



Student Nurses' Hand Hygiene Beliefs and Practices

Öğrenci Hemşirelerin El Hijyeni İnanç ve Uygulamaları

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ABSTRACT

Introduction: Hand hygiene is the most cost-effective and easy implemented measure to prevent healthcare-associated infections. Determining beliefs and practices regarding hand hygiene is highly important in order to improve compliance. However, studies regarding Turkish student nurses' beliefs and practices about hand hygiene are lacking. Thus, this study was performed to determine hand hygiene belief and practices among student nurses. **Method:** The sample of this descriptive study consisted of 462 student nurses from a faculty of nursing. Data were collected via a self-reported hand hygiene questionnaire which determines hand hygiene compliance, beliefs and practices. The hand hygiene beliefs, and practices of student nurses' were determined with the hand hygiene belief scale and the hand hygiene practices inventory. **Findings:** Of the 462 respondents, 108 (23.4%) enrolled the second year, 142 (30.7%) enrolled the third year and 212 (45.9%) enrolled in the fourth year. The average self-reported hand hygiene compliance rate was 84.42±12.64 among student nurses. The student nurses' average hand hygiene practice inventory and hand hygiene belief scores were 65.90±5.54 and 85.04±8.20 respectively. The student nurses reported the lowest compliance rates under the following conditions: before patient contact (4.35±0.88), before entering an isolation room (4.44±0.88) and before caring for a wound (4.55±0.74). **Results:** It was determined that the student nurses reported a high hand hygiene compliance rate. In addition, they showed positive beliefs towards hand hygiene and demonstrated good practices regarding hand hygiene.

Key words: Hand hygiene, belief, practice, student nurse

ÖZET

Giriş: El hijyeni, sağlıkla ilişkili enfeksiyonları önlemek için uygulanan en ucuz ve kolay yöntemdir. El hijyeni ile ilgili inanç ve uygulamaların belirlenmesi, uyumu arttırmak için oldukça önemlidir. Ancak, Türk öğrenci hemşirelerinin el hijyeni konusundaki inanç ve uygulamaları konusunda araştırmalar oldukça sınırlıdır. Bu nedenle, bu çalışma öğrenci hemşirelerin el hijyeni inanç ve uygulamalarını belirlemek amacıyla yapıldı. **Yöntem:** Tanımlayıcı tipteki bu çalışmanın örneklemini bir hemşirelik fakültesinin 462 öğrencisinden oluştu. Veriler, el hijyeni uyumunu, inançlarını ve uygulamalarını belirleyen soru formu ile toplandı. Öğrenci hemşirelerin el hijyen inançları ve uygulamaları El Hijyeni İnanç Ölçeği ve El Hijyeni Uygulamaları Envanteri ile belirlendi. **Bulgular:** Araştırmaya katılan 462 katılımcıdan 108'i (% 23.4) ikinci, 142'si (% 30,7) üçüncü ve 212'si (% 45.9) dördüncü sınıf öğrencisidir. Öğrenci hemşirelerin ortalama el hijyeni uyum oranları 84.42 ± 12.64 idi. Öğrenci hemşirelerin ortalama el hijyeni uygulama envanteri ve el hijyeni inanç puanları sırasıyla 65.90 ± 5.54 ve 85.04 ± 8.20 idi. Öğrenci hemşireler hasta temasından önce (4.35 ± 0.88), izolasyon odasına girmeden önce (4.44 ± 0.88) ve yara bakımı yapmadan önce (4.55 ± 0.74) en düşük uyum oranlarını rapor etmişlerdir. **Sonuç:** Öğrenci hemşirelerin el hijyeni uyum oranının yüksek olduğu belirlenmiştir. Ayrıca, el hijyenine karşı olumlu inançlara sahip oldukları ve el hijyeni ile ilgili uygulamalarının iyi olduğu belirlenmiştir.

Anahtar kelimeler: El hijyeni, inanç, uygulama, öğrenci hemşire

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INTRODUCTION

Healthcare-associated infections (HCAIs) are still one of the most challenging health care problems worldwide leading impaired quality of life, prolonged hospital stays, increased healthcare costs, mortality, and morbidity. Of the many factors associated with HCAIs, hand hygiene is considered the most effective, inexpensive, easily implemented measure for preventing HCAIs.^{1,2} Nevertheless, it is indicated poor compliance to hand hygiene measures among health care professionals.³

As a course of nursing profession's nature, the nurses care for the patients 24 hours a day.⁴ Therefore, nurses take over the most active responsibility in the prevention of HCAIs as representing the largest profession which gets in-contact with patients directly most.^{2,5} Thus, improving hand hygiene compliance among nurses is a critical component for reducing HCAIs.² Because of being the future workforce, creating hand hygiene awareness and improving hand hygiene compliance are critical for student nurses before graduation. Furthermore, student nurses participate in direct patient care and treatment process in clinical areas during their pre-graduation practice under the supervision of their lecturers and nurses. Thus, student nurses can be a source of infection. Being a member of health care team, student nurses have an important role in HCAIs in prevalence and prevention.^{5,6}

It is well known that individuals' health behaviors are affected by their beliefs, values, and attitudes.^{1,7-9} Defining the fallacies, misunderstandings, unproven statements or negative attitudes facilitates to convince caregivers, design interventions, create personal education and trigger behavioral modifications.⁹ Current studies indicate that hand hygiene compliance is influenced by several factors especially myths, personal beliefs, and facts. Assessing beliefs regarding hand hygiene is highly important to improve compliance.^{1,9} Determining undergraduate student nurses' beliefs and practices may improve behaviors upon entering the workforce; also provides the opportunity to change factors leading non-compliance with hand hygiene. It is reported that nursing students are in an ideal position for creating change in hand hygiene practices of qualified healthcare staff.⁶ Investigation of student nurses' hand hygiene beliefs and practices helps to guide nursing education curriculum and make future practice recommendations.

Current studies conducted in Turkey, China, South Korea and Italy reflected various hand hygiene practice and beliefs scores among student nurses.^{5,8, 16,19} Karadag et al. reported that student

nurses generally applied hand hygiene and had positive hand hygiene beliefs.⁸ Mortel et al. stated that Italian nursing students' hand hygiene belief scores were ranged between 2.50 and 4.59 out of 5 with a mean of 3.27 and hand hygiene practice inventory scores were ranged between 3.5 and 5.00 out of 5 with a mean of 4.57.¹⁹ Similarly, Hung et al. indicated that student nurses' demonstrated good practices and positive beliefs toward hand hygiene.

Although hand hygiene knowledge, compliance behaviors, practices and beliefs of nurses and student nurses have been studied extensively, for achieving overall compliance and improving hand hygiene culture among student nurses, beliefs and practices about hand hygiene should be measured regularly. The objective of this study is to determine the student nurses' hand hygiene belief and practices.

METHOD

Design and Sample

This descriptive study was conducted between April - June 2018 at a faculty of nursing of a university situated in Izmir, the western side of Turkey. The duration of the Bachelor's Degree in Nursing of the faculty is 4 academic years. The students are undertaking their first clinical placements on hospital wards in the second year of nursing education. The student nurses receive their initial training related to hand hygiene in their first-year nursing curriculum. Afterward every year before undertaking clinical practice, they receive a mandatory orientation training including hand hygiene measures and practices.

All second, third and fourth-year nursing students (n:1048) were invited to participate in the study during the spring term of the academic year 2017-2018. Inclusion criteria were; (1) registered courses for the 2017-2018 academic year, (2) being a second, third or fourth-year student nurse, (3) enrolled in courses with clinical practice in a hospital, (4) willing to participate in the study. The first-year nursing students did not include in the study, because their training focuses on community health services, not clinical practice at hospitals. Student nurses who were on a pass were absent, or refused to participate were excluded from the study. The total of 1048 undergraduate baccalaureate nursing degree students; 462 replied to the questionnaire (44.08% response rate).

Data Collection

Data collection was done using a data collection form developed specifically for this study by researchers. The form consisted of two parts each measuring specific variables. Part one determines the socio-demographic and hand hygiene variables. The student nurses were asked to assess their hand hygiene compliance in clinical settings via 100 points scale; a score of 0 indicates never, a score of 100 indicates always. Student nurses' hand hygiene belief and practices were measured in part two. Hand hygiene beliefs and practices were measured via Hand Hygiene Belief Scale and Hand Hygiene Practices Inventory.

Hand Hygiene Belief Scale and Hand Hygiene Practices Inventory were developed to evaluate health care students' hand hygiene beliefs and practices by van de Mortel.¹⁰ Cronbach's alpha values of 0.80 and 0.74 were obtained for the Hand Hygiene Beliefs Scale and the Hand Hygiene Practices Inventory. The tool was adapted for Turkish populations by Karadağ et al.⁹ Hand Hygiene Beliefs Scale demonstrated a Cronbach's alpha of 0.76. The Turkish version of Hand Hygiene Beliefs Scale consists of 22 items determining students' hand hygiene beliefs on a 5-point likert scale. The total score of Hand Hygiene Beliefs Scale is ranging between 22-110 points, a high score indicating positive beliefs about hand hygiene. The Cronbach's Alpha value of The Hand Hygiene Practices Inventory was determined as 0.85. The Hand Hygiene Practices Inventory consists of 14 items determining students' hand hygiene practices on a 5-point likert scale. The total score of Hand Hygiene Practices Inventory is ranging between 14-70 points, a high score indicates that hand hygiene practices are always applied.⁹

After the student nurses were informed about the scope of the study, researchers distributed the data collection forms to the volunteer participants. The student nurses were asked to respond the data collection form in the lecture hall at the end of a routine lecture. The data were collected during the students were undertaking clinical training. Completing the survey took approximately 5-7 minutes.

Ethical Issues

Written permission to conduct the research was obtained from the Ege University Scientific Research and Publication Ethics Committee, as well as the institution in which the research would be conducted. Electronic permission was obtained from Karadağ to use the Hand Hygiene Belief Scale and Hand Hygiene Practices Inventory. The purpose and details of the study were explained to the student nurses and written consent was provided by all participants.

Data Analysis

The data were analyzed using the SPSS for Windows version 16.0 software program (SPSS Inc., Chicago, IL, USA). Descriptive data for student nurses were expressed as number, percentage, and mean values. For numerical variables, the fit to the normal distribution of the data was assessed using the Kolmogorov Smirnov test. The Spearman's Correlation, Mann-Whitney U and Kruskal-Wallis tests were performed for variables that were not normally distributed. A p-value of <0.05 was considered statistically significant.

FINDINGS

The average age of students was 22.23±1.84 years (range, 19-40 years). The socio-demographic characteristics and the data related to the student nurses' hand hygiene practices and beliefs are respectively given in Table 1 and Table 2.

Self-Reported Hand Hygiene Compliance

The student nurses' average self-reported compliance score regarding hand hygiene during the clinical practice was 84.42±12.64 out of 100 points (range, 5-100 points). Undertaking intensive care unit practice placement (U: 21770.5 p:0.007) increased self-reported hand hygiene compliance. Students' preferring both handwashing and hand rub for hand hygiene reported higher hand hygiene compliance than others and the difference was statistically significant (X²: 10.664 p: 0.005). Also, student nurses experienced skin reactions related to hand hygiene reported hand hygiene compliance than student nurses who did not experience skin reactions (u: 18310.5 p: 0.012). Student nurses' in their fourth-year self-reported hand hygiene compliance score is higher than others, although the difference was not statistically significant (X²: 2.556 p: 0.279) (Figure 1). It was found that gender (U: 11778.0 p: 0.134), received of extracurricular hand hygiene education (U: 22696.5 p: 0.204), economic status (X²: 1.130 p: 0.568), undertaking operating room practice placement (U: 22529.0 p:0.162) did not affect the self-reported hand hygiene compliance.

Hand Hygiene Practice Inventory Score

The student nurses' hand hygiene practice inventory mean score was 65.90±5.54 (min:29 max:70). Table 3 illustrates the mean scores of the Hand Hygiene Practices Inventory of the student nurses'.

Hand hygiene practice inventory mean scores were significantly greater for the student

nurses enrolling the third year of their education (X^2 : 6.176 p:0.046) (Figure 1).

Student nurses' hand hygiene belief and practice inventory scores showed significant positive correlations (r :0.143 p:0.002).

Student nurses' self-reported hand hygiene compliance and hand hygiene practice inventory scores showed significant positive correlations (r :0.436 p:0.0001).

Furthermore, we determined that there was no statistically significant difference between the student nurses' age (r : -0.029 p: 0.462), gender (U: 12522 p: 0.475), received of education regarding hand hygiene (U: 24190 p: 0.895), undertake intensive care unit practice placement (U: 25174 p: 0.881), undertake operating room practice placement (U:23795 p:0.671), having skin reactions related to hand hygiene (U:19005 p: 0.059) and their hand hygiene practice inventory scores.

Hand Hygiene Belief Score

The student nurses' average hand hygiene belief score was 85.04 ± 8.20 (min:22 max:110). The highest hand hygiene belief score was noted in fourth-year student nurses who were not statistically significant (X^2 : 0.691 p: 0.708) (Figure 1).

Furthermore, we determined that there was no statistically significant difference between the student nurses' age (r : -0.049 p: 0.462), gender (U: 11431.5 p: 0.074), received of education regarding hand hygiene (U: 23669.0 p: 0.610), undertaking intensive care unit practice placement (U: 24896.5 p: 0.729), undertaking an operating room practice placement (U: 24051.0 p: 0.817), having skin reactions related to hand hygiene (U: 20990.5 p: 0.494) and hand hygiene belief score.

	Number	Percentage
Gender		
Male	67	14.5
Female	395	85.5
Class		
Second year	108	23.4
Third year	142	30.7
Fourth year	212	45.9
Economic Status		
Income < Expenditure	76	16.5
Income = Expenditure	361	78.1
Income > Expenditure	25	5.4

	Number	Percentage
Undertake Operating Room Practice Placement		
Yes	299	64.7
No	163	35.3
Undertake Intensive Care Unit Practice Placement		
Yes	282	61.0
No	180	39.0
Received of Extracurricular Hand Hygiene Education		
Yes	299	64.7
No	163	35.3
Source of Education*		
Clinical practice	116	25.1
Published journals/books	209	45.2
Hand Hygiene Method Choice		
Hand Rub	31	6.7
Hand Washing	174	37.7
Both	257	55.6
Skin Reactions Related to Hand Hygiene		
Yes	329	71.2
No	133	28.8

*More than one answer

Table 3. The mean scores of the Hand Hygiene Practices Inventory	
I cleanse my hands:	Mean score \pmSD
After going to the toilet	4.89 \pm 0.42
Before caring for a wound	4.55 \pm 0.74
After caring for a wound	4.81 \pm 0.49
After touching potentially contaminated objects	4.70 \pm 0.59
If they look or feel dirty	4.82 \pm 0.49
After contact with blood or body fluids	4.90 \pm 0.36
After inserting an invasive device	4.82 \pm 0.47
Before entering an isolation room	4.44 \pm 0.88
After physical contact with a patient	4.59 \pm 0.71
After exiting an isolation room	4.81 \pm 0.52
Before endotracheal suctioning	4.64 \pm 0.73
After contact with a patient's secretions	4.89 \pm 0.38
Before patient contact	4.35 \pm 0.88
After removing gloves	4.69 \pm 0.49
Total hand hygiene inventory score	65.90 \pm 5.54

Table 4. The mean scores for Hand Hygiene Belief	
Statements	Mean score \pmSD
Hand hygiene is considered as an important part of the curriculum.	4.59 \pm 0.65
The facilities in which I do clinical practicum emphasize the importance of hand hygiene.	4.29 \pm 0.80
The importance of hand hygiene is emphasized by my clinical supervisors.	4.20 \pm 0.88
I have a duty to act as a role model for other healthcare workers.	4.34 \pm 0.73
When busy, it is more important to complete my task than to perform hand hygiene.	2.26 \pm 1.18
Performing hand hygiene in the recommended situations can reduce patient mortality	4.41 \pm 0.68
Performing hand hygiene in recommended situations can reduce medical costs associated with hospital-acquired infections.	4.56 \pm 0.63
I can't always perform hand hygiene in recommended situations because my patient's needs come first.	2.47 \pm 1.06
Prevention of hospital-acquired infections is a valuable part of a healthcare worker's role.	4.59 \pm 0.67
I follow the guidelines of senior healthcare workers when deciding whether or not to perform hand hygiene.	3.66 \pm 1.18
An infectious disease in a healthcare setting may threaten my life or career.	4.50 \pm 0.69
I believe I have the power to change poor practices in the workplace.	4.10 \pm 0.86
Failure to perform hand hygiene in the recommended situations can be considered negligence.	4.21 \pm 0.81
Hand hygiene is a habit for me in my personal life	4.55 \pm 0.63
I am confident I can effectively apply my knowledge of hand hygiene to my clinical practice.	4.48 \pm 0.67
I try to remember performing hand hygiene in recommended situations.	3.35 \pm 1.26
I would feel uncomfortable reminding a health professional to wash his hands.	3.37 \pm 1.15
Performing hand hygiene after caring for a wound can prevent from infection transmission.	2.52 \pm 1.29
Dirty sinks can be a reason for not washing hands	2.67 \pm 1.12
Lack of soap can be a reason for not cleansing hands.	2.75 \pm 1.19
Performing hand hygiene after caring for a wound can protect from transmission of infectious diseases.	4.55 \pm 0.67
Cleansing hands after going to the toilet can reduce transmission of infectious disease.	4.62 \pm 0.69
Total	85.04\pm8.20

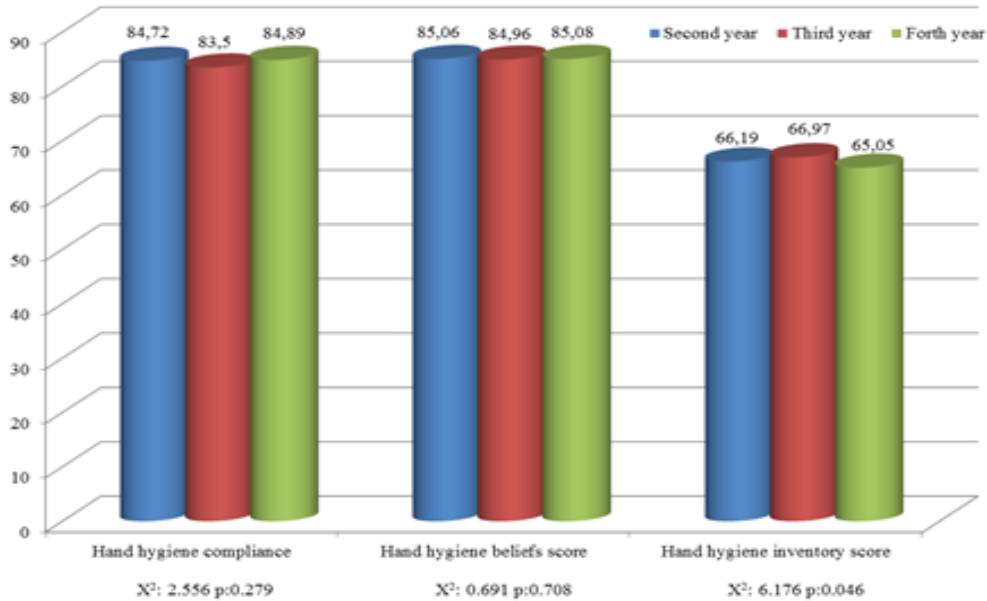


Figure 1. Distribution of Hand Hygiene Compliance, Belief and Practice Scores According to Class Enrolled

DISCUSSION

Hand hygiene is a critical practice to reduce HCAs in healthcare settings. Determining hand hygiene beliefs and practices among student nurses are fundamental for improving behaviors before workforce, creating change in hand hygiene practices of qualified healthcare staff and providing an opportunity to change factors leading poor hand hygiene compliance and consequently improving compliance.^{1,6,9}

Hand Hygiene Compliance

Based on self-reports, this study demonstrates high hand hygiene compliance during clinical practice among student nurses. This rate was higher than the average compliance rates (between 52.7% and 83.5%) concluded in previous studies.^{4,8, 11-13} Al Khawaldeh et al. found that self-reported hand hygiene compliance was 78.93% among Jordanian student nurses.¹¹ It is reported in a previous study that the hand hygiene compliance rate among Canadian student nurses was 74.8%.¹² Karadag et al. determined that the reported hand hygiene compliance rates were 82% among nurses and 77% among student nurses.⁸ Various results were achieved from previous studies conducted in Norway (83.5%), South Korea (82.1%), Singapore (66.3%), Nepal (56%) and Spain (52.7%).¹³⁻¹⁷ Conversely, the hand hygiene compliance rate of our study is less than the compliance rate (88.17%) of Chinese student nurses.⁵ These results demonstrate a moderate to high hand hygiene compliance among student nurses. It is thought that

these various compliance rates were caused by both the methodological differences and students' tendency to overestimate their hand hygiene compliance. Therefore, further observational studies are needed to determine the student nurses' actual hand hygiene compliance.

Current studies have disclosed that hand hygiene compliance is influenced by various factors such as age, gender, duration of clinical experience, hand hygiene method choice and fear of having skin reactions.^{4,12,15} It is found that undertaking intensive care unit practice placement, hand hygiene method choice and experiencing skin reactions related to hand hygiene influenced hand hygiene compliance of student nurses. These findings are consistent with the literature. In addition, in this study the hand hygiene compliance was not influenced by gender, economic status, duration of education, received of extracurricular hand hygiene education, having skin reactions related to hand hygiene. These findings are consistent with previous work by Nematian et al.¹⁸

Hand Hygiene Practice Inventory Score

It was found that student nurses' hand hygiene practice inventory mean score was 65.90±5.54 (min:29 max:70), which is similar to the results reported by Karadag et al. among Turkish student nurses and Hung et al. among Chinese student nurses.^{5,8} South Korean student nurses showed relatively high behavior belief and normative belief levels.¹⁶ Van de Mortel et al. stated that Italian student nurses' hand hygiene score was 4.57 out of 5.¹⁹ All of these results showed that student nurses

generally apply hand hygiene as indicated in the guidelines. However, the lowest compliance rates were indicated before patient contact (4.35 ± 0.88), before entering an isolation room (4.44 ± 0.88) and before caring for a wound (4.55 ± 0.74). Darawad et al. (2012) noted lower hand hygiene compliance rates between patients 68.54 when needs to stop care 55.20 and before providing care 60.67.⁴ Hung et al. (2011) determined the lowest hand hygiene compliance before patient contact.⁵ Similarly, Karadag et al. (2016) reported that the frequencies of performed hand hygiene before physical contact with a patient, after physical contact with a patient and before entering to the isolation room are the lowest compliance rates.⁸ These results are supported by the results of previous studies, reflecting that healthcare professionals prioritize self-protection than protecting their patients.^{4,5,8} However, this comes into conflict with ethical values and imperative to “do no harm”. Therefore, the World Health Organization (WHO) proposed a campaign (Clean Care is Safer Care) emphasizing patient safety and highlighted the significance of placing more emphasis on ethical behavior and imperative to “do no harm” in an undergraduate curriculum for safer patient care.¹

It was found that the potential confounder factors such as age, gender, received of education regarding hand hygiene, having skin reactions related to hand hygiene, undertaking intensive care unit or operating room practice placement did not affect the hand hygiene practice inventory scores, however, education level did. As the mean hand hygiene practice inventory score shows, the Year 3 students reported the highest score than the Year 1 students, but the practice rate dropped among year 4 students.

Similarly, Hung et al. reported a fluctuating hand hygiene practice inventory scores among student nurses in the study year.⁵ At the nursing faculty which this study was conducted student nurses are supervised by lecturers between their first to third-year clinical placements and by ward nurses during their fourth-year clinical placements. The current state supports the concept of supervision of lecturers’ increases student nurses hand hygiene practices.⁵

Hand Hygiene Belief Score

Hand hygiene is an important issue for HCAs prevention and has a tendency to be affected by myths, knowledge, attitude and personal beliefs. Positive hand hygiene beliefs can impact individuals’ behaviors. The results of the present study indicated that student nurses’ had positive hand hygiene beliefs (85.04 ± 8.20). Such a result is supported by the literature.^{5,8,17,19,20} In a study conducted in Turkey by Karadag et al. the average

hand hygiene belief scores were 85.32 ± 9.15 for nurses and 86.39 ± 8.56 for nursing students reflecting positive hand hygiene beliefs.⁸ Mortel et al. stated that Italian nursing students had moderately positive beliefs about hand hygiene.¹⁹ Hung et al. indicated that the student nurses’ hand hygiene belief scores ranged from 2.95 to 5.00 with a mean of 4.03 out of 5.⁵ In a study conducted by Mortel et al. student nurses (3.92 ± 0.05) reported significantly more positive hand hygiene beliefs than medical students (3.52 ± 0.08).²⁰ Positive hand hygiene beliefs can impact individuals’ behaviors consequently improve compliance by creating practice culture which can lead to preventing the development of HCAs. However, student nurses have positive hand hygiene beliefs, to achieve overall compliance the hand hygiene beliefs of student nurses need to be improved.

Limitations

This study has some limitations. The first limitation; the study is carried out with only student nurses from one nursing faculty and therefore cannot be generalized to all healthcare students. The second limitation of this study was the hand hygiene compliance and practices were not directly observed.

CONCLUSIONS

In conclusion, it is determined that Turkish student nurses have positive hand hygiene beliefs and generally apply hand hygiene as recommended by guidelines. Also, student nurses reported high hand hygiene compliance rates. Nevertheless, the students reported the lowest compliance rates before patient contact, before entering an isolation room and before caring for a wound. To create behavioral change and improve hand hygiene culture implementation of educational strategies is recommended. Furthermore, further studies should be undertaken with different healthcare populations via direct observation method.

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