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# FACILITY-LEVEL CASE REPORT OF NURSING CARE PROCESSES FOR PATIENTS WITH SUSPECTED 2019 NOVEL CORONAVIRUS DISEASE IN SHANGHAI, CHINA



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## Abstract

**Introduction:** Coronavirus disease emerged in Wuhan, China, on December 31, 2019, and spread rapidly worldwide. Few studies have described the nursing care provided to patients in isolation between suspicion of having the disease and a confirmed diagnosis. The purpose of this study was to describe the treatment of, and nursing care processes for, patients suspected, but not yet confirmed, of having coronavirus disease at 1 facility in Shanghai, China.

**Methods:** For this retrospective facility case review and patient health record study, data were collected on all patients with suspected coronavirus disease who were treated between January 22, 2020, and February 29, 2020, at 1 hospital. The facility's nursing care processes were described in detail.

**Results:** A total of 119 patients were suspected of having coronavirus disease on the basis of the screening criteria. Nine (7.6%) patients had confirmed coronavirus disease and were transferred to a higher level of care. The remaining 110

(92.4%) were treated and discharged. No cross-infection between patients and hospital staff or other patients was detected. The patients' symptoms included fever ( $n = 98$ , 82.4%), cough ( $n = 79$ , 66.4%), dizziness ( $n = 28$ , 23.5%), headache ( $n = 26$ , 21.8%), fatigue ( $n = 26$ , 21.8%), myalgia ( $n = 16$ , 13.4%), rhinorrhea ( $n = 6$ , 5.0%), diarrhea ( $n = 5$ , 4.2%), severe nasal congestion ( $n = 4$ , 3.4%), and dyspnea ( $n = 1$ , 0.8%).

**Discussion:** Coronavirus disease is very contagious. Nurses need to understand the symptoms and treatment of the disease as well as nursing procedures, and learn how to cut off transmission routes, control transmission sources, and use protective equipment correctly to prevent transmission of the disease within the hospital.

**Key words:** Suspected coronavirus disease; Nursing; Experience

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## Introduction

At the end of December 2019, an outbreak of a severe acute respiratory syndrome caused by coronavirus pneumonia occurred in Wuhan, Hubei Province, China; this pneumonia was named coronavirus disease (COVID-19). It is infectious, and the World Health Organization (WHO) declared COVID-19 a global public health emergency.<sup>1,2</sup> The infection has spread worldwide.<sup>1-3</sup> COVID-19 can cause pneumonia and damage the kidneys, heart, and other organ systems,<sup>4,5</sup> with a mortality rate of approximately 3.2% among 51,857 cases of COVID-19 as of February 16, 2020.<sup>6</sup> As of March 3, 2020, 80,270 confirmed and 520 suspected cases of COVID-19 in China had been recorded.<sup>7</sup>

Without timely care for, and treatment of, patients suspected of having COVID-19, the number of patients with confirmed COVID-19 will continue to increase, and the disease will have a major negative impact worldwide. These patients need to be isolated immediately, which results in the loss of personal freedom and face-to-face contact with their families. Research has shown that patients with suspected COVID-19 can become fearful, anxious, bored, and depressed.<sup>8,9</sup> Suicidal behavior after the imposition of quarantine has prompted patients and others to threaten lawsuits over quarantine policies.<sup>10,11</sup> Thus, the holistic nursing care provided to patients with suspected COVID-19 should aim to improve these patients' quality of life after discharge, and reduce the burden on their families and social economic pressure.

There is a paucity of research in the published literature on the challenges of caring for patients in isolation between the suspicion of having COVID-19 and a confirmed diagnosis, and on the success of processes to prevent transmission within the hospital setting. The purpose of this study was to describe our facility's nursing care processes to prevent hospital transmission, and describe the symptoms and treatment for patients in isolation owing to suspected COVID-19 infection.

## Methods

### STUDY DESIGN

This was a hospital facility case study and retrospective health record review of the processes to prevent the spread of COVID-19 within the hospital and the nursing care, symptoms, and treatments for patients in isolation between suspicion of having COVID-19 and a confirmed diagnosis.

### PATIENTS

For this retrospective study, data were reviewed from patients suspected of having COVID-19 who were admitted to Shanghai Jiao Tong University-affiliated Sixth People's Hospital between January 22, 2020, and February 29, 2020.

### ETHICAL CONSIDERATIONS

The study protocol was approved by the hospital's review committee (number 2020-KY-016), and all patients provided informed consent.

### ADMISSION CRITERIA

The admission criteria were (1) suspicion of having COVID-19 on the basis of the New Coronavirus Pneumonia Prevention and Control Program (7th edition)<sup>12</sup> and (2) age 16 years or older. Very briefly, patients suspected of having COVID-19 were classified on the basis of a history of being in the Wuhan area in the previous 14 days with a fever and/or respiratory symptoms, a history of exposure to COVID-19 (contact with someone with nucleic acid positivity), imaging features of COVID-19 (such as multiple small patches, interstitial changes, double-lung multiple glass shadows, and lung consolidation), and a normal or low white blood cell count and a normal or low lymphocyte count.<sup>12</sup> Suspected COVID-19 was defined as an epidemiological history and any 2 clinical manifestations, or no clear epidemiological history and 3 clinical manifestations.<sup>12</sup>

### FACILITY PROCESSES

We describe in detail the implementation of national and WHO guidelines in the isolation and observation wards accommodating patients with suspected COVID-19, considering infection control and incorporating the perspectives of the hospital, patient, patient's family, and nursing care.

### DATA COLLECTION

Two researchers (Y.L.H. and L.W.) reviewed the clinical records of the patients suspected of having COVID-19, and used a data abstraction tool designed for the purposes of this study to obtain the patients' general data (eg, age, sex, and employment), clinical symptoms (eg, fever, cough, and fatigue), and treatment of major clinical symptoms. The symptoms were abstracted from the narrative nursing notes (considered unstructured data in informatics).

### STATISTICAL ANALYSIS

Variables were analyzed with descriptive statistics using SPSS version 22.0 (IBM Corp).

## Results

The records of 119 patients (72 women, 47 men; ages ranging from 17 years to 80 years) were included in the record review. [Table 1](#) summarizes their sociodemographic data. After active treatment in our hospital, 110 (92.4%) of the 119 patients were discharged; the remaining 9

TABLE 1  
Sociodemographic characteristics and disposition of patients with suspected coronavirus disease

Characteristics	Number (N = 119)	Percentage (%)
Sex		
Female	72	60.5
Male	47	39.5
Employed		
Yes	85	71.4
No	34	28.6
History of smoking		
Yes	6	5
No	113	95
Disposition		
Discharged (COVID-19 negative)	110	92.4
Transfer to other departments (COVID-19 positive)	9	7.6

COVID-19, coronavirus disease.

(7.6%) patients were confirmed to have COVID-19 and were transferred to the Shanghai Public Health Clinical Center for treatment. No cross-infection between patients and hospital staff or other patients was detected (absence of symptoms, negative nasopharyngeal swab, and negative antibody screening).

TABLE 2  
Clinical symptoms of patients with suspected coronavirus disease (N = 119)

Clinical symptoms	n	Percentage (%)
Fever	98	82.4
Cough	79	66.4
Dizziness	28	23.5
Fatigue	26	21.8
Headache	26	21.8
Myalgia	16	13.4
Runny nose	6	5.0
Diarrhea	5	4.2
Severe nasal congestion	4	3.4
Dyspnea	1	0.8

Most patients presented to the emergency department with fever symptoms when they arrived. The symptoms listed are from the first day of hospitalization.

TABLE 3  
Treatment for fever following the national guidelines of China

Fever	Route/Medication
Low-grade fever	Oral <sup>12,*,†,‡</sup>
Moderate fever	Oral <sup>12,*,†,‡, 18#</sup>
High fever	Oral <sup>12,*,†,‡</sup> Intravenous <sup>18,**</sup> Rectal administration <sup>18,††</sup>

Note: We followed the national guidelines of China,<sup>12</sup> and the internal medical diagnosis and treatment routine (China)<sup>18</sup> when using the medications.

Moderate fever: If a bacterial infection was found in the patient's blood routine examination, the provider prescription changed oral ofloxacin to intravenous antibiotics.<sup>18</sup>

\* Oseltamivir 75 mg twice a day (Yichang East Sunshine Changjiang Pharmaceutical Co Ltd)

† Arbidol tablets 0.2 g twice a day (Shi Yao Group Ou Yi Pharmaceutical Co Ltd)

‡ Ofloxacin 0.5 g/day (First Sankyo [Beijing] Pharmaceutical Co Ltd)<sup>10</sup>

# Xinhuang tablet 0.32 g as needed (Xiamen Chinese Medicine Factory Co Ltd)

\*\* Antibiotics were used in 62.2% of the patients with suspected COVID-19 (74 of 119 patients); the main antibiotics were levofloxacin and sodium chloride injection, 0.5 g/100 ml/day (First Sankyo [Beijing] Pharmaceutical Co Ltd)

†† Indomethacin suppositories 0.033 g or 0.05 g (0.1 g/granule) Indocin suppository per rectum (Jiangsu Yuanheng Pharmaceutical Co Ltd)

The main symptoms of the 119 patients with suspected COVID-19 were fever (n = 98, 82.4%), cough (n = 79, 66.4%), and dizziness (n = 28, 23.5%; Table 2). The treatment for fever is summarized in Table 3.

#### NURSING CARE FOR PATIENTS WITH SUSPECTED COVID-19

The nursing care provided to patients with suspected COVID-19 was designed to reduce development of the disease by reduction of COVID-19 transmission routes, controlling the infection, managing patients' symptoms, monitoring the patients, managing nurses, and the use of medical supplies.

##### Reduction of COVID-19 Transmission Routes

At the time of writing this report, COVID-19 was known to be spread mainly through respiratory droplets and person-to-person contact.<sup>13</sup> The cutting off of transmission routes was very important. At the 4 entrances to the hospital and at each entrance to a ward or section, health care personnel performed the initial checks, including monitoring body temperature and making inquiries regarding the patients' epidemiological history on the basis of the National Health Commission of China New Coronavirus Pneumonia Prevention and Control Program (7th edition).<sup>12</sup> The staff showed their work cards; others entering the hospital were required to provide their names and telephone numbers

and undergo temperature monitoring; those with body temperatures above 37.3°C were treated in the fever clinic. In treating patients suspected of having COVID-19, we followed China's National Coronavirus Disease guidelines and the WHO guidelines.<sup>14,15</sup> The hospital set aside 7 floors to care for patients with suspected COVID-19; each patient had a single room.

We admitted 119 patients with suspected COVID-19. Each patient had to wear a mask and could not leave the room or have visitors. The patient's excrement, urine, vomit, and other secretions were collected in special containers and disinfected with chlorine (20,000 mg/L) by immersion for 2 hours.<sup>14</sup> The patient's bed rails, bedside table, door handles, and other potentially contaminated items were sprayed, wiped, or soaked with chlorine (1,000 mg/L available chlorine) or chlorine dioxide (500 mg/L) disinfectant, and wiped clean with water 30 minutes later.<sup>14</sup> The air, water, and means of transportation in the patient's environment were disinfected according to national policies.<sup>14</sup> Health care workers were required to use masks, goggles, isolation clothing, and other personal protective equipment (PPE) for patient isolation care, prevention, and control of droplet and contact transmission.

### *Control of Infection*

To control the spread of COVID-19, national policies<sup>14</sup> and WHO guidelines<sup>15</sup> were followed to control infection from the perspectives of the hospital, patient, and patient's family.

**The hospital perspective.** The hospital closed the departments that could spread COVID-19 through common procedures such as stomatology, otolaryngology–head and neck surgery, and gastroscopy and other related departments from January 2020 to February 2020; only the departments treating emergencies (eg airway foreign body, epistaxis, oral bleeding) remained open. When performing aerosol-generating procedures (eg, aspiration of sputum, intubation, and bronchoscopy), the hospital staff used PPE, including gloves, protective clothing, goggles, protective face screen, and N95 masks. The health care staff donned PPE (N95 masks, goggles, gloves, protective face screen, and protective clothing) before entering the ward and removed it on leaving the ward. A room (semicontaminated area) was established in the ward where the staff could change their PPE. After contact with a patient, the staff would change their PPE in this room before returning to the ward to make contact with the next patient.

The staff's use of stethoscopes, blood pressure cuffs, and thermometers (unique to patients) was in strict accordance with the national disinfection policy.<sup>14</sup> The staff were instructed to not touch their eyes, nose, or mouth with potentially contaminated gloves or hands, and to ensure that the wards were ventilated and that they washed their hands correctly. When not performing a nursing procedure that required patient contact, a distance of at least 1 meter was kept between nurse and patient, for example, when speaking to the patient and taking a history. On completion of a nursing procedure, the nurses avoided contaminating surfaces such as door handles and light switches.

**The patient perspective.** The patients were informed about COVID-19 and its transmission. We used videos, pictures, and a COVID-19 handbook to increase patients' knowledge of COVID-19. Patients suspected of having COVID-19 were instructed to use surgical masks, to cover their mouths and noses with tissue or their arms when coughing or sneezing, to wash their hands frequently before and after meals and after contact with respiratory secretions, and to drink bottled water. Family members were not allowed to bring food to the hospital. The patients' diets were configured by the dietitian; nurses with PPE were responsible for placing the meals on the table in each room; and the nurses also fed those patients who were incapacitated. The waste after dining was placed on the tables, which were disinfected, and packed up by the nurses. The patients were told that the wards needed to be ventilated 3 times a day for 30 minutes each. The clothes of patients suspected of having COVID-19 were placed in designated places and subsequently sterilized according to national guidelines.<sup>12</sup> Health care staff would help patients who needed psychological counseling. For example, to reduce the patients' fears of COVID-19, we provided COVID-19–related information that was relevant to each patient's condition; we also allowed the patients to listen to music, watch videos, and communicate with family members by phone or video regularly.

**The family perspective.** To reduce cross-infection, family members were not allowed to visit the patients. However, when facing separation, patients and their family members can develop anxiety, fear, depression, and other psychological states.<sup>16</sup> We provided Wi-Fi access so that the patients could communicate with their family members by video or cell phone. Family members could contact the providers during working hours to learn more about the patients' conditions.

### *Symptoms Management*

Our patients' symptoms included fever, cough, fatigue, severe nasal congestion, rhinorrhea, myalgia, diarrhea, respiratory difficulties, dizziness, and headache. Fever was the most common symptom ( $n = 98/119$ , 82.4%). The degree of fever was classified as none ( $< 99.2^{\circ}\text{F}$ ), low grade ( $99.2^{\circ}\text{F}$ - $100.4^{\circ}\text{F}$ ), moderate ( $100.6^{\circ}\text{F}$ - $102.2^{\circ}\text{F}$ ), high ( $102.4^{\circ}\text{F}$ - $105.8^{\circ}\text{F}$ ), and ultrahyperpyrexia ( $> 105.8^{\circ}\text{F}$ ),<sup>17</sup> and fevers corresponding to these categories were present in 18 (15.1%), 78 (65.5%), 14 (11.8%), 9 (7.6%), and 0 (0%) of the 119 patients, respectively. Following the Chinese national guidelines,<sup>12</sup> all patients were given oseltamivir (75 mg twice a day), umifenovir (Arbidol tablets) (0.2 g twice a day), and ofloxacin (0.5 g/day). After an internal medical diagnosis and treatment routine,<sup>18</sup> we treated the fever (Table 3 shows the treatments).<sup>18</sup> In addition, 46 (38.7%) patients had a productive cough, and 33 (27.7%) had a dry cough. After an internal medical diagnosis and treatment routine,<sup>18</sup> the cough was treated with Feilike Heji (10 mL thrice a day) or compound licorice (10 mL thrice a day), and ambroxol hydrochloride tablets (30 mg thrice a day).<sup>18</sup>

Only 1 patient developed problems with breathing, which can lead to restricted lung function and impaired gas exchange. The nurses closely observed the patient's respiratory rate and rhythm, and blood oxygen saturation, looking for signs of chest tightness, shortness of breath, and cyanosis to inform the provider. We provided care for the patients according to the provider's prescription.

### *Patient Monitoring*

We measured each patient's temperature every 4 hours, except at 10 P.M. and 2 A.M. if the patient was asleep. When a patient had a fever and was given medicine, the temperature was measured 30 minutes later. The patients were encouraged to drink 2,500 mL to 3,000 mL of water a day to help dissipate heat and to hydrate. When measuring the temperature, the patient's facial color, pulse, breathing, and diaphoresis were monitored, and a provider was informed of any abnormality. Patients with a fever were also provided psychological care. When patients with a fever were uncomfortable, they were able to page the staff members. We clothed ourselves in appropriate PPE and monitored the patients, listened to them discuss their conditions, explained their conditions to them, and encouraged them to remain

confident. If a patient's systolic blood pressure was 140 mm Hg or higher, or if their diastolic blood pressure was 90 mm Hg or higher, we monitored their blood pressure twice per day. The nature of the patients' cough was observed, including urgency, color and nature of the sputum, timing of sputum production, and accompanying symptoms.

### *Nursing Staff and Materials Management*

Our hospital conducted 4 education sessions on COVID-19 per week, and the videos were available to the nurses through WeChat (Tencent).<sup>19</sup> On-site guidance was provided to the nursing staff on the use of protective clothing, goggles, gloves, and other materials. Only qualified professionals (chosen on the basis of testing: those with a passing score regarding theoretical knowledge of COVID-19 and a nursing operations skill score of 90 points or more) were permitted to take part in this work.

To reduce fatigue, senior nurses from other departments monitored the shift changes. Each shift was 8 hours long, with 4 hours or less spent providing direct patient care; the remainder of the shift was spent in activities such as writing nursing records and addressing provider prescriptions. Each nurse had 2 days off a week for 2 weeks, and then a full 7 days off. The bed-to-nurse ratio was 34:68 (1:2). Most patients were admitted to the emergency department for initial triage. The ED workers brought patients with a temperature higher than  $99.2^{\circ}\text{F}$  to the fever clinic for examination. Patients with suspected COVID-19 were transferred to the "suspected case" ward near the emergency department to arrange hospitalization.

During each shift, a lead nurse ensured staff safety. The lead nurse checked whether the staff were wearing their PPE correctly, as well as whether they removed their PPE and disinfected related items as instructed. When nurses encountered difficulties that they could not resolve, the lead nurse helped identify solutions.

To reduce cross-infection, the ward was divided into clean, semicontaminated, and contaminated areas, with the staff changing their clothes, eating, drinking, and resting in specified areas. Every week, psychologists and other counselors were available to provide online psychological counseling for the nursing staff to address psychological stressors and coping mechanisms. The protective clothing, N95 masks, goggles, eye-protection screens, and other equipment were changed

at least once every 4 hours, and more often when they caused discomfort. After contact with a patient, each staff member removed their isolation clothing and gloves and changed into a new PPE set before contact with another patient. Any test sample collected was packed in a double plastic bag and transported in a special box. Nucleic acid test samples were sent to the Shanghai Municipal Center for Disease Control, and other samples were sent to the laboratory, which was contacted in advance.

## Discussion

At the time of writing, our facility case study was the first to describe the experience of providing nursing care to patients in isolation with suspected COVID-19 and before the diagnosis was confirmed. Following national and WHO guidelines, we treated patients suspected of having COVID-19 as if they had a confirmed COVID-19 diagnosis. We successfully treated and discharged 110 (92.4%) of the 119 patients suspected of having COVID-19, and transferred 9 (7.6%) patients with a confirmed COVID-19 diagnosis to the Shanghai Public Health Clinical Center for treatment. No cross-infection between patients and hospital staff or other patients was detected.

We achieved this result owing to several reasons and processes. First, our hospital provided care in strict accordance with Chinese national guidelines, including cutting off of transmission routes, control of infection sources (including disinfection of the ward environment), management of patient and medical staff supplies, and implementation of infection-reduction measures, including limits regarding visitors. Second, active training ensured that the nursing staff used protective equipment correctly when caring for the patients. The scheduling system ensured that the nurses had sufficient rest and psychological counseling support. Third, protective materials were managed strictly. The departments implemented a policy of using 1 set of protective equipment per person per shift (ie, replacement of items such as surgical masks and caps after 4 hours), except in special circumstances. Fourth, close observation of the patients' physical condition and emotional state enabled the provider and psychologists to provide physical and psychological care interventions.

Two studies have described nursing experiences during the COVID-19 outbreak.<sup>20,21</sup> One summarized the experience of nursing care provision to 26 critical patients with COVID-19.<sup>20</sup> The other study described the experience of providing nursing care to 9 critical patients with

COVID-19 using extracorporeal membrane oxygenation.<sup>21</sup> Our study was similar to the previous 2 studies<sup>20,21</sup> in that we carried out patient observation, monitoring, psychological nursing, effective disinfection management, and safety management of the ward. Our facility case study differed from these 2 in that we described the provision of care to patients with suspected COVID-19, instead of critical patients with COVID-19, and our sample was larger than those included in these previous studies.

A third study described the provision of nursing care for an 83-year-old woman with suspected severe acute respiratory syndrome (SARS),<sup>22</sup> which corroborated our findings with similar primary symptoms, including fever, cough, and severe fatigue. Moreover, during the treatment process, the nurses conducted patient triage, arranged for relevant examinations and treatments, and assumed care of the patients with suspected disease; the medical staff implemented patient isolation, then measured and reported the patient's temperature and general health condition.

During the 30-month rehabilitation period after recovery from the SARS outbreak in 2003, 58.9% of the patients developed posttraumatic stress disorder, depression, anxiety disorders, and other mental disorders.<sup>23,24</sup> SARS-related psychological trauma was sustained and widespread. One study found that 47.4% of the patients with suspected COVID-19 developed anxiety, and 30.3% showed depressive symptoms.<sup>25</sup> Another study found that patients with suspected COVID-19 showed signs of anxiety and fear; for example, when they were informed of the possibility of a COVID-19 diagnosis, they exhibited trembling, sweating, and dizziness.<sup>26</sup> Some studies revealed that patients with COVID-19 showed symptoms of depression, anxiety, and posttraumatic stress disorder.<sup>27,28</sup> Any hospital might receive such patients and must provide psychological counseling and other services. We recommend that public outreach, including that provided by news media, should communicate that patients with COVID-19 are suffering, afraid, and lonely to emphasize the need for respect and sympathy for affected patients, rather than discriminating against these patients, to reduce their psychological burdens.

On April 17, 2019, the WHO published guidelines for digital health interventions, including supportive psychotherapy, cognitive behavioral therapy, eye-movement desensitization, and reprocessing and digital health intervention, and affirmed their effectiveness, acceptability, and feasibility.<sup>29</sup> Most hospitals can use these methods to relieve patients' psychological stress.

Some patients with COVID-19 lose their senses of smell (anosmia) and taste (ageusia).<sup>30-32</sup> Most patients with anosmia or ageusia recovered within 3 weeks.<sup>30</sup> However, many viral infections and upper respiratory tract

infections can cause anosmia and ageusia through damage to the olfactory epithelium.<sup>33,34</sup> Nevertheless, anosmia and ageusia have emerged as important symptoms to consider in the early diagnosis of COVID-19 since we initiated our screening processes.<sup>30</sup>

Since our facility processes were initiated, a greater proportion of patients with severe COVID-19 (including those who died from the disease) have met the diagnostic criteria for disseminated intravascular coagulation compared with patients with mild COVID-19 who survived.<sup>35,36</sup> Approximately 50% of the patients with COVID-19 have elevated D-dimer levels; the proportions and levels are higher in patients with severe and critical COVID-19, who have a high risk of thrombosis.<sup>4,36</sup> In 1 study of 449 patients with severe COVID-19, anticoagulant therapy with low-molecular-weight heparin reduced the mortality rate among those with markedly elevated D-dimer levels.<sup>36</sup> For people with low bleeding risk, low-molecular-weight heparin is recommended to be injected subcutaneously.<sup>37</sup> Health care workers should teach patients with COVID-19 about the need to prevent venous thromboembolism, and begin active or passive movement of the lower limbs as soon as possible.<sup>38</sup>

No patients were severe enough to require intubation in our isolation and observation ward for suspected COVID-19 infection. If standard oxygen therapy for patients with severe COVID-19 does not relieve their respiratory distress or hypoxemia, they should be administered high-flow nasal cannula oxygen therapy or noninvasive ventilation for 1 hour to 2 hours. If their condition does not improve and they develop respiratory distress with respiratory frequency higher than 30 breaths/min and oxygenation index less than 150 mm Hg (1 mm Hg = 0.133 kPa), they should be intubated, and their lungs should be ventilated.<sup>12</sup> For patients with difficult airways who are breathing spontaneously, the recommended treatment includes sedation, analgesia, and topical anesthesia. A soft visual intubation mirror should be used to guide transnasal endotracheal intubation; if nasal endotracheal intubation is difficult or nasal bleeding occurs, oral endotracheal intubation should be performed.<sup>39-41</sup> Airway management instruments for use in patients with difficult intubation should include a visual laryngoscope and visual intubation soft endoscope. When difficulty with laryngeal mask placement and ventilation occurs, a surgeon or otolaryngologist should perform a direct tracheotomy.<sup>39-41</sup> Extracorporeal membrane oxygenation can initially be used to ensure oxygenation; tracheal intubation or tracheotomy can then be performed with the patient under anesthesia.<sup>42</sup>

The lack of supplies (such as PPE, hospital worker PPE, or supplies and equipment needed to care for these patients) during the COVID-19 pandemic is also a major social prob-

lem,<sup>43,44</sup> and studies should examine how to improve this situation.

## Limitations

Our study has some limitations. First, it was a single-center study with a relatively small sample. Future research should collect data on more patients with suspected COVID-19 in Shanghai, and share the experience of nursing care provision to these patients. Second, our study was retrospective. Rehabilitation hospitals should conduct prospective studies of the problems these patients have after discharge, and examine the effectiveness of various interventions. Finally, the potential for false positive or negative rate for laboratory tests confirming COVID-19 infection was not taken into account in this study.

## Implications for Emergency Nurses

To our knowledge, this facility case study is the first to describe the standards of care and processes implemented in the care of these patients within the COVID-19 isolation and observation ward, so that emergency nurses and other health care workers can improve their awareness of COVID-19 and provide better care to patients and avoid the threat of COVID-19. We detected zero cross-infection to other patients or staff, which is an important finding for other facilities to emulate. We have provided an exemplar to describe implementing national guidelines at a facility for the management and treatment of patients with suspected COVID-19 disease according to approaches used in China<sup>12,14</sup> and advocated by the WHO,<sup>13,15,29</sup> which might be adopted in other countries. Many emergency departments have an observation unit or level of care within the department or immediately adjacent to the emergency department that may operate as temporary isolation and observation units. Strict infection control, patient monitoring, nurse staffing ratios, psychological support, and rest periods for staff in our isolation and observation unit may provide a best practice for other emergency departments.

## Conclusion

COVID-19 is very contagious and has spread to more than 100 countries. The huge number of suspected COVID-19 cases worldwide is causing global tension and panic. This study summarizes the clinical characteristics of patients suspected of having COVID-19, and our experience in providing nursing care to these patients. Most of the patients were discharged from the hospital, and no cross-infection



between patients and hospital staff or other patients was detected. In the future, hospitals should train their staff to respond to various emergencies, and provide individualized psychological counseling to relieve the psychological stressors and enhance coping for health care staff and patients.

## Author Disclosures

Conflicts of interest: none to report.

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