ISSN 2458-8865 E-ISSN 2459-1505
www.fppc.com.tr
Family Practice & Palliative Care

Research Article

Compliance of cleaning staff to standard precautions in hospital hygiene and affecting factors

Temizlik personelinin hastane hijyeninde standart önlemlere uyumu ve etkileyen faktörler

Şehbal Yeşilbaş[a], Rabia Güven Cengiz[a], Metin Pıçakçıefe[a], Bahadır Dede[a], Emine Tiriç[a], Didem Mülayim Güllü[a]

[a] Department of Public Health, Faculty of Medicine, Mugla Sıtkı Kocman University, Mugla, Türkiye

Abstract

Introduction: Healthcare Associated Infections (HAIs) are infections that develop during the provision of care or healthcare services to the patient in a healthcare institution and are not present or are not in the incubation period at the time of admission to that institution. The frequency of HAIs varies in the world and in our country. All healthcare institutions should take standardized measures to control these infections. Hygienic practices of hospital cleaning staff have an important role in the prevention of person-to-person and environmental transmission. This study was conducted to evaluate the compliance of cleaning staff of Muğla Training and Research Hospital with standard precautions in hospital hygiene and the factors affecting them.

Methods: In this cross-sectional study, the population consisted of the cleaning staff of Muğla Training and Research Hospital. The sample was not selected, 85.3% (n:257) of the population was reached. The questionnaire form includes questions on sociodemographic characteristics, working conditions, hygiene education and the Standard Precautions Scale of Hospital Hygiene: Version of Cleaning Staff (HHSP). The questionnaire form was administered between September 29 and October 17, 2023 using the self-completion method. Descriptive statistics were given as number and percentage, mean and standard deviation. The data were evaluated for conformity to normal distribution using the Kolmogorov-Smirnov test. In the analysis of the data, Independent groups t test, One-way analysis of variance (ANOVA) and Pearson test were used. The limit of significance was accepted as $p<0.05$.

Results: The mean age of the participants was 41.5±9.4 years, 63.8% were female. The participants' working time as cleaning staff was 10.4±7.5 years, the weekly working time was 50.7±7.9 hours, and 81.7% worked in very high and high risk areas. Of the participants, 86.0% stated that they received regular training, 35.0% of those who received regular training stated that they received training once a year and 85.4% stated that the hygiene training they received was sufficient. HHSP total mean score was 89.0±6.6, and mean scores for subscales were as follows: hand hygiene 9.8±0.7, general cleaning 14.5±1.0, compliance with personal precautions 14.0±1.9, use of personal protective equipment 26.8±3.7, waste management 23.9±1.8.

Conclusion: The compliance of cleaning staff with standard precautions in hospital hygiene was found to be high. It can be said as the most important result of the study that those who received regular training on hospital hygiene during their employment had higher compliance with standard precautions related to hospital hygiene. It should be aimed to ensure full compliance of cleaning staff with standard precautions, and training programs should be planned accordingly. Participation of all cleaning staff, especially those working in high risk areas, should be ensured, and deficiencies should be identified and completed by receiving feedback on the training.

Keywords: Hospital, Hygiene, Standard precautions, Healthcare associated infections

Öz

Giriş: Sağlık Hizmeti İlişkili Enfeksiyonlar (SHİE) hastaya bir sağlık kurumunda bakım ya da sağlık hizmeti sunulması sırasında gelişen ve o kuruma başvuru esnasında var olmayan ya da kuluçka döneminde olmayan enfeksiyonlardır. Yapılan çalışmalarda dünyada ve ülkemizde SHİE prevalansı değişmektedir. Sağlık hizmeti veren tüm kurumların bu enfeksiyonlarla mücadelede standart önlemler almaları gereklidir. Hastane temizlik personelinin hijyenik uygulamaları, kişiden kişiye ve çevreden bulaşın önlenmesinde önemli bir yer tutmaktadır. Bu çalışma Muğla Eğitim ve Araştırma hastanesi temizlik personelinin hastane hijyeninde standart önlemlere uyumu ve etkileyen faktörlerin değerlendirilmesi amacıyla yapılmıştır.

Yöntem: Kesitsel tipteki araştırmanın evrenini Muğla Eğitim ve Araştırma Hastanesi temizlik personeli oluşturmaktadır. Örneklem seçilmemiş, evrenin %85,3'üne (n:257) ulaşılmıştır. Anket formunda, sosyodemografik özellikler, çalışma koşulları, hijyen eğitimi ile ilgili sorular ve Hastane Hijyeninde Standart Önlemler Ölçeği (HHSÖ): Temizlik Personeli Versiyonu bulunmaktadır. Anket formu kendi kendine doldurma yöntemiyle, 29 Eylül-17 Ekim 2023 tarihleri arasında uygulanmıştır. Tanımlayıcı istatistikler; sayı ve yüzde, ortalama, standart sapma olarak verilmiştir. Verilerin normal dağılıma uygunluğu Kolmogorov-Smirnov testi ile değerlendirilmiştir. Verilerin analizinde Bağımsız gruplarda t testi ve Tek yönlü varyans analizi (ANOVA), Pearson testi ile değerlendirilmiştir. Anlamlılık sınırı $p<0,05$ kabul edilmiştir.

Bulgular: Katılımcıların yaş ortalaması 41,5±9,4, %63,8'i kadındır. Temizlik personeli olarak çalışma süresi 10,4±7,5 yıl, haftalık çalışma süresi 50,7±7,9 saattir ve %81,7'si çok yüksek ve yüksek riskli alanlarda çalışmıştır. Katılımcıların %86,0'sı düzenli eğitim aldığını, düzenli eğitim alanların %35,0'i yılda bir eğitim aldığını ve %85,4'ü aldığı hijyen eğitiminin yeterli olduğunu belirtmiştir. HHSÖ toplam puan ortalaması 89,0±6,6, alt boyut puanı ortalamaları; el hijyeni 9,8±0,7, genel temizlik 14,5±1,0, kişisel önlemlere uyum 14,0±1,9, kişisel koruyucu ekipman kullanımı 26,8±3,7, atık yönetimi 23,9±1,8'dir.

Sonuç: Temizlik personellerinin hastane hijyeninde standart önlemlere uyumu yüksek bulunmuştur. Çalıştığı süre içerisinde hastane hijyeni ile ilgili düzenli eğitim alanların hastane hijyeni ile ilgili standart önlemlere uyumunun daha yüksek olması çalışmanın en önemli sonucudur. Temizlik personelinin standart önlemlere uyumunun tam olması hedeflenmeli, buna yönelik eğitim programları planlanmalıdır. Başta yüksek riskli alanlarda çalışanlar olmak üzere tüm temizlik personelinin katılımı sağlanmalı, eğitimle ilgili geri bildirimler alınarak eksikler belirlenmeli ve tamamlanmalıdır.

Anahtar kelimeler: Hastane, Hijyen, Standart önlemler, Sağlık hizmeti ilişkili enfeksiyonlar

Received	Accepted	Published Online	Corresponding Author	E-mail
September 6, 2024	December 14, 2024	December 31, 2024	Şehbal Yeşilbaş	sehbalyesilbas@mu.edu.tr
Correspondence	Şehbal Yeşilbaş, Muğla Sıtkı Koçman Üniversitesi Tıp Fakültesi, Halk Sağlığı Anabilim Dalı, Kötekli Mahallesi Marmaris Yolu Bulvarı No:50, 48000, Menteşe, Muğla, Türkiye			
doi	https://doi.org/10.22391/fppc.1542354			

Key Points

1. The compliance of cleaning staff with standard precautions in hospital hygiene was found to be high.
2. Those who receive regular training on hospital hygiene are more likely to comply with standard hospital hygiene measures

Introduction

Healthcare Associated Infections (HAIs) are infections that develop during the provision of care or healthcare services to the patient in a healthcare institution and are not present or are not in the incubation period at the time of admission to that institution. Infections that develop in relation to the service provided in the institution but show symptoms after discharge and develop in relation to the profession of healthcare workers in the relevant healthcare institution are also considered in this category [1]. Since HAIs cause prolonged hospitalization, long-term disability, increased antimicrobial resistance, additional financial burden on patients, families and healthcare systems, and deaths, they are extremely important for healthcare institutions and can be prevented with infection control practices [2]. Worldwide, 7% of patients in high-income countries and 15% in low- and middle-income countries are exposed to at least one HAI during their hospitalization. On average, one in ten affected patients dies due to HAI [3]. In various studies conducted in Turkey, the prevalence of HAIs in hospital intensive care units is between 1.2% and 37.0% [4-8]. Bloodstream infections, pneumonias and urinary tract infections are the most common HAIs in Turkey [9].

Centers for Disease Control and Prevention (CDC) and the Healthcare Infection Control Practices Advisory Committee (HICPAC) report that all healthcare institutions should focus primarily on prevention efforts in the fight against nosocomial infections and should take standard measures, including environmental cleaning, to reduce and/or prevent infections [10]. According to the CDC, standard precautions are basic practices that protect healthcare providers used in the care of all patients from infection and prevent the spread of infections from patient to patient. Within the scope of standard precautions; hand hygiene perform, use of personal protective equipment (PPE), cleaning and disinfection, correct use and removal of needles and other sharps against infections that can be transmitted by blood and other body fluids, contact, respiration [11].

In our country, the "Yataklı Tedavi Kurumları Enfeksiyon Kontrol Yönetmeliği" published on August 11, 2005, infection prevention and control programs for HAIs are implemented by infection control committees established in all inpatient treatment institutions [9]. In hospitals, in addition to healthcare workers, the largest share among various service groups is made up of hospital cleaning staff. Cleaning staff are responsible for cleaning and sterilization of patient rooms, operating rooms, outpatient clinics, intensive care units, corridors, other areas in the hospital, and activities within the scope of medical waste management [12,13]. Hygienic practices of hospital cleaning staff have an important role in the prevention of person-to-person and environmental transmission. Because effective hospital hygiene practices in the hospital environment play a key role in preventing nosocomial infections, breaking the chain of transmission, and thus ensuring patient and employee safety [14]. In addition, training on standard precautions and practices for SHIEs, such as prevention and protection of infectious diseases, sterilization, disinfection, waste management, etc., increases the compliance of hospital cleaning staff with the precautions and contributes to the effective service of health institutions [15] Regular repeat of these trainings is necessary to update the knowledge of the personnel and to ensure compliance with current hygiene standards. This study was conducted to evaluate the compliance of cleaning staff of Muğla Training and Research Hospital with standard precautions in hospital hygiene and the factors affecting them.

Methods

Study Design and Data Scope

The population of this cross-sectional study consisted of 301 cleaning staff working in Muğla Training and Research Hospital. The sample was not selected and it was aimed to reach the entire population. The monthly work schedule of the cleaning staff was obtained from the Chief Physician Office and visits were planned, including night shifts. Each cleaning staff was visited at least three times, but 44 cleaning staff could not be surveyed due to reasons such as inaccessibility, being on holiday or not accepting to participate in the study. 85.3% (n:257) of the population was reached. The questionnaire form, which was prepared by reviewing the literature, includes questions on sociodemographic characteristics, working conditions, hygiene education and the Standard Precautions Scale of Hospital Hygiene: Version of Cleaning Staff (HHSP). After obtaining consent from the cleaning staff, the questionnaire was administered between September 29 and October 17, 2023 using the self-completion method. Dependent variable is compliance with standard precautions in hospital hygiene and independent variables are age, gender, marital status, educational status, income status, working time as cleaning staff, weekly working time, working unit, use of personal protective equipment, compliance to general precautions, receiving training on hospital hygiene at recruitment, receiving regular training, frequency of regular training, evaluating the hygiene training received as sufficient. In the evaluation of the scale scores according to educational status; literate, primary school graduate and secondary school graduate were grouped as secondary school and below educational level. High school, associate degree and university graduate were grouped as high school and above education level. Cleaning staff were asked about the units they worked in during their working period in a way that more than one answer could be given, and they were classified as very high, high, medium and low risk areas as specified in the Muğla Training and Research Hospital-Hospital Cleaning Instruction [16]. Very high risk areas are operating rooms, delivery room, intensive care units, angiography laboratory. High risk areas are emergency department, hemodialysis unit, central sterilization unit, isolation rooms, hematology-oncology service, endoscopy, bronchoscopy, cystoscopy, echocardiography, medical waste storage, morgue-autopsy room, urology ESWL unit, microbiology laboratory. Medium risk areas are daily use areas, general clinics, laboratories, radiology, polyclinics, treatment intervention rooms, pharmacy, kitchen, waiting rooms and elevators, stairs, corridors, bathrooms, meeting rooms, staff rooms and warehouses located in or associated with these areas. Low risk areas are administrative office areas, pharmacy, non-sterile warehouses, archives, technical service offices, outer perimeter areas. Staff who worked in both high and low risk units were classified in the unit with the highest risk. HHSP scale was developed by Selma Demirel in 2022 and validity and reliability study was conducted [17]. The Cronbach α reliability coefficient of the HHSP scale was determined as 0.766. The HHSP scale consists of 19 items and five subscales. The subscales are general cleaning (3 items), waste management (5 items), personal precautions (3 items), hand hygiene (2 items), and use of personal protective equipment (6 items). Each item in the scale is scored on a five-point Likert scale as "1=never", "2=rarely", "3=sometimes/", "4=usually", "5=always". The scale is scored between

19-95 points. As the total score of the scale increases, the level of compliance of cleaning staff to standard precautions increases. As the subscale scores also increase, the level of compliance of cleaning staff to standard precautions in that dimension increases.

Ethical approval and permissions

For the study, written permission was obtained from the Chief Physician's Office of Muğla Training and Research Hospital and ethical approval was obtained from Muğla Sıtkı Kocman University Medical and Health Sciences Ethics Committee (Decision date: 28.09.2023 and Number: 92).

Statistical analysis

SPSS (SPSS Inc., Chicago, IL, USA) version 27 was used for data analysis. Descriptive statistics were given as number and percentage, mean and standard deviation. The data were evaluated for conformity to normal distribution using the Kolmogorov-Smirnov test. In the analysis of the data, independent samples t-test was used to evaluate total scores and sub-scale scores of HHSP according to gender, educational status, receiving regular training on hospital hygiene during employment and evaluating the hygiene training received as sufficient. One-way ANOVA was used to evaluate total scores and sub-scale scores of HHSP according to the working unit of cleaning staff. The correlation of age, working time in cleaning staff and weekly working time with the total scores and sub-scale scores of the HHSP was evaluated by correlation coefficient and Pearson test. The limit of significance was accepted as $p<0.05$.

Results

The mean age of the participants was 41.5±9.4 years, 63.8% were female, 77.0% were married, 54.8% had secondary school education or less, and 46.9% had income equal to expenses. Sociodemographic characteristics of cleaning staff are presented in Table 1.

Table 1. Sociodemographic Characteristics of Cleaning Staff

	Mean ± Standard Deviation	
Age (n:250)	41.5 ± 9.4	
	n	**%**
Gender(n:257)		
Female	164	63.8
Male	93	36.2
Marital status(n:252)		
Single	40	15.9
Married	194	77.0
Divorced	18	7.1
Educational status (n:257)		
Literate	1	0.4
Primary school graduate	106	41.2
Secondary school graduate	34	13.2
High school graduate	90	35.0
Associate degree graduate	4	1.6
University graduate	22	8.6
Income status (n:256)		
Income higher than expenses	21	8.2
Income equal to expenses	120	46.9
Income less than expenses	115	44.9

The participants' working time as cleaning staff was 10.4±7.5 years, the weekly working time was 50.7±7.9 hours, and 81.7% worked in very high and high risk areas. 99.2% of the participants stated that they used at least one personal protective equipment. 91.4% thought that they comply with general precautions regarding hospital hygiene. 86.4% of the participants stated that they received training on hospital hygiene at recruitment, 86.0% received regular training, 35.0% of those who received regular training stated that they received training once a year and 85.4% stated that the hygiene training they received was sufficient. The characteristics related to the working conditions of cleaning staff are given in Table 2.

HHSP total mean score was 89.0±6.6, and mean scores for subscales were as follows: hand hygiene 9.8±0.7, general cleaning 14.5±1.0, compliance with personal precautions 14.0±1.9, use of personal protective equipment 26.8±3.7, waste management 23.9±1.8. HHSP total mean score was statistically significantly higher in those with secondary school education and below than those with high school education and above ($p=0.017$), in those who received regular training on hospital hygiene during their employment than those who did not ($p=0.013$), and in those who found the training adequate than those who did not ($p=0.017$). Hand hygiene subscale mean score was statistically significantly higher in women than in men ($p=0.008$), in those working in low-risk units than in very high-risk units ($p=0.018$) and in those working in medium-risk units ($p=0.017$). Compliance with personal precautions subscale mean score was statistically significantly higher in those who received regular training on hospital hygiene during their employment than in those who did not ($p=0.043$) and in those who evaluated the training as adequate than in those who did not ($p=0.033$). PPE use subscale mean score was statistically significantly higher in those who received regular training on hospital hygiene during their employment than in those who did not ($p=0.041$) and in those who evaluated the training as adequate than in those who did not ($p=0.010$). Waste management subscale mean score was statistically significantly higher in females than in males ($p=0.012$) and in those with secondary school education and below than those with high school education and above ($p=0.041$). The association of the HHSP total scores and subscale scores with sociodemographic characteristics and working conditions is given in Table 3.

Table 2. Characteristics of cleaning staff related to working conditions

	Mean ± Standard Deviation	
Working time as cleaning staff (years) (n:253)	10.4 ± 7.5	
Weekly working time (hours) (n:257)	50.7 ± 7.9	
	n	%
Working unit (n:257)		
Very high risk areas*	107	41.6
High risk areas **	103	40.1
Medium risk areas ***	31	12.1
Low risk areas ****	16	6.2
Use of personal protective equipment (n:256)		
Glove	240	93.8
Mask	225	87.9
Work uniform	190	74.2
Bonnet	116	45.3
Boot	108	42.2
Work apron	102	39.8
Goggle	48	18.8
Face shield	47	18.4
Believing that they comply with general precautions in hospital hygiene (n:255)		
Yes	233	91.4
No	22	8.6
Receiving training on hospital hygiene at recruitment (n:257)		
Yes	222	86.4
No	35	13.6
Receiving regular training on hospital hygiene during employment (n:257)		
Yes	221	86.0
No	36	14.0
Frequency of regular training (n:217)		
Once a year	76	35.0
Every 6 months	84	38.7
Every 3 months	57	26.3
Evaluating the hygiene training received as sufficient (n:219)		
Yes	187	85.4
No	32	14.6

*Very high risk areas: Operating rooms, delivery rooms, intensive care units, angiography laboratory

**High risk areas: Emergency department, hemodialysis unit, central sterilization unit, isolation rooms, hematology-oncology service, endoscopy, bronchoscopy, cystoscopy, echocardiography, medical waste storage, morgue-autopsy room, urology ESWL unit, microbiology laboratory

***Medium risk areas: Daily use areas, general clinics, laboratories, radiology, polyclinics, treatment intervention rooms, kitchen, waiting rooms and elevators, stairs, corridors, bathrooms, meeting rooms, staff rooms and warehouses located in or associated with these areas

****Low risk areas: Administrative office areas, pharmacy, non-sterile warehouses, archives, technical service offices, outer perimeter areas

In the correlation analysis, a very weak positive correlation was found between age and HHSP total mean score (r=0.163, p=0.011), hand hygiene subscale mean score (r=0.163, p=0.011) and general hygiene subscale mean score (r=0.161, p=0.013). There was a weak positive correlation between age and the mean score of the subscale of compliance with personal precautions (r=0.253, p<0.001) and the mean score of the subscale of waste management (r=0.296, p<0.001). There was a very weak positive correlation (r=0.156, p=0.014) between working time as cleaning staff and the subscale score of compliance with personal precautions. The evaluation of the correlation between the HHSP total score, subscale scores and some characteristics is given in Table 4.

Tablo 3. HHSP* total scores and subscale scores association with sociodemographic characteristics and working conditions**

	HHSP*** Total Score Mean ± SD	Hand Hygiene Subscale Score Mean ± SD	General Cleaning Subscale Score Mean ± SD	Compliance with Personal Precautions Subscale Score Mean ± SD	PPE**** Use Subscale Score Mean ± SD	Waste Management Subscale Score Mean ± SD
Gender						
Female	89.5 ± 6.0	9.9 ± 0.4	14.6 ± 0.9	14.0 ± 1.7	26.9 ± 3.5	24.1 ± 1.5
Male	87.9 ± 7.6	9.6 ± 1.0	14.3 ± 1.2	13.9 ± 2.2	26.6 ± 4.0	23.4 ± 2.2
p*	0.064	**0.008**	0.095	0.641	0.589	**0.012**
Educational status						
Secondary school and below	89.8 ± 6.0	9.9 ± 0.5	14.6 ± 0.9	14.1 ± 1.7	27.1 ± 3.6	24.1 ± 1.7
High school and above	87.8 ± 7.1	9.7 ± 0.8	14.3 ± 1.1	13.8 ± 2.0	26.4 ± 3.7	23.6 ± 1.9
p*	**0.017**	0.058	0.056	0.100	0.119	**0.041**
Working unit						
[a]Very high risk areas	88.8 ± 6.3	9.9 ± 0.6	14.5 ± 1.1	13.9 ± 1.9	26.7 ± 3.4	24.0 ± 1.7
[b]High risk areas	88.7 ± 6.8	9.8 ± 0.6	14.4 ± 1.1	13.8 ± 1.9	26.8 ± 3.6	23.9 ± 1.8
[c]Medium risk areas	89.9 ± 6.8	9.9 ± 0.4	14.7 ± 0.7	14.4 ± 1.6	26.9 ± 4.5	24.1 ± 1.9
[d]Low risk areas	89.5 ± 7.5	9.3 ± 1.5	14.5 ± 0.8	14.6 ± 0.7	27.5 ± 4.9	23.1 ± 3.0
p**	0.838	**0.018 (p^{a-d}:0.018, p^{c-d}:0.017)**	0.666	0.346	0.920	0.451
Receiving regular training on hospital hygiene during employment						
Yes	89.4 ± 6.5	9.8 ± 0.6	14.5 ± 1.0	14.1 ± 1.7	27.0 ± 3.6	24.0 ± 1.8
No	86.3 ± 6.8	9.7 ± 1.1	14.4 ± 0.8	13.1 ± 2.7	25.6 ± 4.1	23.4 ± 1.9
p*	**0.013**	0.453	0.754	**0.043**	**0.041**	0.081
Evaluating the hygiene training received as sufficient						
Yes	90.0 ± 6.0	9.8 ± 0.6	14.5 ± 1.1	14.3 ± 1.4	27.3 ± 3.4	24.1 ± 1.6
No	85.9 ± 8.3	9.7 ± 0.6	14.5 ± 0.9	13.2 ± 2.6	25.4 ± 4.0	23.3 ± 2.6
p*	**0.017**	0.289	0.872	**0.033**	**0.010**	0.099
TOTAL	**89.0 ± 6.6**	**9.8 ± 0.7**	**14.5 ± 1.0**	**14.0 ± 1.9**	**26.8 ± 3.7**	**23.9 ± 1.8**

* Independent Samples t Test ** One-way ANOVA *** HHSP: Hospital Hygiene Standard Precautions Scale **** PPE: Personal Protective Equipment

Tablo 4. Evaluation of the correlation between HHSP total score, subscale scores and some characteristics**

		HHSP** Total Score	Hand Hygiene Subscale Score	General Cleaning Subscale Score	Compliance with Personal Precautions Subscale Score	PPE*** Use Subscale Score	Waste Management Subscale Score
Age	r*	0.163	0.163	0.161	0.253	0.064	0.296
	p	**0.011**	**0.011**	**0.013**	**<0.001**	0.330	**<0.001**
Working time as cleaning staff (years)	r*	0.051	0.051	0.037	0.156	0.024	0.041
	p	0.423	0.423	0.559	**0.014**	0.716	0.519
Weekly working time (hours)	r*	0.011	0.011	0.080	-0.056	0.032	-0.070
	p	0.859	0.859	0.210	0.380	0.617	0.274

r*: Pearson correlation coefficient **HHSP: Hospital Hygiene Standard Precautions Scale
***PPE: Personal Protective Equipment

Discussion

HAIs are an important public health problem, 70% of which can be prevented with infection prevention and control practices [3]. For this purpose, standard precautions should be implemented in all institutions where healthcare services are provided and cleaning staff are responsible for their implementation. In our study, we aimed to investigate the compliance of hospital cleaning staff with standard precautions and the factors affecting this compliance.

No other study was found in the literature in which used the cleaning staff version of the HHSP scale, which we used to evaluate the compliance of cleaning staff with standard measures in hospital hygiene, was used. Therefore, when the mean total score of the HHSP of the cleaning staff is evaluated according to the maximum score that can be obtained from the scale, it can be said that the participants' compliance with standard precautions is good. The level of compliance with standard precautions was found to be lower in cleaning staff with higher education level. This situation is thought to be related to the fact that cleaning staff in the young age group have less professional experience although their education level is higher due to the gradual increase in the educational level in our society. The positive correlation between age and compliance with standard precautions, albeit very weak, supports this finding. In the studies conducted using different measurement methods in the literature, studies showing that the level of compliance of healthcare workers with standard precautions is low are the majority [18-20]. However, there are also studies showing that compliance is high [21,22]. Differences in compliance with standard precautions have been explained by many reasons such as the

type of health institutions where health workers are selected, the working unit, differences in the experiences of health workers, status of receiving training, and the level of development of the country or region. Chau et al. evaluated infection control practices among health and support workers and found that experiences from infectious disease outbreaks increased staff awareness [22]. One of the reasons for the high compliance of cleaning staff with standard measures in our study may be the awareness and experience they gained during the COVID-19 pandemic process.

The practice that plays a key role in the prevention of HAIs and is the first among the standard precautions is hand hygiene [11]. In our study, the hand hygiene subscale score was found to be high. The compliance of women and cleaning staff who worked in very high risk areas with hand hygiene measures was found to be significantly higher. In addition, a very weak positive correlation was found between age and compliance with hand hygiene practices. In other studies, it has been reported that female personnel believe in hand hygiene practices more, apply them more frequently and have higher hand hygiene compliance [21,23]. Although it has been emphasized that this may be due to the fact that women are more sensitive about hygiene than men, it is thought to be related to the adoption of gender roles attributed to women by the society. The working areas of cleaning staff include very high risk areas such as intensive care units, operating rooms and surgical units in hospitals. In these areas where invasive procedures are frequently performed and the risk of infection is high, it is thought that the task of employing knowledgeable staff with high hand hygiene compliance will be effective in preventing HAIs. In our study, the mean score of the hand hygiene subscale was found to be significantly higher in those working in very high risk areas compared to those working in low risk areas. Artan et al. also found that hand hygiene compliance of support service staff working in intensive care units was at a high level [24].

PPEs should be used both for self-protection of the personnel and to prevent transmission. In a study conducted by Tekingündüz et al. with cleaning workers in a training and research hospital in Ankara, 95.1% stated that they always use gloves, 71.9% masks, 91.9% work uniforms, 63.4% bonnets and 32.2% goggles [25]. In our study, the rate of glove use was similar, the rate of mask use was higher, while the use of other PPE was lower. Although the frequency of use of PPEs is important, their correct use is also very important. There are studies in the literature showing that the frequency of hand washing before wearing gloves is low [26]. Emphasizing the importance of PPE use and supervision can be useful in ensuring the correct use of PPE.

Compliance of cleaning personnel with general cleaning measures and personal precautions was found to be high. There was a significant correlation between compliance with general cleaning measures and age, and between compliance with personal precautions and age and working time in the profession. Dökümcü et al. found that as the age, working time and experience of surgical nurses increased, their level of compliance with standard precautions also increased [27]. Güngördü et al. also found that hand hygiene compliance of hospital cleaning staff was higher with increasing working years [23]. It can be said that the compliance of employees with standard precautions increases with their work experience and awareness as their working time increases.

Medical wastes are properly separated by healthcare and cleaning staff and collected from the units by the cleaning staff on duty and temporarily stored in the medical waste section of the hospital [13]. In our study, compliance of cleaning staff with waste management was high. The compliance of women and those with an education level of secondary school and below was higher. In addition, a significant relationship was found between age and waste management. This may be related to the fact that young cleaning staff have higher education levels and less professional experience. Çapacı et al. found that the level of medical waste knowledge was higher among women, those aged 28 years and above, and those who received training. They found that the score of allied health and cleaning personnel was higher than that of physicians, and they stated that this was due to the lower rate of physicians receiving training on medical waste management [28]. Hasçuhadar et al. found that approximately half of the hospital staff had a moderate level of medical waste knowledge, doctors were more knowledgeable about the subject, and there was a serious training and knowledge gap in cleaning staff [29]. As can be seen, there are also differences between health institutions. Health institutions are obliged to periodically train and immunize their personnel in charge of medical waste management, to have them undergo health checks at most every six months and to take other protective measures, to provide and ensure the use of special protective clothing and equipment [13].

Hospital personnel should be regularly trained for correct and effective implementation of standard measures in infection prevention and control [15]. In our study, approximately nine out of ten people reported that they received regular training on hospital hygiene and the HHSP compliance scores of those who received regular training were found to be statistically significantly higher. In parallel with our study, in a study conducted by Güngördü et al. 94.6% of hospital cleaning staff received training on hand hygiene and those who received training had positive beliefs and practices about hand hygiene [23]. In the study conducted by Çapacı et al. on healthcare workers, 46.7% of the participants received training on medical waste and a statistically significant difference was found between receiving training and medical waste knowledge level [28]. Tekingündüz et al. conducted a study with cleaning workers and found that 74.1% received training on hygiene and infectious diseases [25]. A study conducted in the USA reported that the institution's provision of necessary protective equipment to employees, frequency of training and receiving feedback played an important role in the compliance of healthcare workers with standard measures [30].

Limitations

Study data are based on participants' self-report and should be supported by studies in which practices are observed. In addition, since our study was conducted only in a training and research hospital, the results cannot be generalized for all healthcare institutions.

Conclusion

The compliance of cleaning staff with standard precautions in hospital hygiene was found to be high. It can be said as the most important result of the study that those who received regular training on hospital hygiene during their employment had higher compliance with standard precautions related to hospital hygiene. It should be aimed to ensure full compliance of cleaning staff with standard precautions, and training programs should be planned accordingly. Theoretical and practical trainings should be planned at frequent and regular intervals. Participation of all cleaning staff,

especially those working in high risk areas, should be ensured, and deficiencies should be identified and completed by receiving feedback on the training. In this way, healthcare workers and cleaning staff will be protected from the risk of infection along with patients.

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

Author Contributions		Author Initials
SCD	Study Conception and Design	ŞY, RGC, MP, BD, ET, DMG
AD	Acquisition of Data	ŞY, RGC, ET, DMG
AID	Analysis and Interpretation of Data	ŞY, RGC, ET, DMG
DM	Drafting of Manuscript	ŞY, RGC, MP, BD
CR	Critical Revision	ŞY, MP, BD

Financial support: The authors received no financial support for the research, authorship, and/or publication of this article.
Acknowledgments : None
Prior publication: 7. International 25. National Public Health Congress, Antalya, Turkey, December 14-17, 2023.

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