

Nurses' Experiences in Using Personal Protective Equipment: A Qualitative Study

Hemşirelerin Kişisel Koruyucu Ekipman Kullanma Deneyimleri: Nitel Bir Çalışma

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This study was presented as an oral presentation at the National Nursing Congress-I, June 14-16, 2021, Online.

ABSTRACT Objective: Our study was conducted with the purpose of determining the usage experiences of nurses differing in terms of protective equipment within the context of the coronavirus disease-2019 epidemic. **Material and Methods:** Twenty nurses who were working in pandemic units participated in our study which used the methods of the phenomenological pattern of Collazzi and purposeful sampling; and conducted between June-July 2020. "Semi-Structured Interview Forms" were used with regards to data collection. The collected data were analyzed through the method of content analysis. **Results:** Depending on the use of protective equipment; it was ascertained that physiological and psychological experiences, dehydration, dermatological problems, changes in the patterns of nursing care, concerns within the processes of group communication, difficulties when communicating with patients arise and that patients had an approach towards nurses which was characterized by the fear of infection. It was found that while the men frequently went through processes of psychological experiences, dermatological problems, dehydration and changes in the patterns of nursing care, the women have gone through processes of physiological experiences, dehydration, dermatological problems, changes in nursing care and time management. **Conclusion:** Nurses should receive training and education with regards to the correct usage of equipment and they should also receive psychological and dermatological support; a safe working environment, a complete set of required equipment and solutions should be developed towards the experienced problems. Furthermore, patients should be provided with training in terms of methods for coping with stress originating from the pandemic.

Keywords: COVID-19; nurse; personal protective equipment

ÖZET Amaç: Çalışmamız, koronavirüs hastalığı-2019 salgınında hemşirelerin koruyucu ekipman açısından farklılık gösteren deneyimlerinin belirlenmesi amacıyla gerçekleştirilmiştir. **Gereç ve Yöntemler:** Collazzi'nin fenomenolojik deseni ve amaçlı örnekleme yöntemiyle Haziran-Temmuz 2020 tarihinde gerçekleştirilen araştırmamıza pandemi birimlerinde çalışan 20 hemşire katılmıştır. Verilerin toplanmasında, "Yarı Yapılandırılmış Görüşme Formu" kullanılmıştır. Veriler içerik analizi yöntemiyle analiz edilmiştir. **Bulgular:** Koruyucu ekipman kullanımına bağlı; fizyolojik ve psikolojik deneyimler, sıvı kaybı, dermatolojik sorunlar, hemşirelik bakım modellerinde değişimler, ekip iletişimde endişeler, hastayla iletişimde engeller yaşandığı ve hastaların hemşirelere bulaş endişesiyle yaklaştığı saptanmıştır. Erkekler sıklıkla psikolojik deneyimler, dermatolojik sorunlar, sıvı kaybı ve hemşirelik bakım modelinde değişimler, kadınlar ise fizyolojik deneyimler, sıvı kaybı, dermatolojik sorunlar, zaman yönetiminde ve hemşirelik bakımında farklılıklar yaşamıştır. **Sonuç:** Hemşirelere ekipmanların doğru kullanımıyla ilgili eğitimler düzenlenmeli, psikolojik ve dermatolojik destek verilmeli, güvenli çalışma ortamı sağlanmalı, eksik ekipmanlar temin edilmeli, yaşanan sorunlara yönelik çözümler geliştirilmelidir. Hastalara da salgın stresiyle başa çıkma yöntemleri konusunda eğitim verilmelidir.

Anahtar Kelimeler: COVID-19; hemşire; kişisel koruyucu ekipman

A new virus was discovered in December 2019 through the investigations made due to a rise in pneumonia cases with an unknown origin. This virus was

named "coronavirus disease-2019 (COVID-19)" by the World Health Organization and the International Committee of Viral Classification.^{1,2} The increase in

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the rates of morbidity and mortality brought a rise in demand for the services of health and social care. The 50-60% of the workforce which is tasked with fulfilling this demand was comprised of nurses.^{3,4}

The COVID-19 disease spreads through droplets and the droplets omitted from infected individuals show a high level of contagiousness within a 1-meter radius. Furthermore, the process of infection can be realized by making physical contact with surfaces which were contaminated by these droplets.⁵⁻⁷ In order to protect themselves and prevent the infection itself, the nurses have to wear personal protective equipment (PPE) when providing health care services to COVID-19 suspicious individuals or to individuals who have a definitely diagnosed COVID-19. The commonly used PPE's in the field of health are gloves, masks, bonnets, glasses and face shields. Health personnel are confronted with the risk of health threatening infection given that PPE's are used or removed inappropriately. Infections developed after the contamination impair life quality, make it difficult to battle the pandemic and cause losses in workforce. Therefore, determining the knowledge and skill levels of nurses and other health personnel in terms of PPE are quite important.⁸⁻¹³

Studies in the literature which are designed to determine the experiences and psychosocial problems of nurses who give health care services to COVID-19 patients are few in number.¹⁴⁻¹⁶ Studies have indicated that nurses experience psychosocial problems due to patients' feeling more responsible for their health, difficult working conditions, heavy workload, fear of being infected or infecting their relatives, limited social support resources and the use of PPE.¹⁴⁻¹⁶ Psychosocial problems experienced by nurses negatively affect health services.¹⁵ Nurses can encounter positive and negative situations within health care applications due to gender differences.^{17,18} Our research was carried out in order to address the problems that nurses experience related to the use of PPE and to determine the variation of the problems according to gender. The research is among the first studies in Türkiye to address the problems faced by nurses due to the use of PPE from a gender perspective. The re-

sults of the study revealed from the perspective of nurses; considering the gender differences, it is thought that it will guide providing psychosocial support to nurses, taking measures for employee safety and creating government policies when similar epidemics are encountered in the future.

MATERIAL AND METHODS

AIM

Our study was conducted with the purpose of determining the protective equipment usage experiences of nurses according to gender within the context of the COVID-19 epidemic.

STUDY DESIGN

The study is a qualitative one, conducted to determine the PPE usage experiences of nurses within the process of battling COVID-19, which uses the phenomenology pattern of Colaizzi. This pattern focuses on the emotions and experiences of individuals rather than measuring phenomenon.¹⁹

PARTICIPANTS

The sampling of this study was obtained by the purposeful sampling technique and comprised of 20 nurses who were working in the pandemic units of public hospitals. The data collection phase of the study was realized between the 30th of June and the 30th of July 2020.

DATA COLLECTION

With regards to the data collection process, the "Semi-Structured Interview Form" was used by the researchers which was designed through a literature review.^{5,7,8,10,12,20-23} In terms of the prepared questions, the "expert opinion" of 2 independent researchers were conferred with. The interviews were conducted by researchers at the time and place which the nurses were available. All the necessary precautions were taken. Two preliminary interviews were conducted with 2 nurses (1 male, 1 female) before the initiation of the study. Interviews continued with all participants-1 or 2 interviews per participant-until the degree of gathered data was satisfactory and each interview lasted approximately 30 to 45 minutes.

ETHICAL ASPECT OF THE RESEARCH

Çankırı Karatekin University Ethics Committee (date: June 8, 2020; no: 252) approval was obtained alongside with the related permission from the hospital where the research took place (29th of June, 2020; decree no: 64943697-799). The “informed consent” paper was signed by all of the participants in good order and all of the nurses were given information about the research before the interviews. This research was conducted in accordance with the Helsinki Declaration.

DATA ANALYSIS

Two independent researchers have reviewed the data within the coding process. Then, these researchers determined the codes via using the content analysis technique and created the themes which explain these codes under similar categories. Content analysis is a technique which is used to examine a research text in a thoroughly and systematic manner.²⁴

TRUSTWORTHINESS

Reliability was obtained via requesting the participants to review their interview statements. Expert opinion from two experts who were experienced in qualitative research was taken to verify the accuracy of the analysis and the clarity of the statements given by the participants.

RESULTS

The nurses who participated in the study in order for the determination of PPE experiences which arise based on differences of gender had the following characteristics; 10 were female, 10 male, 50% were in the age group of 30-41, 45% had a bachelors’ degree, 90% were married, 55% had at least 1 child and a work experience of 11-15 years. All of the participants stated that they received training in terms of protective equipment, 70% of them expressed that they had a medical history regarding contact with the secretion of a COVID-19 positive diagnosed or a patient who was suspected to be positive. Ninety percent stated that they frequently used the PPE’s except the glasses and 30% had correctly expressed the order of putting on the equipment while 15% had correctly expressed the order of removing them. The female participants were coded as “F” respectively whereas the male ones were coded as “M”.

Nurses’ experiences of PPE usage were categorized under two categories; physiological (f: 13) and psychological (f: 12) experiences. It was determined that while the men frequently lived through psychological experiences (n: 8), the women lived through physiological (n: 8) experiences (Table 1).

The problems experienced by nurses which arise from PPE were grouped in 3 categorizes; dehydration (f: 12), dermatological problems (f: 10) and

TABLE 1: The opinions of nurses towards the personal protective equipment.

Theme	Category	Codes	Participants	Quotations
Experience of PPE usage	Physiological experiences	Suffocating Sweating Inconvenient Tiring Limitation of movement	F1, F2, F3, F4, F5, F7, F8, F9, M2, M6, M7, M8, M9 *f: 13 **n: 8 (F) **n: 5 (M)	"First of all, I think using them is necessary. However, the usage is inconvenient and tiring as well" (F2). "I think that it is very important for us to use personal protective equipment. But working, moving and carrying out invasive procedures with the equipment is very difficult" (M6).
	Psychological experiences	A feeling of security Stress	F6, F8, F9, F10, M1, M2, M3, M4, M5, M8, M9, M10 *f: 12 **n: 4 (F) **n: 8 (M)	"I felt stress every time when I removed them. Did my hand touch it, did I touch my face? I think that removing the personal protective equipment is harder and stressful than wearing them" (F8). "Even if not completely, I feel partially safe..." (M3).

*f (Frequency): Number of reiteration; **n: Number of people; PPE: Personal protective equipment.

problems arising from mask usage (f: 4) were experienced. It was found that while men frequently experienced dehydration (n: 7), women lived through both dehydration (n: 5) and dermatological problems (n: 5) (Table 2). Apart from the determined categories, it was expressed that two of the female participants had shortness of breath (F6, F9) and two of the male participants stated that they had lost weight (M4, M10).

These were grouped under 2 categories; changes in care (f: 13) and differences in time management (f: 5). It was determined that the males frequently experienced changes in care (n: 9) whereas the females experienced both changes in care (n: 4) and differences in time management (n: 4) (Table 3). Apart from the stated categories, two female participants expressed that PPE did not have any effect over their activities and applications of health care (F6, F9).

The effect of nurses' PPE usage over the communication between them and their colleagues are grouped under 2 categories; concerns regarding communication (f: 12), team coordination and communication (f: 8). All of the participants stated that they had experienced barriers in terms of communicating with the patients because of PPE usage. Furthermore, participants of both sexes stated that there were concerns with regards to communication established between them and health professionals [F (n): 6, M (n): 6] (Table 4).

The attitudes of the patients towards nurses who are using PPE are evaluated under 3 categories; having the fear of getting infected (f: 12), negative attitudes (f: 5), and acting in a persuasive manner (persuasion attempts emphasizing that they were not sick with the disease) (f: 4). Nurses of both sexes expressed that patients frequently approached them with the fear of getting infected [F (n): 7, M (n): 5].

DISCUSSION

This process of health care, nurses undergo several problems such as getting infected or infecting their own families in the face of the unknown and unpredictable risks of the disease. Therefore, nurses should be thoroughly evaluated by a holistic point of view, they should be provided with psychological support, and the development of complications should be prevented.^{15,16} The conducted research reveals that health workers are concerned in terms of getting infected or infecting their own families with the virus, that they developed psychological problems and a feeling of exhaustion due to the rapid spread of the disease and the ambiguity of a treatment.¹⁵ Again, similar to the research conducted on the matter, our study revealed that due to PPE usage, nurses frequently lived through physiological (f: 13) and psychological (f: 12) experiences. It was determined that while the men frequently lived through psychological experiences (n: 8), the women lived through physiological (n: 8)

TABLE 2: Problems encountered after personal protective equipment usage.

Theme	Category	Codes	Participants	Quotations
Impressions towards symptoms	Dehydration	Sweating	F1, F2, F6, F7, F9, M1, M3, M5, M6, M8, M9, M10 *f: 12 **n: 5 (F) **n: 7 (M)	"I sweat a lot. I feel bad. Unpleasant odour is spread around because I sweat. This situation negatively effects my work" (F2). "All of my body is sweating out. I stink of sweat..." (M2).
			Blemishes on the face Acne Cracked hand skin Mask marks Face shield marks	F3, F4, F5, F7, F8, M2, M3, M4, M7, M8 *f: 10 **n: 5 (F) **n: 5 (M)
	Sore throat Ear ache	F9, F10, M3, M7 *f: 4 **n: 2 (F) **n: 2 (M)	"I experienced a sore throat because of continuous mask usage" (F10). "Masks caused pain in the back of my ears whereas glasses usage caused a pressure and stain marks on my face" (M7).	

*f (Frequency): Number of reiteration; **n: Number of people.

TABLE 3: The effect of personal protective equipments over nursing care.

Theme	Category	Codes	Participants	Quotations
Reflection upon nursing care	Changes in care	Difficulties in invasive applications The incapability regarding the execution of care Deficient care Loss of strength/power	F4, F5, F7, F8, M1, M2, M4, M5, M6, M7, M8, M9, M10 *f: 13 **n: 4 (F) **n: 9 (M)	"Since I had difficulties in establishing vascular access because of personal protective equipment, there were times when I was unable to do so" (F5). "Because of the weight I had lost, I was not strong enough and therefore, I could not carry out the process of nursing care..." (M1).
	Differences in time management	Loss of time Decrease in the duration of care	F1, F2, F3, F10, M3 *f: 5 **n: 4 (F) **n: 1 (M)	"It caused me to perform an application longer than usual. It caused loss of time" (F2). "I thought that the risk of infection would be minimal if I had completed my procedures in the shortest time possible. Because of this, I completed the treatment faster than usual" (M3).

*f (Frequency): Number of reiteration; **n: Number of people.

TABLE 4: The effect of personal protection equipment usage over the communication of nurses.

Theme	Category	Codes	Participants	Quotations
Communication with health professionals	Concerns regarding communication	Fear of infection Thoughts about the disease	F1, F2, F5, F6, F7, F8, M1, M4, M5, M8, M9, M10 *f: 12 **n: 6 (F) **n: 6 (M)	"The question "I wonder if we are carriers?" continuously comes to my mind when we see each other with masks. I can't feel relaxed even on breaks" (M6). "We do not want to understand each other. This process has made us agitated and aggressive" (M5).
	Team coordination and communication	Attempts toward protection A professional approach	F3, F4, F9, F10, M2, M3, M6, M7 *f: 8 **n: 4 (F) **n: 4 (M)	"We talked in a supportive manner with, and held on to each other in a firmer fashion. Because we all experience the same stress" (F4). My colleagues regularly recommended me to be careful and take care of myself and not get sick..." (M2)
Communication with the patient	Barriers in terms of communication	Problems of comprehension Difficulty in hearing	All participants **n: 20	"Among personal protective equipment, especially the mask and the face shield prevented the patients' hearing. Actually, not only their hearing, I can say that we were mutually effected by this" (F2). "I experienced difficulties regarding hearing the patients because of the mask and the face shield. I had to raise my voice in order to communicate..." (M9).

*f (Frequency): Number of reiteration; **n: Number of people.

ones (Table 1). It is thought that the image of being "powerful" and "durable" which are attributed to men by society, results in psychological problems in them, who are concerned that a potential situation of infection may reduce their levels power and durability, whereas

it is thought that women frequently live through physiological problems because PPE usage negatively influences the given care via limiting their mobility.^{17,25}

Health workers use and wear PPE's frequently and for long hours. Using a N95 mask for a prolonged

duration causes the face to get warm and dampen. The pressure of the mask over the skin causes the pilosebaceous channels to congest and acne development can be seen due to the effect of occlusion. Moreover, the adhesive agents and components such as metal clips used in the mask cause itching and rashes on the face with their irritant effect. Prolonged usage of gloves can develop susceptibility to latex and the increased frequency of washing hands and using soap may lead to dryness, cracks and problems like contact dermatitis in the hands.^{26,27} Research conducted on the matter found that health workers had experienced PPE based problems; rashes and acne due to N95 mask usage, a dry skin and itchiness among glove users and that there was a close relationship between adverse skin reactions and PPE usage; while health workers excessively sweat when performing applications such as physically turning the patient which requires a certain amount of physical strength.^{16,20,27} Finally, it was found in the literature that the pressure which is caused by the glasses and mask leads to wounds and pain development behind the ear and that this situation complicates and makes difficult to focus to work.²⁰ Similar to the conducted research, we found that nurses frequently experienced dehydration (f: 12) and dermatological problems (f: 10) due to PPE usage; male nurses were experiencing dehydration (n: 7) while female nurses were experiencing both dehydration (n: 5) and dermatological problems (n: 5) (Table 2). As a result of attributing the image of “being powerful” to the male, applications which require physical strength such as “turning the patient” are mostly done by male nurses and thus, they frequently suffer from dehydration based on sweating when engaging this activity. As for female nurses, it is thought that they experience both dehydration and dermatological problems due to obesity caused by excessive birth weight and excessive nourishment, and due to the reason that 55% of the participants have at least one child.²⁸

Due to PPE usage, nurses encounter certain problems in applications and patient care.¹⁶ The results of relevant studies indicate that PPE usage caused nurses with triple gloves not to feel blood vessels, problems related to drawing blood, and that this situation effected the “senses” and hand skills, lead-

ing to difficulties of cannula applications.^{16,20} As a matter of fact, it is necessary to use gloves to prevent contamination.^{12,13} Furthermore, the fogging of glasses and face shields caused nurses to have difficulties in reading and writing nursing notes and in realizing nursing applications.¹⁶ Similarly, our study found that PPE usage led to certain changes in nursing care (f: 13) and differences in time management (f: 5). It was determined that male nurses frequently experienced differences in care processes (n: 9) while the female nurses experienced both differences in care processes (n: 4) and differences in time management (n: 4) (Table 3). Within the relevant literature, it is thought that problems which arise from PPE usage negatively effects nursing care, resulting in trouble and challenges within care due to the decrease of physical power in males, whereas the same situation alongside with the fear of getting infected, results in problems in both care and time management among female nurses.

Increase in stress level due to the COVID-19 pandemic and inclining away from their colleagues due to infection concerns, negatively affects interpersonal communication processes.²⁹ In one study, statistically significant differences were found between depression, anxiety and stress scores according to the use of visors or eyeglasses/safety glasses of healthcare workers during the COVID-19 pandemic. Increased stress also negatively affects interpersonal communication.²⁹ In another study, it is stated that during the 2003 severe acute respiratory syndrome-coronavirus epidemic, nurses took more protective measures, the epidemic and the measures taken negatively affected communication by increasing stress.³⁰ In our study, it was determined that fear of getting infected appears as an obstacle in front of the communication between the health professionals and the nurses who are wearing PPE (f: 12). This situation also proved as a hindrance regarding the communication between the nurse and the patient. Moreover, it was stated that nurses, both male and female, expressed concerns in terms of team communication (Table 4). The results of our research are similar to the literature findings. It is thought that the stress which nurses experienced, and the problems of hearing and understanding arising from PPE usage

negatively affects communication both with the patients and with the medical team.

The tough and difficult clinical course of COVID-19, the general ambiguity of the situation and societal stigmatization results in increased levels of anxiety in patients. While some patients experience negative feelings such as insecurity and helplessness, others use defense mechanisms such as “denial”, in terms of methods for coping with stress.³¹ In a study, it is stated that patients diagnosed with COVID-19 experience fear and may deny or hide the disease due to fear of stigma. It is stated that some patients may experience feelings of guilt and shame, thinking that they deserve the disease.³¹ Although the patients’ acceptance of the disease differs, they have to apply to the hospital as a result, and the unknown environment and the healthcare professionals, whose faces they cannot even see, can cause patients to be afraid. In this case, it is stated that attitudes towards nurses can change when stress and fear of death are added.³² In our study, it was determined that towards the nurses who were wearing PPE’s, patients had an approach regarding the fear of getting infected (n: 12) and that they were engaging in acts of persuasion based on the notion that they were not sick (f: 4). It was found that patients which belonged to either sex frequently had an approach towards nurses which was shaped by the fear of getting infected [F (n): 7, M (n): 5] (Table 5). The results of our research are sim-

ilar to the literature findings. It is thought that the aforementioned approach towards nurses and the efforts of persuasion stems from the different coping strategies which were used by every individual. In addition, it is thought that the patients may have exhibited such attitudes due to fear of death, not knowing the process and fear of stigma.

CONCLUSION

The study revealed that nurses lived through physiological and psychological experiences based on PPE usage. The safety of the nurses should be ensured in their workplace, the hospital administration should listen to their problems and solutions must be found. In this research, it has been specified that nurses suffered from dehydration and dermatological problems due to PPE usage. In order to prevent skin reactions, dermatologists should be involved in the process, giving the required support to nurses. Furthermore, it was found that nurses experienced problems and limitations within the process of health care, time management, concerns regarding nurse-team and nurse-patient communication due to PPE usage. Psycho-social support must be given to nurses in terms of care management and communication. Education should be given to the patients in terms of coping with stress caused by the COVID-19 pandemic.

TABLE 5: Patients’ attitudes towards nurses who use personal protective equipment.

Theme	Category	Codes	Participants	Quotations
The attitudes of patients	Having the fear of getting infected	Uneasiness	F3, F5, F6, F7, F8, F9, F10,	“They generally ask “Is this a corona unit?” and then they look worried” (F9). “Patients were afraid of me when I wore personal protective equipment” (M4).
		Avoidance	M4, M5, M6, M8, M10	
		Questioning	*f: 12 **n: 7 (F) **n: 5 (M)	
Negative attitudes	Acting in an insensitive way Becoming irritated/angry		F1, F2, M1, M3, M9 *f: 5 **n: 2 (F) **n: 3 (M)	“I did not want to intervene without protective equipment. They acted in an insensitive way in a time when they should show some respect” (F1). “Patients got aggressive when we used personal protective equipment” (M1).
Acting in a persuasive manner	Denying the disease Trying to persuade the nurse according to this denial		F1, F7, M2, M7 *f: 4 **n: 2 (F) **n: 2 (M)	“Statements such as “why are you using these, there is no need! I am not sick!” were voiced” (F4). “They felt bad. some patients tried to persuade us into thinking that they are not sick” (M2).

*f (Frequency): Number of reiteration; **n: Number of people.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Yadigar Ordu; **Design:** Yadigar Ordu, Sakine Yılmaz; **Control/Supervision:** Yadigar Ordu, Sakine Yılmaz; **Data Collection and/or Processing:** Yadigar Ordu, Sakine Yılmaz; **Analysis and/or Interpretation:** Yadigar Ordu, Sakine Yılmaz; **Literature Review:** Yadigar Ordu; **Writing the Article:** Yadigar Ordu, Sakine Yılmaz; **Critical Review:** Yadigar Ordu, Sakine Yılmaz; **References and Fundings:** Yadigar Ordu, Sakine Yılmaz.

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