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The Experiences of the Operating Room Nurses in the COVID-19 Pandemic: A Qualitative Study

Ameliyathane Hemşirelerinin COVID-19 Pandemisindeki Deneyimleri: Nitel Bir Çalışma

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ABSTRACT Objective: This study was conducted to examine the experiences of operating room nurses care for COVID-19 positive and suspected patients during the surgical process. **Material and Methods:** This study was conducted qualitatively with operating room nurses between 01-31 May 2021. 22 operating room nurses were interviewed face-to-face-in-depth in the break room of the operating room. Data were analyzed by Colaizzi's seven-step method. The Consolidated Criteria for Reporting Qualitative Research checklist was used in reporting this research. **Results:** Three themes were determined: Difficulties experienced in the operating room during the COVID-19 epidemic, effect of the COVID-19 epidemic on the operating room organization and the effect of the risk of contamination on the surgical team communication. 7 sub-themes were identified as fear of catching and transmitting the infection, equipment problems, difficulties in the management of emergency cases, operation and working times, changes in the patient transfer line and operating room, social isolation and reduced communication, and fear of medical error. **Conclusion:** This study reveals difficulties experienced by nurses due to COVID-19, effect of the pandemic on the operating room organization and nurses, and effect of the risk of transmission on the surgical team communication. Nurses have fear of catching and transmitting infection in the operating room, lack of equipment, and experience anxiety in managing emergency cases. The pandemic caused changes in the organization of the operating room. Besides, nurses experienced social isolation and team communication decreased, the use of equipment disrupted communication with the surgical team, and this situation led to fear of medical error.

Keywords: Operating room nursing; pandemic; experience

ÖZET Amaç: Bu çalışma, ameliyathane hemşirelerinin COVID-19 pozitif ve şüpheli hastalara cerrahi süreçte bakım verme deneyimlerini incelemek amacıyla yapılmıştır. **Gereç ve Yöntemler:** Bu çalışma 01-31 Mayıs 2021 tarihleri arasında ameliyathane hemşireleriyle nitel olarak yapılmıştır. Çalışma süresince 22 ameliyathane hemşiresi ile ameliyathanenin dinlenme odasında yüz yüze-derinlemesine görüşülmüştür. Elde edilen veriler Colazzinin 7 aşamalı metoduyla analiz edilmiştir. Bu araştırmanın raporlanmasında Konsolide Kriterler kontrol listesi kullanılmıştır. **Bulgular:** COVID-19 salgınında ameliyathanede deneyimlenen zorluklar, COVID-19 salgınının ameliyathane organizasyonuna etkisi ve bulaş riskinin cerrahi ekip iletişimine etkisi olmak üzere 3 tema belirlenmiştir. Enfeksiyon kapma ve bulaştırma korkusu, ekipman problemleri, acil vakaların yönetimindeki zorluklar, operasyon ve çalışma süreleri, hasta transfer hattı ve ameliyathanedeki değişiklikler, sosyal izolasyon ve iletişimin azalması, tıbbi hata korkusu olmak üzere 7 alt tema belirlenmiştir. **Sonuç:** Bu çalışma, ameliyathane hemşirelerinin COVID-19 nedeniyle ameliyathanede yaşadıkları zorlukları, pandeminin ameliyathane organizasyonu ve hemşireler üzerindeki etkisini ve bulaş riskinin cerrahi ekip iletişimine etkisini ortaya koymaktadır. Ameliyathane hemşirelerin ameliyathanede enfeksiyonu kapma ve bulaştırma korkusu yaşadıkları, ekipman eksikliği yaşadıkları ve acil vakaları yönetmede endişe yaşadıkları belirlenmiştir. Pandeminin ameliyathane organizasyonunda değişiklik yapılmasına yol açtığı ifade edilmiştir. Ayrıca pandemi sürecinde sosyal izolasyon yaşadıkları ve ekip iletişimi azaldığı, ekipman kullanımının cerrahi ekip ile iletişimi bozduğu ortaya konmuştur. Bu durumun tıbbi hata korkusuna yol açtığı belirlenmiştir.

Anahtar Kelimeler: Ameliyathane hemşireliği; pandemi; deneyim

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The need for urgent surgical treatment of individuals with coronavirus disease-2019 (COVID-19) emerged during COVID-19. Emergency surgeries continue to be performed, however elective surgeries were reduced or postponed in this pandemic.[1] Nurses have been the frontline and hardest wor king healthcare professionals to stop infection rates and deaths worldwide during the pandemic.[2] In particular, intensive care, emergency services and operating rooms (OR) are high-risk units for COVID-19.[1,3,4]

Since most of the COVID-19 patients needed a ventilator, there was an overcrowding in the intensive care units (ICU) affecting ICU nurses negatively.[5,6] Emergency room personnel are the first healthcare providers to come into contact with COVID-19 patients.[7] Different from ICU and emergency services, the inability to test for COVID-19 in emergency surgeries and the aerosol released from positive patients to the OR can infect OR workers.[5,8]

Negative pressure is necessary to reduce the spread of the virus outside the OR. However, a standard OR is at positive pressure, which increases the risk of COVID-19 contagion.[8,9]

During the pandemic period, nurses had to comply with new protocols and organizations and the new normal.[10] The operation should be continued with the least personnel and the least material possible, at least 2 hours should be waited between the 2 surgeries, and the operating doors should be kept closed throughout the operation. The OR, elevators and transport line for COVID-19 patients are reserved. Besides, patients should be extubated and awakened in the OR.[9] Both during surgery and during intubation and extubation, contact with the secretions and blood of COVID-19 patients increase the risk of infection.[9] Besides, some of the OR nurses are assigned with different responsibilities such as managing ventilated patients in ICUs, care and triage in emergency departments.[11] This situation has made OR nurses a risk group as well as ICU and emergency department personnel.[5,12]

Examining the difficulties, positive/negative experiences of nurses working in high-risk environments is important in terms of solving the problems, and the regulation of health policies in this direction.[2] In a study, anesthetists and OR nurses had high rates of anxiety and depression in the COVID-19 outbreak.[13] Due to the increasing number of patients and lack of personnel, long working hours, and burnout affect OR nurses negatively. Increased stress and anxiety can seriously affect nurses' performance, decision-making ability, and the likelihood of medical errors may increase.[12]

Being aware of the challenges and problems faced by OR nurses during COVID-19 can assist in designing management strategies to control the crisis that may occur in the surgical process. Nurses can act in a planned manner by considering the crises may occur due to infection while performing nursing practices during the surgical process. Besides, positive experiences can guide other nurses in their practices.[14]

For all these reasons, it is necessary to evaluate the difficulties and positive and negative experiences of nurses during the COVID-19, their effects on the patients and health policy in detail.[15] No qualitative study has been found in the literature examines the experiences of OR nurses in the pandemic process in our country. Therefore, this study aims to examine OR nurses experiences who care for COVID-19 patients during the surgical process.

MATERIAL AND METHODS

STUDY DESIGN

This study was completed qualitatively in order to examine difficulties, positive/negative experiences of OR nurses during the pandemic process.

STUDY POPULATION

The population of the study consists of 22 nurses working in the OR in a universty hospital in the Central Anatolian Region. All of the nurses worked only in the OR during the pandemic period and not assigned to other services. As it is a qualitative study, a clear sample number has not been determined as stated in the literature.[16] All of the nurses working in the OR volunteered to participate in the study. The study was completed with 22 nurses. It is thought data saturation was reached because the

entire universe was reached and the data was begun to repeat.

DATA COLLECTION

Data were obtained in 1-31 May 2021 using an introductory information form and a semi-structured interview form.

In the introductory information form, questions such as gender, age, marital status, education level, working years in the OR, and total working years in nursing were included. The semi-structured interview form was developed by the authors based on the related literature and consisted of 5 open-ended questions (Table 1).[6,12]

The interviews were conducted by a researcher experienced in qualitative research, in the break room of the OR, using face-to-face and in-depth interview technique. After obtaining the consent of the participants, audio recordings were taken. The interviews lasted an average of 10-15 minutes. Incomprehensible questions and answers were repeated.

DATA ANALYSIS

Colaizzi's seven-stage method was used in the analysis of the data.[17] 1) In the first step, the voice recordings transcribed verbatim on the computer. 2) All documents were read several times by 2 researchers and important points were underlined. 3) Meanings were created from important expressions. The important expressions were decided according to the expressions are frequently mentioned in the discourses of the nurses and which are also included in the literature. 4) Common expressions were grouped and categorized, and themes and sub-themes were formed by revealing the relationships between the categories. For example, the fear of catching and transmitting the virus, equipment problems and the difficulties experienced by nurses in the management of emergency cases are categorized under the main theme of difficulties experienced in the OR. 5) All the themes and sub-themes created were comprehensively integrated with the nurses' experiences. 6) The basic structure of nurses' experiences was established. 7) Afterwards, nurses were asked to read and confirm the findings and if they had any statements they would like to add. The nurses did not make any changes.

The data are given with direct quotations. Besides, the Consolidated Criteria for Reporting Qualitative Research checklist was used.[18]

RIGOUR AND TRUSTWORTHINESS

The rigour and trustworthiness of the data was assessed based on the strategies determined by Jiggins Colorafi and Evans.[19] These strategies are confirmability, transferability, consistency and reliability. For confirmability, the data was stored by transferring it to the computer and the data were analyzed independently by 2 researchers. There are not differences between researchers in the data analysis process. The study is transferable because the entire universe is reached and data saturation is achieved. For consistency, all interviews were conducted by the same researcher. In order to ensure the reliability and consistency of the research, expert opinion was sought in order to confirm whether the sub-themes given under the conceptual theme reached in the research represent the aforementioned conceptual category. The experts were in agreement that the sub-themes represented the themes.

ETHICAL DIMENSION OF THE STUDY

For this study, permission was obtained from the Ministry of Health, General Directorate of Health Services (2021-04-04T12_23_37) and ethical ap-

TABLE 1: Semi-structured interview questions.

What are the challenges you faced as an operating room nurse during the COVID-19 pandemic?
How did you feel while taking part in the surgery of the person with a confirmed COVID-19 diagnosis?
How did the risk of COVID-19 transmission in the operating room affect your communication with your surgical teammates?
Has the COVID-19 pandemic changed the operation and organization in the operating room? If so, how did it change?
How has the COVID-19 pandemic affected your workload in the operating room?

proval were obtained from Yozgat Bozok University Ethics Committee (Date: April 21, 2021; No: 21/12). Verbal informed consent was obtained from the nurses. The names of the OR nurses were anonymous and they were given codes (N1; Age; Gender). The study was conducted in accordance with the principles of the Declaration of Helsinki.

RESULTS

54.5% of nurses were female, the mean age was 34.13±3.99, and 68.1% of them were married. The mean working experience in the operation room was 5.31±2.16 (Table 2). In the study, 3 main themes and 7 sub-themes were created (Table 3).

THEME 1: DIFFICULTIES EXPERIENCED IN THE OR DURING THE COVID-19 OUTBREAK

This theme included fear of catching and transmitting the infection, equipment problems, and difficulties in managing emergency cases.

Sub-Theme 1.1: Fear of Catching and Transmitting the Infection

The nurses stated they work in close contact with the patients in the OR and they experience the fear of catching the infection seriously. Most of the nurses stated they were concerned about passing the COVID-19 on to their families or close circles. Moreover, nurses stated the fear of transmitting was higher than the fear of catching the infection.

"In fact, I can say one of the most vulnerable moments was going into surgery. Sometimes emergency surgery comes and you enter. Is the patient COVID-19 positive? Has it infected you? What if I carry it to my family? Fear and anxiety behind thousands of questions and questions (N12; Age: 39; Gender: Female)."

"In this process, while working with a covid positive patient, I had the most difficulty in dealing with the fear of infecting my family. I can say that this concern was higher than my own risk of trans-

TABLE 2: Sociodemographic characteristics of the operation room nurses (n=22).

Sociodemographic characteristics	n	%
Gender		
Female	12	54.5
Male	10	45.5
Marital status		
Married	15	68.1
Single	7	31.9
Age ($\bar{X}$±SD) (minimum-maximum)	34.13±3.99 (28-41)	
Working experience in the operation room (years) ($\bar{X}$±SD) (minimum-maximum)	5.31±2.16 (1-9)	

SD: Standard deviation.

TABLE 3: Schematic view of the experiences of operations nurses (n=20).

Themes	Sub-themes
Theme 1: Difficulties experienced in the operating room during the COVID-19 outbreak	• Fear of catching and transmitting the infection • Equipment problems • Difficulties in the management of emergency cases
Theme 2: Effect of the COVID-19 pandemic on the organization of the operating room	• Operation and working times • Changes in the patient transfer line and operating room
Theme 3: Effect of transmission risk on surgical team communication	• Social isolation and reduced communication • Fear of medical error

mission. In this process, some of my friends were diagnosed with anxiety disorder and started treatment. The underlying cause was the fear of carrying the infection (N14; Age: 38; Gender: Female)."

Sub-Theme 1.2: Equipment Problems

The nurses mentioned the equipment shortages was a major problem. It was stated they approach every patient as COVID-19 positive in elective or emergency surgeries, and they frequently use protective equipment, but it is not enough. Some nurses thought it was too difficult to work with equipment for long-term surgeries.

"The only way to minimize the risk of contamination and to be protected is the use of equipment. The lack of equipment worried us. You are in close contact with aerosols in the OR and must be protected. Most of the equipment has been transferred to the pandemic services (N22; Age: 37; Gender: Female)."

"Working with the equipment was very challenging for me. Especially sweating and headache caused by the equipment made me very tired during the surgery (N20; Age: 28; Gender: Male)."

Sub-Theme 1.3: Difficulties in the Management of Emergency Cases

Nurses complained there was no time to do a COVID-19 test in emergency surgeries. They also stated when they had to intervene in an emergency, they could interrupt the use of the equipment and this increased the risk of transmission.

"I think that we have a very difficult time in the management of emergency cases. There is no time to test the patient and get results. The entire team is at risk. This was a situation created tension and fear for me (N5; Age: 31; Gender: Male)."

"In emergency surgeries, we could not wear the equipment for a long time to intervene in the patient early, which increased our risk of contracting the infection (N7; Age: 35; Gender: Female)."

THEME 2: EFFECT OF THE COVID-19 PANDEMIC ON THE ORGANIZATION OF THE OR

Nurses stated the COVID-19 caused changes in the organization of the OR and this was mandatory. In this theme, it was emphasized there were changes in the operation and working times, the patient transfer line, and the operation room.

Sub-Theme 2.1: Operation and Working Times

Most of the nurses stated the operation times were shortened and the waiting times between the operations were prolonged. Besides, nurses stated rotating work and performing only emergency surgeries caused a shorter working time and they were satisfied with this situation. Nurses stated this change in operation times had a positive effect on their motivation to work.

"With the pandemic, we entered a period where elective surgeries were postponed for a long time and emergency surgeries were performed. We keep operation times as short as possible. We do not spend unnecessary time in the OR. This is an important step to avoid the risk of transmission (N1; Age: 40; Gender: Female)."

"We keep the operation times short during the pandemic process, we allocate a long time for disinfection between each operation. In this way, we feel a little safe and this situation increases our motivation (N3; Age: 41; Gender: Female)."

Sub-Theme 2.2: Changes in the Patient Transfer Line and OR

Nurses stated that a separate transfer line and a separate operation room were created in the OR, especially for the COVID-19 positive patient. The nurses thought organizational changes relieved them and gave clarity to the process.

"We made a lot of changes in the OR. We have provided a separate elevator, separate stretcher, and a separate operation room for patients at risk of infection. Of course, we were very tired during this process, but these changes were important to feel safe (N19; Age: 33; Gender: Female)."

"One of the most difficult processes to manage was the operation of COVID-19 positive patients. We separated the OR and used one room only for infected patients. For the separated rooms, ventilation, waste management, disinfection measures, cleaning of the operation room were monitored with a separate workflow. Of course, the situation was not very

pleasant for the health personnel who went into operation in these rooms. We are very tired, both psychologically and physiologically but algorithms made the job easier (N21; Age: 29; Gender: Male)."

THEME 3: EFFECT OF TRANSMISSION RISK ON SURGICAL TEAM COMMUNICATION

Nurses stated that due to the fear of catching COVID-19, their communication with their teammates decreased and therefore the risk of medical error increased. Some nurses expressed they felt socially isolated. This theme includes social isolation and decreased communication among nurses, and the fear of medical error.

Sub-Theme 3.1: Social Isolation and Reduced Communication

Most of the nurses stated rotational work, social distance, and use of protective equipment weakened communication between the team. The nurses thought team communication throughout the surgical process was very motivational, and poor communication caused isolation and anxiety.

"The pandemic has taken away the unity that is our motivation to work for us. Drinking coffee with the team after an operation…. Even this is a luxury in our minds (N18; Age: 36; Gender: Female)."

"We are so worried during the operation. Fear of contamination, social distance, the equipment we use prevent us from contacting each other. Actually, I think it undermines the strength of the team. You do not enjoy your work as much as you used to. You cannot even use the breaking rooms effectively (N7; Age: 35; Gender: Female)."

Sub-Theme 3.2: Fear of Medical Error

Nurses stated that communication, eye contact, and team cooperation are very important throughout the surgical process. These factors were thought to be effective in medical error.

"You need to be in constant communication during the operation. The protective equipment you wear negatively affects your verbal and nonverbal communication. You may need approval for some initiatives and preparations. The disruption in communication increases my concerns about malpractice (N8; Age: 30; Gender: Male)."

"Personal protective equipment significantly reduces verbal communication during and after surgery. Even if you talk, the other person does not hear you, in this case, it increases our fear of doing something wrong or incomplete (N5; Age: 31; Gender: Male)."

DISCUSSION

DIFFICULTIES EXPERIENCED IN THE OR DURING THE COVID-19 OUTBREAK

OR workers are at high risk for contact with infectious diseases.[13,20] In a study, surgeons who were positive for COVID-19 received the virus from OR with a rate of 12.5% and were in the 3rd place, followed by ICUs (4.2%).[21] Another study with surgeons reported surgeons had high levels of stress related to COVID-19.[22] Besides, OR nurses, may be affected psychologically in the COVID-19 pandemic.[13] In our study, the most frequently experienced emotions of OR nurses were the fear of catching and transmitting the infection and fatigue. Most of the nurses stated they were concerned about passing the COVID-19 on to their families or close circles. In a similar study, nurses were afraid of catching COVID-19 and transmitting the disease to their families.[23] Our study results are similar to the literature.

The use of protective equipment is one of the most important measures to control infectious diseases.[24] In our study, some nurses stated there was a lack of equipment due to the allocation of most of the equipment to the pandemic services and they were worried about this situation. In addition, some of the nurses reported that the use of equipment in long-lasting surgeries caused headaches and sweating, and this caused fatigue. Similar to our study, there is a lack of personal protective equipment in studies.[25,26] In another study, nurses stated that although they did not experience a lack of equipment, the equipment made patient care difficult and increased physical fatigue.[6]

In cases requiring emergency surgery during the pandemic period, patients had to be operated without a COVID-19 test.[27] This situation can cause stress and fear in OR personnel. Similarly, in our study, one of the issues that nurses had difficulties was that there was no time to do a covid test and wear personal protective equipment in emergency surgeries, and the risk of infection was increased.

Effect of the COVID-19 Pandemic on the Organization of the OR

Working with fewer staff, long shifts and personal protective equipment shortages are increase the anxiety of nurses.[28] In the current study, organizational support such as adequate staff, reasonable working hours, changes in the organization were identified as important factors. Most of the nurses stated the operation times were shortened, the waiting times between the operations were prolonged and they were satisfied with this situation. Contrary to our study, OR nurses who had short breaks during the COVID-19 experienced more anxiety because they were tired and had difficulty meeting their fundamental needs. Nurses have also had longer shifts since the beginning of the pandemic, as they were transferred to units outside the OR.[29] Nurses specializing in anesthesia are assigned to take on responsibilities different from traditional anesthesia roles, such as patient care in ICU and triage in emergency departments.[11] Hospitals may have implemented different practices to meet the needs of health personnel during the pandemic process. In our study, it is thought that the OR nurses are more motivated because they are not assigned outside the unit they work.

In order to simplify the care of COVID-19 positive/suspected patients in need of surgery, and to reduce the risk of perioperative infection to nurses and patients, nursing policy, organizational changes and algorithms should be created in the OR.[30] In our study, nurses mentioned a separate transfer line and operation room were created for the patient with COVID-19 positive. In addition, organizational changes relieved them, made them feel safe, and gave clarity to the functioning. Some nurses stated they were very tired both psychologically and physiologically, but the algorithms made their work easier.

Effect of Transmission Risk on Surgical Team Communication

Practices such as quarantine and social distancing applied to keep the pandemic under control, reduce the risk of disease, however it cause social isolation.[31] Social distance and quarantine can isolate nurses, increase their stress, disrupt their psychology and impair the quality of nursing care.[32] In a study, all of the nurses stated they experienced social isolation and their use of social media increased.[33] In our study, most of the nurses stated the use of social distance and protective equipment weakened the communication between the team. The nurses thought that team communication throughout the surgical process was very motivational, and poor communication caused anxiety. The fear of contamination experienced by nurses, the negative effect of personal protective equipment on communication and the fear of medical error are other important points of this study. In studies, the use of personal protective equipment and social distance reduce contact and communication with the patient and cause negative emotions in nurses due to disruption of care.[6,34] During the pandemic, ethical values may conflict with safety requirements in the care of critically ill patients, especially in intensive care and OR, and the expectations of not being able to fully meet patient care and coping with it may cause emotional distress in nurses.[34]

It is stated that personal protective equipment, face masks and headgear reduce verbal and nonverbal communication between OR personnel during surgery, and this may endanger the safety of the surgery.[35] Similarly, in our study, most of the nurses stated the use of equipment disrupted team communication, they had problems in hearing, and therefore they were afraid of doing something wrong during the operation. Open communication should be used throughout the surgery, team members should be addressed by name, and individuals can be asked to repeat requests to avoid misunderstandings.[35]

LIMITATIONS

This study was completed in a single health center with OR nurses. Therefore, the results of this study cannot be generalized to other groups.

CONCLUSION

This study reveals the difficulties experienced by OR nurses due to COVID-19, the effect of the pandemic on the OR organization and nurses, and the effect of the risk of transmission on the surgical team communication. Among the difficulties experienced by the nurses in the OR, they experienced fear of catching the virus and infecting their family members, lack of equipment, and difficulties in the management of emergency cases. The pandemic caused some changes in the organization of the OR, shortened operation times and working hours, changes were made in the patient transfer line and in the OR. The risk of transmission of COVID-19 affects the communication of the surgical team, communication decreases and causes social isolation, and the use of personal protective equipment disrupts communication and causes fear of medical error in nurses.

Revealing the problems and experiences of OR nurses can guide the development of solutions for the development of a credible surgical care system in future pandemics.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

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: *Yeliz Sürme;* ***Design:*** *Yeliz Sürme, Gökçen Aydın Akbuğa;* ***Control/Supervision:*** *Yeliz Sürme, Gökçen Aydın Akbuğa;* ***Data Collection and/or Processing:*** *Derya Esenkaya;* ***Analysis and/or Interpretation:*** *Yeliz Sürme, Gökçen Aydın Akbuğa;* ***Literature Review:*** *Yeliz Sürme, Gökçen Aydın Akbuğa;* ***Writing the Article:*** *Yeliz Sürme, Gökçen Aydın Akbuğa;* ***Critical Review:*** *Yeliz Sürme, Gökçen Aydın Akbuğa, Derya Esenkaya.*

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