Original Article

Evaluation of Hand Hygiene Practice Status of Nursing Students in Turkey

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Abstract

Background: Although it is known that hand washing is important in preventing healthcare-related infections, hand hygiene compliance among nurses is known not to be good. In order to control these infections successfully, nursing students who are candidates for this profession need to be supported for hand hygiene
Objectives: To examine nursing student's hand hygiene practice status.
Methodology: The study universe had 2nd, 3rd and 4th year nursing students who had at least one year of nursing education and clinical practice experience (n=431). After being informed, the participant's verbal consent was obtained and the Hand Hygiene Practices Inventory was applied with sociodemographic data collection form.
Results: Student's total Hand Hygiene Practices Inventory mean score was 65.36±4.92. There is a statistically significant difference between the variables of gender, grade level and hand hygiene severity and HHPI mean score ($p<0.001$). It was determined that the highest hand hygiene compliance was after contacting the patients (98.4%) and the least compliance was before wearing gloves (31.1%).
Conclusions: Hand hygiene practice scores of the students were high. However, variables such as education level and receiving training on the subject do not affect hand hygiene practice. Therefore, students need to gain the practice of hand washing affectively.

Key Words: hand hygiene, nursing student, practice

Introduction

Healthcare-associated infections (HAIs) still remain one of the most important health problems that cause deterioration of quality of life worldwide, prolonging hospital stay time, increasing health costs, increasing mortality and morbidity (Okgun Alcan and Dolgun, 2019). The incidence of HAIs is reported as 7% in developed countries and 10% in developing countries (Khan, Baig and Mehboob, 2017; Bayram *et al.*, 2019). This rate has been reported as more than 1.4 million people worldwide (WHO, 2002). The easiest and cheapest way to prevent these infections is hand washing (Hugonnet and Pittet, 2000; Akyol, 2007; Bayram *et al.*, 2019). In fact, it is reported that 30% of HAIs can be reduced only by hand hygiene (Bahcecioglu Turan, Mankan and Polat, 2017). Although hand hygiene still has an important place in preventing the transport of infection agents and reducing the incidence of infection-related to health personnel, studies have highlighted that the health personnel's level of compliance with hand hygiene is low (Muller *et al.*, 2015; Karadag, Yildirim and Pekin Isleri, 2016; Okgun Alcan and Dolgun, 2019). Nursing is a profession that is involved in patient care 24 hours a day and has close contact with patients and the hospital environment, therefore it has a high risk of infection (Akyil and Uzun, 2007; Okgun Alcan and Dolgun, 2019). Microorganisms found in the hands, mouth and nasal cavities of nurses, which can be carriers for many infection agents, although healthy, can be easily transmitted to patients and can lead to an increase in the duration of hospital stay, cost, labor loss and etc. as a result of healthcare-

associated infections (HAIs) (Akyil and Uzun, 2007). This also is a factor in the direct-indirect transport of infections from the hospital to public. Active microorganisms can spread to the public through discharged patients, employees or visitors. Control and prevention of this condition is a complex and multi-factor public health problem. Therefore, incompatibilities and inadequacies in hand hygiene practices of health care workers are also an important risk factor for public health (Ertek, 2008; Cebeci, Gursoy and Tekingunduz, 2012; Aylaz, Sahin and Yildirim, 2017). Therefore, improving hand hygiene compliance among nurses is critical for reducing HAIs (Benson and Powers, 2011). It is important to build hand hygiene awareness and improve hand hygiene compliance in student nurses prior to graduation, as they will build the future workforce. In addition, student nurses participate directly in the process of patient care and treatment in clinical areas during internship practices before graduation, under the supervision of lecturers and nurses. Thus, student nurses can also be a source of infection. Student nurses, a member of the medical team, play an important role in prevalence and prevention in HAIs (Hung *et al.*, 2017; Labrague *et al.*, 2018). For this reason, in order for nurses to have handwashing skills, they need to learn it cognitively, affectively and psychomotorly during their education (Bayram *et al.*, 2019). Although the literature states that nurses and nursing students who provide health care know the importance of handwashing and hand hygiene, they have difficulty turning it into action (Kobra *et al.*, 2016; Bayram *et al.*, 2019).

In order to create comprehensive approaches, it is important to identify the state of the students' hand hygiene practices and related problems, to eliminate these problems and to develop new strategies for improving handwashing behaviour (Akyol, 2007). In the literature, hand hygiene knowledge and observational hand hygiene practices of working and student nurses have been studied a lot, but the number of studies on the evaluation of hand hygiene practice is low. This study's aim is to evaluate the hand hygiene practice of nursing students with the Hand Hygiene Practices Inventory which was adapted to Turkish in 2016.

Methodology

Application Location of the Study: The study is descriptive one and was conducted at Uludag University Faculty of Health Sciences in Bursa/Turkey during the spring semester of the 2019-2020 academic year.

The Universe and the Sample of the Study: Study's universe was the 2nd, 3rd and 4th-year students who were in the nursing program, received at least one year of nursing education and had clinical practice experience (n=431). Sample selection was not made since it was aimed to reach all students. With 305 students participating, the study was completed and 71% of the universe was reached.

Application of the Study: After students were informed, verbal approval was obtained from the participants and the sociodemographic data collection form and scale form were distributed to students. It was stated to the participants that the data collected will only be used for the purpose of the research and will not be shared with any other institution or person. Before the application, it was stated that participation in the study was not mandatory and that the study group consisted only of voluntary participants. The time required to apply the scale and the sociodemographic data collection form is 10 minutes.

Data Collection Tools: The data were collected through the sociodemographic data collection form and the Hand Hygiene Practices Inventory.

Sociodemographic Data Collection Form: In the form prepared by the researcher, besides the student's sociodemographic characteristics, questions are asked about the importance of hand hygiene as well as the status of the students having been trained in hand hygiene.

Hand Hygiene Practices Inventory (HHPI): HHPI was developed by Thea Van de Mortel in 2009 to determine the way individuals practice hand hygiene (Van de Mortel, 2009). HHPI is a 5-type scale of 14 items. The scale is scored as 1=never, 2=sometimes, 3=often, 4=very frequently, 5=always. When calculating, the score of the answers given to the questions is summed up. The total score of HHPI varies between 14-70 and the high score indicates that hand hygiene practices are always performed. The coefficient of internal consistency reliability in Turkish validity and reliability study was set at 0.85. It has been reported that the single-factor structure is appropriate for HHPI, as in the original inventory. HHPI, adapted to Turkish, is a valid and reliable measurement tool for measuring hand hygiene practice (Karadag, Yildirim and Pekin Isleri, 2016).

Data Analysis: Descriptive statistics and frequency distributions of the data were obtained. In order to determine the statistical tests/analyses, the assumptions of normality and homogeneity of variances were evaluated by Kolmogorov-Smirnov and Levene tests. Parametric tests were used to analyze data found to be normally distributed. One Way ANOVA and Student t-test were used for cross-group comparisons. The scale's reliability analysis was performed and the Cronbach's alpha has been calculated. P<0.05 is accepted as a statistical significance value.

Ethical Approval: The ethics committee approval of Bursa Uludag University Health Sciences Research and Publication Ethics Committee, dated January 29, 2020, and numbered 2020/01, and work permit numbered 45226392-605/E.334 was obtained from the Dean of the Faculty of Health Sciences.

Results

247 (81.0%) of the students constituting the study group are women, 109 (35.7%) are 2nd-grade students, 29 (9.5%) are high school graduates and 24 (7.9%) are graduates of other high schools. (Industrial Vocational High School, Anatolian Teacher High School, Anatolian Technical High School, Multi-Program High School, etc.) Of the study group, 20 (6.6%) have a poor economic perception and 11 (3.6%) have a general academic average of 1.00-1.99. 269 (88.2%) of the students had an education for hand hygiene, and 48 (15.7%) said that hand hygiene is important. The findings of the sociodemographic characteristics of the study group were given in Table 1.

According to the results of the study, in the statistical evaluation conducted according to the students' sociodemographic and hand hygiene characteristics and HHPI score average (p<0.001), the difference between gender and scale point average was found to be statistically significant. The higher HHPI score average sits on female students in the statistical evaluation conducted with gender (p<0.01). Statistical evaluation at the grade level did not show a statistical difference between students' grade level and HHPI score averages (p>0.05). The higher HHPI score average for students who consider hand hygiene to be "very important" was found to be statistically significant (p<0.01). There is no statistical difference between the graduated high school, economic perception, general academic average and educational status for hand hygiene, and HHPI scale score average (p>0.05). Comparison results of HHPI score averages with student's hand hygiene and sociodemographic characteristics were given in Table 2.

According to the questions that evaluate the handwashing status of the students, it was determined that the most people applied hand hygiene was "after contact with the patient" with 300 people (98.4%) and the least people applied hand hygiene "before wearing gloves" with 95 people (31.1%). The data about students' hand hygiene practices are given in Table 3.

Table 1. Sociodemographic and Hand Hygiene Characteristics of the Study Group

Variables	**n(%)**
Gender	
Female	247 (81.0)
Male	58 (19.0)
Grade Level	
2nd Grade	109 (35.7)
3rd Grade	112 (36.7)
4th Grade	84 (27.5)
Graduated High School	
Regular High School	29 (9.5)
Medical Vocational High School	49 (16.1)

Private High School	12 (3.9)
Science High School	174 (57)
Religious Vocational High School	17 (5.6)
Other High Schools	24 (7.9)
Economic Status Perception	
Bad	20 (6.6)
Neutral	195 (63.9)
Good	90 (29.5)
General Academic Average	
1.00-1.99	11 (3.6)
2.00-2.99	152 (49.8)
3.00-4.00	142 (46.6)
Education Status on Hand Hygiene	
Yes	269 (88.2)
No	36 (11.8)
How Important Is Hand Hygiene To You?	
Important	48 (15.7)
Very Important	257 (84.3)
Total	305 (100.0)

Table 2. Comparison of HHPI Score Averages with Sociodemographic and Hand Hygiene Characteristics of Students

Variables	**HHPI ($\bar{X}$±SD)**
Gender	
Female	65.08 ± 4.35
Male	61.22 ± 7.71
t; p	**3.390; 0.001**
Grade Level	
2nd Grade	64.99 ± 5.62
3rd Grade	66.18 ± 4.13
4th Grade	66.03 ±4.59
F;p	9.962; 0.107
Graduated High School	
Regular High School	64.55 ± 4.71
Medical Vocational High School	66.73 ± 3.29
Private High School	64.75 ± 4.45
Science High School	65.03 ± 5.24
Religious Vocational High School	65.76 ± 3.63
Other High Schools	65.91 ± 6.26

F;p	7.471; 0.188
Economic Status Perception	
Bad	66.80 ± 2.89
Neutral	64.93 ± 5.22
Good	65.96 ± 4.52
F;p	2.596; 0.273
General Academic Average	
1.00-1.99	65.18 ± 4.06
2.00-2.99	64.63 ± 5.46
3.00-4.00	66.15 ± 4.23
F;p	5.573; 0.062
Education Status on Hand Hygiene	
Yes	65.32 ± 4.96
No	65.61 ± 4.67
t; p	5.047; 0.677
How Important Is Hand Hygiene To You?	
Important	61.87 ± 6.88
Very Important	66.01 ± 4.17
t; p	**8.450; .000**
Total	65.36±4.92

HHPI: Hand Hygiene Practices Inventory $\bar{X}$: Mean, SD: Standart Deviation, t:student t test, F: One Way ANOVA

Table 3. In What Cases Do You Practice Hand Hygiene?*

	Number of people n(%)
After contact with the patient	300 (98.4)
After contact with body fluids	282 (92.5)
When leaving the hospital	255 (83.6)
After contact with the patient's environment	233 (76.4)
Before contacting the patient	226 (74.1)
Before eating	276 (87.2)
After removing the gloves	270 (88.5)
Before aseptic procedure	220 (72.1)
Before wearing gloves	95 (31.1)

*Multiple answer questions

Discussion

In accordance with the knowledge and skills obtained by nursing students during their education, their hand hygiene behaviors and handwashing practices are expected to be high (Bayram *et al.*, 2019). According to the results of this study, students' HHPI score average was 65.36±4.92 (high) (Table 2). Looking at the studies done with nursing students; in the study of Bayram et al, it was reported that the student's HHPI score average was 64.26±5.33 (Bayram *et al.*, 2019). In a study conducted by Karadag et al (2016), students' HHPI score average was reported as 64.52±4.90 (Karadag *et al.*, 2016), while in other studies of Karadag et al (2016), students' HHPI score average was reported as high (Karadag, Yildirim and Pekin Isleri, 2016). Similar results were obtained in studies conducted by Van de Mortel (2009) in Australia (Van de Mortel, 2009), by Van de Mortel et al (2010) in Greece (Van de Mortel, Apostolopoulou and Petrikkos, 2010) and in Italy (Van de Mortel *et al.*, 2012). In our study, student's HHPI score average was found to be high. The positive attitudes of the faculty members, who were good role models during the clinical practice, may have been effective in the student's high hand hygiene practice score. However, the high hand hygiene practice scores might be high due to the fact that student nurses have not yet performed nursing as a profession, so they are not affected by the variables (work intensity, overtime hours, etc.) that nurses express about the reasons of not being able to apply hand hygiene.

According to the literature, one of the risk factors for nonconformity in hand hygiene is to be male (Yuceer and Demir, 2009) and the studies report that women adapt hand hygiene behaviors better (Skodová *et al.*, 2015; Bahcecioglu Turan, Mankan and Polat, 2017). The results of this study show that HHPI score average of female students are higher than male students ($p < 0.05$; Table 2). The study by Skodova et al (2015) also found that men spread more hospital infections than women and were more careless about hand hygiene (Skodová *et al.*, 2015). Bahcecioglu Turan et al (2017) found that hand hygiene compliance of female students was higher than male students (Bahcecioglu Turan, Mankan and Polat, 2017). And in the study of Karadag et al (2016), male students' HHPI score averages were higher than female students (Karadag *et al.*, 2016). The fact that the same results were found about gender in studies conducted in different regions and societies of the world where hygiene behaviors are examined, is explained by gender roles.

With the increase of the grade level in nursing education, the knowledge and competence of the theory and clinical practice possessed are expected to be high. In this study, there was no statistical difference between the student's grade level and their HHPI score average ($p>0.05$; Table 2). Similar results have been reported in other studies (Bahcecioglu Turan, Mankan and Polat, 2017; Bayram *et al.*, 2019). Similarly, there is no statistical significance between the students' general academic averages and HHPI score averages ($P>0.05$; Table 2). The reason for this result is that the training can be effective in increasing students' knowledge, but it cannot have the same effect in creating behavior change.

In this study, there is no statistical significance between the student's graduated high and their HHPI score averages ($p>0.05$; Table 2). This result can be explained by the possibility that the graduated high school may be insufficient to produce behavior change in hand hygiene practice, given that nursing education at the university does not change the HHPI score average on a class basis.

Education is an important tool in the development of the nurse's clinical knowledge and skills (Bayram *et al.*, 2019). In this study, there was no statistically significant difference between student's HHPI score averages and hand hygiene education ($P>0.05$; Table 2). This result can be explained by the fact that knowledge alone does not have a sufficient effect on behavior and belief change, but can often be an important primary factor (Tekin, 2009). Supporting this information, the student's HHPI score averages who found the practice of hand hygiene very important were higher than the students who found it important ($p<0.05$; Table 2).

In clinical practice, it is recommended to wash hands before and after contact with the patient, after contact with bodily fluids, before aseptic procedures and after contact with the patient's surroundings (Bayram *et al.*, 2019). In this study, it was determined that the most frequently applied hand hygiene situation was "after contact with the patient" with 98.4% and the least hand hygiene situation was "before wearing gloves" with 31.1% (Table 3). Similar results have been

reported in other studies (Aktug Demir *et al.*, 2013; Bahcecioglu Turan, Mankan and Polat, 2017). Our study concludes that students do not prefer hand washing for protection unless they contact with focal points such as bodily fluids, patients and patient environment. There are different results about handwashing preferences in the literature. In the study of Toraman et al (2009), the handwashing rate was 73% after glove removal, 70% before and after contact with the patient, and 81% after contact with body fluids (Toraman, Battal and Caskurlu, 2009). The study by Sundal et al (2017) found that 78% of students washed hands before aseptic procedures, while 84.5% washed hands after contact with the patient's bodily fluids (Sundal *et al.*, 2017). In the study of Mahmood et al (2015), the majority of the study group did not require hand hygiene before palpation of the abdomen (72.0%) and before injection (70.0%); all stated that it was necessary to practice hand hygiene after removing the examination gloves (100.0%) (Mahmood, Verma and Khan, 2015).

Conclusion

Hand hygiene practice scores of the students were high. However, variables such as education level and receiving training on the subject do not affect hand hygiene practice. Hand hygiene is practiced by the students at most in case of contact with the patient and patient environment or in case of contamination. Therefore, students need to gain the practice of handwashing affectively. It is recommended to use different teaching methods while integrating them into the curriculum to give nursing students hand washing habits.

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