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Exploring perceived stress from caring for coronavirus disease (COVID-19) patients in nurses: a qualitative study

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Abstract

Background: The coronavirus pandemic has increased the perceived stress among people worldwide. The new coronavirus issue has recently put nursing staff under severe stress.

Aims: This study aimed to evaluate the stress perceived by nurses in caring for new coronavirus patients.

Methods: This qualitative conventional content analysis was conducted from February and March 2021. Twelve nurses working in the inpatient care wards for COVID-19 patients in Tehran hospitals were enrolled using purposive sampling. Data were collected through in-depth and semi-structured interviews and collection continued until reaching data saturation. All interviews were recorded, transcribed, reviewed and analysed using the Graneheim and Lundman method.

Results: One main category, five categories and 19 sub-categories emerged from the data. The nurses experienced 'the process of transition from unknown conditions'. Caregiving stress, impression on all aspects of life, COVID as a strange disease, stress caused by patient characteristics and stress reduction over time were issues in the formation of stress in nurses caring for patients with COVID-19.

Conclusions: The findings indicated that nurses caring for COVID-19 patients experience varying levels of stress for a variety of interrelated reasons. Knowing how nurses perceive the stress of

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caring for patients with COVID-19 can aid in the development of practical steps to reduce stress and make nurses more comfortable.

Keywords
coronavirus disease, COVID-19, nurse, perceived stress, qualitative study

Introduction

Since the report of the new coronavirus (COVID-19) outbreak in China, the disease has subsequently spread to other parts of the world, causing a pandemic. The World Health Organisation has declared COVID-19 as a 'public health emergency of international concern' (Limcaoco et al., 2020). Two confirmed cases were reported in Qom, Iran, on 19 February 2020, and the government imposed suppression of people movement and lockdown in all the provinces after confirming new cases (Farsi et al., 2021). This condition led to the instability of many standard procedures worldwide, forcing nations into considerable burdens in socioeconomic, healthcare, political and educational domains (Farsi et al., 2021). The evidence showed that the coronavirus pandemic has increased the level of perceived stress among people around the world (Bo et al., 2020; Greenberg et al., 2020; Limcaoco et al., 2020; Mukhtar, 2020; Roy et al., 2020).

Nurses have always played a critical role in infection prevention, infection control, isolation control, and public health. However, information on job stress is limited among nurses caring for patients with COVID-19 (Mo et al., 2020). Nurses are at the forefront of this COVID-19 crisis, as they are with many healthcare issues. Nurses and their leaders must also be aware that there are physical and emotional needs that need to be handled. Nurses must learn to make their personal health needs more of a priority as well (Ross, 2020). Studies show that health workers, especially nurses, experienced high levels of stress during the period of caring for patients with COVID-19 (Bo et al., 2020; Du et al., 2020; Kang et al., 2020; Mo et al., 2020; Pragholapati, 2020). Factors such as being away from family and loved ones, having children at home, very long shifts and high stress at work are among the factors that increase the stress perceived by nurses caring for COVID-19 patients (Du et al., 2020).

Recently, stress as an interdisciplinary concept has become an area of great interest and has been widely explored (Jennings, 2008). The source of stress is often known and caused by an external factor (Teymouri et al., 2019). Stress occurs when perceived demand exceeds the ability to cope in individuals (Lazarus, 2006). Stress is unavoidable and different people perceive and interpret stressors in different ways; it cannot be ignored, but it may be mitigated through a series of interventions (Key Kittrel, 2005; Pasandideh and Saulekmahdi, 2019).

Job stress is a condition in which job-related factors interfere with a person's physical and mental health (Azad-Marzabadi et al., 2007). Sufficient evidence in this field shows that these stresses affect physical health, mental health, quantity and quality of performance, productivity, job dissatisfaction, leaving work, delays and absenteeism (Keats, 2010).

Among the various occupations, nursing is a very stressful one. The high level of stress in this job, caused by a combination of personal factors and factors related to the work environment, affects the physical and mental health of nurses (Waltz et al., 2010). In Iran, 80% of health system workers are nurses. Besides, 80% of the work in hospitals is performed by them (Hazavehei et al., 2017). The overall prevalence of job stress in Iranian nurses is 37.5%, while its rate is 20% in the United States and 28% in Singapore (Ghanei Gheshlagh et al., 2017; Isfahani et al., 2021; Mealer et al., 2007).

One issue that has recently put nursing staff under severe stress is the COVID-19 pandemic (Du et al., 2020). According to what was mentioned and the lack of a similar study in Iran, this study aimed to evaluate the stress perceived by nurses in caring for COVID-19 patients.

Methods

Design

This descriptive qualitative study with a conventional content analysis approach using the Graneheim and Landman method was conducted in 2020 (Lindgren et al., 2020).

Setting and participants

Twelve nurses working with COVID-19 patients in inpatient care wards of two hospitals in Tehran, Iran, were enrolled in the study by purposive sampling. The inclusion criteria were having at least four weeks of experience in caring for patients with COVID-19 and the willingness to participate in the study. The exclusion criterion was withdrawal from the study for any reason.

Data collection

The in-depth and semi-structured interviews were conducted with nurses at the end of their work shifts and in the same hospital. After explaining the purpose of the study and the ethical codes, written informed consent to participate was obtained from each nurse. Based on the collected data, the sampling process continued until data saturation was achieved such that no new code from the participants' experiences emerged. Face-to-face contact was limited to prevent transmission of COVID-19; therefore, interviews were conducted with nurses in February and March 2021 by following health protocols and with protective masks, long gowns, and a transparent separating shield. To control an emotional outburst situation, nurses were told that we would conduct the interview on any day they felt they were mentally and physically fit. A psychologist was also always available for consultation. Interviews with nurses were conducted in a separate, soundproofed room in the hospital's nursing department where the interviewees were. However, from the beginning of the interview, the nurses were asked whether they felt comfortable or not about the place of the interview, and the interview began with their consent. All the interviews were recorded on an audio electronic device. The main questions of the study were 'Please describe the meaning of perceived stress from your perspective in dealing with a patient with COVID-19', or 'Please describe the experience of 1 day of hospitalisation of a patient with COVID-19', and 'How stressful is dealing with a patient with COVID-19'. Based on the participants' responses, more questions were asked to gather in-depth data, including, 'Can you give an example of what causes you stress when caring for a patient with COVID-19?' Again, based on the participants' answers, the interviews were continued with more detailed questions such as 'What do you mean?' and 'Please explain more about this'. The average duration of the interviews was 45 minutes. Since changes in tone, gesture and movements of the participant during the interview are not identified by audio recording, field notes were taken verbatim during the interview and subjected to content analysis.

Data analysis

Data analysis was carried out concurrently with data collection using the analysis method suggested by Graneheim and Lundman (2004). The interviews were transcribed verbatim and read several times to ensure a general understanding of the participants' statements. Next, meaning units were determined and related codes were assigned. Through a constant comparison of similarities and differences, codes were sorted and grouped into main category, categories and sub-categories. MAXQDA version 12 software was used for data management during the data analysis process.

Table 1. Nurses' individual characteristics of the participants at two hospitals in Tehran, Iran, 2021.

Variables		*n*
Gender	Male	4
	Female	8
Age (year)	20–30	4
	31–40	5
	>40	3
Work experience (year)	1–10	6
	11–20	5
	>20	1

Rigour

The four criteria of transferability, dependability, credibility and conformability were used in this study to increase rigour (Guba and Lincoln, 1989). Credibility was established using member and peer-checking, prolonged engagement and maximum variance of the participants' techniques. For member-checking, for example, a brief report on the findings was given to two clinical nurses who were asked to assure the researcher of the reflection of their experiences and perspectives in the analysis report. For peer checking, two qualitative researchers approved the primary codes and categorising process. Transferability was achieved through the provision of a rich description of data collection and analysis processes and findings, which allowed the readers to match the findings with their contexts.

Results

Participants were licensed nurses and head nurses working in intensive care units ($n=5$), infectious diseases wards ($n=4$), internal medicine wards (2) and cardiac diseases wards ($n=1$). The individual characteristics of participants are reported in Table 1. In total, 312 codes were generated and categorised into one main category, five categories and 19 sub-categories (Table 2). Categories and sub-categories are explained in what follows.

Caregiving stress

Data analysis showed that nurses have problems when dealing with a patient hospitalised with COVID-19 disease, and this can cause a kind of caregiving stress in nurses. Four sub-categories were identified: 'The beginning of a period full of stress', 'Challenges in caregiving', 'Lack of personal protective equipment' and 'Uniqueness of patients'.

The beginning of a period full of stress. With the hospitalisation of every COVID-19 patient, a nurse is involved in a certain period of caregiving, and these caregiving periods are associated with high stress for nurses. A nurse with an MSc degree said:

> In general, we go through a stressful period with each patient, and every time I encounter a COVID-19 patient, it is as if a stressful trek begins for me. (P_4)

Challenges in caregiving. During the care of a patient with COVID-19, nurses faced various challenges, such as a lack of nursing staff, increased number of work shifts, shortage of intensive care

Table 2. Nurses' perceived stress from caring for coronavirus disease (COVID-19) patients at two hospitals in Tehran, Iran, 2021.

Main category	Categories	Sub-categories
The process of transition from unknown conditions	Caregiving stress	• The beginning of a period full of stress • Challenges in caregiving • Lack of personal protective equipment • Uniqueness of patients
	Impression on all aspects of life	• Stress of potential transmission of the disease to family members • Fear of infection • Forgetting personal life
	COVID-19 as a strange disease	• Unpredictable disease course • High mortality • Creation of special critical situations • The unknown of COVID-19
	Stress caused by patient characteristics	• Patient mental states • Rate of patient involvement • Patient underlying disease • Patient age • Patient family
	Stress reduction over time	• High stress at the beginning of the epidemic • Stress reduction over time • Distinguishing features of the disease reduces stress

unit beds, critical patient care in the ward and concern about the patient becoming critical. A nurse with a BSc degree said:

> An important issue is the problem of the number of nurses; that is, we in the inpatient wards have nurses taking leave and leave due to illness. Even when one nurse returns from leave, another one begins her leave, and we have a shortage of nurses. This stress is very great. (P_3)

Lack of personal protective equipment. The use of appropriate personal protective equipment has a great effect on reducing stress. When personal protective equipment was not available, nurses were stressed by caregiving. A nurse with a BSc degree said:

> I think personal protection is very effective for reducing stress, and when you come to the patient with the proper coverage for a week and see that you are not infected, you realize that the only thing that can reduce stress is to have full coverage and go to work and you do not have any problems. (P_8)

Uniqueness of patients. It was found that due to the differences between COVID-19 and other infectious diseases as well as the unique characteristics of each patient with COVID-19, the care of these patients has its own unique conditions, and this specificity could cause stress to a nurse. The differences in the prevalence and incidence of COVID-19 compared to other infectious diseases cause nurses to have specific reactions in terms of stress to these patients. A nurse with a BSc degree said:

> It's not like having a cold, and suppose I get sick and cough for 4 or 5 days and have bruises and think I will be fine later. According to these advertisements that show the mortality rate is high and other factors, it's normal for everyone to be afraid of it. (P_7)

Each COVID-19 patient has unique symptoms and clinical courses that differ completely from other patients. These differences in symptoms and clinical progression sometimes cause nurses to be confused about caregiving, which in turn leads to mental conflict. A nurse with an MSc degree said:

> Experiences are different; different patients are admitted with different manifestations, and we have a story with each of them. (P_4)

Impression on all aspects of life

Caregiving stress in nurses was a continuous and permanent stress that could affect various aspects of life. This stress could reduce a person's ability and energy to do personal tasks and reduce a person's efficiency in personal, social and family actions. Under this category, there were three sub-categories: 'Stress of potential transmission of the disease to family members', 'Fear of infection' and 'Forgetting personal life'.

Stress of potential transmission of the disease to family members. The stress of transmitting the disease to family members stays with the nurses throughout their hospital working time and at home and creates a sense of guilt in them. Many times, thorough protection with protective protocols could not relieve this stress. A nurse with a BSc degree said:

> Personally, I'm afraid to go home and involve others. I am afraid that eventually my children and parents will become involved [with this disease], and my stress is only because of my family. (P_{11})

Fear of infection. One of the main causes of stress in nurses was fear of infection. When nurses saw patients in a critical condition, they developed a kind of empathy that caused them stress. High mortality and fear of transmitting the disease to family members also increased this stress. A nurse with a BSc degree said:

> Whatever symptoms we have, we quickly feel that we are infected, and this puts a lot of stress on us. (P_1)

Forgetting one's personal life. The perceived stress of caring for patients with COVID-19 was sometimes so high that nurses forgot about their personal lives. For example, a nurse might forget her exercise schedule on a particular day, or she might forget her promise for buying her daughter her favourite doll, or she might forget to take her car to the garage, and so on. A nurse with an MSc degree said:

> Sometimes the stress is so high that I forget that I have another life at all; for example, yesterday I completely forgot that I had a walk in the park every Wednesday. (P_5)

COVID-19: A strange disease

The nurses have always had varying levels of stress while providing patient care. The nurses used different words to express their fear, for example, fear to the point of death, too much, terrified, a

little and so on. The special and strange features of this disease distinguished perceived stress because of caring for patients with COVID-19 from other cases. Under this category, there were four sub-categories: 'Unpredictable disease course', 'High mortality', 'Creation of special critical situations' and 'The unknown of COVID-19'.

Unpredictable disease course. One reason for the perceived stress of caring for patients with COVID-19 was the unpredictability of the recovery process or severity of disease in patients with COVID-19. A sudden loss of consciousness and worsening of the patient's condition were conditions that completely surprise nurses. A nurse with a BSc degree said:

> Maybe the patient I was taking care of yesterday and everything was fine is not awake today. This has happened to us a lot, and this causes us a lot of stress. (P_1)

High mortality. The mortality rate of patients with COVID-19 was much higher than nurses expected. The death of any patient with COVID-19 was a deep shock to the nurse, which ultimately increased their perceived stress. A nurse with an MSc degree said:

> The number of deaths that occur in one day has a direct impact on the stress of our workday. The higher the mortality rate one day, the more stress we have. Really, sometimes on days when mortality is high, I think that maybe I did not take good care of myself, and I get more stress in caring for the next patient. (P_{12})

Creation of special critical situations. The factors such as patients' deep fear of their illness, the emergence of care conditions that the nurse has never experienced before and an intrinsic fear of COVID-19 disease created specific critical conditions for nurses. A nurse with a BSc degree said:

> Patients talk about the pain they are experiencing and the great stress they have for fear of death, and they may be very mild, but they are so scared and crying that they get depressed. (P_{10})

And another nurse with an MSc degree said:

> It created a complex situation that I had never experienced during my service. (P_4)

The unknown of COVID-19. The unknown of COVID-19 was one of the main causes of increased stress perceived by nurses in caring for these patients. As research progresses and more specific information was released about the disease, nurses' stress decreased, and whenever the disease showed features that did not exist before, their stress increased. A nurse with a BSc degree said:

> This disease, because it is an unknown, causes me a lot of stress. Even when a new feature of the virus is discovered, I still feel so sure that many of its dimensions remain unknown, and this puts me under stress. (P_1)

Stress caused by patient characteristics

Findings showed that some patient characteristics played a key role in increasing stress. This category includes five sub-categories: 'Patient mental states', 'Rate of patient involvement', 'Patient underlying disease', 'Patient age' and 'Patient family'.

Patient mental states. The patients' agitation and stress can be transmitted to nurses and lead to increased stress in caregiving for them. Because of the great fear patients with COVID-19 have, most of them suffered from severe stress due to their health condition. A nurse with a BSc degree said:

> Patients who become mentally agitated have a very negative and bad effect on us, and there are some patients who themselves have a lot of stress. For example, a patient's shortness of breath becomes stressful and now you have to prove to him that this mask that you put on improves breathing, and you have to talk to the patient for a long time, and you have to support him mentally to make him feel better. (P_9)

Rate of patient involvement. Another characteristic of COVID-19 patients that caused perceived stress in caregiving nurses was the severity of the disease and the degree of involvement of the patient's lungs. The more critical the admitted patient was, the more stress nurses perceived. A nurse with a BSc degree said:

> My stress depends a lot on the extent of the patient's lung involvement. When a patient is admitted with 80% lung involvement, I am really confused by the severity of the stress and feel I cannot help the patient. (P_1)

Patient underlying disease. When a patient hospitalised with COVID-19 had a chronic or underlying disease such as diabetes, chronic heart disease or kidney failure, the perceived stress of nurses increased. These patients were more prone to injury than COVID-19 and were more likely to have their conditions worsen. A nurse with a BSc degree said:

> It is very important to determine whether a patient has an underlying disease or not. Patients who have an underlying disease cause us more stress, because as I said, they are not predictable at all; that is, they may be fine, but in 3 or 4 hours they will be fully unconscious, losing body weight, and this creates a very bad condition. (P_6)

Patient age. The age of a COVID-19 patient influenced the stress perceived by caregiving nurses. Both old age and young age caused stress. In old age, elderly people usually had a weaker immune system, and old age was associated with underlying diseases; thus, they were less able to cope with the disease that caused the nurses stress. Moreover, the death of a young patient was always unexpected and very sad. It evoked a kind of sympathy in nurses, which caused great discomfort and stress associated with caring for young patients. A nurse with a BSc degree said:

> The younger the patient is the more stress we have, because it is very painful when he dies. When a young patient dies, I feel like I am in the place of him or her or the family. When I see a person's small children waiting for news of their parents' health, but we have to inform their families about the death of these patients, it is very painful. (P_3)

Patient family. The characteristics of a patient's family could affect the stress perceived by nurses. Families who were more aware of their patient's condition and constantly asked nurses to explain their illness to them transferred a lot of stress to nurses who were caring for a patient with COVID-19. A nurse with an MSc degree said:

> Patients with families who follow up are more likely to pass on their stress to us; for example, a hospitalized patient's wife and children were constantly in the back of the ward wanting to see us and ask questions

about their loved one's condition. I was so stressed that when I went to take care of their patient, my hands shook. (P_5)

Stress reduction over time

The stress perceived by nurses was very high at the beginning of the COVID-19 virus outbreak, and as time passed, the perceived stress of nurses decreased. At the beginning of the COVID-19 outbreak, nurses faced a very critical situation and various stressors, and the more the time that passed, the better able the nurses were to adapt to these conditions. Under this category, there were three sub-categories: 'High stress at the beginning of the epidemic', 'Stress reduction over time' and 'Distinguishing features of the disease reduces stress'.

High stress at the beginning of the epidemic. At the beginning of the outbreak of COVID-19, nurses were in a critical situation due to the very high morbidity and mortality rate worldwide as well as the high media coverage, because they did not know what they were fighting, and they did not know what would happen. A nurse with a BSc degree said:

With the early outbreak of COVID-19, my stress was very, very high, and I had never had such stress in my work. I was worried about getting infected, but I did not know exactly how to be careful not to get infected. Moreover, I did not know how to take care of these patients, nor did I not know to go home to rest or not to go home so that my family does not get sick. (P_8)

Stress reduction over time. Although nurses still experience high stress in caring for patients with COVID-19, their perceived stress levels have decreased significantly since the onset of the COVID-19 outbreak. As time has gone on, nurses have somehow been able to better adapt to the situation and neutralise the stressors. A nurse with a BSc degree said:

After about 2–3 months and now, my stress has decreased a lot. I try to follow the protective principles of COVID-19 and come to the patient's bedside with a special mask and gun, and I do not have any particular stress. (P_7)

Distinguishing features of the disease reduces stress. Over time and with more research by scientists, nurses' knowledge of the various dimensions of COVID-19 increased. This increase in awareness led nurses to care for patients with a good knowledge of COVID-19 and reduced their stress. A nurse with a BSc degree said:

Of course, now that we have some understanding of the symptoms and treatment, the situation has improved for me and my colleagues. Before I knew it, we were facing some shocking events every day. (P_1)

Main category: The process of transition from unknown conditions

Perceived stress from caring for coronavirus disease (COVID-19) patients in nurses represented the process of transition from unknown conditions. During the transition of this process, the nurses found themselves in a complex situation, many of which they experienced for the first time due to the fact that COVID-19 is unknown. This unknown condition was experienced by the nurse as caregiving stress, impression on all aspects of life, COVID as a strange disease, stress caused by the patient characteristics and stress reduction over time.

Discussion

This study aimed to evaluate the perceived stress of nurses caring for coronavirus disease (COVID-19) patients. Overall, the findings indicated that nurses caring for COVID-19 patients during the process of transition from unknown conditions experience varying levels of stress for a variety of interrelated reasons, such as stress in caregiving, fear of disease transmission to family members, strange features of COVID-19, patient characteristics and time to deal with the outbreak of COVID-19. The nurses used different words to express their fear, for example, fear to the point of death, too much, terrified, a little and so on. In line with the findings of this study, other studies have emphasised the high level of stress perceived by nurses caring for patients with COVID-19 (Ruiz-Fernández et al., 2020; Shen et al., 2021; Zhang et al., 2020).

The current study also showed that nurses experience some kind of stress in caregiving when caring for patients with COVID-19. This caregiving stress can stem from 'periods full of stress', 'challenges in care', 'lack of personal protective equipment' and 'uniqueness of patients'. In line with these findings, another study showed that among the reasons for caregiving stress in nurses were the increase in demand for care, presence on the front lines of patient care and lack of personal protective equipment (Ruiz-Fernández et al., 2020; Willan et al., 2020). What seems necessary is an effort to reduce this caregiving stress that can be achieved through greater collaboration between professionals, communication and organisational support (Aryankhesal et al., 2019).

The results showed that an important factor that increases the perceived stress of nurses is the fear of transmitting the disease to family members. Nurses are constantly afraid of being infected and transmitting the disease to their families. Many of them consider their infection to be inevitable but stated that they cannot cope with the feeling of guilt and worry about family infection. According to Ehrlich et al., healthcare workers are afraid of infecting their family, friends, colleagues, communities and country; despite this fear, however, they continue to fight on the front-lines for patients with COVID-19. Therefore, it is everyone's public duty to follow the protective instructions to prevent the transmission of the disease (Ehrlich et al., 2020). Another study stated that the stress of transmitting the disease was higher in nurses who had elderly people and/or young children in their families (Lee et al., 2005).

The findings showed that COVID-19 has become a strange disease due to its 'unpredictable course', 'high mortality', 'creation of special critical situations' and 'being unknown'. These features have created a critical situation for the whole world and increased the stress perceived by nurses in caring for patients with COVID-19. The world experienced SARS in 2003 and MERS in 2012 with the coronavirus outbreak (Chan et al., 2013). In all of these epidemics, high prevalence and high mortality rates caused a crisis (Chan et al., 2013; Tian et al., 2020). In fact, being drawn against an unknown and health-threatening situation can cause stress (Farsi et al., 2021). In contrast, knowing about the disease makes us less stressed on the face of it, but unfortunately, we did not know this at the beginning of the COVID-19 outbreak (Grech, 2020).

Data analysis showed that patient characteristics can also affect the perceived stress of nurses in caring for a patient with COVID-19. Although the COVID-19 mortality rate is higher among elderly patients (Tian et al., 2020), nurses experience high stress in caring for young patients because they feel sympathetic towards them.

When nurses face public health emergencies, psychological stress reactions will occur because of a sense of uncertainty and potential harm (Singh et al., 2020). Data analysis showed that the perceived stress of nurses was very high at the beginning of the COVID-19 virus outbreak, and as time passed, the perceived stress of nurses decreased. When demands of a situation exceed the resources available, individuals may feel stressed, arousing a psychological response to the perceived threat (O'Dowd et al., 2018). Therefore, nurses experienced high stress at the beginning of the COVID-19 outbreak and this calmed down over time (Zhang et al., 2020).

It should be noted that these categories are somewhat related, and an increase or decrease in one affects the others. For example, having a family member with COVID-19 evokes guilt and stress in the nurse, which affects the patient's care and reduces his/her performance, and causes caregiving stress between nurses in the ward. Therefore, it is important to take comprehensive action to reduce the reversible causes of increased nurses' perceived stress, as this is not a one-dimensional, straight-line mode with an interconnected network of causation.

Implications of the present study

The implication of this study is to identify what happens to nurses when caring for patients with COVID-19. Once it is understood how nurses perceive the stress of caring for patients with COVID-19, effective steps can be taken to reduce this stress and make nurses more comfortable. The following ways are suggested to reduce the perceived stress of nurses: to provide personal protective equipment as soon as possible for the treatment staff, especially nurses; to provide psychological support to nurses in critical situations with the availability of psychiatrists and psychologists; up-to-date information from reliable scientific sources in this matter should be provided to them; the spread of rumours and the presentation of false information in various news sources including social media should be prevented; volunteer nurses should be used in the COVID-19 wards and appropriate incentives for the work of nurses in the COVID-19 wards such as financial support to be given more.

Limitations

One of the limitations of this study was the low sample size. Although the data were collected from two hospitals in Tehran and the number of participants was low, we tried to reach data saturation. Some participants may not have shared their real experiences, and to counter this limitation, we tried to win their trust and establish a good relationship with them, and emphasised that the results will remain anonymised.

Conclusion

The results of the current study showed nurses experienced the process of transition from unknown conditions. Several factors such as caregiving stress, fear of disease transmission to family members, strange characteristics of COVID-19, patient characteristics and stress reduction over time are involved in the formation of stress in nurses caring for patients with COVID-19. It was also found that these factors are related to each other, so a comprehensive action can reduce nurses' perceived stress from COVID-19.

Key points for policy, practice and/or research

- Identifying the factors influencing the perceived stress of nurses in caring for a patient with COVID-19 can help them in caring for these patients.
- Intervention to reduce perceived stress by nurses increases the quality of care.
- This form of perceived stress can recur in infectious crises and other acute clinical cases.
- The results of this study will be effective in primary and secondary prevention of perceived stress in similar cases.
- It is important to take comprehensive action to reduce the reversible causes of increased nurses' perceived stress.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Consent for publication

The consent information explicitly explained the possibility of the results being published.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical approval

This study was approved by the ethical committee of the Aja University of Medical Sciences (ID: IR.AJAUMS.REC.1399.268). All methods were performed in accordance with the relevant guidelines and regulations (e.g. Declaration of Helsinki). The purpose and manner of the study were explained to all participants. Written informed consent was obtained from the participants to reduce the risk of disease transmission through potentially contaminated papers and pens. The participants were assured of the anonymity and confidentiality of the information and audio files and that they had the right to withdraw from the study at any time.

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