.
- [3] McDermott C, Gibb AP, Paterson-Brown S, Brady RR.(2008) Fact or infection: do surgical trainees know enough about infection control? *Ann R Coll Surg Engl*; 90 (8): 647-50.
- [4] World Health Organization. 10 facts on patient safety. Available from: <http://www.who.int/feature/factsfile/patientsafety/en/index.html>.
- [5] Robert AW(2001) Controlling anti-microbial resistance in hospitals infection control and use of antibiotics. *Emerg Infect Dis.*;7:188–192.
- [6] Siegel, J. D., Rhinehart, E., Jackson, M., & Chiarello, L. (2007). Healthcare Infection Control Practices Advisory Committee. Guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings. Centers for Disease Control (CDC).
- [7] Phillips, G. & Ker, J. (2006). Champion students! Experience with a standardized infection control training package in medical students. *J Hosp Infect*, 62, 518-519.
- [8] Wiwanitkit, V. (2002). Knowledge survey concerning universal precaution among the Thai preclinic year medical students: a medical school-based study. *Am J Infect Control*, 30, 255-256.
- [9] Elliott, S. K. F., Keeton, A., & Holt, A. (2005). Medical students' knowledge of sharps injuries. *J Hosp Infect*, 60, 374-377.
- [10] Bryce, E. A., Scharf, S., Walker, M., & Walsh, A. (2007). The infection control audit: the standardized audit as a tool for change. *Am J Infect Control*, 35, 271-283.
- [11] Easton, P. M., Sarma, A., Williams, F. L. R., Marwick, C. A., Phillips, G., & Nathwani, D. (2007). Infection control and management of MRSA: assessing the knowledge of staff in an acute hospital setting. *J Hosp Infect*, 66, 29-33.
- [12] Sax, H., Perneger, T., Hugonnet, S., Herrault, P., Chraïti, M. N., & Pittet, D. (2005). Knowledge of standard and isolation precautions in a large teaching hospital. *Infect Control Hosp Epidemiol*, 26, 298-304.
- [13] Askarian, M., Honarvr, B., Tabatabaee, H. R., & Assadian, O. (2004). Knowledge, practice and attitude toward standard isolation precaution in Iranian medical students. *J Hosp Infect*, 58, 292-296.
- [14] Koenig, S., & Chu, J. (1993). Senior medical students' knowledge of universal precautions. *Acad Med*, 68,372-374
- [15] Mann, C. M., & Wood, A. (2006). How much do medical students know about infection control? *J Hosp Infect*, 64, 366-370.
- [16] Feather, A., Stone, S. P., Wessier, A., Boursicot, K. A., & Pratt, C. (2000). 'Now please wash your hands': the handwashing behavior of final MBBS candidates. *J Hosp Infect*, 45, 62-64.
- [17] Hunt, D. C. E., Mohammudaly, A., Stone, S. P. & Dacre, J. (2005). Hand hygiene behaviour, attitudes and beliefs in first year clinical medical students. *J Hosp Infect*, 59, 371-373.

- [18] Kim, K. M., Kim, M. A., Chung, Y. S., & Kim, N. C. (2001). Knowledge and performance of the universal precautions by nursing and medical students in Korea. *Am J Infect Control*, 29, 295-300.
- [19] Calabro, K., Weltge, A., Parnell, S., Kouzekanani, K., & Ramirez, E. (1998). Intervention for medical students: effective infection control. *Am J Infect Control*, 26, 431-436
- [20] Colombo, C., Giger, H., Grote, J., Deplazes, C., Pletscher, W., Lüthi, R., & Ruef, C. (2002). Impact of teaching interventions on nurse compliance with hand disinfection. *J Hosp Infect*, 51, 69-72. <http://dx.doi.org/10.1053/jhin.2002.1198>
- [21] Suchitra JB, Lakshmi Devi N.(2007) Impact of education on knowledge, attitudes and practices among various categories of health care workers on nosocomial infections. *Indian J Med Microbiol.*;25: 181–187.
- [22] Tavolacci, M. P., Ladner, J., Bailly, L., Merle, V., Pitrou, I., & Czernichow, P. (2008). Prevention of Nosocomial Infection and Standard Precautions: Knowledge and Source of Information among Healthcare Students. *Infection Control and Hospital Epidemiology*, 29(7), 642-647.
- [23] Ann Shuttleworth. Teaching nurses the importance of microbiology for infection control. *Nursing Times.net*. Vol: 100, Issue: 36, Page No: 56
- [24] Kim, K. M., Kim, M. A., Chung, Y. S., & Kim, N. C. (2001). Knowledge and performance of the universal precautions by nursing and medical students in Korea. *Am J Infect Control*, 29, 295-300.
- [25] A. Aliko and A. Alushi.(2009) Knowledge and Attitudes of Albanian Dental School Students Towards HIV/AIDS. University of Tirana, Tirana, Albania.
- [26] Hasan Hafizi, Edlira Sharra, Albana Fico, Rosella Centis, Giovanni Battista Migliori, Lia D'Ambrosio, Paolo Castiglia (2012) Results of a tuberculin skin test survey performed in a national representative sample of young Albanian students.
- [27] Burazeri G, Roshi E, Tavanxhi N.(2004) Does knowledge about sexually transmitted infections increase the likelihood of consistent condom use? *Prev Med*. Dec;39(6):1077-9.