ARAŞTIRMA / RESEARCH

The Compliance of Nurses with Isolation Precautions During the Pandemic and the Effect of COVID-19 Fear and Anxiety: An Observational and Descriptive Study

Hemşirelerin Pandemi Sırasında İzolasyon Önlemlerine Uyumu ile COVID-19 Korku ve Kaygısına Etkisi: Gözlemsel ve Tanımlayıcı Bir Çalışma

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Abstract

Objective: This study was aimed to determine the compliance of nurses caring for patients with COVID-19 with isolation measures and the relationship between nurses' fear and anxiety of COVID-19 and their compliance with isolation measures.

Material and Method: This cross-sectional study using direct observation was carried out between February and May 2021. The study sample consists of 57 nurses. Data were collected with The Compliance with Isolation Precautions Scale, The Coronavirus Fear Scale, The Coronavirus Anxiety Scale, and Observation Form for Compliance with Isolation Precautions. Data were analyzed using descriptive statistics (number-percent, mean±standard deviation), Mann-Whitney U test and Kruskal-Wallis analysis, Spearman correlation analysis.

Results: The compliance of the nurses with the isolation precautions was 80.07±9.70. 73.7% of the nurses did not wear the personal protective equipment in the correct order and 78.9% did not take it off correctly. The COVID-19 fears levels of the nurses were 15.61±5.94, and their anxiety levels were 0.98±1.74. No correlation was found between COVID-19 fears, anxiety and compliance with isolation measures.

Conclusion: The nurses evaluated their isolation compliance level as good but as a result of the observation, they did not apply the personal protective equipment wearing and removing steps with the correct technique. The nurses' fear of COVID-19 was moderate, their anxiety was low, and there was no relationship with this variables and their compliance with isolation measures. Making arrangements and training related to compliance with isolation measures may be important in combating COVID-19 and similar threats.

Keywords: Anxiety, COVID-19, fear, isolation, nursing.

Öz

Amaç: Bu çalışma, COVID-19'lu hastalara bakım veren hemşirelerin izolasyon önlemlerine uyumunu ve hemşirelerin COVID-19 korku ve kaygıları ile izolasyon önlemlerine uyumları arasındaki ilişkiyi belirlemeyi amaçlamaktadır.

Gereç ve Yöntem: Doğrudan gözlemin kullanıldığı bu kesitsel çalışma, Şubat-Mayıs 2021 tarihleri arasında gerçekleştirildi. Çalışmanın örneklemini 57 hemşire oluşturmaktadır. İzolasyon Önlemlerine Uyum Ölçeği, Koronavirüs Korku Ölçeği, Koronavirüs Kaygı Ölçeği ve İzolasyon Önlemlerine Uyum Gözlem Formu ile veriler toplandı. Veriler, tanımlayıcı istatistikler (yüzde sayı, ortalama±standart sapma), Mann-Whitney U testi ve Kruskal-Wallis analizi, Spearman korelasyon analizi kullanılarak analiz edildi.

Bulgular: Hemşirelerin izolasyon önlemlerine uyumu 80.07±9.70 idi. Hemşirelerin %73,7'si kişisel koruyucu donanımını doğru sırada takmadı ve %78,9'u doğru sırada çıkarmadı. Hemşirelerin COVID-19 korku düzeyleri 15,61±5,94, kaygı düzeyleri 0,98±1,74 olarak bulundu. COVID-19 korkusu, kaygısı ve izolasyon önlemlerine uyum arasında bir ilişki bulunmadı.

Sonuç: Hemşireler izolasyon uyum düzeylerini iyi olarak değerlendirdiler ancak gözlem sonucunda kişisel koruyucu donanım giyme ve çıkarma adımlarını doğru teknikle uygulamadıkları görüldü. Hemşirelerin COVID-19 korkusu orta, kaygıları düşük ve bu değişkenler ile izolasyon önlemlerine uyumları arasında ilişki yoktu. İzolasyon önlemlerine uyum ile ilgili düzenleme ve eğitimlerin yapılması COVID-19 ve benzeri tehditlerle mücadelede önemli olabilir.

Anahtar Kelimeler: Anksiyete, COVID-19, hemşirelik, izolasyon, korku.

1. Introduction

The coronavirus (COVID-19) disease, which causes severe acute respiratory failure, first appeared in Wuhan, China in December 2019 and quickly spread to many regions of the world (1,2), and the World Health Organization (WHO) declared it a pandemic on 11th March, 2020. The first positive case was recorded in Turkey on 10th March, 2020, and the number of cases continued to rise since then (3). COVID-19 is highly contagious and anyone who providing direct healthcare directly to an affected patient is at high risk of infection. Nurses come into direct contact with patients in all units such as the emergency service, outpatient clinics, other clinics and intensive care units and are at significant risk of becoming infected (4). Nurses are key members of the healthcare team in controlling and preventing the spread of infectious diseases (5). In our country as well as in the world in the current global pandemic, nurses are at the forefront by providing one-on-one care to individuals infected with COVID-19. Therefore, the rigorous use of infection control and prevention strategies by nurses is critical to protect themselves and prevent or limit transmission in healthcare settings (6, 7, 8).

As reported by WHO and the Ministry of Health of the Republic of Turkey, nurses are required to implement standard, contact and droplet isolation precautions when caring for/contacting suspected or definitively diagnosed COVID-19 patients (3,9). Hand and respiratory hygiene, as well as the use of appropriate personal protective equipment (PPE), are standard precautions (10). Barrier precautions such as hand washing and the use of alcohol-based hand sanitizers, masks, gloves and gown are the simplest and most effective ways to reduce contamination (11). It is important that PPE is used correctly and rationally in preventing the transmission of infectious agents. The effectiveness of PPE heavily dependents on suitable and consistent equipment, sufficient personnel training, correct hand hygiene, and right human behavior (6, 12). In this pandemic, where hand hygiene, social distance and surface disinfection are important, nurses have great responsibilities in the prevention and control of infections. Therefore, in this study, it is aimed to reveal the compliance of nurses with isolation precautions during in the COVID-19 pandemic.

Nurses, who spend a lot of time with patients, are especially vulnerable since they play a key role in Covid-19 prevention and intervention activities, including as prevention, management, and isolation of the infection. As a result, nurses face not only physiological but also psychological issues that cause anxiety and fear (13). According to Xiang et al. (14), healthcare personnel who care to persons with a suspected or actual COVID-19 diagnosis are at an elevated risk of infection as well as mental health disorders. Pappa et al. (15) stated in their study that at least one in five healthcare professionals' experienced anxiety or depression. Among the causes of mental distress in healthcare workers are personal concerns about contacting COVID-19 patients and getting the disease or infecting others and insufficient PPE (16). No studies were found in the literature examining the relationship between nurses' fear of covid and compliance with isolation measures. For this reason, in this study, the relationship between the fear and anxiety levels of nurses and their compliance with isolation measures

in the fight against the COVID-19 pandemic, which deeply affects all areas of life, was evaluated. This study will contribute to the literature in terms of observational evaluation of nurses' compliance with isolation measures. Determining nurses' compliance with isolation measures, revealing the relationship between fear and anxiety levels, can help plan training programs and interventions for psychological empowerment and adaptation to isolation.

The purpose of this study is to determine nurses' compliance with isolation precautions, their fear and anxiety levels, and to reveal the relationship between fear and anxiety levels and compliance of nurses with isolation precautions in the COVID-19 pandemic.

Research questions:

1. In the COVID-19 pandemic, how is the compliance of nurses with isolation precautions?

2. What is the fear level of nurses in the COVID-19 pandemic?

3. What is the anxiety level of nurses in the COVID-19 pandemic?

4. In the COVID-19 pandemic, is there a relationship between nurses' fear and anxiety levels and their compliance with isolation precautions?

2. Material and Methods

2.1. Study Design and Setting

This study is a cross-sectional study conducted by direct observation method. This study was carried out with nurses involved in the care of adult COVID-19 infected patients between February and May 2021 in a university hospital in the western region of Turkey.

Observations were made in day-night shifts in 2 intensive care units, 2 medical clinics and emergency service, where patients diagnosed with COVID-19 were cared for. The criteria for reporting observational studies, Strengthening the Reporting of Observational Studies in Epidemiology (STROBE), were followed in this study (17).

2.2. Participants

Nurses in this study were chosen basis of the following criteria: Working in a clinic, intensive care unit and emergency service where patients diagnosed with COVID-19 are present, volunteering to participate in the study. The universe of the study is comprised of 69 nurses working in the units mentioned above. Sampling method was not used and the whole universe was tried to be reached out. The study was conducted with 57 nurses, since 2 of the nurses were on leave and 10 of them did not agree to participate in the study (response rate 82%).

2.3. Study Instrument

The Participant Identification Form was used to collect the sociodemographic information of the nurses, scales and a structured observation form were used to evaluate their compliance with isolation measures and their COVID-19 anxiety and fear levels.

2.3.1. Participant Identification Form

In this form, there are questions to determine the nurses' age, gender, educational status, years of experience in the profession, in which unit they work in, duration of caring for patients with COVID-19, status of flexible working hours status, number of patients they care for, status of having COVID-19, isolation precautions, the status of receiving education, adequacy of infrastructure and protective equipment the hospital regarding isolation precautions.

2.3.2. Scale of Compliance with Isolation Precautions

The compliance of the nurses with the isolation precautions was assessed using the Scale of Compliance with Isolation Precautions developed by Ulupınar and Tayran (18). The 18-item scale is 5-point Likert type and has 14 positive and 4 negative items that indicate compliance with isolation precautions. Rating: 1=Strongly disagree, 2=Disagree, 3=No idea, 4=Agree, 5=Strongly agree. The score can be obtained from the scale is between 18-90. A high score indicates high compliance to isolation precautions. The internal consistency (Cronbach's α) was 0.85 in Ulupınar and Tayran. In our study, this value (Cronbach's α) was found to be 0.76.

2.3.3. Coronavirus (COVID-19) Fear Scale

The Coronavirus (COVID-19) Fear Scale, whose Turkish validity and reliability research was completed by Bakioğlu et al. (19), was used to assess nurses' fear of the COVID-19 pandemic. The scale has seven items. A five-point Likert-type rating scale was used, from 1 = Strongly Disagree to 5 = Strongly Agree. The scale yields scores ranging from 7 to thirty-five. A high score suggests that you are afraid of the coronavirus. The Cronbach's alpha internal consistency coefficient of the scale was 0.82 in the study of Bakioğlu et al. The internal consistency (Cronbach's α) was found to be 0.80 in this study.

2.3.4. Coronavirus Anxiety Scale

In order to determine the nurses' anxiety about Coronavirus, the Coronavirus Anxiety Scale, whose Evren et al. (20) conducted a Turkish validity and reliability research, which was employed. The scale has five items using a five-point Likert scale (from 0 = Not at all to 4 = Nearly every day over the last 2 weeks), where participants report how often they have experienced the situations in the statements in the last 2 weeks. The minimum score for each question is 0, while the maximum score is 4. The scale can produce a score ranging from 0 to 20. A higher score suggests greater anxiety caused by Coronavirus. Additionally, a cut-off point of ≥ 9 has been shown to have a good accuracy in diagnosing dysfunctional anxiety (90% sensitivity and 85% specificity). The internal consistency (Cronbach's α) was 0.80 in the study of Evren et al. The internal consistency (Cronbach's α) was found to be 0.81 in this study.

2.3.5. Observation Form for Compliance with Isolation Precautions

The researchers created a 32-item observation form in line with the literature (9, 21, 22) on this topic, objectively evaluate the isolation compliance of nurses. This form included items related to PPE use, hand cleaning and social distancing. Observation form was distributed to seven specialists. (1 registered nurse (RN) and 6 faculty members with RN and PhD degrees) for content validity. The content validity of observation form was assessed using the Davis technique (reference here). Items with a content validity index of less than 0.80 were removed from the scale (11 items were removed), and some adjustments were made to the suggestions offered. The observation form consists of 21 items and those who do the application are evaluated as yes and those who do not are evaluated as no.

2.4. Data Collection

The data were collected in two stages. The first stage is observing the nurses through the observation form; the second stage is applying forms and questionnaires. In the first stage, the nurses were given general information on infection control and infection prevention about the research to prevent the Hawthorne effect and invited to the study. The nurses who accepted to participate in the study provided both verbal and written consent. Then, each participant was observed in the shift they worked (day or evening-night shift). Due to the pandemic conditions, the practices of a nurse for each item in the observation form were recorded in the observation form during the care of a single patient. Observations due to pandemic conditions were made by a researcher (TM). Observations were made during the care and treatment of COVID-19 patients. The observer recorded the observation results on the standard form by giving a number for each participant. In the second stage, after the observations were completed, data were collected from the nurses with the participant identification form, the Scale of Compliance with Isolation Precautions, the Coronavirus Fear Scale and the Coronavirus Anxiety Scale.

2.5. Ethical Considerations

Ethics committee approval (05.01.2021 E-60116787-020-11255) and institutional approval were acquired from the Pamukkale University Ethics Committee where the study was conducted. The study adhered to the Helsinki Declaration's standards. The nurses who agreed to participate in the study were informed and their written consent was obtained.

2.6. Data Analysis

All statistical analyses of data were carried out using the Statistical Package for the Social Sciences (SPSS) v.25. (IBM Corp., Armonk, NY, USA). Continuous variables were presented as mean and standard deviations, whereas categorical variables were presented as numbers and percentages. Normal distribution was determined using the Kolmogorov-Smirnov and Shapiro-Wilk tests. When parametric test assumptions were not specified, the Mann-Whitney U test and the Kruskal-Wallis of variance analysis were employed to compare independent groups. To study the associations between continuous variables, Spearman correlation analysis was utilized. The statistical significance level was set at 0.05.

3. Results

The majority of the nurses are female (75.4%) and aged between 20 and 30 (86%). More than half of the nurses have at least bachelor's degree (64.9%). Slightly more than half of the nurses (61.4%) have been working in the profession for less than 5 years. It was found that more than half of the nurses (68.4%) had received training in isolation precautions and did not have COVID-19 (73.7%). Many of the nurses (78.9%) reported that the necessary infrastructure and materials for isolation precautions were sufficient. There was no statistically significant difference between the mean scores for compliance with isolation precautions and demographic data. The relationship between COVID-19 Fear Scale mean score and nurses' gender, educational status, and the clinic where they work was statistically significant ($p < .05$). A statistically significant difference was found between the nurses' gender and coronavirus anxiety ($p=0.046$) (Table 1).

Table 1. The Relationship Between Nurses' Descriptive Characteristics and Compliance with Isolation Precautions, Coronavirus Fear Scale, Coronavirus Anxiety Scale (n=57)

Characteristic (variable)	n (%)	Mean Scores of the Scale of Compliance with Isolation Precautions	Mean Scores of the Scale of Coronavirus Fear Scale	Mean Scores of the Scale of Coronavirus Anxiety Scale
Age group (years)				
20-30	49 (%86)	80.24 ± 10,22	15.61 ± 6.05	0.97 ± 1.71
30-40	8 (%14)	79 ± 6,78	15.62 ± 5.65	1.00 ± 2.07
***P*-value**		0.302*	0.814*	0.668*
Gender				
Female	43(%75,4)	80.6 ± 5,9	17.09 ± 5.71	1.13 ± 1.78
Male	14(%24,6)	78.43 ± 17,18	11.07 ± 5.94	0.50 ± 1.60
***P*-value**		0.584*	**0.001***	**0.046***
Education Level				
Associate degree	20(%35,1)	82.55 ± 4,89	18 ± 6.41	1.05 ±1.70
License	37(%64,9)	78.73 ± 11,43	14.32 ± 5.33	0.94±1.79
***P*-value**		0.200*	**0.029***	0.811*
Working year				
0-4 years	35(%61,4)	79.51 ± 11.69	14.60 ± 6.33	0.80 ± 1.43
> 4 years	22(%38,6)	80.95 ± 5.67	17.22 ± 4.99	1.27 ± 2.16
***P*-value**		0.869*	0.065*	0.652*
Workplace**				
Pandemic clinic	11(%19.3)	80.27 ± 6.37	13.45 ± 5.04	0.27 ± 0.46
Intensive care	40(%70.2)	80.18 ± 11.15	16.87 ± 5.84	1.30 ± 1.98
Emergency service	6 (%10.5)	79 ± 4.15	11.16 ± 5.70	0.16 ± 0.40
***P*-value**		0.450**	**0.039****	0.145**
Years of experience in the present department				
0-6 month	25(%43,9)	79.48 ± 6,06	14.60 ± 4.75	0.88 ± 1.71
6-12 months	32(%56,1)	80.53 ± 11,98	16.40 ± 6.70	1.06 ± 1.79
***P*-value**		0.120*	0.299*	0.652*
Number of patients per nurse				
0-3 patients	9 (%15.8)	83 ± 6.04	17.55 ± 5.47	0.88 ± 2.02
4-7 patients	30(%52.6)	79.6 ± 12.2	15.06 ± 5.64	0.63 ± 1.21
>7 patients	18(%31.6)	79.39 ± 6.18	15.55 ± 6.74	1.61 ± 2.22
***P*-value**		0.324**	0.548**	0.302**
Covid status				
Yes	15(%26.3)	80.2 ± 6.06	13.66 ± 4.92	0.26 ± 0.45
No	42(%73.7)	80.02 ± 10.86	16.30 ± 6.17	0.98 ± 1.96
***P*-value**		0.630*	0.136*	0.120*
Infrastructure and equipment adequacy status				
Yes	45(%78.9)	81.38 ± 5.97	16.17 ± 6.03	1.20 ± 1.90
No	12(%21.1)	75.17 ± 17.61	13.50 ± 5.31	0.16 ± 0.38
***P*-value**		0.243*	0.179*	0.051*
Getting training on isolation precautions				
Yes	39(%68.4)	79.82 ± 11,56	15.38 ± 5.91	0.89 ± 1.66
No	18(%31.6)	80.61 ± 3.94	16.11 ± 6.16	1.16 ± 1.94
***P*-value**		0.558*	0.475*	0.504*

* Mann-Whitney U Test **Kruskal-Wallis Test

As a result, it was stated that nurses' compliance with isolation precautions was high, their fear of COVID-19 was at a moderate level, and their anxiety was low (Table 2).

After the observations made in the clinic, it was determined that all the nurses used masks and gloves before entering the patient room (Table 3).

Observations in the clinic revealed that most of the nurses complied with the following precautions: "When passing from patient to patient, he/she takes off his/her gloves properly" and "throws them in the appropriate waste bin", "Uses disposable equipment or patient-specific equipment", "Wears a surgical mask when in the same environment with any individual.", "Washes hands with soap and water after removing PPE" (Table 3).

In the observations made in the clinic, more than half of the nurses (%) did not comply with the following precaution items: "Washes hands/uses hand antiseptics after touching every area in the clinic/intensive care unit", "Removes all PPE properly after patient care", "Wears PPE, gown, mask, goggles and gloves in appropriate order before entering the patient room/area". There is no statistically significant difference between the scale of compliance with isolation precautions and direct observations ($p>.05$). (Table 3). The score of nurses wears a disposable protective overall/gown, goggles/face shield before entering the patient room/area and additionally uses overalls in case of contact with body secretions are higher. There is a statistically significant difference between "Wears a disposable protective overall/gown before entering the patient room/area", "Wears goggles / face shield before entering the patient room/area", "Additionally uses overalls in case of contact with body secretions" items and coronavirus fear scale scores ($p<.05$). Scores of the Scale of Compliance with Isolation Precautions are higher for nurses who close the gown so that there is no open space. There is a statistically significant difference between this item and the scale score ($p<.05$).

There is no relationship between the mean score obtained from the scale of compliance with isolation precautions and the mean scores obtained from the coronavirus fear and anxiety scales ($p>.05$) (Table 4).

4. Discussion

Nurses' compliance with isolation precautions during caring for COVID-19 patients is very important to protect themselves and their patients from being infected with COVID-19. This study aimed to determine nurses' compliance with isolation precautions, COVID-19 fear and anxiety, and their effect on compliance during the pandemic. Nurses' compliance with isolation precautions was also evaluated by direct observation.

In this study, no statistically significant difference was found between nurses' compliance with isolation precautions and their descriptive characteristics (Table 1). Studies have found that as the working year increases, nurses' compliance with isolation precautions gets higher (23, 25, 26). Again, in a study investigating healthcare personnel's knowledge, awareness, and compliance with isolation precautions in Nigeria, it was found that nurses with 10 years or more professional experience had better compliance (27). In this study, it was found out that the working years of the nurses were between 0-5 years and there was no difference in terms of years. Özden and Özveren (28) stated that nurses working in intensive care units had better compliance scores for isolation precautions than nurses working in medical and surgical clinics. In this study, there was no difference between the services due to the application of standard isolation practices in the clinic, intensive care and emergency services for the patients who were isolated due to COVID-19 during the pandemic. In the study conducted by Geçit and Özbayır (29), similar to this study, no statistically significant difference was found between gender, educational status, age, education about isolation precautions and the clinic studied.

In this study, the difference between gender and the mean score of the fear scale was statistically significant, and the fear level of women was found to be higher than male (Table 1). The results of the study contain similar results with the study of Aslan and Dinç (44). In addition, the anxiety level of female was found to be higher in this study (Table 1). This may be due to social roles that are thought to belong to female, such as being a mother and taking care of children. The difference between the educational level of nurses and the mean scores of COVID-19 fears is statistically significant (Table 1), and their levels of fear decrease as their educational level increases. The reason for this is to show how to act consciously and manage the negative situation as the level of education increases. In this study, the difference between the clinics where the nurses work and the COVID-19 fear mean score was statistically significant, and the fear levels of the nurses working in the intensive care unit were found to be higher (Table 1). The result of systematic review examines the mental health of healthcare workers in the COVID-19 pandemic was showed that working in areas with a high incidence of infection is significantly associated with high stress and psychological discomfort (45). The results of another study indicate that depression, anxiety, fear and sleep disorders may occur in healthcare workers during the COVID-19 epidemic, and intensive care nurses are in the high-risk group (46).

Table 2. Analysis Results of The Scale of Compliance with Isolation Precautions, Coronavirus (COVID-19) Fear Scale and Coronavirus Anxiety Scale

	M	SD	Min.-Max.
Scale of Compliance with Isolation Precautions	80.07	9.70	22.00-90.00
Coronavirus (COVID-19) Fear Scale	15.61	5.94	7.00-28.00
Coronavirus Anxiety Scale	.98	1.74	0.00-7.00

M, mean; SD, standard deviation; min, minimum value; max, max value

Table 3. The Relationship between Nurses' Compliance with Isolation Precautions and Direct Observation in the Clinic

Isolation precautions	Compliance with isolation precautions		Mean Scores of the Scale of Compliance with Isolation Precautions		Mean Scores of the Scale of Coronavirus Fear Scale		Mean Scores of the Scale of Coronavirus Anxiety Scale	
		n (%)	M (SD)	Z*, p	M (SD)	Z*, p	M (SD)	Z*, p
1. Applies hand hygiene before wearing personal protective equipment (PPE)	Yes	23 (40.4)	80.65 ± 5.58	-.677	16.43± 5.89	-.970	0.60 ± 0.98	-.447
	No	34 (59.6)	81.67 ± 6.26	0.499	15.05± 6.00	0.332	1.23 ± 2.08	0.655
2. Applies hand hygiene after wearing PPE	Yes	7 (12.3)	79,57 ± 4.58	-.938	16.00 ± 7.02	-.329	0.57 ± 0.78	-.056
	No	50 (87.7)	81.50 ± 6.13	0.348	15.56 ± 5.86	0.742	1.04 ± 1.84	0.956
3. Wears a disposable protective overall/ gown before entering the patient room/ area.	Yes	51 (89.5)	81.70 ± 5.90	-1.773	16.15 ± 5.82	-2.019	1.01 ± 1.80	-.313
	No	6 (10.5)	77.5 ± 5.54	.076	11.00 ± 5.32	0.043	0.66 ± 1.21	0.755
4.Closes the gown in a way that there is no open space.	Yes	34 (59.6)	82.35 ± 6.14	-2.087	15.67 ± 6.33	-.163	0.85 ± 1.70	-.997
	No	23 (40.4)	79.65 ± 5.42	0.037	15.52 ± 5.46	0.871	1.17 ± 1.82	0.319
5. Wears surgical/N95/FFP2 mask before entering the patient room/area.	Yes	57 (100)	80.07 ± 9.77	-	15.61 ± 5.94	-	0.98 ± 1.74	-
6. Wears goggles / face shield before entering the patient room/area.	Yes	44 (77.2)	82.09 ± 5.62	-1.926	16.47 ± 5.96	-2.087	1.09 ± 1.91	-.272
	No	13 (22.8)	78.46 ± 6.45	0.054	12.69 ± 5.05	0.037	0.61 ± 0.96	0.785
7. Wears gloves before entering the patient room/area.	Yes	57 (100)	81.26 ± 5.96	-	15.61 ± 5.94	-	0.98 ± 1.74	-
8. Wears PPE, gown, mask, goggles and gloves in appropriate order before entering the patient room/area	Yes	15 (26.3)	80 ± 5.41	-.954	15.33 ± 5.81	-.009	1.26 ± 2.21	-.654
	No	42 (73.7)	81.71 ± 6.14	0.340	15.71 ± 6.06	0.993	0.88 ± 1.56	0.513
9. Additionally uses foot protectors in case of contact with body secretions	Yes	20 (35.1)	82.35 ± 5.13	-.847	16.00 ± 5.90	-.369	0.60 ± 1.42	-1.484
	No	37 (64.9)	80.67 ± 6.35	0.397	15.40 ± 6.04	0.712	1.18 ± 1.88	0.138
10. Additionally uses a cap in case of contact with body secretions	Yes	18 (31.6)	83 ± 5.20	-1.472	17.44 ± 6.16	-1.591	1.22 ± 2.07	-.708
	No	39 (68.4)	80.46 ± 6.19	0.141	14.76 ± 5.72	0.112	0.87 ± 1.59	0.479
11. Additionally uses overalls in case of contact with body secretions	Yes	48 (84.2)	81.68 ± 5.61	-1.053	16.33 ± 5.94	-2.182	1.12 ± 1.86	-1.353
	No	9(15.8)	79 ± 7.57	0.392	11.77 ± 4.49	0.029	0.22 ± 0.44	0.176
12. When passing from patient to patient, he/she takes off his/her gloves properly and throws them in the appropriate waste bin.	Yes	55 (96.5)	81.23 ± 6.04	-	15.56 ± 5.97	-	1.01 ± 1.76	-
	No	2(3.5)	82 ± 4.24		17 ± 7.07		0.00 ± 0	
13. When passing from patient to patient, he/she takes off his/her gown properly and throws it into the appropriate waste bin.	Yes	41 (71.9)	81.34 ± 6.11	-.383	16.21 ± 6	-1.036	1.00 ± 1.81	-.295
	No	16 (28.1)	81.06 ± 5.74	0.702	14.06 ± 5.68	0.278	0.93 ± 1.61	0.768
14. Removes all PPE properly after patient care	Yes	12 (21.1)	83.42 ± 5.38	-1.531	15.91 ± 5.79	-.255	0.83± 1.26	-.157
	No	45 (78.9)	80.68 ± 6.03	0.126	15.53 ± 6.05	0.799	1.02 ± 1.86	0.875
15. Removes PPE just before leaving the patient room	Yes	50 (87.7)	81.54 ± 6.06	-.951	16 ± 6.11	-1.243	1.04 ± 1.85	-.362
	No	7 (12.3)	79.29 ± 5.19	0.342	12.85 ± 3.80	0.214	0.57 ± 0.53	0.717
16. Washes hands with soap and water after removing PPE.	Yes	51 (89.5)	81 ± 5.68	-1.147	15.68 ± 5.92	-.169	0.86 ± 1.63	-1.504
	No	6 (10.5)	83.5 ± 8.31	0.251	15 ± 6.72	0.866	2 ± 2.44	0.133
17. Washes hands/uses hand antiseptics after touching every area in the clinic/ intensive care unit	Yes	13 (22.8)	79.23 ± 5.86	-1.363	15.23 ± 6.79	-.324	0.53 ± 0.77	-.338
	No	44 (77.2)	81.86 ± 5.92	0.173	15.72 ± 5.75	0.746	1.11 ± 1.93	0.736
18.Uses disposable equipment or patient-specific equipment (e.g. stethoscopes, etc.).	Yes	56 (98.2)	81.17 ± 5.98	-	15.76 ± 5.88		1.00 ± -	
	No	1(1.8)	86± -		7 ± -	-		-
19. Room doors are kept closed except when entering or leaving the room	Yes	37 (64.9)	80.97 ± 5.45	-.746	15.32 ± 5.98	-.411	0.89 ± 1.89	-1.628
	No	20 (35.1)	81.80 ± 6.93	0.456	16.15 ± 5.99	0.681	1.15 ± 1.46	0.104
20. Wears a surgical mask when in the same environment with any individual.	Yes	56 (98.2)	81.28 ± 6.01	-	15.57 ± 5.99	-	0.89 ± 1.62	-
	No	1(1.8)	80 ± -		18 ± -		6 ± -	
21. Warning posters/plates/figures for isolation precautions are used at the entrance of each patient room.	Yes	50 (87.7)	81.56 ± 6.17	-1.426	16.10 ± 5.85	-1.657	0.98 ± 1.69	-.473
	No	7 (12.3)	79.14 ± 3.8	0.154	12.14 ± 5.81	0.098	1 ± 2.27	0.636

Abbreviations: M, mean; p, level of statistical significance; SD, standard deviation

*Z, Mann–Whitney test Significant (p< 0.05)

Table 4. Spearman's Correlation Analysis Results for Coronavirus Fear Scale, Scale of Compliance with Isolation Precautions, Coronavirus Anxiety Scale

	Scale of Compliance with Isolation Precautions	
	r	p
Coronavirus (COVID-19) Fear Scale	0.084	0.536
Coronavirus Anxiety Scale	0.143	0.287

The mean scores of the nurses from the scale of compliance with isolation precautions show that their compliance with isolation precautions is at high level (Table 2). When we look at the studies that determined the compliance of healthcare workers with isolation precautions before the pandemic in Turkey (23, 24), it was found that the compliance was lower than during the pandemic. Along with the pandemic, public information on reducing transmission both in working life and social life (social media, TV, posters, etc.) has been extensively provided by the Ministry of Health and nursing associations. Intensified training programs on isolation precautions were also organized in hospitals, and many nurses participated in these programs.

As a result of direct observation in this study, it was observed that nurses' practice of isolation precautions was high (Table 3). It was seen that all of the nurses used masks and gloves when they entered the patient rooms. Similarly, in a study conducted in Indonesia, it was stated that nurses' practices for isolation precautions during the COVID-19 pandemic were high and that all nurses used masks when entering patient rooms if the patient had respiratory-related symptoms (30). The reason for the high rate of wearing gloves and masks may be that the COVID-19 pandemic is a respiratory and contact-transmitted disease.

The use of PPE is a key strategy in reducing exposure to a vector (e.g. a COVID-19 patient) and environmental contamination. PPE functions as a physical barrier to protect againist in all types of transmission (31). In this study, it was determined that many of the nurses used PPE before entering the patient room/area (Table 3). At this point, it can be thought that the training given to nurses is effective.

When wearing and removing PPE, it should be worn (gown, mask, goggles, face shield and gloves) and removed in an order (gloves, goggles, face shield, gown, mask) in accordance with the evidences (32). However, it was observed in the study that most of the nurses did not wear and remove PPE with the right technique (Table 3). It has been determined that healthcare personnel often contaminate their skin and clothing while removing contaminated gloves or gowns (33). Okamoto et al (34) found in their study that self-contamination is common among healthcare workers during removal of contaminated PPE. According to the results of the observations made in another study, it was stated that almost all the healthcare personnel had errors in the PPE removal order, PPE removal technique, and/or proper PPE usage (35). Bovin (36) stated that the lack of awareness about putting on and removing PPE, limited time, and lack of knowledge about the right technique can lead to this situation. In addition, in this study, the rate of nurses washing their hands/using hand antiseptics after touching each area in the clinic/intensive care unit was found to be low (Table 3). Regarding the prevention of COVID-19 infection, many researchers have proven that alcohol-based hand rub/handwashing is one of the most effective, simple, and inexpensive methods against COVID-19 cross-contamination (37). In a study, it was determined that while the frequency of hand washing increased when the pandemic first started, it decreased as time went on (38). Sadule-Rios and Aguilera (39) stated that one of the main problems related to hand hygiene compliance of nurses in the intensive care unit is excessive workload. In this study, it was determined that many of the nurses worked in the intensive care unit and the number of patients per person was 4 or more. In addition, it was also observed that all nurses wore gloves in patient care. Acquarulo et al. (40) found that the use of gloves was a potential barrier to hand hygiene. The effectiveness of wearing gloves in preventing contamination of healthcare workers hands and in helping to reduce the transmission of pathogens has been confirmed in many clinical trials, but gloves do not provide complete protection against hand contamination (41). In conclusion, the reason for the low handwashing rates among nurses in this study may be related with high workload and the use of gloves in patient care.

Outbreaks are causes of concern. It has been observed that people's fear and anxiety levels increased, especially as the pandemic occurred and the number of cases increased (42). Nurses have always been on the front line in clinics during this pandemic. In this context, it is important to examine the effects of fear on the behavior of nurses, whose contact with COVID-19 is much higher than other parts of the society since the beginning of the pandemic (43). In this study, it was determined that the COVID-19 fears of the nurses were moderate and their anxiety was low (Table 2). In addition, no relationship was found between fear and anxiety of COVID-19 and compliance with isolation measures (Table 4). Studies conducted early in the pandemic have shown that nurses caring for patients with confirmed or suspected COVID-19 diagnoses experience both physical and emotional exhaustion related to feelings of helplessness, increased patient workload, and lack of PPE (47). However, since this study was carried out in February-May 2021, due to factors such as the fact that a year has passed since the pandemic, the chaos at the first moment was replaced by a more organized hospital environment, the elimination of the lack of PPE, etc. associated anxiety may be considered low.

Fear of COVID-19 was found to be statistically significantly higher in nurses who wore disposable protective overall/gown, goggles/face shield before entering the patient room/area and additionally used overalls in case of contact with body secretions (Table 3). The use of personal protective equipment PPE is an important factor in keeping healt care workers safe, especially in high-risk environments (48). This result may be due to the fact that healthcare professionals pay more attention to the use of PPE due to the fear of contracting the virus.

4.1. Limitations

The most important limitation of this study is the sample size. This study was conducted only in one hospital only. Therefore, the findings of the research are limited to this hospital only. Due to the pandemic, there was only one observer and for each nurse, compliance behaviors to isolation precautions in a patient care was observed. Some data were self-reported.

5. Conclusion and Recommendations

As a result of the observations made in this study, it was observed that nurses' compliance of the nurses with the isolation precautions was high, but many of the nurses did not apply the steps of wearing and removing PPE with the right technique. In addition, it was determined that their fear of COVID-19 was moderate, and their anxiety was low, and no correlation was found between their compliance with isolation precautions.

Observing nurses' compliance with isolation precautions and determining the factors affecting compliance with isolation precautions will help to identify the problems in this area, to make arrangements for the problems and to prepare training programmes.

6. Contribution to the Field

This study, the compliance of nurses caring for patients with a diagnosis of COVID-19 to isolation precautions was determined and the relationship between fear and anxiety of COVID-19 and compliance with isolation precautions was examined. Knowing how much the nurses comply with the isolation precautions is a very important step in preventing the spread of the pandemic. Thus, it will ensure that the missing steps in the use of PPE are known, and the necessary training is provided.

Ethical Aspect of the Research

Verbal and written consent was obtained from the nurses who agreed to participate in the study, and their identities were kept confidential. In addition, permission was obtained from the institution. Ethical approval was obtained from the Ethical Committee of the University (05.01.2021 E-60116787-020-11255).

Conflict of Interest

This article did not receive any financial fund. There is no conflict of interest regarding any person and/or institution.

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Authorship Contribution

Concept: ASZ, SA, TM; **Design:** ASZ, SA, OF; **Supervision:** ASZ, SA, OF; **Funding:** None; **Materials:** None; **Data Collection/Processing:** ASZ, TM; **Analysis/ Interpretation:** ASZ, SA, OF; **Literature Review:** ASZ, SA; **Manuscript Writing:** ASZ, SA; **Critical Review:** ASZ, SA, OF.

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