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The Psychological Change Process of Frontline Nurses Caring for Patients with COVID-19 during Its Outbreak

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ABSTRACT

Aim: To identify the psychological change process of the registered nurses who worked in the epicenter of the COVID-19 outbreak.

Background: The pandemic of COVID-19 has continued to pose an unprecedented threat and challenge to people's health around the world. Nurses are at high risk because they work within the closest proximity to patients. Understanding nurses' psychological change process during the care for patients with COVID-19 is imperative for healthcare leaders.

Methods: This was a qualitative descriptive study that took place in a hospital in Wuhan, China, the epicenter of the COVID-19 epidemic, from February 9th to March 15th, 2020. Using purposive sampling, we interviewed 23 nurses. Data were analyzed using Colaizzi's method of data analysis to find, understand, and describe nurses' experiences.

Results: The psychological change process of frontline nurses included three stages, early, middle, and later stages. The psychological characteristics of each period were ambivalence, emotional exhaustion, and energy renewal, respectively. Nurse leaders were anchors in facilitating frontline nurses' psychological adaptation.

Conclusions: In the past month, the psychological characteristics of nurses changed over time. The study indicated the necessity for nurse leaders to implement intervention programs based on nurses' psychological characteristics in different periods to promote nurses' health during this critical time period.

Introduction

Novel coronavirus disease is an acute respiratory disease caused by a novel coronavirus, which the World Health Organization (WHO) named COVID-19 (WHO, 2020). The main clinical symptoms of COVID-19 are malaise, fever, cough, and shortness of breath (Centers for Disease Control and Prevention [CDC], 2020). This disease is highly contagious and has quickly spread and become pandemic around the world (CDC, 2020). At the time of this writing (April 3, 2020), the disease has spread globally, with more than a million confirmed cases and 50,000 deaths worldwide (CDC, 2020; WHO, 2020). These numbers continue to rise. The novel coronavirus disease was initially reported in Wuhan City, Hubei Province, China, in January 2020. The disease was quickly spread in January 2020, and Wuhan became the epicenter in China.

With the sudden eruption of confirmed cases in Hubei province, there was a great need for resources in the epicenter of China, especially healthcare staff and materials. The

Chinese government implemented a short-term strategic plan, sending healthcare professionals, including physicians and nurses, from all over the country to Hubei for the rescue. These nurses and physicians signed up voluntarily to be selected by the hospital leaders according to the needs of the national rescue center. Consequently, 42,000 medical staff across the country, with nurses accounting for the majority of the workforce, were deployed to Hubei to help the epicenter take care of the most significant number of patients infected in China.

Healthcare workers, particularly nurses, are at high risk of being infected because they are in the closest proximity to patients. The pandemic of COVID-19 is stressful for healthcare workers. Current research has already shown that healthcare professionals suffer from psychological distress due to COVID-19 pandemic (Chen et al., 2020). They experience considerable psychological distress when working with patients diagnosed with COVID-19, including social isolation, role conflicts, fear, and anxiety (Chen et al., 2020).

The fear and anxiety caused by an infectious disease can be devastating if not appropriately identified and managed. Due to the sudden outbreak of the disease, we do not know what nurses experience when caring for patients with COVID-19, especially during the situation where nurses are sent away from their usual work environments to work in the epicenter. These nurses have been working in the epicenters for more than a month now. It is essential to understand the psychological changes in these nurses and ways to manage their stress. This information is urgently needed by nurse leaders to design plans for stress management and interventions to maintain nurses' psychological well-being. The purpose of this study is to examine the psychological experience and change process of nurses in the epicenter of COVID-19 and to provide strategies that nurses could use to handle their stress.

Methods

Study design

This is a qualitative descriptive study designed to explore nurses' experiences when caring for patients with COVID-19. Data were analyzed using Colaizzi's method of data analysis to find, understand, and describe nurses' experiences.

Ethical consideration

The Hospital Research Ethical Committee approved this study.

Setting and sample

This study took place in a university-affiliated hospital in Wuhan, China. It was a hospital designated to treat severe patients with COVID-19, such as patients who needed to be on ventilators. The participants in the study were frontline nurses who voluntarily signed up and were then selected to go to Wuhan to help take care of the patients with COVID-19 in the epicenter of China.

A purposive sampling method was used to select participants, who worked in the isolation unit, provided direct care for patients confirmed with COVID-19 infection, and voluntarily consented to participate in the study. Nurses were excluded if they did not want to participate in this study or left the isolation unit in the past month due to physical discomfort. Information saturation was applied as a standard to gauge the sample size (Sandelowski, 1995).

We used emails to recruit nurses. When they replied and indicated their interest, the first author set up an appointment with the potential participant to explain the study. After obtaining their consent, the first author conducted the interview, which was recorded through WeChat video, a social media platform. Nurses were assured that their participation and information provided would be anonymous and kept confidential.

Data collection

Data were collected through semi-structured interviews, which were recorded by WeChat video. The interview questions were developed by the research team and tested with two frontline nurses who worked in an isolation unit. The grand tour questions used to begin the interviews were, "Could you describe a typical day in the isolation unit, caring for COVID-19 patients in the past month?" "How have your psychological feelings changed during this past month?" Probing questions were asked to encourage participants to elaborate on their experiences.

During the interviews, field notes were taken, including the tone of nurses' speech, special facial expressions, and gestures. The interview techniques, such as rhetorical questions, repetition, summary, and response, were used to obtain the most real psychological feelings during the interview process. The duration of each interview lasted 30-50 minutes. To ensure the accuracy of the information, the team members converted the recording into text within 24 hours after the interviews.

Data analysis

This was a qualitative descriptive study to explore nurses' experiences in caring for patients with COVID-19. Data were analyzed using Colaizzi's method of data analysis to find, understand, and describe nurses' experiences. Colaizzi's data analysis method provided a rigorous analysis closely based on the data and generated a concise description of the phenomenon under study (Colaizzi, 1978). The process of the data analysis included (a) Reading the transcription of the interviews in its entirety to achieve an overall understanding of its content; (b) Analyzing and extracting significant statements; (c) Encoding and collecting recurring statements of opinions; (d) Classifying similar initial codes in more comprehensive sub-themes; (e) Summarizing major themes from the sub-themes; (f) Returning to the interviewees for verification.

The first author was the primary coder, who discussed the coding process with the team throughout the coding process. If there were disagreements among team members about the codes, the team would read the original transcripts to look for participants' original meanings. The coding agreement was achieved among team members.

Results

Demographics of the participants

Twenty-three nurses participated in the study. The average age of the nurses was 31.5 years old. The average working experience was 7.58 years. Nurses' education was mainly a Bachelor of Science in Nursing. The details of the nurses' demographic characteristics are displayed in Table 1.

Table 1. Demographics of participating nurses (n = 23).

Demographics		n (%)
Gender	Female	18 (78.3)
	Male	5 (21.7)
Age (years)	23-30	15 (65.2)
	31-35	4 (17.4)
	36-40	4 (17.4)
Working experience (years)	2~5	15 (65.3)
	6~10	3 (13.0)
	11~15	3 (13.0)
	16~20	2 (8.7)
Education	Associate's degree	3 (13.0)
	Bachelor's degree	17 (73.9)
	Master's degree	3 (13.0)

The psychological characteristics and change process of the nurses

The psychological changes of the nurses who worked in the epicenter went through three stages. These stages included the early stage (ambivalence), middle stage (emotional exhaustion), and later stage (energy renewal). Nurses had distinct psychological characteristics in each of the stages.

Early stage – Being ambivalent

The early stage was when nurses received the notice to go to the epicenter until entering the isolation unit. In this stage, when nurses were notified that they were selected to go to Wuhan, their psychological experience was mainly being ambivalent. They were torn between a sense of professional mission and fear of being infected.

On the one hand, nurses were excited and felt proud that they had the opportunity to serve and fulfill the professional responsibility and commitment, which made them step forward without hesitation. A nurse articulated, “As a healthcare worker, I have the obligation and responsibility to treat patients who are suffering. As a nurse, my education prepares me with the ability to care and comfort patients and families.” A national disaster, like the COVID-19 pandemic, united the people and made a nation stronger. Nurses, as a major workforce in the fight against the epidemic, are duty-bound to care for others, who are respectfully called “anti-epidemic heroes” in China.

On the other hand, however, nurses unavoidably feared the uncertainty in front of them because COVID-19 was indeed highly contagious. The feeling of fear was particularly strong during the early stage of the disease outbreak. The lack of understanding of the virus and the therapeutic regimen of the disease, coupled with reports of a sharp increase in the number of infections every day (more than 1,000 people were diagnosed every day), added to their worries of themselves and their family members’ safety. Besides, reports, showing that healthcare professionals were infected with or even died due to COVID-19, further intensified nurses’ fear. Recalling the moment of departure from their original city, three participants burst into tears because of the uncertainty about their safety and time to return home. One nurse indicated with a crying voice, “I sometimes even wonder if I can come back home alive.” The early stage is

characterized by nurses’ ambiguity of the commitment to serve and the unavoidable fear.

Middle stage – Emotional exhaustion

The middle stage was the time when nurses entered into an isolation ward for 1–2 weeks. At this stage, the negative psychological experience of the nurses was most significant because they started to face challenges from various aspects, including unfamiliar working environment and colleagues, bulky personal protective equipment (PPE), isolated loneliness, and risk of getting infected.

Nurses’ main psychological characteristics in this stage were anxiety, depression, somatization, compulsiveness, fear, and irritation. They had to familiarize themselves with a new working environment and complex work procedures. One nurse pointed out that “Everything here is new and unfamiliar, including the cold and humid climate of the south, working environment and colleagues, which made me feel very anxious.” Another nurse mumbled in a low voice that “I don’t want to talk to anyone. I feel suffocated and depressed when I come here.”

In addition to adapting to the pressure of work and environment, nurses said that the heavy PPE garment made them feel that it was hard to breathe, and they experienced chest distress. These physical discomforts aggravated nurses’ psychological stress. However, because of their fear, they wanted to make sure that they wore the PPE correctly. They were scared to be infected with COVID-19. One nurse emphasized, “I repeatedly looked into the mirror to see if the PPE was properly equipped and sealing good. When wearing the heavy protective equipment into the ward for the first time, I felt out of breath, chest tightness, and scared. The goggles were covered with fog in less than half an hour, and because of that, I could not see clearly.” Another nurse added, “During the first few days working in the infected zone, I was very nervous. I constantly recalled the nursing procedures that I learned during my orientation in the isolation unit.” Nurses were very anxious and were afraid to get infected if they did not wear the PPE correctly.

Besides their own challenges and fear to conquer, nurses also faced tremendous challenges of patients’ adverse emotions, including irritability, noncompliance with treatment, and even aggressive behaviors. One nurse said slightly angrily, “It was infuriating that they were still unwilling to cooperate when we risked our lives to take care of them.” Under these situations, what made matters worse was that nurses could not seek support or embrace their colleagues directly because a close personal distance could cause cross-infection. Nurses, especially younger ones, started to feel emotionally depleted. Some younger nurses began to show an overexcitement and a higher-level of aggressive response to various work situations. Consequently, this continuous state of excitement led to a rapid loss of physical energy, and nurses began to experience physical signs and symptoms, such as insomnia, sore throats, and fatigue.

Later stage – Energy renewal

The third stage was the period of 3–4 weeks after nurses worked in an isolation unit. It was during this stage that nurses' psychological adaptation began to occur. This might be mainly due to nurses' familiarity with the work environment and processes, the mutual support of team members, the social support, the monetary incentives, and the recognition from the government and public. They felt that what they were doing was meaningful and valuable to the health of the people and the nation. Their energy was renewed by recovering the original purpose of their commitment to care, reevaluating the value of the nursing profession, taking pride in their contributions, and having an elevated sense of personal accomplishment.

One nurse explained, "I feel good now and more devoted to nursing work. Psychologically, I am not as nervous as I was when I first entered the isolation unit." The recovery of patients or improvements of their conditions were also positive incentives for nurses, especially when patients gave affirmation and praise to them. One nurse mentioned, "Patients bowed to us when they were discharged. Their actions of appreciation touched me, which energized me and made me have a great sense of achievement."

Simultaneously, the multifaceted support provided by nursing managers, such as protection training, shift adjustment, psychological comfort, also helped nurses to relieve physical and psychological stress. One nurse said that "nurse leaders' caring actions, such as letting us take off work during the menstrual period, made me feel cared." Another nurse said, "That was my first in-depth conversation with our director, which is unforgettable and makes me feel warm."

Discussion

When nurses face public health emergencies, psychological stress reactions will occur because of a sense of uncertainty and potential harm (Singh et al., 2020). The emergence of negative psychological emotions can lead to tension or fragility of various organs and systems of the body. These impact their health and performance on the nursing job, reducing the quality of care provided and hence patient safety (Chen et al., 2016; Johnson et al., 2017). This research reveals the process of nurses' psychological changes in the first month and shows the pattern of ambivalence, emotional exhaustion, and energy renewal.

Most of the nurses indicated that they volunteered to help patients with COVID-19 in Wuhan, driven by a strong sense of mission and responsibility. During the outbreaks of the disease, nurses were aware of the severe shortages of nurses in the epicenter. Nurses felt that it was their sacred mission to serve in times of a national crisis that coincided with their patriotic enthusiasm and made them want to serve. The sense of responsibility of the nursing profession was another reason to support nurses working in the epicenter because they saw serving patients as their mission. They regarded nursing as their individual and professional responsibility and commitment to doing their best to care

for patients (Wu et al., 2019). When nurses witnessed the sufferings of others, their altruism helped them show empathy and provide relief (Lee, 2016; Wu et al., 2009). However, even though this sense of mission made them step forward bravely, they were still afraid to work in the epicenter because of their perceptions of danger.

This respiratory infectious disease had an unusual propensity to arouse fear because the infection was transmissible, imminent, and invisible (CDC, 2020; WHO, 2020). During the Severe Acute Respiratory Syndrome (SARS) epidemic, hospital employees who worked in high-risk locations, such as SARS units were two to three times more likely to have high posttraumatic stress disorder (PTSD) symptom levels than those without this exposure. PTSD symptom levels were positively associated with their perceptions of SARS-related risks (Wu et al., 2009). In the early stage of the COVID-19 outbreak, the uncertainty about the source of the virus, the lack of special treatment, and the high infection rate, or even death of health care workers, all compounded nurses' fears. It triggered their compulsive thinking of "what will happen if I was infected?"

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). In the second stage, nurses' negative psychological experiences were most significant. In this stage, nurses confronted multifaceted pressures. Organizationally, nurses faced unfamiliar environments, complex workflow, and dangers posed by exposure to COVID-19 patients. Personally, nurses experienced interpersonal isolation and fragile resilience.

Interpersonal isolation emerged because of the necessity to use PPE and physical distance (Sohrabi et al., 2020). Exposure to infectious disease also reduces the availability of social support, especially support from family, which could have buffered the impact of stress. When facing those stressors, nurses were more susceptible to developing various types and degrees of negative emotions, including anxiety, depression, somatization symptoms, and even specific stress-related behaviors, such as compulsive hand washing.

The finding of the study about nurses' psychological changes in the third stage was consistent with the research on nurse burnout and self-care. Nurses confronted with stress could renew their energy by practicing self-care strategies. Wei et al. (2020) have identified six strategies to promote self-care: finding ones' energy sources, nurturing trusting and enjoyable work relationships, performing emotional hygiene, reforming meanings of stressors and events, practicing gratitude with a positive attitude, and recognizing ones' strengths and uniqueness.

The care and support of leaders, adequate PPE, and strict pre-job training were all sources of energy, which could reduce the risk of getting infected. The gradual establishment of collegial interpersonal relationships in the epicenter provided enjoyable work relationships. Besides, patients' gratitude, public praise, and government support all have enhanced the dignity of nurses and their sense of professional value. Together, these may have inhibited the emergence of psychological disorders.

The implication for nursing leaders

Identifying negative psychological response and promoting emotional expressions in the first stage

This study indicates that it is essential for nurse leaders to devote more attention to nurses' psychological responses and identify their negative emotions in time. Nurses in this study had a common psychological expression, fear. They feared the unknown, the uncertainty, and the uncontrollable situations. Fear could generate fear-related behaviors that were associated with increased psychological distress and psychiatric disorders (Shultz et al., 2016). Nurse leaders can design and implement appropriate interventions to help nurses relieve their fear. For example, nurse leaders can have psychologists or psychosocial therapists come and talk to nurses or use certain activities, such as mindfulness practice, writing work logs, communicating and expressing feelings among team members, or yoga, to help nurses alleviate their psychological symptoms (Lehmann et al., 2015; Lin et al., 2015; Yang et al., 2018).

It is also recommended that leaders communicate with nurses directly and encourage them frequently so that they feel cared for and valued. Paying attention to nurses' needs is an early intervention, which will make nurses feel the altruism that their leaders convey (Wei et al., 2019). This could promote nurses' willingness to express their emotional needs.

Providing work-related support in the second stage

While nurse leaders encourage nurses' emotional expressions, providing work-related support, such as adequate PPE, equipment needed to care for patients, and appropriate training, for nurses working in the isolation unit, is essential. Without proper protection, nurses working with COVID-19 patients are directly exposed to a hazardous environment. As stated in Maslow's hierarchy of needs, the bottom and the most basic human needs are physiological and safety needs (Abulof, 2017). Only when nurses' basic physiological and safety needs are met, will they be able to experience love, esteem, and self-actualization and be motivated to provide the same to others without feeling energy-depleted or burnout.

Healthy nurses and other healthcare workers are the backbones of a healthy nation. Providing maximum protection and meeting nurses' physiological needs in the working area are fundamental protective mechanisms to prevent nurses from being infected and from running out of energy or burnout. The WHO, on March 3, 2020, called on industry and governments to increase manufacturing PPE by 40 percent to meet rising global demands. In addition to making sure that nurses have enough PPE, nurse leaders should arrange appropriate training for nurses, including the standardized process of wearing and removing PPE cautiously, precautions against infection when caring for patients, and appropriate training on using treatment equipment. Especially, the newly graduated nurses should receive more training because they lack experience in the treatment of

major infectious diseases and have limited clinical work experience compared to experienced nurses. In addition, nurse leaders should make sure that nurses have flexible, as well as shorter shift durations in the isolation unit, to ensure adequate rest (Lehmann et al., 2015).

Nurse leaders adjusted the time of each shift from 6 hours to 4 hours, combined with the time spent wearing protective clothing and disinfecting, which was approximately equal to the regular working hours. And this action has been recognized and appreciated by the nurses there. However, it should be pointed out that shorter shift duration means that more nurses should participate in the work of the isolation unit, so it is suggested that nursing managers should make adjustments according to the practical scene. To frequently check on nurses about their physical and psychological needs and experiences were recommended for nurse leaders, which can help them identify and address nurses' needs in a timely manner.

It is worth noting that the average age of the nurses in the study was 31.5 years old, of which 15 (65.2%) were nurses less than or equal to 30 years old. More importantly, young nurses might be less experienced in handling disastrous situations and infection control measures, especially when they face more significant job challenges and bear more pressure. Hence, nursing managers should be reminded to pay more attention to young nurses when providing work-related support.

Enhancing nurse adaption and fostering nurse resilience

In the third stage, nurse leaders can help nurses improve their adaptability by providing stress adaption skills, like nurturing a trusting and enjoyable work atmosphere and promoting support among colleagues. Nurse leaders play an essential role in building supportive interpersonal relationships at a workplace, which can significantly improve nurses' psychological health (Wei et al., 2018). Previous studies showed that even after the public health epidemic ended, personnel who participated in medical assistance but were not infected still had varying degrees of stress disorders even 1-2 years later (Vyas et al., 2016). Psychological resilience could help individuals cope with continual difficulties and challenges at work and in life (Britt et al., 2016). Improving the resilience of nurses to thrive or flourish after experiencing stressful events could help nurses adapt quickly and reduce the long-term effects of negative psychological experiences.

Limitations

A major limitation of this study was related to the time of the data collection. We interviewed nurses after they had worked in the isolation unit for a month. At that time, nurses were in their third, energy renewal, stage. There might be a recall bias for their experiences in the first and second stages. Nonetheless, this study found that nurses' experiences could provide valuable information for nurse leaders to understand nurses' needs at various stages.

Conclusions

Nurses play an irreplaceable role in the rescue work in the COVID-19 pandemic. They constitute a significant workforce in caring for patients during this challenging time. They experience noticeable psychological changes over the course of their caregiving. While they care for others, they need to be cared for and valued themselves. They have feelings of ambiguity and fear. Nurse leaders can facilitate front-line nurses' psychological adaptation to their work environment changes.

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