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Research Article

Knowledge and Awareness of Health Care Associated Infection Control Measures Among Intensive Care Unit Nurses in Hospitals, Turkey

Türkiye Hastanelerinde Yoğun Bakım Hemşireleri Arasında Sağlık Bakım ile İlgili Enfeksiyon Kontrol Önlemleri Hakkında Bilgi ve Farkındalık

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Abstract

Aim: In this study, we aimed to determine knowledge and awareness of health care associated infection control measures among intensive care unit (ICU) nurses in Turkish hospitals using case-vignettes.

Material and Methods: The questionnaire form used in this study was designed and prepared by the researchers by screening the relevant literature. Informative part of the form consisted of demographic data. The question part included 5 main sections with narrative questions of case vignettes and multiple-choice items related to the vignettes. A total of 285 nurses were accessed through e-mail addresses; the survey link was then sent to the ICU nurses who accepted participation in the questionnaire.

Results: A total of 149 out of 285 nurses completed the questionnaire and sent filled the form online. The number of the nurses who consider screening of patients admitted to the ICUs from another health care institutions in terms of MRSA, VRE and carbapenemase-producing Enterobacteriaceae was 111 (74.4%), 118 (79.1%) and 93 (62.4%), respectively. The number of the nurses who thought that the hands should be rubbed with alcohol-based hand sanitizer and for 20-30 seconds was 90 (60.4%) and 95 (63.8%), respectively. In case of patients with Clostridium difficile diarrhea, the number of nurses gave the answer as the hand hygiene must be provided by washing hands with antimicrobial soap and water was twenty-six (17.4%)

Conclusion: The result of this study indicated that knowledge and awareness of HCAIs among ICUs nurses were not at a desired level. Our results highlight the need for education and training especially on hand hygiene to raise awareness of control of HCAIs in ICUs.

Keywords: Intensive care unit, health care acquired infection, hand hygiene, isolation, nurse, questionnaire

Öz

Amaç: Bu çalışmada, Türkiye'deki hastanelerdeki yoğun bakım ünitesi (YBÜ) hemşirelerinin sağlık hizmetleri ile ilişkili enfeksiyon kontrol önlemleri konusundaki bilgi ve farkındalıklarını vaka vinyetleri kullanarak belirlemeyi amaçladık.

Materyal ve Metot: Bu çalışmada kullanılan anket formu araştırmacılar tarafından ilgili literatür taranarak tasarlanmış ve hazırlanmıştır. Formun bilgilendirici kısmı demografik verilerden oluşmuştur. Soru kısmı ise olgu vinyetlerinin anlatımsal sorularını ve çoktan seçmeli maddeleri içeren beş ana bölümden oluşmuştur. Toplam 285 hemşireye e-posta adresleri üzerinden ulaşılmış ve ankete katılmayı kabul eden ICU hemşilerine anket bağlantısı gönderilmiştir.

Bulgular: Toplam 285 hemşireden 149'u anketi tamamlayarak formu çevrimiçi olarak göndermiştir. ICU'lara başka başka bir sağlık kuruluşundan gönderilen hastaların MRSA, VNE ve karbapenemaz üreten enterobakteriler açısından taranması gerektiğini düşünen hemşirelerin sayısı sırasıyla 111 (%74.4), 118 (%79.1) ve 93 (%62.4)'tür. Ellerin alkol bazlı el dezenfektanı ile ve 20-30 saniye boyunca ovulması gerektiğini düşünen hemşirelerin sayısı sırasıyla 90 (%60.4) ve 95'tir (%63.8). Clostridium difficile diarrhea bulunan hasta olması durumunda ellerin antimikrobiyel sabun ve su ile yıkanmasıyla el hijyeni sağlanması gerektiği şeklinde cevap veren hemşirelerin sayısı 26'dır (%17.4).

Sonuç: Bu çalışmanın sonuçları ICU hemşireleri arasında HCAI bilgi ve farkındalığının istenen düzeyde olmadığını göstermiştir. Bulgularımız ICU'larda HCAI kontrolünün farkındalığını artırmak amacıyla özellikle el hijyeni konusundaki eğitim ihtiyacını vurgulamaktadır.

Anahtar Kelimeler: Yoğun bakım ünitesi, sağlık bakım edinilmiş enfeksiyon, el hijyeni, izolasyon, hemşire, anket

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INTRODUCTION

Health care associated infections (HCAIs) are those infections that patients acquired while receiving health care (1). HCAIs include infections developed in various settings of where patients received care such as family medicine clinics, home care, ambulatory care and long-term care. Studies have reported that the most common adverse events affecting hospitalized patients include HCAIs, adverse drug events and surgical complications (2, 3). HCAIs increase morbidity, mortality and duration of hospitalization, and therefore more research and changes in daily practice are needed to ensure hospital safety and prevent HCAIs (4,5).

The impacts of HCAIs involve prolonged hospital stays, long-term disability, increased resistance of microorganisms to antimicrobials, additional financial burden, high costs for patients and their families and excess deaths (6). Patients at Intensive Care Units (ICUs) are more prone to HCAIs. HCAIs not only negatively affect patients at ICU, but also impose socioeconomical burden by increasing health care costs especially in developing countries (7). According to the 2017 Surveillance of HCAIs and preventions indicators in European ICUs report by the European Union, patients admitted to ICUs are at 5 to 10 fold higher risk of acquiring HCAIs due to both intrinsic (e.g. immune-depression) and extrinsic (e.g. mechanical ventilation) risk factors, because ICUs are often the epicenter of an emerging HCAIs problems and antimicrobial resistance in the hospital (8). This makes knowledge, attitudes and responsibilities of health care workers at ICUs more critical. According to the report of the European Surveillance System (TESSy) in 2014 patients staying in an ICUs longer than two days, 6,995 (8%) presented with at least one HCAIs (9). The utilization of invasive devices and invasive monitoring is an important risk factor for developing HCAIs in ICUs, resulting in a significant increase in morbidity, mortality and health care costs (10).

Nursing workload has been shown to have a significant impact on HCAIs (11). A nurse to patient ratio <1 has been associated with an increased risk of developing HCAIs, prolonged length of stay and costs (12). In the ongoing COVID-19 pandemic, shortage of nurses in ICUs has caused considerable problems in the management of hospitals and coping with HCAIs in addition to the novel coronavirus itself. The COVID-19 outbreak has shown the importance of infection control especially in ICUs and the knowledge and attitudes of nurses towards hygiene. Adherence to infection control guidelines, sound knowledge of the health care workers, including nurses, and simple practices such as hand hygiene have shown dramatic effects on reduction of HCAIs. The objective of this study was to investigate knowledge and awareness of health care associated infection control measures among intensive care unit nurses in Turkish hospitals.

MATERIAL AND METHOD

This study was performed as case-vignettes questionnaire between June 2019 and September 2019. This study was performed as case-vignettes questionnaire between June 2019 and September 2019. Before the beginning, approval was obtained from the Yeditepe University Clinical Research Ethics Committee for the implementation of the study (Decision no:KAEK:991). The study was conducted in accordance with the relevant ethical principles of 1964 Declaration of Helsinki and its later amendments. The study was conducted via e-mail communication with nurses, members of Turkish Society of Intensive Care Nurses (TSICN), and working in ICUs in Istanbul province and other provinces.

Questionnaire Form

The questionnaire form used in this study was designed and prepared by the researchers by screening the relevant literature (Appendix). Informative part of the form consisted of demographic data including gender, city of institution, hospital type, ICU type and duration of working in ICU. The question part included 5 main sections with narrative questions of case vignettes and multiple-choice items related to the vignettes. Q1 consisted of YES/NO options, Q2 multiple-choice answers, Q3 two sub-items, Q4 and Q5 TRUE/FALSE options. The answers given by the participants were compared with an answer key and evaluated. In order to facilitate the analysis and prevent bias, no open ended questions were used. The questionnaire form was entered to the popular questionnaire website SurveyMonkey (www.surveymonkey.com)

The Survey

First, e-mail information of ICU nurses from Istanbul and other provinces was obtained from the TSICN. A total of 285 nurses, members of TSICN were accessed through e-mail addresses and social media platforms. The nurses were trained about infection in detail. The survey link was then sent to the ICU nurses who accepted participation in the questionnaire. A deadline for the completion was sent to the participants. Incomplete forms were excluded from the study. 149/285 nurses completed the survey. The question part included 5 main sections with narrative questions of case vignettes and multiple-choice items related to the vignettes. We selected common clinical cases in terms of health care associated infection control measures.

Statistical Analysis

The answer forms were transferred to the Microsoft Excel software. Continuous variables were expressed as mean ± standard deviation and categorical variables as frequency (n) and percentage (%). As of the nature of the study, we did not perform hypothesis tests and were content with evaluating the questionnaire objectively.

RESULTS

A total of 149 out of 285 nurses completed the questionnaire

and sent filled the form online. At the deadline, all 285 nurses were informed about the completion of the questionnaire. The answers were entered to a computer and sorted. The mean age of the nurses was 29.0±6.1 years. Of all participants, 121 (81.2%) were female and 28 (18.8%) were male. Duration of working in an ICU was longer than 5 years in 99 (66.4%) nurses. The city of institutions was Istanbul in 77 (51.7%) and non-Istanbul in 72 (48.3%) nurses. Distribution of hospital types is shown in Figure 1 and that of ICU types in Figure 2.

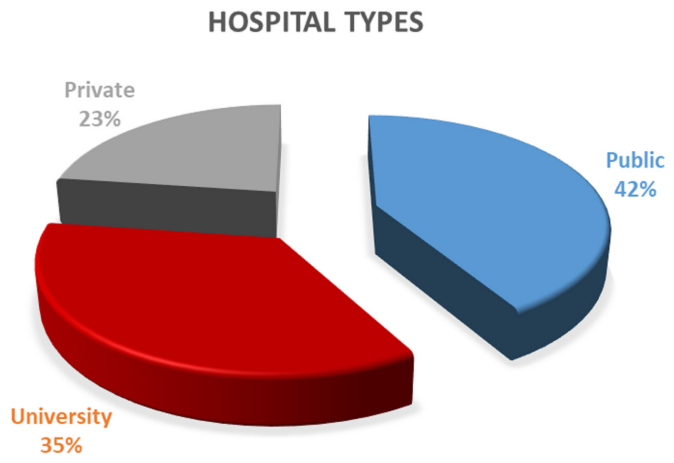

Figure 1. Distribution of the nurses according to hospital types

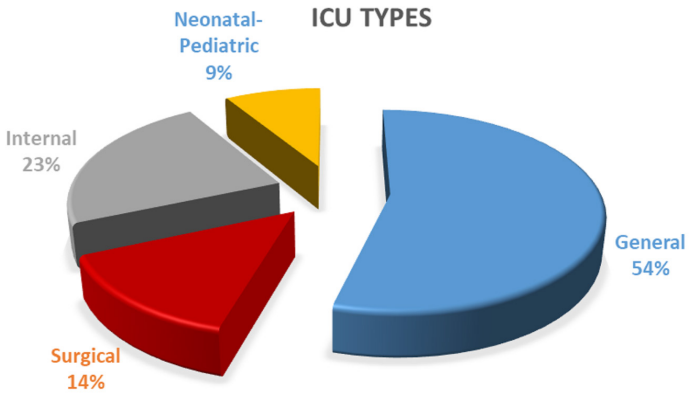

Figure 2. Distribution of the nurses according to ICU types

Evaluation of the Questionnaire

Q1

The number of the nurses who consider screening of patients admitted to the ICUs from another health care institutions in terms of MRSA, VRE and carbapenemase-producing Enterobacteriaceae was 111 (74.4%), 118 (79.1%) and 93 (62.4%), respectively. Seventy (50%) of the nurses gave the correct answer to all three conditions. Distribution of the nurses who gave the correct answer to this question is shown in Figure 3.

Q2

The number of the nurses who gave the correct answer to the Q2 was 119 (79.9%). Distribution of the nurses who gave the correct answer to this question is shown in Figure 4.

Q3

The number of the nurses who thought that the hands should be rubbed with alcohol-based hand sanitizer and for 20-30 seconds was 90 (60.4%) and 95 (63.8%), respectively. Of all nurses, 65 (43.6%) knew both the correct method and the correct duration. Distribution of the nurses who gave the correct answer to the Q3 is shown in Figure 5.

Q4

Only one nurse stated the correct answer during the aspiration of respiratory secretions of patient in intensive care unit regarding the use of personnel protective equipment and hand hygiene.

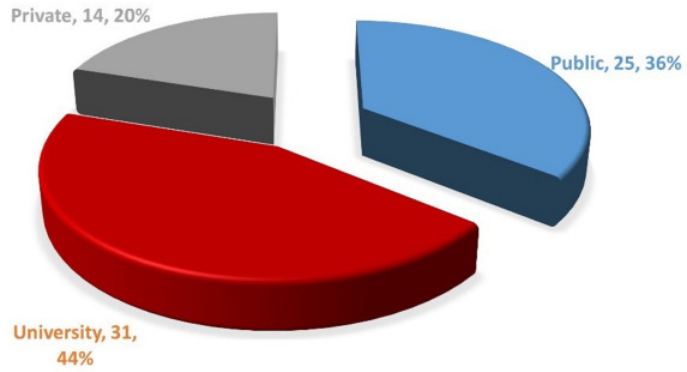

Figure 3. Numbers and percentages of the correct answers to Q1 by hospital type

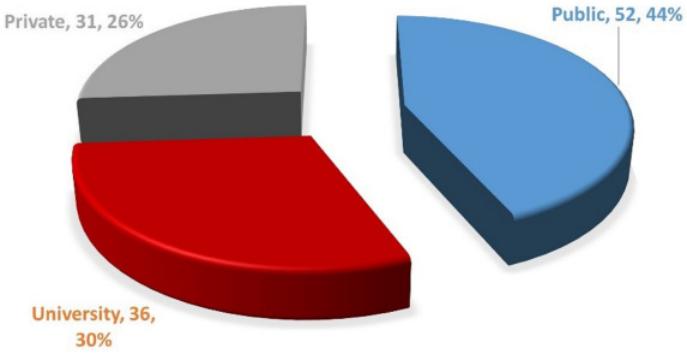

Figure 4. Numbers and percentages of the correct answers to Q2 by hospital type

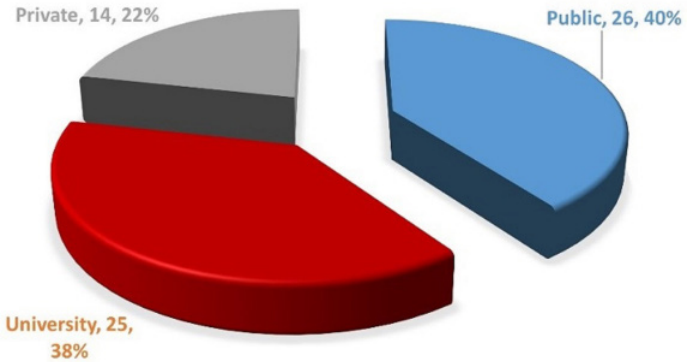

Figure 5. Numbers and percentages of the correct answers to Q3 by hospital type

Q5

In case of patients with Clostridium difficile diarrhea, the number of nurses gave the answer as the hand hygiene must be provided by washing hands with antimicrobial soap and water was twenty-six (17.4%). Distribution of the nurses who gave the correct answer to this question is shown in Figure 6.

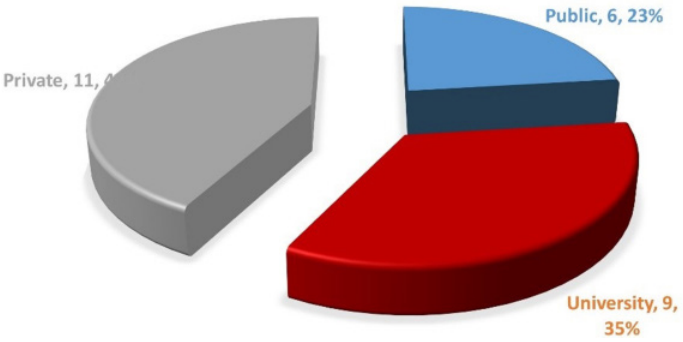

Figure 6. Numbers and percentages of the correct answers to Q5 by hospital type

DISCUSSION

The present study was performed in order to investigate knowledge and awareness of control of HCAIs among Turkish ICU nurses. In the present study, it is seen that results of the case-vignettes are not very satisfactory and there are a lot of things that can be done to close the gaps in the knowledge and awareness of HCAIs among ICUs nurses. As ICUs have a critical place in the control of HCAIs, particularly amidst the -unfortunately- ongoing COVID-19 pandemic, both basic and advanced knowledge of HCAIs is a very current issue from nurses' perspective. Because nurses are in the front line at the fight with the virus at one hand, while they are responsible to deliver optimal-quality of care to protect patients' against HCAIs.

Looking at the other side of the medallion, 38 (25.5%), 31 (20.8%) and 56 (37.6%) nurses stated that they do not consider screening of patients admitted to the ICUs from another health care institutions for MRSA, VRE and carbapenemase-producing Enterobacteriaceae. These facts are very high for such a critical profession working in ICUs where the rate of HCAIs is reported as high as 8% (9). Even higher rates have been reported in the literature. In a study from Greece, the rate of HCAIs was reported as 9.1% with the most common types of HCAIs being lower respiratory infections, bloodstream infections and systemic infections (13). In another study, the rate of HCAIs was reported as 9.4% with the most common types being bloodstream infections, UTIs and pneumonia (14). These rates highlight the importance of knowledge and awareness of HCAIs among healthcare staff, especially those working in ICUs.

In a study from Hungary aiming at measuring nurses' awareness of infection control measures, low HCAI and hand hygiene (HH) scores obtained from the questionnaire were reported to underline the need to enhance infection control training in Hungarian hospitals and to improve nurses' knowledge on infection control (15). In the present study, 30 (20.1%) ICU nurses did not answer the hygiene related question correctly. Furthermore, 59 (39.6%) nurses did not prefer the most effective hand hygiene method as rubbing the hands by alcohol-based hand sanitizer in case of there is no visible dirt, no body fluid belonging to the patient on the hands of nurses. and 54 (36.2%) nurses chose the hand hygiene duration as 40-60 seconds for this situation. Of course these rates are disappointing. The importance of hand hygiene was closely observed once again during the COVID-19 pandemic. Whereas, health care staff and especially nurses have responsibility for being role models for patients in particular and the general population in a wide sense. The situation is not much different in other regions of the world. According to the recommendation from the World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC), hand hygiene is the most important and easy way to control HCAIs (16,17). According to the vital role of nurses in preventing HCAIs, they are key members of infection control teams in hospitals. For this reason, one should have sufficient knowledge and skills in the field of infection control.

Unfortunately studies investigating nurses' knowledge about hand hygiene have not reached the same conclusion. In a study about hand hygiene among health care staff, Malekmakan et al. noted that nurses' knowledge about standard precautions is not enough and many nurses believe that there is no need for hand hygiene by wearing gloves (18). In another study by Bulut et al., hand washing of health care staff working in intensive care units of a state hospital were found not to be at a desirable level and also the physical conditions were not sufficient for providing hand hygiene (19). Fox et al. reported that a hand hygiene protocol for patients in the ICU was associated with reductions in HCAIs and improvements in nurses' hand-washing compliance (20).

In our study, the Q4 included one question of three options about isolation of the patients and nine further questions regarding donning PPEs appropriately. Unfortunately, among 149 participants, only one (0.67%) nurse knew all 10 questions correctly, indicating the urgent need for education and training programs especially for nurses working in ICUs. On the contrary, Arli et al. reported that the nurses included in the study have generally good compliance with isolation precautions and scores of the nurses working in an ICU were higher than those of the nurses working in clinics (21).

In this study twenty-six (17.4%) nurses informed hand hygiene by washing hands with antimicrobial soap and water in case of C. difficile diarrhea although alcohol based hand sanitizers are not effective against spores of Clostridium difficile, therefore hand hygiene with antimicrobial soap and water is preffered method for this reason.

Oughton MT et all (22). have shown that handwashing with

antimicrobial soap and water reduced the colony count on the hands by 2.14 log (10) CFU/mL whereas alcohol based handrub had no effect (0.06 log(10) CFU/mL) removing C. difficile from the hands.

Today, there are numerous opportunities to overcome these shortcomings. These facilities include on-line training, periodic educations, congresses, symposiums as well as digital platforms such as YouTube. For example, professional YouTube contents can be uploaded to directly focus on nurses. However, there is not much time to accomplish these improvements because of the disaster named COVID-19 and what will be done without wasting time.

Study Limitations

First, the number of participants is small for such a significant questionnaire. Second, although there are numerous questionnaire studies on HCAIs in the literature, each study applied its own survey form, making a healthy comparison difficult. Third, our study included three major domains as hand hygiene, patient isolation and PPEs. Perhaps including more domains of HCAs nursing management could give more detailed insight. Finally, hand-washing, PPE donning and isolation practices differ among the countries based on sociocultural and developmental factors. Nevertheless, we believe that our results will shed light on the issue and provide guidance for future large-scale studies.

CONCLUSION

The result of this study indicated that knowledge and awareness of HCAIs among ICU nurses were not at a desired level. However, this is also true for many previous studies. Even in the same studies there are significant differences between health centers. Our results highlight the need for training especially on hand hygiene and donning PPEs. In order to achieve training targets, technological tools including social media and video platforms such as YouTube could be effectively used to facilitate these education programs and their effectiveness. Every possible material from ICU protocols to posters could be benefited from to raise awareness of HCAIs in health care staff working in ICUs.

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Conflict of interest: *The authors declare that they have no competing interest.*

Ethical approval: *Before the beginning, approval was obtained from the Yedi Tepe University Clinical Research Ethics Committee for the implementation of the study (Decision no:KAEK:991).*

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