Original Article

"Growth under pressure": The Experience of COVID-19 ICU Nurses - A Qualitative Study

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Abstract

Background: As an epidemic, COVID-19 has brought a new shock to the world's healthcare system. The crisis caused by this disease and the prolonged involvement of communities and healthcare systems have intensified the duties and psychological burden of nurses. The current study aimed to explain the experience of ICU nurses during the COVID-19 crisis. **Materials and Methods:** The present study was conducted using conventional content analysis in 2021. Twenty nurses of the COVID-19 ICU of Ahvaz hospitals were selected by purposive sampling. The main method of data collection was semistructured interview. The process of data analysis was done based on Granheim and Lundman's approach using MAXQDA-2020. For the scientific rigor of the findings, Guba and Lincoln's four criteria were abided by. The COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist was used to ensure the study met the recommended standards of qualitative data reporting. **Results:** After data analysis, 22 subcategories, eight categories, and one theme (growth under pressure) were extracted. The eight main categories included (psychological crisis, physical exhaustion, family conflicts, complex care, professional development, expertise, life enrichment, and full support). **Conclusions:** Despite the pressures that ICU nurses faced during the COVID-19 pandemic, they were able to grow by benefiting from positive experiences. These findings can lead to the development and implementation of effective interventions to improve adaptation strategies of nurses, especially those working in the intensive care unit, during the COVID-19 and other future crises.

Keywords: *COVID-19, growth, ICU, nurses, pressure*

Introduction

As an epidemic, COVID-19 brought a new shock to the world's healthcare systems, and Iran is no exception.[1] Many nurses were involved in providing services at the bedside of COVID-19 patients, and the nursing profession needs to be aware of what ICU nurses went through while doing clinical work and caring for the COVID-19 patients amid the COVID-19 pandemic.[2] There is a data gap as regards the experiences of ICU nurses in providing care during the pandemic. There were numerous challenges due to the COVID-19 pandemic that nurses in intensive care units faced and might be facing in the future.[3] For a society to have an efficient health system, the treatment teams' concerns and demands should be well understood, and supporting strategies should be formulated to reduce their physical and mental stress.[4]

Meneguin *et al*.[5] investigated the burnout and quality of life of nursing personnel during the COVID-19 period. They found that nurses experienced high burnout and reduced quality of life, especially in relation to their physical activities. Peng *et al*.[6] adopted a phenomenological approach to study the psychological experiences of nurses taking care of COVID-19 patients. They identified four main themes regarding the psychological state of nurses, namely, negative emotions in the early stages, self-control styles, growth under stress, and positive emotions along with negative emotions. According to Levi *et al*., COVID-19 created multifaceted physical, psychological, and professional conflicts for the medical staff, especially the nurses.[7] Kim *et al*.[8] studied the nurses' experience of caring for patients with MERS syndrome (a type of coronavirus) in South Korea. They showed that these nurses feel as if they are thrown into the danger zone and experience immense pressure due to the virus.

The experiences of nursing staff, who took care of COVID-19 patients, are of particular importance for designing action plans.[9]

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However, limited research has so far been conducted to explore the experiences of COVID-19 ICU nurses in Ahvaz, Iran. Moreover, the experiences of nurses in each cultural context could be different. It is important to note that ICU COVID-19 nurses have the most contact with COVID-19 patients and have richer experiences. In this regard, experience-based research, such as qualitative research, is the most appropriate approach to examining the experience of ICU nurses during the COVID-19 epidemic. A rich understanding of these experiences can be beneficial to improve the working conditions of nurses, ensure better crisis management, and ultimately improve the quality of patient care.

The present study is the first phase of a larger study explaining the adaptation process of ICU nurses to the COVID-19 crisis with a grounded theory approach. The grounded theory approach is a qualitative research methodology that attempts to unravel the meanings of people's interactions, social actions, and experiences. The adaptation process of ICU nurses to the COVID-19 crisis has been variable, relative, dynamic, and contextual. Adaptation is an abstract concept and is formed in an interactive process; therefore, the grounded theory is a proper research approach to investigate the adaptation process of ICU nurses to the COVID-19 crisis. The current study aimed to explain the experience of ICU nurses in caring for patients with COVID-19. In fact, the results of this study can serve as the basis for discovering the adaptation process of ICU nurses to the COVID-19 crisis.

Materials and Methods

This study is extracted from a Ph.D. dissertation on nursing titled: "Explaining the adaptation process of ICU nurses to the COVID-19 crisis" which was conducted using grounded theory. The current study was conducted using conventional content analysis during 2021–2022. Twenty nurses were selected by purposeful sampling method from among the nurses of the ICUs of university hospitals affiliated with Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran. Inclusion criteria were: having at least one year of useful work experience in the COVID-19 ICU, having at least a bachelor's degree in nursing, and willingness to participate in the study and share experiences. The maximum variation sampling technique was used to capture various backgrounds and work experiences as well as differences in age, gender, and educational attainment. Sampling continued until data saturation.

The main method of data collection was semistructured interview, and the length of the interviews was 20 to 40 minutes. First, a phone call was made to the nurses to explain the objectives of the study, and then, the time and place of the interviews were arranged at their convenience. Seventeen nurses were interviewed once; three nurses were interviewed twice. The reason why some of the interviewees were interviewed more than once was because after analyzing the interview transcripts of some of the participants, we realized that the obtained data were inadequate, and in some cases, were not completely clear to us. Therefore, since each of these cases of ambiguity could have a profound contribution to our results and since we had access to all participants, we reinterviewed some of the nurses.

The interviews were conducted in the office of the head of the intensive care unit, which was a quiet room. Of course, the head of the ICU was not present at the time of the interviews. The interviews were conducted by the first author (VS), who is a Ph.D. student in nursing. He had already passed advanced courses on qualitative research methods in his Ph.D. program and had conducted several interviews in partial fulfillment of those courses. In addition, he conducted the first interview in this study under the supervision of his supervisor (i.e. the corresponding author of the present study). After his qualification to conduct qualitative interviews was verified by the supervisor, he proceeded to perform the subsequent interviews.

The interview questions focused on the nurses' work experiences during the COVID-19 crisis. First, they were asked a general question: e.g., "Please tell me about the ICU nursing experience during the COVID-19." The interview was then guided based on the answers of the participants. To elicit more information and clarify the nurses' answers, exploratory and follow-up questions were also asked, and answers to these questions led to the formation of further questions. During the interviews, the participants were asked to cite specific examples to describe the issue raised. All interviews were digitally recorded and immediately transcribed verbatim. To immerse in the data, the researcher listened to the interviewees several times and reviewed their transcription repeatedly. Data collection continued until no new data were added to the existing data (i.e. data saturation was reached). It is important to note that no new data were obtained in the last three interviews.

The data were analyzed using conventional content analysis following the five steps of Granheim and Lundman.[10] In the first step, the interviews were recorded and immediately transcribed verbatim, and the transcription was used as the primary data of the research. In the second step, the audio file was listened to several times, the transcriptions were reviewed repeatedly, and decisions were made to divide the text into meaning units. The words, sentences, and paragraphs of the participants' statements that contained important points related to the research topic were considered as meaning units. Notes were written in the margins of the text along with coding. In initial coding, the participants' own words and the researcher's impressions of their statements were used. The third step involved the abstracting of semantic units and the selection of codes. According to the experiences of the participants, manifest and latent contents were extracted from the sentences or paragraphs based on their words and denoting codes, and then coding and summarization

were done. In the fourth step, based on the continuous comparison of similarities, differences, and relevance, the codes that indicated a single topic were placed in one category, and in this way, subcategories, categories, and codes were formed. Cases of ambiguity that needed further attention were resolved by referring to the participants and checking them in subsequent interviews to make sure that they were resolved, and the position of the codes in each category was fully determined. In the fifth step, at the interpretation level, the categories were summarized and the central concept of each category was identified. Then, the central and abstract concepts were extracted. The concepts were determined based on the description of the internal themes in the text, and these internal themes were reviewed according to the entire data.[10] Interviews continued until the main categories were identified and data saturation was reached. In all steps, an attempt was made to mitigate the potentially deleterious effects of the researchers' preconceptions that might have tainted the process of data analysis. Data analysis was done using MAXQDA version 2020. We used Guba and Lincoln's criteria (including credibility, transferability, conformability, and dependability) to guarantee trustworthiness and rigor.[11] The credibility of the data was increased by using a maximum variation sampling technique to capture various backgrounds and work experiences as well as differences in age, gender, and educational attainment. Credibility promotion methods (member check and peer check) were used to resolve any ambiguity in the codes. As far as member check was concerned, parts of the interviews and codes were returned to the participants to check for accuracy and resonance of their experiences. With regard to peer check, two faculty members were asked to compare the level of similarity between the extracted categories and the experiences of the participants. Conformability was ensured by regularly collecting data (audit trial), accurately recording and writing the steps and process of the research, observing impartiality, and obtaining the agreement of ICU nurses on the interviews, codes, and classification of similar codes and categories (comparing what the researcher perceived with what the participants meant). Dependability was confirmed by immediately transcribing the interviews, seeking the opinions of three colleagues who are experts in qualitative research (external check), and re-reading the entire data. Finally, by interviewing participants with maximum diversity and providing direct quotes and examples, transferability was confirmed. The COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist was used to ensure the study met the recommended standards of qualitative data reporting.

Ethical considerations

The study was approved by the Ethics Committee of Ahvaz Jundishapur University of Medical Sciences (Ref. ID: IR.AJUMS.REC.1400.266). Written informed consent was obtained from the participants. The participants were assured that participation in the study was voluntary, the interviews would be recorded anonymously, their information would remain confidential, they could withdraw from the study at any stage, and that they have the right to be aware of the general results of the study and receive the audio file of their interview. They were also notified that they may be referred to again to complete the discussions just in case. The study accepted and followed the ethical standards outlined in the Declaration of Helsinki.

Results

In this study, 20 participants (14 women and 6 men) aged between 27 and 45 years were interviewed. The mean age of the participants was 32.3 years. In terms of marital status, nine were married and 11 were single. Seventeen had a bachelor's degree in nursing, while the other three had a master's degree. The range of work experience in the ICU was between 1 and 13 years (mean: 4.7). Table 1 shows the participant characteristics. Table 2 present the codes, subcategories, categories, and themes extracted from the experience of ICU nurses during the COVID-19 pandemic. After data analysis, 94 codes, 22 subcategories, eight categories (psychological crisis, physical exhaustion, family conflicts, complex care, professional development, expertise, life enrichment, and full support), and one theme (Growth under pressure) were extracted.

Category 1. Psychological crisis: According to the experiences of the participants in this study, the ICU environment is stressful, and the nature of the COVID-19 disease was described as very terrible. In fact, ICU nurses experienced many psychological crises during the period of COVID-19. This category included two subcategories, namely, "Negative emotions" and "Psychological disturbance." To exemplify these experiences, quotes from the participants are given below. It should be noted that after each quote, the participant's profile is written according to the following pattern (Number: Age. Sex. ICU work experience).

1-1. **Negative emotions:** ICU nurses who dealt with or were exposed to patients with COVID-19 may have experienced symptoms of anxiety, depression, and suicidal thoughts. Anxiety and stress can have negative effects on patient care as well as nurses' mental health. The nurses stated various reasons for their anxiety, including stressful environment, fear of being infected, and being stressed about an unfortunate situation. *"It was very difficult for us to manage the patient; we were highly stressed, so was the patient who came there. We had difficulty having contact with the patient. We were worried for our health and our family's."* (P8: 31y.F.5y)

2-1. **Psychological disturbance:** ICU nurses were very exposed to mental pressure caused by the COVID-19, and due to more frequent and longer contact with COVID-19 patients, they were likely to suffer from psychological problems and lasting symptoms more often

Table 1: Participant Characteristics

Participant number	Gender	Age (year)	Marital status	Nurse/head nurse	Degree	ICU Work experience (year)	Interview duration (min)
1	Female	28	Married	nurse	Bachelor	1	55**
2	Female	29	Married	Nurse	Bachelor	3	40
3	Female	37	Married	Head nurse	Master	11	38
4	Female	32	Single	Nurse	Bachelor	5	40
5	Female	24	Single	Nurse	Master	2	40
6	Female	37	Married	Head Nurse	Bachelor	11	35
7	Female	32	Single	Nurse	Bachelor	5	40
8	Female	31	Married	Nurse	Bachelor	5	60**
9	Male	28	Single	Nurse	Bachelor	3	40
10	Female	27	Single	Nurse	Bachelor	3	28
11	Male	36	Single	Nurse	Bachelor	4	32
12	Female	30	Single	Nurse	Bachelor	2	30
13	Female	45	Married	Head nurse	Bachelor	13	60**
14	Female	32	Married	Nurse	Master	5	30
15	Male	35	Single	Nurse	Bachelor	5	30
16	Female	37	Married	Head nurse	Bachelor	11	35
17	Male	28	Married	Nurse	Bachelor	2	27
18	Male	28	Single	Nurse	Bachelor	3	28
19	Male	28	Single	Nurse	Bachelor	3	20
20	Female	29	Single	Nurse	Bachelor	3	31

**Interviews were conducted twice

Table 2: Subcategories, categories, and theme

Subcategories	Categories	Theme
Negative emotions	Psychological crisis	Growth under pressure
Psychological disturbance		
Progressive physical breakdown	Physical exhaustion	
Physical injury caused by personal protective equipment		
Disruption in daily family life	Family conflicts	
Family tension		
Equipment challenge	Complex care	
Human forces challenge		
Inefficient organizational management		
pandemic confusion		
Excessive workload		
professional growth	Professional development	
professional relationship growth		
Strengthening the nursing status and identity		
Gradual adaptation	Expertise	
Cultivating creativity and learning		
Personal growth	Life enrichment	
Change in lifestyle		
Positive emotions		
Sense of gratitude	Full support	
Support umbrella		
Management support		

than other healthcare workers. *"Sometimes, I used to cry all along the road from here to Ramhormuz; I couldn't help it; one by one the patients came to my mind."* (P4:32y.F.5y).

Category 2. Physical exhaustion: The ICU nurses participating in this study stated that they suffered from physical exhaustion during the COVID-19 pandemic and were physically depleted. ICU nurses experienced extensive physical complications that disrupted their daily lives. This category included two subcategories, namely, "Progressive physical breakdown" and " Physical damage caused by personal protective equipment."

1-2. **Progressive physical breakdown:** The participants stated that working during the COVID-19 crisis brought them many physical problems, which became more severe with the passage of time. *"At times, my sleep and appetite were disturbed. For example, if a patient to whom I was very close expired, I would be sleepless for a day or two, and my whole body would break down."* (P10:27y.F.3y).

2-2. **Physical damage caused by personal protective equipment:** The participants in this study stated that most of the time they went through heavy and long shifts due to the lack of manpower and the large number of patients, and due to the continuous and prolonged use of personal protective equipment, they suffered numerous physical injuries. *"Masks, shields and other clothes were worn for hours. After the shift, we would notice that there was sore rash where the mask had contact with the skin"* (P1:28y.F.1y).

Category 3. Family conflicts: Being away from their family due to the fear of transmission of infection was among the main challenging experiences of the nurses participating in this study. Family members' opposition to the presence of nurses in the hospital environment

at the beginning of the disease outbreak and increasing conflicts with family members were other experiences of nurses. This category included two subcategories, namely, "Disruption in daily family life" and "Family tension."

1-3. **Disruption in daily family life:** ICU nurses in this study stated that the restrictions that the COVID-19 crisis created for them disrupted their daily lives with their families. *"At first, I tried not to go home very often because everyone was afraid of me. One or two months later when I went home, my father would seat two or three meters away from me."* (P17:28y.M.2y).

2-3. **Family tensions:** The participants in this study stated that during the COVID-19 crisis, their family tensions escalated, which created many challenges for them. One of their major challenges was family pressure to quit their jobs. *"I called my brother and told him that I wanted to go to the Covid-19 ward. He was very upset and argued with me and said: 'you have no right to go there! Come here to our city to work for me!' I told him: 'I would go, just don't tell mom'"* (P20:29y.F.3y).

Category 4. **Complex care:** The main obstacle that ICU nurses faced during the COVID-19 crisis was the complex, unknown, unpredictable, and stressful working conditions. The lack of equipment and manpower made it difficult for them to take care of patients. This category included five subcategories, namely, "Equipment challenge," "Human force challenge," "Inefficient organizational management," " Pandemic confusion," and "Excessive workload."

1-4. **Equipment challenge:** ICU nurses stated that during the COVID-19 crisis, they faced a severe shortage of equipment and tools needed for the safe care of patients. In addition, they stated that the protective clothing provided for them did not meet the required standards. *"Our supplies and equipment were limited. We were short of protective equipment; the masks they gave us were not standard."* (P6:37y.F.11y)

2-4. **Human force challenge:** According to the participants, the challenges related to human resources that they were dealing with included: lack of specialized and trained personnel, inefficiency of human resources, and attempts of nurses to quit their jobs. *"We were only two nurses and one anesthesia technician, and there were 12 patients. How is it possible for three people to set up Ambu bags for 12 patients?"* (P12:30y.F.2y).

3-4. **Inefficient organizational management:** One of the important factors that the ICU nurses stated was the poor management at different levels during the COVID-19 crisis, which caused them to be demotivated and frustrated, and ultimately led to a negative impact on their performance and quality of work. *"Unfortunately, the hospital manager was more interested in trivial matters and showing off than in solving problems"* (P11:36y.M.4y).

3-4. **pandemic confusion:** ICU nurses stated that due to the sudden spread of the disease, inadequate knowledge about COVID-19 and its complexity, and lack of knowledge about how to care for COVID-19 patients, they were confused and ultimately helpless. *"I couldn't figure out at all that a disease could be so dangerous and threaten people's lives so much. It was not known at all how it was transmitted. It was a very unknown disease"* (P9:28y.M.3y).

4-4. **Excessive workload:** The participants stated that during the COVID-19 crisis, ICU nurses were faced with a high workload due to the double work pressure, high patient mortality rate, psychological pressure caused by the patient's companions, and the unsuitable physical conditions of the work environment. They stated that these conditions were unbearable for them and affected their performance. *"One of our patients was a female teacher who was very sick. We did CPR three times until the morning, but she expired at 4:00 a.m. I was under a lot of pressure."* (P16:37y.F.11y).

Category 5. **Professional development:** Despite all the hardships faced by nurses during the course of COVID-19, this crisis made the nursing community more cohesive and united. Also, the nursing profession was more highlighted in this period, the status of nurses was improved, and finally, their professional development was established. This category included three subcategories, namely, "Professional growth," " Professional relationship growth," and" Strengthening the nursing status and identity."

0.1-5. **Professional growth:** One of the important factors that led to the better and more frequent adaptation of ICU nurses to the COVID-19 crisis was professional growth. Professional growth took place, thanks to cooperation and integration, mutual support, interest in work, and continuous training. *"When one of the colleagues couldn't come to work, for example, we would say that the patient is not only hers; the patient is ours. I mean the crisis made us be more cooperative"* (p14:32y.F.5y).

2-5. **Professional relationship growth:** Effective communication is a prerequisite for success in any profession. Proper communication in the COVID-19 crisis was doubly important for reasons such as the unknown nature of the disease, the use of multiple personal protective equipment, the morbidity and mortality of the disease, and the lack of manpower and equipment. This communication was not limited only to nurses but included all the treatment staff, and it even involved patients and their relatives. *"One of the ways is communication with the patient. I even used to play songs for the patients. I established a very good relationship with the patients"* (p18:28y. M.3y).

3-5. **Strengthening the nursing status and identity:** One of the significant changes that was made to the nursing community during the COVID-19 crisis was the strengthening of the nursing profession, position, and

identity. This positive event alleviated the hardships and the overwhelming problems of the COVID-19 crisis. Despite all the challenges it created for nurses, the COVID-19 crisis managed to bring the nursing community closer to its original and praiseworthy position. *"I was very happy that the social capacity and status of nursing was enhanced and made nurses more visible"* (P13:45y.F.13y).

Category 6. **Expertise:** The participants stated that despite the hardships of the COVID-19 crisis period, they were able to achieve an acceptable level of expertise and skill in managing such crises. The reasons given by the ICU nurses for this issue included practicing to tolerate hardships, experiencing teamwork, increasing awareness and skills, strengthening the sense of creativity, and learning new issues. This category included two subcategories, namely, "Gradual adaptation" and "Cultivating creativity and learning."

1-6. **Gradual adaptation:** ICU nurses were under a considerable amount of stress at the outset of the outbreak of COVID-19, and it was difficult for them to cope with the existing critical conditions. However, gradually over time, a gradual adaptation was developed in them. The reasons that led to the gradual adaptation of ICU nurses included familiarity with the disease and its treatment process, gaining experience and skills, and learning new problems. *"As days passed, I got more used to the ward, and about a week to ten days later, I was getting adapted. Gradually, it became normal, and I was acclimated"* (P4:32y.F.5y).

2-6. **Cultivating creativity and learning:** In spite of the challenges the ICU nurses were experiencing during the pandemic, the outbreak of COVID-19 and the difficulties associated with it brought them awareness, creativity, skills, and valuable experiences. Over time, these nurses became more knowledgeable about the care of COVID-19 and their creativity blossomed. *"Little by little, our awareness increased, our patients became more and more involved, and we had to deal with it like a normal disease, and we learned a lot and were able to manage* it" (P2:29y.F.3y).

Category 7. **Life enrichment:** Because the COVID-19 crisis affected all aspects of people's personal lives, both physically and psychosocially, ICU nurses tried to enrich their lives by using value-laden behaviors. They tried to cope with the new conditions by not only strengthening their individual capacities and strengths but also making fundamental changes in their daily lives.

1-7. **Personal growth:** Individual growth of ICU nurses took place, thanks to their high commitment, personal interest in work, conscientiousness, resistance, self-sacrifice, self-confidence, courage, and hope. If it were not for their sacrifice and dedication, it would have been impossible to overcome the critical conditions of COVID-19. Another strength of the nurses was their courage and self-confidence, which ultimately led to their perseverance and hope. *"I am a responsible person. I have never left in the middle of a shift. Even though I was under a lot of pressure, the shifts were heavy, or I was treated badly, I never left."* (P19:28y.M.3y).

2-7. **Change in lifestyle:** The onset of COVID-19 brought about many changes in the working conditions and personal lives of ICU nurses. To cope with these changes, nurses had to make changes in their lifestyles. These changes included listening to music, changing the environment, doing physical activity, using supplements, studying, having short-term rests, and resorting to traditional medicine. This lifestyle change as a strategy helped the nurses to adapt to the critical situation and continue to provide their services. *"During the Covid-19 days, I used to take supplements and do exercise occasionally. I tried to change the songs I used to listen to; I started listening to happy music and stopped listening to sad songs."* (P15:35y.M.5y).

3-7. **Positive emotions:** Despite the presence of negative emotions, ICU nurses also experienced positive emotions. The participants stated that their positive emotions during this period included observing ethical considerations, philanthropic feelings, and sympathy for patients. "*We are doing many things, none of which are in my job description. Everything you do has a moral value such as caring for humanity and sympathy for patients*" (P15:35y. M.5y).

Category 8. **Full support:** Following the nurses' encounter with the COVID-19 crisis, they tried to optimally use all support resources at their disposal to cope with the situation. The comprehensive support perceived by nurses from various sources made smoother and more bearable the winding and difficult road of fighting the COVID-19 crisis. Certainly, benefiting from multiple support sources created a positive synergy and was a helping hand for ICU nurses amid this arduous path. This category included three subcategories, namely "Sense of gratitude,"" Support umbrella" and "Management support."

1-8. **Sense of gratitude:** The COVID-19 crisis had created difficult and exhausting conditions for ICU nurses, but receiving a sense of gratitude from patients and their companions served as a soothing and comforting factor. The fact that the ICU nurses understood that their continuous efforts were seen and appreciated by the patients and their companions doubled their energy and ability to continue. *"There was a patient's relative whose mother had passed away, but the next week she came with a bouquet of flowers to thank me. This was really strange and beautiful. She said: 'I saw how hard you worked, and I'm grateful to you'."* (P1:28y.F.1y).

2-8. **Support umbrella:** Support sources for ICU nurses included private, government, and even military companies, family, society, and the media. Extensive support from various sides acted as a protective umbrella for nurses and made the continuation of the fight against COVID-19 smoother for them. *"Some companies outside the hospital,*

such as the steel and pipe company, supported us. This had a great impact on our spirits." (P7:32y.F.5y).

3-8. **Management support:** According to the participants, benefiting from management support helped the ICU nurses in their difficult and laborious path of fighting COVID-19. The feeling of receiving management support at different levels assisted the nurses in adapting to the critical situation and continue to provide services. *"The head nurses' support was good at times of crises. They often worked alongside other nurses. It's very good when you see your supervisor is working with you. It gives you a good morale."* (P3:37y.F.11y).

Theme: Growth under pressure

In this study, ICU nurses experienced multiple pressures following the onset of COVID-19, including psychological crisis, physical exhaustion, family tension, and complex caregiving. However, they had positive experiences such as professional development, expertise, life enrichment, and full support. This showed that ICU nurses were able to achieve personal and professional growth despite enduring many pressures.

Discussion

The aim of the current study was to explain the experience of ICU nurses during the COVID-19 crisis. From the data analysis, eight categories, including "psychological crisis," "physical exhaustion," "family conflicts," "complex care," "professional development," "expertise," "life enrichment" and "full support," were achieved. The theme of "Growth under pressure" was obtained as the main theme of the present study. In the following, these findings are discussed in more detail and in separate sections.

In Ariapooran *et al*.'s[12] study, it was found that the prevalence of secondary traumatic stress (STS) during the outbreak of COVID-19 in nurses was 51.11%. The average STS in ICU/CCU nurses was higher than that of nurses in other departments. Another study reported suicide attempts among nurses during the COVID-19 period.[13] Pasay-An *et al*. found that nurses were rejected by the community during the COVID-19 pandemic and were isolated in one way or another.[14] In Nelson *et al*.,[15] it was found that COVID-19 had long-lasting negative effects on the mental health of nurses. In line with these studies, the results of the present study confirmed psychological crises, including stress and anxiety, depression, aggression, isolation and negative thoughts during the outbreak of COVID-19. This highlights the role of psychiatric nurses in identifying the problem and providing counseling and supportive care services for the nurses involved in departments related to COVID-19.

Sikaras *et al*.[16] found that nurses, who took care of COVID-19 patients, experienced more fatigue and burnout than their colleagues who worked in other departments. According to Moradi *et al*.,[17] long-term care of COVID-19 patients led to physical complications such as physical fatigue, spots, dermopathy, and hormonal disorders in ICU nurses. In Gordon *et al*.,[18] ICU nurses mentioned headache and shortness of breath as unpleasant consequences of caring for COVID-19 patients. Nurses, who provide care for these patients, experience high levels of fatigue and burnout. Therefore, there is an urgent need to address this problem by both taking organizational measures such as managing the promotion of staffing and implementing supportive interventions.

According to Nilsson *et al*.,[19] the most stressful factor with regard to the work in the COVID-19 ICU was that it was such a grueling experience that nurses did not have the energy to devote themselves to their families as they wanted. Çelik *et al*.[20] reported that nurses suffer from the collapse of family relationships and the inability to maintain balance within their family. Such family conflicts were also evident in the present study due to the limited family visits and their pressure to leave work. The work–family balance for nurses dealing directly with COVID-19 patients changed during the pandemic. Reducing the rate of these conflicts, providing family and organizational support, and teaching nurses how to deal with crises are effective measures in this respect.

In Sampe *et al*.,[21] nurses complained about the lack of equipment, such as N95 masks, gloves, etc., Deldar *et al*.[22] reported that nursing managers, who had experience of caring for COVID-19 patients, mentioned the "lack of experienced and reliable staff" as one of their most important challenges. To reduce the workload on their staff during the pandemic, nursing managers were forced to use nurses from other departments or hospitals who volunteered to join the COVID-19 wards. However, the new personnel had little, if any, knowledge and experience working with monitoring devices or ventilators. In Pazokian *et al*.,[23] the nurses stated that the workload in the COVID-19 ward is really heavy and exhausting. Yosefi *et al*.[24] estimated that the average workload and its dimensions among nurses working in the COVID-19 ward were at a high level. In the current study, the reasons for the heavy workload of ICU nurses during the COVID-19 crisis included stressful work environment, hectic work schedule, negative and bad news, high expectations, lack of rest time, mismatch between the number of nurses and patients, and overcrowding of the ward. Nursing managers should carry out the necessary interventions, especially with regard to increasing the number of nurses, training specialist nurses, establishing a proportionate ratio of nurses to patients, providing equipment, and preparing for crises.

Moradi *et al*.[17] reported that insufficient support, lack of personnel incentives, and lack of financial support by the hospital explain the weak organizational support for ICU nurses. In Guttormson *et al*.,[25] ICU nurses perceived the

insufficient leadership support and inequality in the healthcare team, which is consistent with the results of the present study. Continuing education about disaster management, ethical decision making, and effective leadership in daily practices help nurse managers develop the necessary skills to better direct their teams in times of crisis. In a crisis like COVID-19, nursing managers at all managerial levels must be involved in the decisions made in health institutions. In Podgorica *et al*.,[26] the nurses pointed out the following factors: limited information about the COVID-19 virus, inadequate preparation for the COVID-19 tsunami, lack of practical skills in caring for COVID-19 patients, etc., which is in line with the results of the present study. Therefore, it is necessary to hold regular theoretical and practical courses on the knowledge and the necessary risks needed to deal with large-scale health emergencies such as COVID-19.

The ICU nurses interviewed in the current study mentioned the COVID-19 crisis as a positive factor contributing to their professional development. Most nurses reported that during the outbreak of COVID-19, their work and emotional relationships at work changed for the better, and they loved and helped each other more than they used to.[27] Training and informing nurses based on the latest findings about the COVID-19 epidemic was one of the effective strategies in Varaei *et al*.[28] Zamanzade *et al*.[29] acknowledged the increase in the social acceptance of nursing during the coronavirus epidemic. Lee *et al*.[30] found that the outbreak of COVID-19 has caused the development and empowerment of the sense of professional identity among nurses. In this regard, Sun *et al*.[31] also mentioned the development of professional responsibility and self-reflection. According to Kim *et al*.,[32] during the COVID-19 pandemic, nurses learned the meaning of nursing at work, recognized the professionalism of nursing, and were proud to be nurses. Although nurses have suffered hardships during the COVID-19 pandemic, this crisis can be an opportunity for their professional development and rebuilding their professional identity. In fact, this pandemic can provide a stronger voice for informing the nursing profession and influencing healthcare policies and future nursing practices.

Participants in Han *et al*.[33] reported that over time, as they adapted to the ICU environment and entered the treatment setting, their abilities improved significantly. In Mansour *et al*.,[34] the last theme emerging from their data was maturation during the crisis. Danielis *et al*.[35] found that in their attempts to cope with the challenging environment by filling knowledge gaps, the nurses fortified their efforts in self-directed learning by accessing online courses and reading scientific articles. Expertise is one of the important adaptation strategies of ICU nurses in the present study which empowered them in their job position. The reasons given by the ICU nurses for the adoption of this strategy included practicing how to tolerate hardships, experiencing teamwork, increasing awareness and skills, strengthening the sense of creativity, and learning new issues. Finally, the ICU nurses stated that all the bitter-and-sweet experiences of the COVID-19 crisis contributed to their expertise and skillfulness.

In Kackin *et al*.,[36] nurses who took care of COVID-19 patients resorted to exercise, gratitude, watching movies and TV series, cooking, painting, listening to music, reading books, feeding animals, and taking positive notes to cope with and better adapt to the COVID-19 pandemic. Ahmadidarrehsima *et al*.[37] stated that to reduce their stress, the participants in their study used strategies such as eliminating negative thoughts, going for a walk, reading books, relaxation techniques, and keeping trust in God. Several participants in Podgorica *et al*.'s[26] study used humor in their professional teams. In the current study, ICU nurses tried to effectively compromise with the COVID-19 crisis through personal development. Also, due to the special conditions that COVID-19 had created for their personal and career lives, the participants tried to adapt to the existing conditions by changing their lifestyles. Finally, by enriching their lives, they tried to cope with the difficult conditions of COVID-19 and continue providing services to patients.

In Bartzik *et al*.,[38] the studied nurses confirmed their sense of humor and the perceived appreciation of the community, and they regarded patients as a buffer of negative effects related to the epidemic. In Gordon *et al*.,[18] ICU nurses who cared for patients with COVID-19 stated that they used short-term coping strategies including peer support and family support. Varaei *et al*.[28] reported that financial encouragement of nurses against hard work over time was one of the supportive actions of nursing managers. In the present study, ICU nurses sought to cope with the situation by taking advantage of multiple sources of support. These supports included support from organizations and companies, society, family, media, and incentive packages. In fact, one of the main reasons for nurses to stay in the COVID-19 ward was this multilateral support.

The main theme of this study was "Growth under pressure." In Kim's study, over time, participants felt they were growing as they became familiar with the tasks involved in caring for COVID-19 patients.[32] Emergency nurses in Jiang's study during the COVID-19 crisis experienced three periods of stress, adaptation, and growth, respectively.[39] In Nayon Lee's study, nurses ultimately grew by discovering the value and meaning of their work while receiving social support from the community.[30] This issue is very similar to posttraumatic growth. The positive growth and transformation that results from experiencing difficult and painful human conditions. In fact, it can be said that ICU nurses grew after fighting the frontline battle against an infectious disease epidemic.

Conclusion

In the present study, a clear and comprehensive picture of the experience of ICU nurses during the COVID-19 pandemic crisis was depicted. Despite the pressures ICU

nurses faced during the COVID-19 pandemic, they were able to grow by benefiting from positive experiences. The information obtained from the findings of this study may help nurses to effectively cope with the challenges posed by COVID-19 and else emerging crises. These findings can help to develop and implement effective interventions to improve the coping strategies of nurses, especially those working in the intensive care unit during the COVID-19 pandemic. Considering the important role of nurses in similar crises, the following measures seem to be necessary to reduce the mental and psychological workplace pressures in the nursing profession. These include primary nursing care training for emerging infectious diseases, making nurses satisfied with their profession, paying attention to the professional demands of nurses, popularizing a fair portrayal of the important role of the nursing profession in the cultural milieu of the society, and adopting special support policies. Such strategies will make future crises more controllable and manageable for the nursing community, especially ICU nurses, to deal with.

Although the critical phase of COVID-19 is over, there is still the disease of COVID-19. In fact, the end of the crisis is a good opportunity to conduct more extensive qualitative research to discover the rich and new experiences of nurses involved in this epidemic. Although qualitative studies are not often intended to generalize the results, it is recommended that similar studies be conducted in other areas to make the results more generalizable. In addition, to identify current and future challenges and adopt appropriate coping strategies, longitudinal studies with long-term engagement with participants can provide more valuable results. However, our study was conducted within a limited period of time.

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Conflicts of interest

Nothing to declare.

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