



## Qualitative Research on COVID-19-infected Pneumonia Patients: Patients' Perceptions and Psychological Experiences and Needs

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### Abstract

**Purpose:** To provide COVID-19 patients with appropriate references, for designing and implementing appropriate interventions, and prevention and control measures, the perception, psychological experiences, and needs of patients experiencing COVID-19 coupled with pneumonia were investigated.

**Patients and Methods:** This study adopted the phenomenological method for qualitative research. Twenty-two COVID-19 patients were interviewed through semi-structured interviews using WeChat video calls and speech synchronization. The seven-step analysis method by Colaizzi was used to sort, code, classify, summarize, and refine the data on the cognition, psychological experiences, and disease prevention and control demands of COVID-19 patients.

**Results:** According to the qualitative data, the perceptions of patients were categorized into two themes: (1): Lack of knowledge, beliefs and practices; (2): Diseases affecting normal life. Psychological experiences of disease were categorized into two themes: (1): Stage reaction after catching the illness; (2): Post-traumatic growth. Disease prevention and control demands were categorized into three themes: (1): Disease information acquisition needs; (2): Medical service security needs; (3): Humanistic care needs.

**Conclusion:** COVID-19 patients had a low level of awareness of the virus' significance and lacked knowledge about the disease, as evidenced by their perceptions of the disease. They are easy to experience negative psychological experience, eager to ask for understand and help. In the case of COVID-19 with pneumonia, there is a strong demand for information about the epidemic and for physiological and psychological help. Medical staff should integrate resources from all walks of life, actively guide patients, meet patients' needs, and enhance their ability to cope with the pandemic. This study provides reliable information for medical personnel to deliver interventions and prevention and control measures for patients with COVID-19 with pneumonia.

**Keywords:** COVID-19; Perception; Psychological experience; Qualitative research; Phenomenological method

### Introduction

The novel Coronavirus (COVID-19) outbreak occurred in Wuhan, China, in late December 2019 [1]. Since its discovery, the disease has rapidly spread worldwide. Recently, the number of overseas patients has increased [2]. According to the WHO daily epidemic report, as of on August 25<sup>th</sup>, 2020, there are 23,518,343 confirmed cases of COVID-19 in the world, including 90,264 cases in China, 23,428,079 cases outside China, and 810,492 deaths, involving 216 countries or regions [3]. The pandemic has become a "public health emergency of international concern," seriously threatening people's health, lives, property, safety, and even the world's economy. Unfortunately, to our knowledge, most of current qualitative and observational researches on COVID-19 with pneumonia are concerned with the psychological experiences and cognition of both medical staff and residents [4-6]. And few studies search the perceptions, psychological experiences and needs of patients with COVID-19 during the period of being treated. Thus, this qualitative study aims to understand such patients' perceptions and psychological experiences and needs, to help medical personnel realize vital intervention measures. Face-to-face and semi-structured in-depth interviews were conducted through WeChat video calls and voice recordings. The perceptions and psychological experiences and needs were discussed in-depth, focusing on the patients' perspectives. This study

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aims to provide a reference for the design and implementation plans for future interventions and prevention and control measures targeting patients with COVID-19.

## Research Objectives and Methods

### Research objectives

A purposive sampling procedure was used to recruit patients. The COVID-19 patients were selected in Wuhan Leishenshan Hospital from February to March 2020. The inclusion criteria for participants included the following: 1) diagnosed with COVID-19 by etiology or serology, 2) patient has stable mental health, good communication skills, and acceptable physical condition for an interview, 3) willingness to participate in the study and to sign informed consent, 4) participants did not attend other research at the same time.

Exclusion criteria included the following: 1) serious illness and coma, 2) poor comprehension ability and inability to participate in the interview normally. Researchers (JJ.L & GD.L) in the recruitment site assisted in identifying eligibility, including registration information and medical histories. The sample size of the interview was saturated given that there were no new topics or ideas after the data information was analyzed.

### Research methods

Using the phenomenological method for qualitative research, As COVID-19 is highly transmissible, semi-structured in-depth interviews were conducted through the social media application, WeChat, using video calls and voice recordings. This way is still personalized and in-depth. Through a detailed literature review, we designed an outline of the semi-structured interviews, and then consulted experts for confirmation. Pre-interviews were conducted for five patients. The outline was adjusted and improved according to the interview results.

The interview outline includes the following questions: 1) Under what circumstances was the COVID-19 confirmed? What did you feel at that time? How were you able to regulate these emotions? 2) Would you please elaborate on the experiences and feelings after the diagnosis of the disease and subsequent hospitalization? 3) How do you think the COVID-19 has affected you? 4) What are your biggest pressures and worries at the present? 5) What do you know about COVID-19? How do you know that? 6) What kind of help would you like to receive after your bout with the disease? 7) Do you think that the measures taken by the medical staff during your hospitalization met your needs for the disease? If not, what additional interventions are needed? 8) How do you think your life will change after your discharge? 9) What other help would you like to receive after discharge?

### Data collection

The data were collected in in-depth interviews, which were mainly conducted by the first author. The first author, CX.W was a master student with the ability to understand most local dialects. CY.L was another researcher also with the ability to understand most local dialects, helping to take field notes without speaking during interviews. Both of the researchers were trained about the description of the study and principles of ethics. Before the interview, a researcher (JJ.L) prepared the remote interview equipment and established a network connection, and introduced two interview researchers (CX.W & CY.L) to the participants. Two researchers (CX.W & CY.L) approached recruited participants to get the trust of the respondents.

Patients were provided comfortable, quiet, and private rooms for the interviews, and the purpose and process of this study were explained to the patients in detail. In addition, the necessity of an on-site recording was explained and consent of the research participants was obtained. During the interview, we ensured to create a relaxed atmosphere, show respect to patients, and focus on listening to their responses, and record the interviews. To ensure the accuracy and comprehensiveness of the data, the patients were not provided any inductive suggestions and were simultaneously carefully observed and recorded for changes in facial expressions, body language, and voice tones. Each patient was interviewed once or twice, with each session lasting 40 min to 60 min.

### Data sorting and transcription

Within 24 h after the interview, the first author (CX.W) and another researcher (CY.L) converted the interview video into text and printed the text. Firstly, the first author watched the interview video repeatedly to get familiar with all aspects of qualitative data. In the process of transcription, when you encounter an obscure dialect, consult with another researcher. Secondly to reduce the information loss caused by transcription, as much as possible, it is necessary to also consider non-verbal information such as sighing, frowning, and shaking of the head. After transcription, the researcher supplemented the transcripts with interview notes and listened to the recordings to ensure the accuracy of the information. Finally, the translated text was anonymized and the interviewees were numbered.

### Data analysis

To ensure the integrity and accuracy of the data, the collected data were analyzed and interpreted through Colaizzi's seven-step analysis method [7]. The interview text was read carefully and repeated opinions were coded. The codes were classified and the integration results were described to form a structural framework. Finally, the research object was reviewed for reliability and validity verification. The researchers made the final grouped themes have a certain internal relevance according to a certain order and theme. After finishing the analysis process, the first author asked another two researchers (JJ.L & CY.L) for opinions and invited an expert (GD.L) to discuss the identified themes for further reliability.

### Ethics

The study was approved by the ethics committee of Shuguang Hospital Affiliated to Shanghai, University of Traditional Chinese Medicine (2020-798-05-01). The patients voluntarily participated in the study and signed informed consent. This study was conducted in accordance with the principles of the Declaration of Helsinki.

## Results

### Demographic data of interviewees

In total, 26 patients were invited, one patient's condition changed, and the other three patients refused to talk about their disease, later only twenty-two patients from the Hubei Province of Wuhan City were included in this study. Table 1 provides the details of twenty-two participants' demographic characteristics.

### Perception of diseases

**Theme 1: Lack of knowledge, beliefs, and practices:** Patients with COVID-19 lack knowledge about the disease and its importance. Furthermore, awareness regarding proper protection is weak. These factors make the existing protection measures inadequate and hinder the prevention and control of the disease. This study summarizes

**Table 1:** Patients' demographic characteristics.

Characteristics	Total (N=22)	Percent (%)
<b>Gender</b>		
Male	13	59.1
Female	9	40.9
<b>Age (years)</b>		
Mean age	55.95	
Range	30-75	
<b>Age groups (years)</b>		
30-44	5	22.7
45-59	6	27.3
60-75	11	50.0
<b>Marital status</b>		
Married	20	90.9
Widowed	2	9.1
<b>Degree of Education</b>		
≤ High school	14	63.6
≥ Secondary specialized school	8	36.4
<b>Occupation</b>		
Farmer	5	22.7
Employed	4	18.2
Freelance	3	13.6
Retired	10	45.5
<b>Length of stay (day)</b>		
<14	15	68.2
≥ 14	7	31.8
<b>Clinical classification</b>		
Mild illness	7	31.8
Ordinary type	13	59.1
Severe cases	2	9.1

these manifestations as a lack of knowledge, beliefs, and helpful practices. 1) Lack of knowledge regarding the disease. Patient 10: "Don't know what the COVID-19 is? How did it spread? How do you protect yourself from it? I don't know anything about it! In daily life, self-protection is poor, whereas protection could help in blocking the COVID-19." Patient 21: "It is not recognized that the virus is very infectious and that protective measures are not in place." 2) Lack of attention to disease. Patient 18: "The main reason is that I didn't pay attention to the disease and I felt that I was in good health. How could I have thought that it was so easy to be infected." Patient 22: "I didn't realize the harm of the disease, I am indifferent to it. And laugh at the people around me" 3) Weak awareness regarding necessary protection. Patient 3: "In the process of buying vegetables and going home, I took off my mask for a while. When I went home, I found that I had a fever. As soon as I went to the hospital for examination, then I was isolated and hospitalized." Patient 11: "I have close contact with another positive patient because I take care of my partner who tested positive. I didn't do a good job of protection. After my wife was hospitalized, I went to the hospital to get tested and found that he was infected as well." 4) Lack of health education. Patient 5: "After the operation, the patient developed a cold. After the examination, the lung symptoms were mild." Patient 12: "What is health education? I only know to wear masks and to wash hands frequently to prevent contracting the new coronavirus."

**Theme 2: Disease affects normal life:** Patients stated that due to the COVID-19 pandemic, they had low financial resources, could not look after their families, suffered from physical injuries, seriously affecting their normal lives. Patient 8: "I am unable to work within one year, my family members were also infected, isolated, and their financial resources are worrisome. Oh! What should I do? (Frown)" Patient 9: "I couldn't work normally. I only earned a basic salary. I couldn't take care of my family for a long time in isolation." Patient 11: "My son has not been able to return to China for decades. We are both elderly and living at home. He is without any children to accompany him when he is ill" (puts head down and turns silent). Patient 22: "inconvenient life, difficulty in travelling, lack of interpersonal communication, a series of inconveniences (helpless smile)."

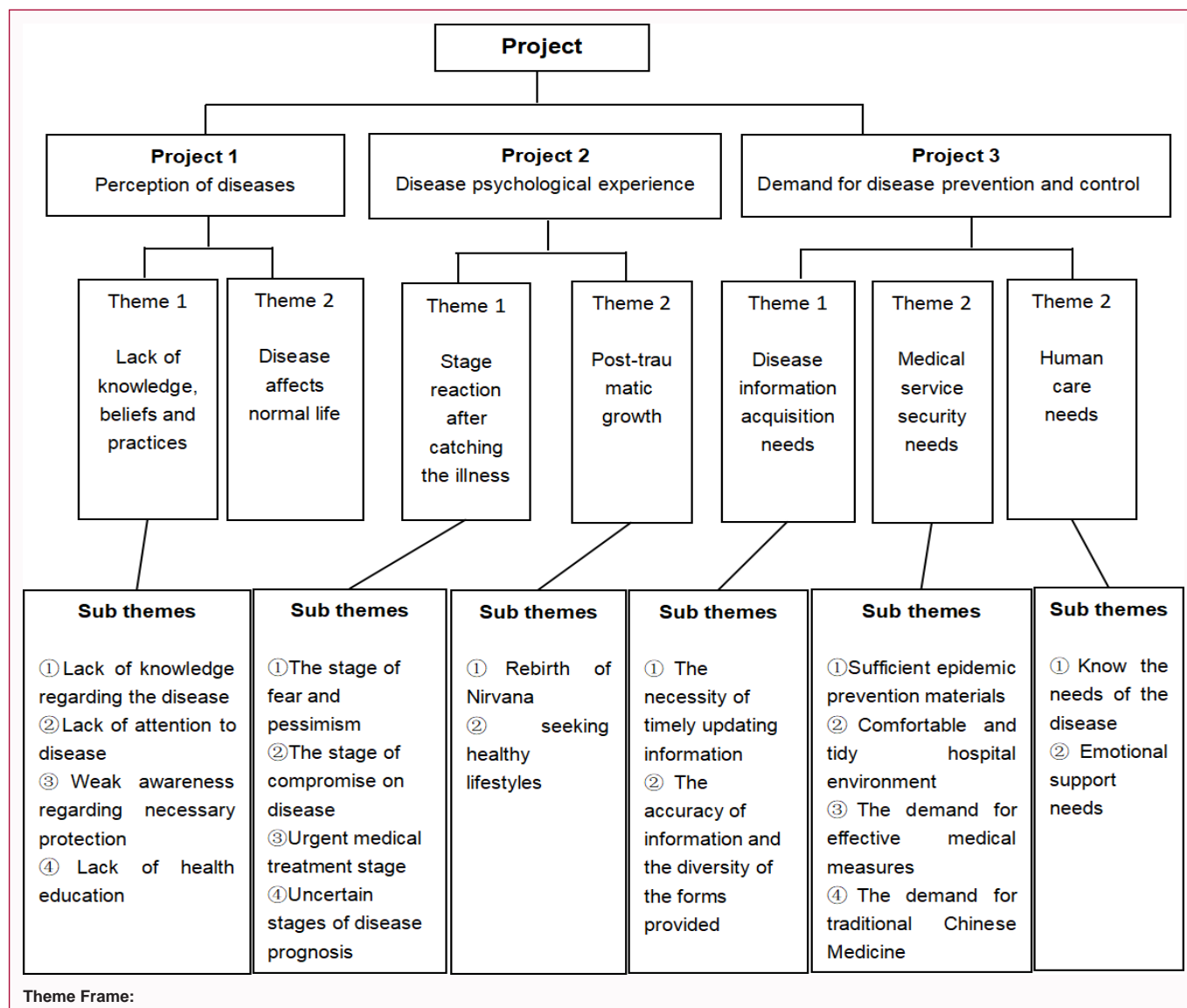
### Disease psychological experience

**Theme 1: Stage reaction after illness: 1)** The stage of fear and pessimism. The majority of COVID-19 patients showed negative emotions such as pessimism, depression, and fear after the interview. Patient 4: "On February 2<sup>nd</sup>, my case was diagnosed as viral pneumonia. I was desperate! I could not live in the upper house. I did not think I had a chance to survive! On March 7<sup>th</sup>, the positive nucleic acid test results sent me into despair" (eyes red with tears). Patient 10: "COVID-19 diagnosed in hospital when I contracted a fever. I felt panic after being diagnosed. Patient 11: I was in a pessimistic mood at that time, because my son was abroad and my wife had just been hospitalized. At that time, I was alone at home, feeling a little bit scared" (shaking his head and laughing bitterly).

**Theme 2: The stage of compromise on disease:** The delayed physical symptoms and changes in psychological attitudes lead to several patients compromised on the disease. Medical staff should use professional clinical knowledge and skills coupled with psychological interventions to understand and help these patients better. Patient 2: "Since it has been confirmed, treat it well! I have no choice but to rely on my country!" Patient 8: "No one told me that I had been diagnosed. I was eager to know my own situation. I was told after many inquiries. I was very calm and prepared for it." Patient 19: "At present, there is no specific medicine. My nucleic acid test has continuously turned negative, so we have to wait" (frown).

**Theme 3: Urgent medical treatment stage:** Due to the severity of the disease and the fear of its effects, patients expressed hope that they could be hospitalized for treatment as soon as possible to get optimum care and comfort. Patient 4: "The inpatient needs to be reported to the leaders of all levels in order. All the reports that need to be reported have been reported. We can't wait for the arrangement. On March 7<sup>th</sup>, the nucleic acid test result was positive. I wonder if we can wait for the arrangement of the superior this time. I'm very happy (smiling)! Patient 7: "On January 26<sup>th</sup>, 2020, I want to be hospitalized as soon as possible, but there were no ward spaces available, so I was only able to isolate myself at home and get medicine from the hospital. I was gradually stable after arranging treatment."

**Theme 4: Uncertain stages of disease prognosis:** The patients showed uncertainty about the disease prognosis. The psychological aspects primarily manifested in patients' feelings of shame because they have the disease. Physiological effects were primarily evident in the fear of causing sequela and the possible recurrence of the disease. Patient 2: "Other things are OK. I'm afraid of infecting children. I'm afraid that people around me will look at me with judgment. Even if I am already cured, I am afraid that people around me will not



dare approach me” (bows his head, bites his lips and resists tears). Patient 8: “I hope the government will continue to pay attention to my follow-up recovery. I hope that the society will not treat us differently. The best hope is that there will be no serious sequela.” Patient 7: “I saw a lot of people who were cured and discharged from the hospital two days ago and found that they have been re-infected after examination (suddenly loud). Will I get this disease again after I leave the hospital?”

**Theme 2: Post-traumatic growth**

1) Rebirth of Nirvana

After the illness, the interviewees had a new understanding of life, and had more reverence for life. Patient 8: “I used to have the thought that money and works are very important, so I just wanted to succeed. Can you understand the feeling? As long as I can live, nothing matters.” Patient 17: “After catching this COVID-19 was a narrow escape from death, which was like a walk in the palace of hell (Chinese saying), I found that life is the most important thing. I had a lot of things to do. I should cherish the present and live a good life.”

2) Seeking healthy lifestyles

In the COVID-19 patients, the level of self-care consciousness improved after being diagnosed with the disease. They hope to get ways to promote the recovery of health. Patient 18: “the COVID-19 infection caused too much damage to the body. During the hospitalization, the nurses taught us to practice Tai Chi, which were of great help to my illness. After discharge, I would continue to schedule regular examinations by said traditional Chinese medicine experts. Patient 19: “Why did I have to be infected? Is my body too weak? I will definitely eat more nutritious food in the future.” Patient 22: “Do a good job in personal protection, relax your mind, exercise regularly, and of course, focus on more information about health promotion.”

**Demand for disease prevention and control**

**Theme 1: Disease information acquisition needs:** The importance of disseminating reliable information regarding the disease is evident throughout the prevention and control stage of the pandemic. Patients are in urgent need of timely and accurate information related to the disease. This information should be diverse to provide awareness of different protective measures against the disease.

1) The necessity of timely updating information.



Updates regarding the COVID-19 must be provided promptly. Patient 11: "Due to the fact that the government did not inform the people about the actual situation of the pandemic, when my wife had a fever and cough last January 22<sup>nd</sup>, we thought it was just a common cold. I did not take protective measures when I took care of my wife for four days." Patient 17: "In the early stages of the disease, there were not a lot of publicity materials and prevention and control reports. This lack of information made us unable to correctly judge the situation and take insufficient preventive measures."

2) The accuracy of information and the diversity of the forms provided

The information provided about the diseases should be diverse and accurate. Patient 7: "I get health knowledge through the TV, Internet, and community health knowledge lectures. However, I found that the information published on the network is not consistent, and I cannot distinguish which information is correct." Patient 10: "After leaving the hospital, I still need more information regarding the prevention and control of the new coronavirus, so that I can prevent myself from contracting it again, in addition to also sharing the information with my relatives and friends. For some symptoms that are still present, I hope to guide them through publicity materials that may help protect them. I often communicate with the medical staff by phone and WeChat, and hopefully help speed up the recovery of the body."

**Theme 2: Medical service security needs:** 1) The demand for sufficient epidemic prevention materials.

Interviewees said that due to the lack of understanding towards the disease, the epidemic prevention materials did not be reserved in advance, and the epidemic prevention materials could not be purchased, so self-protection could not be done well in the event of a pandemic. Patient 13: "At the beginning of the pandemic, during the new year, many pharmacies did not open. I am old and my easily tired legs proved to be an inconvenience. When I went out to do errands, I did not wear masks at all."

2) Comfortable and tidy hospital environment

Patients expressed hope for a comfortable, tidy, and convenient hospital environment, which helps to prevent and control diseases. Patient 8: "There are only common kettles in the ward, and if it is more convenient to have a ward with a kettle, cross infection can be avoided to the greatest extent." Patient 1: "It is inconvenient to take the boil water in the morning." Patient 17: "Now I only have a very small activity scope, so I feel that my heart is closed and suffocated" (frown).

3) Demand for effective medical measures

The interviewees expressed the hope that they could get targeted medical measures for intervention during their hospitalizations. Patient 10: "During the hospitalization, we hoped that the doctor's diagnosis and psychological guidance will help us control our condition." Patient 21: "The main reason is that the waiting time in the hospital is too long, my psychological state is getting worse and worse, and there is pain felt due to the several drawing of blood, in addition to the fact that I am still a little worried about my condition. I hope that the medical staff can communicate with us more about our personal conditions."

4) The demand for Traditional Chinese Medicine (TCM)

Interviewees expressed hope that TCM may be relied on to help

recover from the disease, which may help enhance patients' confidence in fighting the disease. Patient 11: "When I went to Leishenshan hospital" (happy smile) "I received the meticulous care of the medical staff of the Shanghai medical team of traditional Chinese medicine. The staff taught me ways on how I can fight against the pandemic and to strengthen myself, which boosted my confidence in fighting against the virus." Patient 21: "I have received traditional Chinese medicine before. Once I get sick, I would take western medicine for injection. This time, I met Dr. Song in Leishenshan hospital. I really experienced the full expectations I had of traditional Chinese medicine and he answered my questions and concerns patiently. I believe and hope that the medical staff of the traditional Chinese medicine medical team will be able to go home safely" (clenching his fist, nodding, showing firm eyes).

**Theme 3: Human care needs know the needs of the disease:** COVID-19 patients hoped to learn about their condition clearly to understand the current situations better, which helped to calm and stabilize their moods. Patient 17: "I hope that during the hospitalization, the doctor can ask me more about my condition, and tell me the development of the disease and the examination data in detail, so that I can clearly know my current situation." Patient 21: "Nucleic acid tests, CT scans. And blood samplings are all done, but the results are not known. I hope that the medical staff can communicate more with us about the disease."

### Emotional Support Needs

Satisfying patients' emotional needs effectively improved their psychological problems, enhanced patients' confidence in fighting diseases, and improved their overall quality of life. This interview is mainly focused on two aspects of emotional support: Persistence in inner self belief-hope for life. Patient 18: "I told myself to dare to face the reality, persistence is victory" (refueling gesture). Patient 19: "The hospital nucleic acid diagnosis is a little difficult to accept. Patients should have help in comforting themselves, and should be told that their situation is not serious; it must be OK." Patient 21: "I need comfort for myself and my family. I'm slightly sick. I'm still young and OK." Social and emotional support from family. Patient 10: "I hope the communication between the patients can help me overcome the discomfort." Patient 11: "At this time, my son who is in a foreign country has information regarding our current situation. He calls me every day to comfort me. Our community's network members, property managers and secretaries are very concerned about my being at home alone. They not only encourage me in spirit, but also try their best to help me in life, and slowly get me out of my dilemma." Patient 22: "I hope that the outside world can cheer me on. I can definitely overcome the pandemic by contacting my friends and relatives through my mobile phone."

## Discussion

As we know, this study is one of the earliest qualitative researches on cognition, psychological experience and needs of patients with COVID-19 during the time of catching the illness. The data collected are the earliest data about the COVID-19 broke out in Wuhan, China. Although the disease has been well controlled in China, the situation abroad is still in a critical state. This study strictly follows the process of qualitative research. The results of this study are reliable and can be used as reference basis.

### Perception of diseases

COVID-19 has large populations are generally susceptible, if not

treated on time, risk the lives of those infected with the disease [8,9]. This study demonstrates that the knowledge concerning COVID-19 is not available to some patients, and the information regarding disease transmission is unclear. The necessary protective measures against the disease are not in place, leading to its rapid spread, unable to work and live normally, and harming the interests of themselves and their families. More information concerning COVID-19 is critical for the prevention and control of its spread. The results of this study show that COVID-19 patients had insufficient cognition in virus transmission route, personal protective measures and self-care methods (respiratory function exercise, nutrition guidance, psychological guidance, etc.). Therefore, COVID-19 patients' knowledge about diseases and health education should be strengthened based on the results of this study. However, due to the particularity of the disease, the form of health education should be changed. The content of health education can be made into cartoons and videos which are easy to understand based on internet, which can be pushed regularly. Health information of COVID-19 can also be performed daily in the ward by large screen projection and radio broadcast.

### Disease psychological experience

**Stage reaction after catching the illness:** This study shows that COVID-19 patients can undergo periodic changes in psychology, from being fear of illness, compromising towards disease, urgent medical treatment to uncertainty of disease prognosis. Most patients have various pessimistic emotions such as fear, uneasiness, and fear after diagnosis, which is consistent with the results of Xuemei Qin and other researchers [10-12]. The sense of fear from an uncertain future is common in people experiencing health problems [13]. This is also true for patients diagnosed with COVID-19. Some patients express a sense of uncertainty about the prognosis of the disease, primarily manifesting in a sense of psychological stigma and physiological concern about the occurrence of serious complications as well as the possible recurrence of the disease. At the beginning of the epidemic, medical staff fails to focus on the mental health. These psychological problems affect the health of patients and are not conducive to the recovery and the quality of life.

Therefore, while giving patients active treatment, It should pay attention to the psychological problems of COVID-19 patients and provide different aspects of psychological guidance to patients [14,15]:

1) **Personal psychological counseling:** vent their emotions actively, consult psychological counselors; maintain normal regular work and rest; carry out relaxation training such as meditation and yoga [16].

2) **Family intervention:** guide family members to fully communicate with patients through telephone and WeChat, so as to reduce their panic and anxiety, and help patients establish confidence in fighting against diseases.

3) **Medical staff intervention:** communicate with patients, listen to the patients' inner feelings; set up a patients' mutual aid groups to actively share the experience and feelings of catching the illness; positive psychological intervention (mindfulness training, keeping gratitude journal) can effectively reduce the patients' sense of shame and improve the level of social psychological adaptation [17]; creating a positive environment (painting on protective clothing).

4) **Social support:** integrate psychological crisis intervention into the overall plan of prevention and control, encourage experts with post disaster psychological crisis intervention experience, set up

psychological rescue expert group to provide technical guidance, and set up psychological assistance hotline [14].

In addition, TCM believes that "Seven emotions" are emotional responses of human Viscera Qi and Blood to the external environment, including "Joy", "Anger", "Worry", "Thinking", "Sadness", "Fear", and "Surprise". They are normal stress reactions of human body. Once the "seven emotions" are over extreme, they will cause harm to the body and even lead to diseases. Staff can use empathy, overcoming emotion with emotion, and other emotional nursing of traditional Chinese techniques [18,19]. We can also use the method of Chinese medicine foot bath, traditional guidance and traditional Chinese medicine aromatherapy for psychological adjustment [20].

**Post-traumatic growth:** The results of COVID-19 show that most of the patients have a new understanding and awe of life, gain post-traumatic growth, enhance psychological resilience, and produce positive psychological feelings. In positive psychology, positive psychological characteristics are considered as a manifestation of psychological defense, which can help individuals form positive psychological coping behaviors [21]. A study has shown that positive emotions have adaptability, which can enhance the individual's psychological function and social connection, so as to improve the well-being and reduce the risk of physical and mental health [22]. This suggests that medical staff should focus on the effect of positive psychological characteristics, and combine the positive psychological experience of COVID-19 patients with the needs of disease prognosis, so that the positive psychological state can be well adapted and maintained to the maximum extent. For the patients who have not had positive psychological experience after trauma. In addition, we should continue to pay attention to their psychological changes, give psychological intervention, and guide them to develop in the direction of positive psychology.

At the same time, it suggests that the medical staff should focus on the prognosis of the disease, and attend to the needs of discharged patients, strengthen communication between the medical guidance team and patients, and conduct continuity nursing, to promote patients to return to normal life as soon as possible. Analysis of the interviews in this study revealed that some patients showed improvements in self-care awareness, and had the desire to receive more specific suggestions to promote health, such as from TCM, nutrition supplements, and exercises for health. Other studies have shown that provides continuity nursing through the Internet can achieve better results [23-26]. The needs of patients to promote health combined with the Internet can provide corresponding help for the discharged patients.

### Disease prevention and control demands

**Disease information acquisition needs:** This study shows that patients require timely, accurate, open, and transparent information of the disease and that there is a demand for a variety of information sources, consistent with the results of a previous survey in Shanghai [27]. In the early stages of the pandemic, due to the lack of information regarding the disease, information from media providers was inconsistent and there was a lack of relevant information reports, which resulted in more patients infected. In view of this, In China, information on epidemic prevention and control is pushed daily through official media, set up personal application code, and COVID-19 zone is set up in commonly used social software, so as to let the public know the information of epidemic prevention and control in time.

But this reveals that there are some problems in Infectious Diseases (IDs) monitoring in China, such as the weak ability to detect IDs, the lag of data early warning, and the limitation of information sources [28]. In the future, we can base on the existing medical big data, using artificial intelligence algorithm to mine, summarize and refine the characteristics of IDs, establishing the monitoring and early warning indicators of EIDs, and constructing the early warning model, so as to realize the active monitoring and early warning of suspicious IDs, and establish a sound public health early warning system and infectious disease reporting system. Moreover, the interviews revealed that there is a need to adopt the principle of diversification regarding the forms of information and to spread disease knowledge through various publicity materials in different forms and carriers. These methods will help prevent and hopefully eradicate the disease.

**Medical service security needs:** "Supporter" - sufficient protective materials and personnel. The results of this study shows that patients with COVID-19 shows a demand for prevention and control materials and hospitalization treatment, and the shortage of protective materials, beds and medical staff was the biggest obstacle to epidemic prevention and control. In China, major enterprises have spontaneously developed masks; 42,000 medical and nursing personnel from all parts of the country have been dispatched to Hubei Province; two hospitals have been built within 10 days, and 15 shelter hospitals have been activated. It provides the most important guarantee of personnel and materials for epidemic prevention.

"Defender" - comfortable hospitalization environment. Clinical medical staff should not only actively help patients to control symptoms and improve the negative emotional experience caused by symptoms and illness, but also focus on the environment in which they provide their medical services. This study shows that patients hope to have a comfortable and clean hospital environment during hospitalization, and the narrow space makes patients feel pressed. A German psychologist put forward the famous human behavior formula:  $B=f(P,E)$ , in the case of a stable personality with a more optimized environment, human behavior could be optimized if we provide a comfortable and tidy inpatient environment for patient, improve the patient's comfort, and promote the recovery of patients' health [29,30].

"Helpers" - TCM. Currently, TCM plays an important role in the diagnosis and treatment of COVID-19 [16,31,32]. This study also shows that patients have a positive attitude towards TCM. In addition to the TCM dialectical medication of Chinese medicine decoction and traditional acupuncture [34,35]. Intervention measures that can be provided by nursing staff should also be considered. Jiansheng Li et al. [36] formulated a comprehensive consensus on rehabilitation of TCM. The consensus recommended the following measures: functional training, moxibustion, acupoint massage, and emotional therapy, etc. Therefore, during hospitalization, it is advisable to establish a medical guidance team to teach Chinese medicine skills and psychological care of Chinese medicine to patients. Videos and on-site guidance can be used to improve the sensory experience of patients, and simultaneously, regular scientific knowledge education of Chinese medicine should be provided.

## Limitations

This study had several limitations. The study subjects were all from Wuhan. This restriction may reduce the generalizability of the results, and therefore, future studies should explore the differences

between our findings and those obtained by studying other regions. In addition, this study is a qualitative study, which did not be assessed by the psychological state assessment scale. In the future researches can be assessed by short self-assessment scale, so as to clarify the type and degree of psychological disorders and intervene according to psychological problems.

## Conclusion

COVID-19 patients have a lack of knowledge, negative psychological experiences, and desire for further awareness to help them understand the novel disease. There are strong opinions for information, physiology, and psychology in the prevention and control of the pandemic. Medical staff should integrate resources from all fields, actively guide patients, meet patients' needs, and enhance patients' abilities to cope with the pandemic. There are various ways by which COVID-19 patients can better understand their own perceptions and psychological experiences and needs. We hope that medical and nursing staff can provide appropriate interventions and prevention and control measures for COVID-19 patients.

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