Open Peer Review on Qeios

Evaluation of the impact of the COVID-19 pandemic on nurses

Bilgehan Irmak[1], Habip Gedik, Kadriye Kart Yaşar[1]

1 Dr. Sadi Konuk Education and Research Hospital

Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.

Abstract

Objective: It was aimed to investigate the effects of the COVID-19 pandemic on the professional activities and lives of nurses, as well as their compliance with infection control measures during their health care services.

Materials and Methods: This descriptive, cross-sectional survey study was conducted between August 1st and September 1st, 2022 on the nurses who worked during the COVID-19 pandemic at Prof. Dr. Murat Dilmener Emergency Hospital, Istanbul, Turkey.

Results: Of the 200 nurses whose questionnaires were evaluated in the study, 147 (73%) were female, 53 (26.5%) were male, and 133 (66%) were clinical nurses. Of these, 152 (76%) had recovered from COVID-19, and 86 (56%) of them had experienced moderate symptoms, although almost all of them fully used personal protective equipment during the COVID-19 pandemic process and 190 (95%) of them had COVID-19 vaccines. The uncertainty of the pandemic process, the presence of a large number of care patients, and the respiratory distress of patients were recorded as the most distressing issues.

Conclusion: Nurses have been most affected by the uncertainty of the pandemic. It was observed that compliance with infection controls increased in those who recovered from COVID-19 and did not want to be infected again. Nurses who were afraid of death due to COVID-19 needed more psychological support in proportion to the severity of their symptoms. The high rates of COVID-19 among nurses suggest that the virus is highly contagious and will continue to pose a danger with its pathogenic features and emerging new variants.

Bilgehan Irmak[1], **Habip Gedik**[2] and **Kadriye Kart Yaşar**[2]

[1] *Nurse, Department of Infectious Diseases and Clinical Microbiology, University of Health Sciences Bakırköy Dr. Sadi Konuk Training and Research Hospital, İstanbul*

[2] *Infectious Diseases and Clinical Microbiology Physician, Department of Infectious Diseases and Clinical Microbiology, University of Health Sciences Bakırköy Dr. Sadi Konuk Training and Research Hospital, İstanbul, Turkey*

Keywords: Nurse, COVID-19, pandemic, vaccine, infection control, compliance, personal protective equipment.

Introduction

Coronavirus disease 2019 (COVID-19) infection, caused by a new coronavirus that first appeared in Wuhan, China in 2019, was declared a pandemic by the World Health Organization on March 11, 2020, due to its occurrence, spread, and severity in many countries [1].

As a result of the spread of the infection, which threatens the individual's life by spreading through the epidemic, droplets, direct contact, fecal-oral route, inanimate object, and perinatal, the density has increased in health institutions, and physicians and nurses play an important role in the fight against the epidemic [2][3]. Nurses are more exposed to the risk of infection due to long working hours and frequent and prolonged contact with patients. They may be an unintentional mediator in the spread of the virus by being infected [4][5]. Despite the fear of being infected and infecting their family members under difficult working conditions, they continue to work in clinics with great devotion [6]. Therefore, the principles of using personal protective equipment are essential for nurses both to protect their health and to prevent contamination [7].

This study aimed to investigate the effects of the COVID-19 pandemic on the professional activities and lives of nurses as well as their compliance with infection control measures during their health care services.

Material and Method

This descriptive, cross-sectional survey study was carried out to investigate the effects of the pandemic process on the professional activities and lives of nurses as well as their compliance with infection control measures between August 1st and September 1st, 2022 at Prof. Dr. Murat Dilmener Emergency Hospital, Istanbul, Turkey which has 600 clinical beds and 410 intensive care beds and was established for the treatment of COVID-19 inpatients due to the COVID-19 pandemic. A 21-question survey form was presented to nurses for the study. Nurses, who were between the ages of 20-65 and were working at Prof. Dr. Murat Dilmener Emergency Hospital during the pandemic, were included in the study. Nurses, who were on leave/out of the hospital, and did not want to participate in the study, were not included in the study. The name, surname, and other personal information of the nurses who participated in the survey were not asked. As the primary evaluation, it was aimed to observe the difficulties experienced by nurses during the COVID-19 pandemic and the impacts on them. The secondary evaluation was aimed to evaluate the compliance of nurses with infection control measures during the pandemic process. This study was carried out by Bakırköy Dr. It was carried out with the approval of the Sadi Konuk Training and Research Hospital Ethics Committee, with the decision number 2022-13-02 and dated 04.07.2022.

In the questionnaire form, gender, age range, educational status, place of duty in the hospital, the status of having COVID-19 disease, the severity of the symptoms, living with the family, any person in the family who recovered from

COVID-19, any death in the family due to COVID-19, the fear of infecting the family members with the COVID-19, the vaccination status against COVID-19, the name of the vaccine, the frequency of use of personal protective equipment in the care of patients with COVID-19, the issues that caused difficulties while performing the nursing care, the fear of death, and receiving psychological support were queried.

Statistical Analyses

Frequency and percentage values were calculated for categorical variables. Mean, standard deviation, and median values were given for continuous variables. The normal distribution test of continuous variables was done with the Kolmogorov-Smirnov test. Chi-square analysis was used for the relationships between categorical variables. Categorical variables were evaluated with Fisher's exact test. The independent sample t-test was used to compare two groups in continuous independent variables with normal distribution. In the variables that did not fulfill the normal distribution assumption, the Mann-Whitney U test was used in the comparison of two independent groups. Pearson correlation analysis was used to determine the correlational relations between the variable. The interpretation of the correlation coefficient:

If r is <0.2, that means a very weak correlation or no correlation. If r is between 0.2-0.4; that means a weak correlation. Moderate correlation is interpreted as between 0.4-0.6. A high correlation is interpreted as between 0.6-0.8. If it is 0.8>, it is interpreted that there is a very high correlation. P<0.05 were considered statistically significant.

Results

Of the 200 nurses whose questionnaires were evaluated in the study, 147 (73%) were female, 53 (26%) were male, 184 (92%) were in the 20-30 age range, 10 (5%) were in the 30-40 age range, and 6 (3%) were between the ages of 40-50. In terms of education, 16 (8%) were high school graduates, 22 (11%) were associate degree graduates, 150 (75%) had bachelor's degrees, and 12 (6%) had master's graduates. Of the nurses, 15 (7%) were working as supervisor nurses, 133 (66%) working in clinics, and 52 (26%) working in intensive care units. The status of nurses regarding Covid-19 disease were presented in Table 1.

Table 1. The status of nurses regarding COVID-19

	Yes N (%)	No N (%)
Have you been in the care of Patients with COVID-19?	198 (%99)	2 (%1)
Have you had COVID-19?	152 (%76)	48 (%24)
Has anyone had COVID-19 in your family?	136 (%68)	64 (%32)
Has anyone in your family died due to COVID-19?	28 (%14)	172 (%86)
Did you live with your family during the care of patients with COVID-19 at the hospital?	75 (%37,5)	125 (%62,5)
Have you received psychological support due to COVID-19? Has medication been recommended by a psychiatrist?	7 (%3,5)	193 (%96,5)
Have you experienced fear of death due to COVID-19?	68 (%34)	132 (%66)

Of the 152 nurses who had COVID-19, 12 (6%) were working as supervisor nurses, 102 (51%) as service nurses, and 38 (19%) as intensive care nurses. Of these, 17 (12%) had severe symptoms, 86 (56%) had moderate symptoms, and 49 (32%) had mild symptoms. Moreover, 61 (81%) of 75 nurses living with their families had COVID-19, and 14 (19%) did not. While 57 (76%) of these nurses reported that family members had COVID-19 disease, 18 (24%) did not. Of the 125 nurses who did not live with their family members, 91 (72%) reported that they had COVID-19, while 34 (28%) did not. Of the 200 nurses in our study, 190 (95%) were vaccinated against COVID-19, and 10 (5%) were not. However, 145 (76%) of the vaccinated nurses and 7 (70%) of the 10 non-vaccinated nurses have been infected with COVID-19. That was statistically similar (p: 0.842; Table 2). All of the nurses reported that there was no serious problem with the timely supply of personal protective equipment during their duties. The use of personal protective equipment in the care of COVID-19 patients and the most issues during the pandemic were given in Table-3 and -4.

Table 2. The vaccination status of nurses against COVID-19

COVID-19 vaccine name and number of doses	N (%)
2 doses of BioNTech	87 (%43,5)
2 doses of Sinovac	21 (%10,5)
2 doses of Turkovac	-
1 dose of Turkovac	-
Both BioNTech and Sinovac	82 (%41)
Unvaccinated	10 (%5)

Table 3. The use of personal protective equipment by nurses in the care of COVID-19 patients

Use of Personal Protective Equipment	Never N (%)	Rarely N (%)	Occasionally N (%)	Almost always N (%)
Glove Use	1 (%0,5)	2 (%1)	1 (%0,5)	196 (%98)
Surgical Mask Use	3 (%1,5)	2 (%1)	8 (%4)	187 (%93,5)
FFP2 Mask Usage	2 (%1)	5 (%2,5)	13 (%6,5)	180 (%90)
Use of Visors and Glasses	24 (%12)	40 (%20)	64 (%32)	72 (%36)
Use of Gown	7 (%3,5)	19 (%9,5)	20 (%10)	154 (%77)

Table 4. The most issues while performing nursing care during the pandemic

	Yes N (%)	No N (%)
To be able to fully comply with infection control measures	43 (%21)	157 (%78)
Number of patients	99 (%49)	101 (%51)
Respiratory distress in patients	94 (%47)	106 (%53)
Fear of death due to the virus	69 (%35)	131 (%65)
Incompatibilities between colleagues	22 (%11)	178 (%89)
The uncertainty of the pandemic	112 (%56)	88 (%44)

There was no statistically significant relationship between the history of COVID-19 in nurses and those including age, gender, education status, the history of COVID-19 in family members, any death in family members due to COVID-19, the use frequency of personal protective equipment such as gloves, surgical mask, N95 mask, visor and goggles, gowns, receiving psychological support due to COVID-19, and the vaccination status of nurses. A statistically significant, but weak correlation was found between the history of COVID-19 and the fear of death due to COVID-19 (p: 0.014; Pearson Correlation coefficient: 0.181; Odds Ratio: 2.749; Confidence Interval: 1.04-1, 21). A statistically significant, but weak relationship was found between the severity of symptoms related to recovered COVID-19 and receiving psychological support due to COVID-19 (Fisher's Exact Test p: 0.025; Pearson Correlation coefficient: 0.122; Confidence Interval: 0.801-2.86).

Discussion

The prominent features of the nurses who participated in our study were women, a young population aged 20-30, with undergraduate education, working in the care of COVID-19 patients, and taking appropriate control measures. A high level of compliance, proper use of personal protective equipment, and getting vaccinated with very few (95%) exceptions were considered low risk for the deadly and sickening effects of the virus [8]. However, the fact that two-thirds of them have a moderate course of COVID-19 indicates how high the potential of COVID-19 for mortality, contagiousness, and

disease is despite all precautions [9]. The fact that working in an inpatient clinic or intensive care service does not make a difference in terms of the incidence of the disease shows that the transmission of the virus to other people is caused by environmental contamination rather than the severity of the disease [10]. This reveals how easy the spread of the disease is and how wide the effect of the virus is. Considering that nurses are healthcare professionals with the most frequent and longest contact time with patients, it is understood how common the disease is despite all precautions [10]. For this reason, nurse planning in clinics should be done according to the worst scenario in terms of preparation for pandemic situations to maintain the health service properly against the decrease in the number of nurses due to the disease. It requires separate planning, especially for nurses working in clinics and intensive care units, over middle age, and with chronic diseases. It would be more rational to assign nurses in this group to units with a lower risk of disease and to assign nurses as young as possible and without morbidity in high-risk departments so that active patient care and health services are not disrupted [11]. Poyraz et al. reported that 72% of the nurses worked in the pandemic service, more than half of them had COVID-19, and 41% of them survived the disease at moderate severity [12]. In the study conducted by Berberoğlu, it was reported that more than half of the nurses worked in the pandemic service and the care of COVID-19 patients, and 52 (23%) had COVID-19 [13]. Işıklı et al. reported that 57% of nurses were actively working in the care of COVID-19 patients and 52% were quarantined after exposure [14]. In another study, it was reported that 30% of nurses had COVID-19 [15]. Since the dates of these studies were much earlier than our study, it is thought that their rates were lower than those in our study.

The results of our study revealed that the risk of transmitting COVID-19 to the families of nurses is not as high as it was thought, but is as much as the risks during daily activities. Therefore, working in departments with COVID-19 patients will not pose a high risk of infecting their relatives with COVID-19 if healthcare personnel fully fulfill infection control measures and are vaccinated [16]. Nurses are more concerned about themselves about COVID-19, especially nurses who experience moderate symptoms and are psychologically affected and need more psychological support [17]. In particular, the severity of the symptoms seems to be related to the increased need. It should also be noted that the neuropsychiatric effects of the virus also contribute to this problem [18]. In the study conducted by Bayülgen et al., nurses' mean score on the Coronavirus Anxiety Scale was found to be high (11.3±4.3), while the mean score on the Beck Hopelessness Scale was found to be moderate (8.8 ± 6.1). A moderately positive correlation was found between the mean scores of the Coronavirus Anxiety Scale and the mean scores of the Beck Hopelessness Scale [19]. In the study of Öztürk et al., while the rate of very advanced depression score was 25% in nurses, this rate was 11% in doctors. Very advanced anxiety scores in nurses/healthcare workers were statistically significantly higher than in doctors. The rates of nurses with high-stress scores were also found to be significantly higher than doctors [20]. In the study of Garcia-Reyna et al., among the employee categories in Mexico's regional hospitals, the group of 1340 (45%) nurses had the highest fear score [21]. In the study of Khattak et al., no significant difference was found between the anxiety levels of nurses who care for COVID-19 patients and those who do not. However, fear of COVID-19 among nurses was more common than among the general population [22][23].

Although almost all of the nurses in our study were vaccinated against COVID-19, more than half of them had COVID-19. Due to the decrease in the effectiveness of vaccines with newly formed variants, the infection rates in

vaccinated nurses and unvaccinated nurses were similar [24]. On the other hand, vaccines prevent fatal outcomes and reduce disease-related mortality in people who were at great risk due to advanced age and comorbid conditions [25]. In the study of Gökmen et al., the majority of nurses were vaccinated against COVID-19, and very few nurses contracted COVID-19. However, at the time of the above-mentioned study, the COVID-19 vaccine had just begun to be administered and the total number of COVID-19 cases was relatively low compared to today[15]. In studies conducted in many countries, it has been reported that other healthcare professionals have a more negative attitude toward the COVID-19 vaccine than doctors and nurses and that nurses have the highest rates of COVID-19 among healthcare workers [26][27].

The nurses in our study paid attention to the use of personal protective equipment during the COVID-19 pandemic and almost all of them used it appropriately. In published studies, it has been reported that nurses have the highest rates of COVID-19 among healthcare worker groups during the pandemic [28][29]. Karadede et al. reported that surgical nurses working in the operating room are more knowledgeable about asepsis, antisepsis, and disinfection, and therefore their compliance with infection control measures in the care of COVID-19 patients is higher than other nurses [29].

The uncertainty of the pandemic process, the high number of patients, and respiratory distress in the patients were the most problems while fulfilling their nursing duties during the pandemic process in our study. The number of patients was reported to be higher than before the pandemic as the main issue for nurses [12]. Contrary to our study in which nurses did not experience any problems in their harmony with their colleagues, studies have reported that communication among teammates was adversely affected, and there was sharing of experience/emotions, but not at a sufficient level [12][30].

Conclusion

Nurses have been most affected by the uncertainty of the pandemic. It was observed that compliance with infection controls increased in those who recovered from COVID-19 and did not want to be infected again. Nurses who were afraid of death due to COVID-19 needed more psychological support in proportion to the severity of their symptoms. Although the compliance of nurses with infection control measures and vaccination rates are high, the high rates of COVID-19 among nurses suggest that the virus is highly contagious and will continue to pose a danger with its pathogenic features and emerging new variants.

References

1. ^*European Centre for Disease Prevention and Control. Novel coronavirus disease 2019 (COVID-19) pandemic: increased transmission in the EU/EEA and the UK–sixth update. Stockholm, Sweden: ECDC; 2020.*
2. ^*Naserghandi A, Allameh SF, Saffarpour R. All about COVID-19 in brief. New Microbes New Infect 2020;35:100678.*

3. ^*Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA 2020;323(11):1061-1069.*
4. ^*Çevirme A, Kurt A. COVID-19 PANDEMİSİ VE HEMŞİRELİK MESLEĞİNE YANSIMALARI . Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi 2020;7(5): 46-52.*
5. ^*Zheng R, Zhou Y, Fu Y, Xiang Q, Cheng F, Chen H, et al. Prevalence and associated factors of depression and anxiety among nurses during the outbreak of COVID-19 in China: A cross-sectional study. Int J Nurs Stud. 2021;114:103809.*
6. ^*Mehta S, Machado F, Kwizera A, Papazian L, Moss M, Azoulay É, et al. COVID-19: a heavy toll on health-care workers. Lancet Respir Med 2021;9(3):226-228.*
7. ^*World Health Organization. (2020). Rational use of personal protective equipment for coronavirus disease (COVID-19): interim guidance, 27 February 2020 (No. WHO/2019-nCov/IPCPPE_use/2020.1). World Health Organization.*
8. ^*Degarege A, Naveed Z, Kabayundo J, Brett-Major D. Heterogeneity and Risk of Bias in Studies Examining Risk Factors for Severe Illness and Death in COVID-19: A Systematic Review and Meta-Analysis. Pathogens 2022;11(5):563.*
9. ^*Ong SWX, Tan YK, Chia PY, Lee TH, Ng OT, Wong MSY, et al. Air, Surface Environmental, and Personal Protective Equipment Contamination by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) From a Symptomatic Patient. JAMA 2020;323(16):1610-1612.*
10. [a, b]*Gómez-Ochoa SA, Franco OH, Rojas LZ, Raguindin PF, Roa-Díaz ZM, Wyssmann BM, et al. COVID-19 in Health-Care Workers: A Living Systematic Review and Meta-Analysis of Prevalence, Risk Factors, Clinical Characteristics, and Outcomes. Am J Epidemiol 2021;190(1):161-175.*
11. ^*Guerriero F, Guido R. Modeling a flexible staff scheduling problem in the Era of Covid-19. Optim Lett 2022;16(4):1259-1279.*
12. [a, b, c]*Poyraz, A. Pandemi Sürecinde Hemşirelerin Covıd-19 Korkusu Ve Tükenmişliğinin Bakım Davranışlarına Etkisi. Bursa Uludağ Üniversitesi Sağlık Bilimleri Enstitüsü Hemşirelik Anabilim Dalı, Yüksek Lisans Tezi, 2021, Bursa.*
13. ^*Köken Berberoğlu AŞ. Edirne İl Merkezindeki Bir Kamu Hastanesinde Hemşirelerin Covıd-19'dan Korunma Bilgileri İle İzolasyon Önlemlerine Uyum Ölçeği Değerlerini Etkileyen Kimi Faktörlerin Belirlenmesi. Tekirdağ Namık Kemal Üniversitesi Sosyal Bilimler Enstitüsü Sağlık Yönetimi Anabilim Dalı, Yüksek Lisans Tezi, 2021, Tekirdağ*
14. ^*Işıklı AG, Şen H, Soydaş D. Assessment of psychological resilience, job satisfaction, and fear level of nurses infected and not infected with the COVID-19 virus. J Psy Nurs 2021;12(4):281-278.*
15. [a, b]*Gökmen BD, Sarıboğa,Y. Hemşirelerde Koronafobi. Online Türk Sağlık Bilimleri Dergisi 2021;6(3):372-381.*
16. ^*Mo Y, Eyre DW, Lumley SF, Walker TM, Shaw RH, O'Donnell D, Butcher L, Jeffery K, Donnelly CA; Oxford COVID infection review team, Cooper BS. Transmission of community- and hospital-acquired SARS-CoV-2 in hospital settings in the UK: A cohort study. PLoS Med 2021;18(10):e1003816*
17. ^*Si MY, Su XY, Jiang Y, Wang WJ, Gu XF, Ma L, et al. Psychological impact of COVID-19 on medical care workers in China. Infect Dis Poverty 2020;9(1):113.*
18. ^*Aydin AL, Erdogan HA, Bold N, Gedik H, Yayla VA, Aydin ÖA, Yasar KK. Neurological manifestations of SARS-CoV-2 infection among hospitalized patients. Acta Medica Mediterranea 2020;36: 3773*

19. ^*Bayülgen MY, Bayülgen A, Yeşil FH, Akcan HT. COVID-19 Pandemisi Sürecinde Çalışan Hemşirelerin Anksiyete ve Umutsuzluk Düzeylerinin Belirlenmesi. Sağlık Bilimleri Üniversitesi Hemşirelik Dergisi 2021;3(1):1-6.*
20. ^*Öztürk M, Tuncer GE, Kotanoğlu MS, Erdinç S, Kılıklı S. Covid-19 Pandemisinde Görev Alan Sağlık Çalışanlarının Algıladıkları Sosyal Desteğin Depresyon, Anksiyete ve Stres Düzeylerine Etkisi. Ankara Eğitim ve Araştırma Hastanesi Tıp Dergisi 2021;54(1):70-77.*
21. ^*García-Reyna B, Castillo-García GD, Barbosa-Camacho FJ, Cervantes-Cardona GA, Cervantes-Pérez E, Torres-Mendoza BM, et al. Fear of COVID-19 Scale for Hospital Staff in Regional Hospitals in Mexico: a Brief Report. Int J Ment Health Addict 2022;20(2):895-906.*
22. ^*Li Z, Ge J, Yang M, Feng J, Qiao M, Jiang R, et al. Vicarious traumatization in the general public, members, and non-members of medical teams aiding in COVID-19 control. Brain Behav Immun 2020;88:916-919.*
23. ^*Khattak SR, Saeed I, Rehman SU, Fayaz M. COVID-19 Pandemisi Korkusunun Pakistan'daki Hemşirelerin Ruh Sağlığı Üzerindeki Etkisi. Journal of Loss and Trauma 2021;26(5):421-435.*
24. ^*Ikbel Hadj Hassine. Covid-19 vaccines and variants of concern: A review. Rev Med Virol 2022;32(4):e2313.*
25. ^*Watson OJ, Barnsley G, Toor J, Hogan AB, Winskill P, Ghani AC. Global impact of the first year of COVID-19 vaccination: a mathematical modelling study. Lancet Infect Dis 2022;S1473-3099(22)00320-6.*
26. ^*France, Santé Publique. Recensement national des Cas de COVID-19 Chez les professionnels en établissements de santé. Santé publique France [Internet], 2021. URL available at: https://www.santepubliquefrance. fr/etudes-et-enquetes/recensement-nationaldes-cas-de-covid-19-chez-les-professionnels-enetablissements-de-sante*
27. ^*Kabamba Nzaji M, Kabamba Ngombe L, Ngoie Mwamba G, Banza Ndala DB, Mbidi Miema J, Luhata Lungoyo C, et al . Acceptability of Vaccination Against COVID-19 Among Healthcare Workers in the Democratic Republic of the Congo. Pragmat Obs Res 2020;11:103-109.*
28. ^*Arli SK, Bakan AB. Nurses' compliance with isolation precautions and the affecting factors. Appl Nurs Res 2017;38:175-178.*
29. [a, b]*Karadede Ö, Karadede H, Kavala A. Covıd-19 Servislerinde Çalışan Sağlık Personelinin İzolasyon Önlemlerine Uyumlarının Değerlendirilmesi. Türkiye Klinikleri Hemşirelik Bilimleri Dergisi 2021;13(3):649-60*
30. ^*Arpacıoğlu S, Baltacı Z, Ünübol B. COVID-19 Pandemisinde Sağlık Çalışanlarında Tükenmişlik, Covid Korkusu, Depresyon, Mesleki Doyum Düzeyleri Ve İlişkili Faktörler. Cukurova Medical Journal 2021;46(1):88-100*