

Araştırma Makalesi/ Research Article

## Evaluation of COVID-19 Fear and Hand Hygiene Practices of Healthcare Professionals in a University Hospital

### Bir Üniversite Hastanesinin Sağlık Çalışanlarında COVID-19 Korkusu ve El Hijyeni Uygulamalarının Değerlendirilmesi

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#### ÖZ

**Amaç:** Bu araştırma bir üniversite hastanesinde sağlık çalışanlarının COVID-19 korkusu ve el hijyeni uygulama düzeyleri ile COVID-19 korkusu ve el hijyeni uygulamaları arasındaki ilişkiyi incelemek amacıyla yapılmıştır.

**Yöntem:** Tanımlayıcı ve ilişki arayıcı tipteki araştırmanın evrenini bir üniversite hastanesinin çeşitli birimlerinde çalışan 50 doktor, 100 hemşire toplam 150 çalışan oluşturmuştur. Çalışmaya gönüllü 97 sağlık çalışanı katılmıştır. Veriler "Sağlık Çalışanı Tanıtım Formu, COVID-19 Korkusu Ölçeği ve El Hijyeni Uygulamaları Envanteri" ile toplanmıştır.

**Bulgular:** Kadın çalışanların COVID-19 korku ve el hijyeni uygulama düzeyi puan ortalamaları erkeklere göre daha yüksek saptanmıştır ( $p < 0.05$ ). Eğitim düzeyine göre COVID-19 korku puan ortalamaları arasında istatistiksel olarak anlamlı bir fark saptanmıştır ( $p < 0.05$ ). Eğitim düzeyine göre el hijyeni uygulamalarını yapma düzeyi puan ortalamaları arasında istatistiksel olarak anlamlı fark bulunmamıştır ( $p > 0.05$ ). El hijyeni sonrası çalışanların %96.9'u en az bir sorun yaşadığını ifade etmiştir. COVID-19 korkusu ile el hijyeni uygulamalarını yapma düzeyi arasında çok zayıf düzeyde pozitif yönlü ve anlamlı bir ilişki olduğu belirlenmiştir ( $r = 0.224$ ;  $p < 0.05$ ).

**Sonuç:** Bu araştırma el yıkama uygulamalarının ve COVID-19 korkusunun cinsiyet özelliğinden etkilendiğini, sık el yıkama, el dezenfektanı kullanımının cilt sorunlarında rol oynadığını göstermektedir.

**Anahtar Sözcükler:** COVID-19, el hijyeni, sağlık çalışanı

#### ABSTRACT

**Objective:** The research aimed to analyze healthcare professionals' "levels of COVID-19 fear and hand hygiene practice" and "the correlation between COVID-19 fear and hand hygiene practices" in a university hospital.

**Methods:** The population of this descriptive and correlational research comprised 150 professionals, that is, 50 doctors and 100 nurses working in various units at a university hospital. The number of healthcare professionals who voluntarily took part in the research was 97. The data were collected through the "Healthcare Professional Introduction Form, COVID-19 Fear Scale, and Hand Hygiene Practices Inventory".

**Results:** The female professionals' mean COVID-19 fear level score and hand hygiene practice level score were higher than those of males ( $p < 0.05$ ). There was a significant difference among the mean COVID-19 fear scores with reference to the education level ( $p < 0.05$ ). Of the professionals, 96.9% had at least one problem after hand hygiene. It was determined that there was a very weak, positive, and significant correlation between the level of COVID-19 fear and that of hand hygiene performance ( $r = 0.224$ ;  $p < 0.05$ ).

**Conclusion:** The research reveals that hand hygiene practices and the COVID-19 fear are affected by gender, as well as the fact that frequent handwashing and hand sanitizer use play a role in skin problems.

**Keywords:** COVID-19, hand hygiene, healthcare professional

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## Introduction

Isolated first in China, in December 2019, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) leads to the 2019 coronavirus disease (COVID-19). According to the World Health Organization, the COVID-19 mortality rate was 6.9% as of April 26, 2020. While the case fatality rate in developed European Union countries such as Spain, Italy, France, and England was over 10%, Turkey reported the case fatality rate to be 2.5% (İşsever et al., 2020). Globally, on January 29, 2022, there were 364.191.494 confirmed COVID-19 cases reported to WHO, including 5.631.457 deaths. The death rate per hundred thousand was 262.77 in the USA and 102.75 in Turkey (World Health Organization (WHO), 2022).

The healthcare professionals' contact with COVID-19 positive patients is inevitable. Most healthcare professionals get infected with this new virus, and unfortunately, there are reports of death, like in previous epidemics (Araghi et al., 2020). The reports state that hospital-induced (nosocomial) infections can be prevented through basic infection control measures, including wearing a surgical mask, along with hand and environmental hygiene. Hand hygiene is the primary and most essential step of infection control and hygiene practices. Respiratory droplets and fecal spillage emitted by COVID-19 patients turn the environment into a potential medium of transmission, thus stipulating a detailed environmental and hand hygiene (İşsever et al., 2020). The nurses' and physicians' compliance with all infection control measures, including isolation measures and hand hygiene, is substantial for preventing nosocomial infections (Erden et al., 2015; Moore et al., 2021; Roshan et al., 2020). Despite being an economical and effective method of infection control, the healthcare professionals' compliance to hand hygiene was not at the recommended level in the past (Chatfield et al., 2017; Israel et al., 2020; Kingston et al., 2016; Terzi et al., 2020). Ensuring healthcare personnel's high-level adherence to hand hygiene has always been a challenge. For this reason, the World Health Organization constantly draws attention to the importance of handwashing to prevent the spread of COVID-19, especially during the present pandemic process (WHO, 2020a).

COVID-19's emergence and its consequences have caused fear and anxiety among healthcare professionals as it globally has for individuals (Ahorsu et al., 2020). Studies have reported the fear increasing in the individuals who had contact with

the COVID-19 infected individuals (Lin, 2020). In a study conducted in China by Wang et al. (2020), providing individuals with detailed, updated, and concise health information (e.g., hand hygiene, wearing a mask, treatment) was noted to reduce stress, depression, and anxiety levels. Hand hygiene, along with other infection control activities, has received much attention during this crisis, not only because it has been a priority but also because the healthcare professionals have become more concerned about their exposure to COVID-19 (Roshan et al., 2020). Little knowledge is present about the effects of national public-health quarantine practices on hand hygiene compliance in hospitals. In the literature, studies reporting hand hygiene compliance of healthcare workers in hospitals during the first pandemic of the 21st century (influenza A/H1N1) or the COVID-19 pandemic at the time of this study were limited (Moore et al., 2021). At the time of this study, there were no published studies on compliance with hand hygiene practices in our country. Recently, there has been a lot of research showing the level of hand hygiene compliance at different levels of the healthcare system. The compliance of healthcare workers with hand hygiene has changed with the fluctuations of COVID-19 (Al-Maani et al., 2022; Kamara et al., 2022; Luszczynska et al., 2022). Investigating how pandemics and epidemics affect the hand hygiene practices of healthcare professionals is important in terms of present and future studies, as well as determining the factors that will affect compliance. Since the nurses and the physicians are the healthcare professionals who contact with patients the most, this research analyzed healthcare professionals' "levels of COVID-19 fear and hand hygiene practice" and "the correlation between COVID-19 fear and hand hygiene practices" in a university hospital.

## Research Questions

1. What level of COVID-19 fear do healthcare professionals go through?
2. What is the healthcare professionals' level of hand hygiene practice?
3. What are the factors affecting the healthcare professionals' levels of COVID-19 fear and hand hygiene practice?
4. Is there a correlation between the COVID-19 fear and hand hygiene practice of healthcare professionals?

### Materials and Methods

This research was carried out to analyze healthcare professionals' "levels of COVID-19 fear and hand hygiene practice" and "the correlation between COVID-19 fear and hand hygiene practices" in a university hospital. The research is a descriptive and correlational study. It was conducted through an online questionnaire software, with the participation of internal medicine, surgery, intensive care, and emergency department professionals of a University Hospital, between June 20-July 20, 2020. Thus, the research population comprised intensive care units, internal and surgical services, and all healthcare professionals working in the emergency department (Physician=50 and Nurse=100, N=150) of a University Hospital. The researcher(s) did not opt to sample selection. Once every ten days, (totally three) reminders were sent to the individual phones of the healthcare professionals who volunteered, and the Google Forms address link was also sent online to them over WhatsApp. The ones who accepted attending the research provided their data online in person. Ninety-seven healthcare professional attendees made up the sample. The participation rate was 65%. Provided that they consented, the individuals in the units where the research was being conducted were included. Unlikely, the ones working at units of limited patient care, treatment, and invasive interventions (outpatient services, ECG, Holter, etc.) were exempted.

The researcher assigned the healthcare professional attendees' COVID-19 fear scale and scores of hand hygiene practices inventory as the dependent variables of the research. Likewise, the independent variables were determined as the participants' sociodemographic characteristics, such as age, gender, educational status, unit worked in, years of working, and work system.

#### Data Collection Method and Tools

Due to the COVID-19 process, collecting the data through an online questionnaire method was preferred as the data collection method. The Healthcare Professional Introduction Form, COVID-19 Fear Scale, and Hand Hygiene Practices Inventory developed by the researcher functioned as data collection tools.

#### Healthcare Professional Introduction Form:

The Healthcare Professional Introduction Form was created by the researcher through a review of the relevant literature (Chatfield et al., 2017; Kingston et al., 2016; Terzi et al., 2020). The form comprised 21 questions and two sections, including 8 questions on healthcare professionals' sociodemographic

characteristics (age, gender, marital status, occupation, education level, unit worked in, work system, years of working) and 13 questions on hand hygiene-related features such as hand hygiene training, hand hygiene material, conditions hampering compliance with hand hygiene, time spent while washing hands, frequency of contact with the patient, frequency of handwashing, the material used for drying hands.

**COVID-19 Fear Scale:** The scale was a one-dimensional, 7-item, and 5-point Likert type scale (structured from the 'strongly disagree' option towards the 'strongly agree') developed by Ahorsu et al. (2020). The lowest score to be obtained from the items was 1, while the highest was 5. The total score was calculated by summing the scores of each item (min=7, maximum=35 points). It is accepted that the higher the total score is, the higher the COVID-19 fear will be. Factor loadings ranged between .66 and .74, while the adjusted item-total correlation ranged between .47 and .56 in the original scale. Cronbach's alpha value was .82. Internal consistency and test-retest reliability ( $\alpha = .82$  and ICC = .72) of the scale were accepted (Ahorsu et al., 2020). Within the Turkish adaptation of the COVID-19 Fear Scale conducted by Satici et al. (2020), researchers evaluated Cronbach's alpha, McDonald's omega, Guttman's lambda, and composite reliability and found the overall scale reliability coefficient to be .84. The Turkish version of the scale was reported as a reliable measurement tool (Satici et al., 2020). In the present research, the total scale reliability coefficient was .88.

**Hand Hygiene Practices Inventory:** Hand Hygiene Belief Scale (HHBS) and Hand Hygiene Practice Inventory (HHPI) were developed by Thea van de Mortel in 2009, adapted to Turkish, and studied for validity and reliability by Karadağ in 2016. A 5-point Likert-type HHPI, comprising 14 items and scored as never=1, seldom=2, sometimes=3, usually=4, always=5, was used in the present research. Since the total HHPI score ranged between 14 and 70, a high score indicated that a person always practiced the hand hygiene. Cronbach's alpha internal consistency coefficient of the scale was .80. Karadağ conducted a validity study of the scale with 340 university students. The internal consistency reliability coefficient of the scale was found to be 0.85, while the test-retest reliability was .60. In this study, Cronbach's alpha internal consistency coefficient of the scale was .95.

### Analysis and Evaluation of the Data

SPSS 22.0 packaged software was used for statistical analysis of the research data. The data were evaluated by the researchers through number-percentage distribution. The normality of the distribution was examined by the Kolmogorov–Smirnov. Tests to analyze the relation between the dependent variables and independent variables were t test, Kruskal-Wallis test, one-way analysis of variance (ANOVA) test, and Spearman correlation test. The statistical significance level was selected as  $p < 0.05$ . Though the relevant literature comprises various classifications for interpreting the correlation relationship, in general, (r:0.00-0.30) has been interpreted as weak, (r:0.31-0.49) as medium, (r:0.50-0.69) as strong, and (r:0.70-0.100) as very strong (Tavşancıl, 2002).

### Results

In Table 1, the introductory characteristics of the professionals are given. The mean age was  $32.36 \pm 7.79$ , while the mean years of working value was found  $9.57 \pm 8.04$ . It was seen that 67% of the professionals were women, 58.8% were married, 79.4% were nurses, 50.5% had bachelor's degrees, and 80.4% were living with their families. Of the participants, 59.8% worked in internal services, and 67% worked for 40-45 hours a week. In the last three months, 19.5% were not pleased with the working environment (Table 1).

Table 2 depicts the distribution of healthcare professionals' hand hygiene-related characteristics. More than half of the attendees (58.8%) reported previously receiving hand hygiene training through in-service training, 52.6% received that training in the last three months during the pandemic process, and 47.4% did not receive training in recent three months. The rate of those stating having adequate knowledge of hand hygiene was 87.6%. The most frequently used material in hand hygiene within the last three months was determined to be alcohol-based hand disinfectant and/or water and soap by a rate of 62.9%. The participants listed the excess workload (63.9%), the irritant effects of hand hygiene materials (47.4%), and the lack of hand hygiene materials (33%) among the reasons hampering their compliance with hand hygiene. An overwhelming majority (96.9%) of the professionals stated to have experienced at least one of the problems such as itching, dryness, cracking, wounds, rashes, and denudations after hand hygiene. The rate of those reporting contact with the patient and their environment more frequently than 15 times

in a working day was 80.4%, washing hands over 15 times in a working day was 79.4%, having a duration of handwashing between 15-30 seconds was 75.3%, and drying hands with a paper towel was 93.8% (Table 2).

In Table 3, the comparison of the professionals' descriptive characteristics and hand hygiene-related characteristics with the fear of COVID-19 and the performance level of hand hygiene practices is analyzed. The COVID-19 fear of all professionals was found to be  $17.98 \pm 6.07$ , and the performance level of hand hygiene was  $64.34 \pm 8.46$ . Both the mean score of the COVID-19 fear and that of the professionals' hand hygiene practice levels were higher in women than in men, and the difference between them was statistically significant ( $p < 0.05$ ). Statistically, a significant difference was found between the mean scores of the COVID-19 fear with reference to education level ( $p < 0.05$ ). It was observed that there was no statistically significant difference between the mean scores of the hand hygiene practice levels with reference to the education level ( $p > 0.05$ ). No statistically significant difference was found between the mean scores of the COVID-19 fear and those of hand hygiene practice levels with reference to the conditions such as marital status, occupational status, unit worked in, weekly working time, and hand hygiene training within the last three months ( $p > 0.05$ ).

As seen in Table 4, according to the results of the Spearman correlation analysis conducted to analyze the correlation between the COVID-19 fear and the hand hygiene practice levels, there was a very weak, positive, and statistically significant relationship between those two [ $r = 0.224$ ;  $p < 0.05$ ]. (Table 4).

### Discussion

This research was conducted to analyze the correlations between the "COVID-19 fear and healthcare professionals' hand hygiene practice levels" and between "COVID-19 fear and healthcare professionals' hand hygiene practices" in a university hospital. Using liquid soap and alcohol-based hand antiseptic as the essential personal protective equipment is one of the recommendations for healthcare professionals who are likely to contact confirmed/probable COVID-19 cases closer than one meter (Bal and Çelik, 2020).

**Table 1.** Distribution of the professionals' descriptive characteristics

Characteristics		$\bar{X} \pm SD$	
<b>Age</b>		32.36 ± 7.49	
<b>Years of working</b>		9.57 ± 8.04	
		<b>n</b>	<b>%</b>
<b>Gender</b>	Female	65	67.0
	Male	32	33.0
<b>Marital status</b>	Married	57	58.8
	Single	37	38.1
	Divorced	3	3.1
<b>Occupational status</b>	Specialist physician	7	7.2
	Assistant	13	13.4
	Physician	77	79.4
	Nurse		
<b>Education level</b>	High school	7	7.2
	Associate degree	6	6.2
	Bachelor's degrees	49	50.5
	Graduate	19	19.6
	Medical Specialist	16	16.5
<b>Living people</b>	Family	78	80.4
	Alone	19	19.6
<b>Unit Worked In</b>	Internal service	58	59.8
	Surgical service	12	12.4
	Intensive care	23	23.7
	Emergency	4	4.1
<b>Weekly Working Time</b>	40-45 hours	65	67.0
	46-64 hours	23	23.7
	65-80 hours	4	4.1
	81 hours or more	5	5.2
<b>Work environment satisfaction in the last three months</b>	Pleased	31	32.0
	Partly satisfied	47	48.5
	Not pleased	19	19.5
<b>Total</b>		<b>97</b>	<b>100.0</b>

Current findings indicate that the COVID-19 virus is transmitted through respiratory droplets or contact. Once contaminated hands touch the mucosa of the mouth, nose, or eyes, the contact transmission occurs; the virus might also be transferred from one surface to another with contaminated hands facilitating indirect contact transmission. As a result, hand hygiene is extremely important in preventing the spread of the COVID-19 virus (Moore et al., 2021; Roshan et al., 2020; WHO, 2020b). The World Health Organization has identified '5 Moments for hand hygiene' to highlight the best practice of hand hygiene. These are consecutively:

before touching the patient, before clean/aseptic procedures, after the risk of exposure to bodily fluids, after touching the patient, and after touching the patient's environment (WHO, 2009). Hands, if visibly got dirty, if there is visible contamination of blood or body fluids, should be washed with water and soap. Apart from this rule, cleansing hands through alcohol-based hand sanitizer or washing them with water and soap is not superior to one another in terms of effectiveness. Learning and precisely applying this knowledge is of significant importance (Arman, 2013; Derin, 2021). It is stated that healthcare professionals' washing their hands with soap and water can cause dryness and irritation on the skin, while hand antiseptics cause skin dryness. Thus, the risk of dryness and dermatitis forming on the hands due to hand antiseptics is lower than the same risk due to washing hands with water and soap (Araghi et al., 2020). Another study denotes lacking information and training as one of the most impeding factors disabling the healthcare professionals from being motivated for handwashing (Al-Maani et al., 2022; Demir et al., 2013; Sin and Rochelle, 2022). Accordingly, more than half of the participants in the present study (58.8%) reported having ever received hand hygiene training through in-service training, 52.6% having received hand hygiene training within the last three months during the pandemic process and 47.4% not having received hand hygiene training within the same interval. The rate of those stating having adequate hand hygiene knowledge is 87.6%. In the study conducted by Artan et al. (2018), 40.9% of the participants stated having received in-service training within the institution and during the service, and 38.6% within the institution. The regularity of in-service training on hand hygiene is essential for enhancing motivation and knowledge levels of the healthcare professionals. In the study by Demir et al. (2013), the rate of attendees stating having received hand hygiene training was reported as 80.4%, while the rate of those stating not having the training was 19.6%. As for the present research, the rate of those stating not having received training was 15% suggesting conformity with the literature. Additionally, in Demir et al. (2013)'s study, 59% of the participants stated having received hand hygiene training from the infection control committee. The compliance of healthcare professionals to hand hygiene practices ranged between 80-95% during the inspection tours when they were directly monitored by infection prevention specialists (Roshan et al., 2021).

**Table 2.** Distribution of professionals' hand hygiene related characteristics

Characteristics		n	%
<b>Hand hygiene training</b>	No	15	15.5
	In-service training	57	58.8
	In-service training and/or conference/course	25	25.8
<b>Hand hygiene training in the last three months</b>	Yes	51	52.6
	No	46	47.4
<b>Hand hygiene knowledge level</b>	Adequate	85	87.6
	Needs to be developed	12	12.4
<b>Hand hygiene material used in the last three months</b>	Alcohol-based hand disinfectant and/or water and soap	61	62.9
	Water and soap	28	28.9
	Alcohol-based hand disinfectant, soap and water, Povidone-iodine solutions and/or chlorhexidine gluconate	5	5.2
	alcohol-based hand sanitizer	3	3.1
<b>The reasons impeding their hand hygiene compliance*</b>	Work overload	62	63.9
	Irritant effects of hand hygiene materials	46	47.4
	Insufficient amount of hand hygiene material	32	33.0
	Skin problem	21	21.7
	Time constraint	16	16.5
	Informative signage for hand hygiene, inadequate guides	5	5.1
	Wearing adequate gloves	3	3.1
	Lack of role models	2	2.1
<b>Having problems with hands after hand hygiene</b>	No	3	3.1
	Having at least one problem (itching, dryness, cracking, wound, rashes, denudations, etc.)	94	96.9
<b>Frequency of contact with the patient and his/her environment in a working day</b>	1-5 times	2	2.1
	6-10 times	10	10.3
	11-15 times	7	7.2
	Over 15 times	78	80.4
<b>Frequency of Hand washing in a working day</b>	1-5 times	3	3.1
	6-10 times	8	8.2
	11-15 times	9	9.3
	Over 15 times	77	79.4
<b>Duration of handwashing</b>	Less than 15 seconds	10	10.3
	15-30 seconds	73	75.3
	Over 30 seconds	14	14.4
<b>Hand drying material</b>	Paper towel	91	93.8
	Paper towel or inability to dry when not available	6	6.2
<b>Total</b>		<b>97</b>	<b>100.0</b>

\* Given as % of existing ones. Multiple answers were marked.

In a study conducted during the pandemic, the mean compliance rate of healthcare professionals to hand hygiene rose from 35% to 71% from January 2019 to January 2020, while the mean compliance rate in all hospitals soared from 46% to 89% between

January and April 2020. “Pre-patient-contact hand hygiene” was determined to rise from 28% to 79%, and “post-patient-contact hand hygiene” from 65% to 100% (Israel et al., 2020). The said study, analyzing hand hygiene performance through an

automatic hand hygiene monitoring system in hospitals during the pandemic, drew attention to the fact that it is difficult to maintain improvements in hand hygiene performance, even under pandemic conditions (Moore et al., 2021). The effect of the hand hygiene role model project on increasing the compliance of healthcare workers was investigated in a quasi-experimental observational study. Health employee's overall compliance rate significantly increased from a baseline of 52.6% before the intervention to 74.1% after three months from the intervention, and 70.0% on follow-up after more than one year (Al-Maani et al., 2022).

The present study determined that in the first stage of the COVID-19 pandemic, the most frequently used hand hygiene material within the last three months was alcohol-based hand disinfectant along with water and soap by 62.9%. In the study by Karaoğlu and Akin (2019), the most frequently used material for hand hygiene by nurses was alcohol-based hand disinfectant besides water and soap, with a rate of 81.6%. In another study conducted by Toraman et al. (2009) within the intensive care unit of a private hospital, 1397 occasions in total that require hand washing were identified. The number of said occasions requiring hand washing in nurses, doctors, and allied healthcare personnel was distributed respectively as 562 (40%), 375 (27%), and 460 (33%). Toraman et al. (2009) found the overall average handwashing rate of health personnel to be 73%, while the distribution occurred as 86% for nurses, 56% for the physicians, and 72% for the assistant health personnel. Similar to our study, the handwashing habits of doctors are at a lower rate (Al-Maani et al., 2022; Duman-Karakuş, Tanyel, and Deveci, 2022; Kamara et al., 2022).

Although there was a variety of reasons for inadequate compliance with hand hygiene, the most common ones we come across in the literature were that the handwashing takes time, the workload is excessive, the thought that hand washing harms the hands, the belief that the hands are not dirty, insufficient number of sinks, insufficiency of the handwashing and drying materials, the short contact time with the contaminated material (Demir et al., 2013). Similarly, in the present research, the participants listed excess workload (63.9%), the irritant effects of hand hygiene materials (47.4%), and lacking hand hygiene materials (33%) as the top three reasons that hampered their compliance to hand hygiene. Most of the professionals (96.9%) stated that they experienced at least one of the

problems among itching, dryness, cracking, wound, rashes, and denudations after hand hygiene. In fact, this is a considerable problem to be addressed as of hampering the hand hygiene compliance of the healthcare professionals. Güçlü et al. (2012) stated that one of the most important causes of non-compliance was the irritation effects on the hands due to frequent handwashing. Although the relevant studies mainly deal with the hand hygiene compliance of healthcare professionals, skin irritation problems, which are among the conditions that interrupt compliance to hand hygiene, can be investigated within larger sample groups. Araghi et al. (2020) noted that detergents and disinfectants predispose healthcare professionals to hand dermatitis. In the study by Demirdal et al. (2007), the nurses stated the reasons for reducing the frequency of handwashing as excessive workload by 58.7%, damage to hands by 22.7%, and insufficiency of sinks by 12%, while the physicians' answer for the same question showed a distribution as overwork by 34.7%, distrust in the environment and materials used for handwashing by 21.3%, insufficiency of the sinks by 20% and damage to the hands by 17.3%. Previous studies have identified concern with skin irritations, and hands becoming dry and cracked, etc., as a barrier to engagement in hand hygiene behaviour, these concerns were not observed in the present sample. Previous studies have also observed that emergency and busy situations may be a barrier to effective hand hygiene behaviour among healthcare workers (Sin and Rochelle, 2022). However, these concerns were not observed in Sin and Rochelle's 2022 study.

In the observational research conducted by Karaoğlu and Akin (2019), 21% of handwashing processes took less than 5 seconds, 73.2% took 5-15 seconds, 5.8% took longer than 15 seconds, and 77.8% of the nurses dried their hands after the handwashing process. In this research, the rate of those who reported handwashing to take between 15-30 seconds was 75.3%, and that of those drying their hands with a paper towel after handwashing was 93.8%. One can consider that the long-time hand washing and overwhelming superiority in percentage were because direct answers came from the volunteering participants through QA forms rather than an observation-based study.

The changes in the ratio of the number of healthcare professionals to that of patients during the epidemic, giving care to a risky group, transmission risk of the disease to the healthcare professionals, changing the working system,

caregiving to the patients with protective equipment worn on during busy working hours, and the possibility that they convey the virus to the other patients or their own families may all cause the healthcare professionals to go through feelings such as stigmatization, fear, anger, anxiety, uncertainty and burnout (Aktura and Özden, 2020). However, individual fears also need to be worked on in order

to reduce the transmission rate of COVID-19 worldwide and achieve a holistic goal. Because, as the high infection rate and relatively high mortality rate naturally cause individuals to get anxious about COVID-19, this raises the humans' fear of coming into contact with COVID-19-infected individuals (Lin, 2020).

**Table 3.** Descriptive characteristics of the healthcare professionals and comparison of their COVID-19 fear with hand hygiene practice levels

Characteristics		COVID-19 fear $\bar{X} \pm SD$	Statistics	Hand hygiene practice levels $\bar{X} \pm SD$	Statistics
<b>Overall (All the Healthcare professionals)</b>		17.98±6.07		64.34±8.46	
<b>Gender</b>	Female	19.25±5.85	t=-3.051	66.20±6.81	t=-2.835
	Male	15.41±5.78	<b>p=.003</b>	60.56±10.18	<b>p=.007</b>
<b>Marital status</b>	Married	18.25±5.89	t=0.677	63.58±9.35	t=-1.381
	Single	17.38±6.33	p=.500	65.97±6.03	p=.171
<b>Occupational status</b>	Specialist physician	21.14±4.14	F=3.406	67.43±2.64	F=.406
	Assistant physician	19.15±4.49	p=.182	63.08±8.51	p=.816
	Nurses	17.49±6.38		64.27±8.79	
<b>Education level</b>	High school	18.57±6.24	KW=11.684 <b>p=.020</b>	68.00±2.77	KW=5.071 p=.280
	Associate degree	13.67±7.79		58.50±13.02	
	Bachelor's degrees	16.71±6.26		63.98±9.51	
	Graduate	20.84±4.78		66.53±4.33	
	Medical Specialist	19.81±4.58		63.44±7.69	
<b>Unit Worked In</b>	Internal service	17.60±5.70	KW=3.754 p=.289	63.71±9.43	KW=1.828 p=.609
	Surgical service	18.08±5.12		66.33±4.68	
	Intensive care	17.78±7.15		65.13±6.32	
	Emergency	24.25±6.07		63.00±14.00	
<b>Weekly Working Time</b>	40-45 hours	18.19±5.88	KW=3.071 p=.381	66.04±6.29	KW=4.048 p=.256
	46-64 hours	17.35±6.90		60.83±11.83	
	65-80 hours	14.50±4.12		60.25±12.55	
	81 hours or more	21.00±5.53		61.60±7.16	
<b>Hand hygiene training in the last three months</b>	Yes	17.49±6.58	t=-.834	63.80±9.94	t=-.670
	No	18.52±5.48	p=.406	64.94±6.49	p=.505

**Table 4.** The relationship between the COVID-19 fear and the hand hygiene practice level (n=97)

COVID-19 Fear	Hand Hygiene Practice Level	
	Spearman correlation	.224
p	<u>.028</u>	



Studies conducted so far show that the COVID-19 fear can exacerbate the damage to the person caused by the disease (Guan et al., 2020; Huang et al., 2020). Under normal conditions, the infectious diseases arising during the pandemic period cause fear among the people, depending on getting caught by the disease. The fear is directly related to transmission rate and environment, morbidity, and mortality (Pappas et al., 2009). The COVID-19-induced transmission and mortality rates can lead to feelings of fear and discrimination against other individuals in social life and thus exacerbate the effects of the disease. However, individuals' fear of COVID-19 is also directly related to infection rate, incidences, and mortality (Ahorsu et al., 2020). In a study, hand hygiene was observed to gain novel importance in the minds of healthcare professionals, given the severity of this epidemic. Within that period, the healthcare professionals were more complying with the hand hygiene (Roshan et al., 2020). As a matter of fact, during the pandemic process, there has been an increase and decrease in compliance with hand hygiene due to fluctuations. Although a large number of intervention studies have been reported to improve hand hygiene adherence, it can be difficult to maintain effectiveness unless campaigns are renewed periodically (Al-Maani et al., 2022; Sin and Rochelle, 2022).

In the present study, the difference between the mean scores of COVID-19 fear and hand hygiene practice levels, with reference to marital status, occupational status, the unit worked in, weekly working time, and hand hygiene training within the last three months, was not statistically significant ( $p > 0.05$ ). García-Reyna et al. (2020) conducted a study on the hospital staff's COVID-19 fear perception, depending on gender, age, unit worked in, and shift variables. As a result of that research, the nurses' COVID-19 fear perception was determined to be of a higher level than that of the other professionals in terms of the unit worked in, and that of females compared to that of males as well. Both the mean score of COVID-19 fear and that of the professionals' hand hygiene practice levels were higher in women than in men, and the difference between the two genders was statistically significant ( $p < 0.05$ ). This result also supported the literature, and the female participants' mean COVID-19 fear scores were higher than the males'. One reason for this may be that the women undertake diverse daily roles and have a more fragile temperament. With reference to the education level,

a statistically significant difference was identified between the mean COVID-19 fear scores, and the feeling of fear increased as the education level got higher.

In this study, a very weak, positive, and statistically significant correlation was found between COVID-19 fear and hand hygiene practice levels. This correlation is an expected result. Prior to our study, we did not investigate support structures such as adequate hospital availability of hand hygiene products, hand hygiene posters/reminders, or healthcare worker leadership, or employee perceptions such as fatalism, all of which may have influenced the a very weak, positive relationship. As a matter of fact, it has been revealed in a study that hand hygiene compliance is different at various levels of the health system and it is known that research is needed to learn more about compliance (Kamara et al., 2022). Across countries and time, levels of handwashing adherence and strictness of policies were high. Path analysis indicated that stricter containment and health policies were indirectly related to lower handwashing adherence via lower self-efficacy and self-monitoring. Less strict policies were indirectly related to higher handwashing adherence via higher self-efficacy and self-monitoring (Luszczynska et al., 2022).

### Conclusion

The research findings indicated that healthcare professionals had COVID-19 fear at a moderate level, and their hand hygiene practice levels were high. Regarding the gender factor, one can consider being a female as a determinant variable in COVID-19 fear and hand hygiene compliance. As for hand hygiene compliance, numerous healthcare professionals brought the workload and hand hygiene materials' irritant effects to the fore. Thus, administrations should ensure the continuity of personal protective equipment for healthcare professionals, especially for protecting and maintaining skin health. Early treatment of occupational hand dermatitis is another capital issue for healthcare professionals. Hand lotion and softening solutions should be provided, and hand-protecting measures should be taken to prevent hand washing-induced skin problems. The research presented critical data at the point of providing feedback to the healthcare professionals and the health managers' taking measures to relieve these problems. In special periods such as pandemics, the institutions should adopt strict infection control mechanisms and ensure the delivery of hand

hygiene and COVID-19 trainings at regular intervals. Continuous monitoring is essential apart from determining the current situation in the early COVID-19 pandemic period. The installation of hand hygiene monitoring systems in hospitals can be a good option. Offering online counseling services to healthcare professionals and investigating the problems they face and the conditions they go through during the epidemic period is also recommendable for better management of the process. The long-term effects of hand hygiene practices on COVID-19 should be monitored through randomized controlled studies in future research environments. It is required to identify areas unsuitable for hand hygiene in hospitals and design studies to assess the impact of targeted interventions. Furthermore, during the pandemic period, in terms of protecting and improving individual, family and community health, nurses and healthcare professionals should also draw the clinicians' attention to hand hygiene practices and compliance like in all areas of society.

### Study Limitations

The most important limitation was that the study covered solely the healthcare professionals serving in a hospital in Sivas province. In order to abstain from potentially infectious contacts, online communication was preferred. However, the challenges faced in networked access to the professionals working during the COVID-19 pandemic process turned out to be another limitation.

**Ethics Committee Approval:** This study was decided to be ethically and scientifically appropriate by a university's Ethics Committee of Non-Invasive Clinical Research (Project No: 20-KAEK-138). To conduct the research, institutional permits were obtained from the Scientific Research Platform of the Ministry of Health. Those who voluntarily accepted taking part in the study filled in the data online.

**Peer-review:** External referee evaluation.

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**Conflict of interest:** None.

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### What did the study add to the literature?

- In the present research as well, the participants listed excess workload, the irritant effects of hand hygiene materials, and insufficiency of those materials in amount as the top three reasons hampering their compliance with hand hygiene.
- Recognition of the health care professionals' perceptions regarding COVID-19 fear and associated hand hygiene may be informative and ultimately improve the practice.
- It is of immense importance to know the factors that impede compliance to hand hygiene. The study draws attention to the monitoring of hand hygiene during the pandemic period.

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