



## Research Article

# Nursing Response to Coronavirus Disease 2019 in The Intensive Care Center Composed of Multiple Hospital Nursing Teams Using The Five Elements of Quality Management

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## Abstract

Summing up the nursing management strategy of COVID-19 ward and combining with the reality of the hospital, we established a severe COVID-19 nursing linkage team composed of nurses from many hospitals. Using the five elements of the quality management system "Man, Machine, Material, Method and Environment" as the starting point to transform the special ward environment, formulate appropriate system norms and work flow, optimize the allocation of human resources, strengthen the nursing quality control of key links and implement humanistic care measures for nursing staff, it provides a guarantee for nurses to work safely and comfortably. It provides some experiences and methods for the orderly development of nursing management in COVID-19 ward.

**Key words:** COVID-19, nursing management, critical care.

## Introduction

2019 novel coronavirus was named by the World Health Organization (WHO) on January 12, 2020 (1). On February 11, 2020, WHO announced that the disease caused by the SARS-CoV-2 virus was officially named 2019 Coronavirus Disease (COVID-19). COVID-19 was first found in Hubei Province, China. At present, COVID-19 has spread to many countries all over the world (2).

The main way of transmission of COVID-19 is through respiratory droplets and close contact. It may be transmitted through aerosols when exposed to high concentrations of aerosols for a long time in a relatively closed environment (3). There are still many unknown areas in human understanding of the disease. COVID-19 patients with mild symptoms only show low-grade fever, fatigue, dry cough, etc., which are similar to common cold symptoms and are easily ignored by the patients

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themselves. Nucleic acid testing, lung ct and blood routine examination are needed to identify them. Most of the severe patients developed dyspnea or hypoxemia one week after infection, and the severe ones developed Acute Respiratory Distress Syndrome (ARDS) (4). In addition to respiratory failure, COVID-19 can also affect the central nervous system. It often leads to delirium in patients, which seriously affects the prognosis of patients (5-6).

The epidemic situation in Hubei Province is concentrated, and the Health Commission of the people's Republic of China has mobilized medical personnel from other provinces and cities to form multiple medical teams to support Hubei. The Jingzhou Central Hospital of Hubei Province (hereinafter referred to as "our hospital") has received the support of the first batch of 6 nurses from Guangdong Province since February 12, 2020. As of March 12, 2020, a total of 63 nurses from 23 hospitals in Guangdong Province had rushed to our hospital to participate in the treatment and care of COVID-19's critically ill patients. Due to the differences in culture, process and nursing priorities of each hospital, in order to make the joint nursing teams of many hospitals operate efficiently, strengthen the positive response and effective response of the nursing system, ensure the safety of nurses, and ensure the quality of nursing work, we take the five elements of a quality management system "Man, Machine, Material, Method and Environment" as the starting point to manage the intensive care center of COVID-19 in the hospital. In terms of organization, the five elements of the quality management system are the tools of the upper management departments, which can not only eliminate the trivialities of the upper management departments, but also ensure that the upper managers are satisfied with their quality results. Due to the total quality management thought of "Man, Machine, Material, Method and Environment" has strong practicability and maneuverability, it has become an important part of a management theory in the construction industry

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and administrative department (7). Based on the actual situation of the hospital, we quickly established a COVID-19 intensive nursing linkage team to take over the hospital's COVID-19 intensive care center, and achieved good results. This article summarizes the nursing management work in the ward, and we hope it will be helpful to the arrangement of further epidemic fighting and support activities.

## Materials and methods

### 1 Application of "Five Elements" in nursing management system

Our hospital is a prefecture-level regional medical center in Hubei Province, China. On January 21, 2020, it was designated as a fever clinic medical institution and a designated hospital for critically ill patients of COVID-19 in Jingzhou City. According to the principle of "concentration of patients, experts, resources and treatment" of the Prevention and Control Headquarters, COVID-19 intensive care center of Jingzhou City was officially opened in our hospital on February 16, 2020, which can treat 100 critically ill patients. According to the notice issued by the Prevention and Control Headquarters, all suspected patients who come to our hospital are required to undergo nucleic acid testing and lung CT examination for subsequent treatment. In the face of a large number of critically ill patients, how to quickly establish the response mechanism of nursing support staff from different departments and different hospitals is a great challenge for the hospital's nursing management system. Since February 13, 2020, our hospital has set up a COVID-19 intensive nursing linkage team. The members of the team are the nursing leaders who came to our hospital, the director of the nursing department of our hospital, a head nurse of the department, a head nurse of Intensive Care Unit (ICU) and a head nurse of the ward. They are fully responsible for the guidance, supervision, training and management of the nursing work of COVID-19 intensive care center, and they hold regular

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meetings to unify management and strengthen cooperation. We take the five elements of quality management "Man, Machine, Material, Method and Environment" as the starting point to clarify the responsibilities, work contents and straighten out the process, so that the nursing work of COVID-19 intensive care center can be carried out smoothly.

### 1.1 "Man": do a good job in the evaluation, deployment and management of nursing human resources as well as the nursing quality management of patients

(1) Evaluation of the number of nursing human resources personnel: The allocation of nursing human resources is the basic condition to ensure the quality of nursing work (8). A comprehensive assessment of the needs of nursing manpower and sufficient staff are the prerequisites for the smooth development of nursing work. First of all, we evaluate the existing number of critically ill patients and the nursing workload; secondly, we estimate the recent workload in advance according to the dynamic trend of the epidemic and the expected number of critically ill patients transferred to our hospital; thirdly, the team members work together to determine the mode and shift of scheduling, and finally determine the number of nursing staff needed according to the existing workload, estimated workload assessment and shift scheduling.

(2) Evaluation of human resources post ability: The COVID-19 intensive care center of our hospital includes 10 beds in the critical isolation ward, which are mainly used to treat critically ill patients. In addition to the general ICU monitoring, the nursing contents of this kind of patients also include the treatment and nursing with high professional requirements, such as invasive mechanical ventilation, continuous renal replacement therapy (CRRT), Extracorporeal Membrane Oxygenation (ECMO) and so on. At present, 78 beds in the general severe isolation area are open, mainly for severe patients. The nursing care of these patients requires nurses to master the techniques of

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non-invasive ventilation, high-flow oxygen therapy, prone position ventilation and so on. According to the above post ability requirements, we evaluate the ability of the nursing staff in our hospital and the nurses who come to our hospital to understand their age, working years, professional background, training experience, etc., and classify the ability of the nursing staff to prepare for the fight against COVID-19. The critical isolation ward gives priority to recruiting nurses who are competent for the work of COVID-19 's critically ill patients from the intensive care department, neurology department and respiratory department, while the general intensive care ward arranges nurses with working experience in the relevant intensive care unit to ensure that they have the ability to deal with nursing work. In addition, the nursing staff of our hospital who have the ability to work in the critical isolation ward are put on record, and they are used as the hospital backup nursing echelon to prepare for the rotation of personnel at any time.

(3) Exploration of the linkage mode of human resources: Implementation of the responsibility nurse group work system: according to the number of patients and the severity of their illness, the nursing staff is divided into 3 to 5 responsible groups, each with 3 to 5 people, composed of nurses from our hospital and nurses Guangdong Province. The team members are relatively fixed and have reasonable levels. A 6-hour work shift system is implemented in the general critically ill isolation ward, and a 4-hour work shift system is implemented in the critical patient isolation ward. They are mainly responsible for basic care, specialist care, psychological care, pulmonary rehabilitation care and life care for critically ill patients. Each responsible group has a team leader, who is served as a senior nurse in our hospital. She needs to assign specific patients to each member of the group, and is also responsible for communication, coordination and process guidance. In addition, the disinfection group is arranged every day, and the personnel are relatively fixed, they are responsible for disinfection and isolation in the

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ward, and a nurse in the coordination team is responsible for online material application, communication inside and outside the isolation ward and the management of protective materials. The main nurse is responsible for handling doctor's orders, receiving drugs, checking and other work. Since the disinfection class, coordination class, and main class need to be familiar with the working environment and procedures of the hospital, these shifts are all performed by the nursing staff of our hospital. In order to prevent staff infections, we have arranged a health infection control team to assist and supervise the staff entering the isolation ward to wear protective equipment correctly and to ensure that the protection is in place. In addition, we have also set up the post of protection supervisor, requiring the staff to work in 6-hour shifts and be responsible for 24-hour guidance and supervision of the whole process when all kinds of personnel (such as doctors, nurses, etc.) remove protective equipment. In each isolation area, we set up one head nurse of our hospital and one head nurse of Guangdong Province hospital, who are responsible for nursing quality management. At the same time, a head nurse who is familiar with our hospital's situation and work process and is good at communication is appointed to be responsible for the overall coordination of COVID-19 intensive care center.

(4) Dynamic allocation of human resources: Based on the number of suspected and confirmed COVID-19 patients, the actual nursing workload, the development trend of the epidemic, and the number of patients temporarily referred, the dynamic assessment and timely deployment of manpower needs are carried out. In addition, when the nurse has physical discomfort or skin breakage, the staff should be replaced in time.

(5) Management of nursing team: Strengthen communication with nursing team leaders in Guangdong hospitals to understand their needs, and provide them with warm facilities, daily necessities, accommodation and simple introduction of local dialects, so that they can adapt to the local

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environment and work as soon as possible. ①During the period of insufficient protective materials, the leaders of our hospital led the staff to raise protective equipment to ensure adequate supply of protective equipment for front-line personnel and eliminate the worries of front-line staff. ②Our hospital and the hotel signed an agreement to provide temporary accommodation for employees for free, and all those working in the isolation ward can apply for admission. We arrange their diet reasonably and contact the nutrition department to allocate the diet for the front-line staff to ensure adequate nutrition. ③If the medical staff involved in the prevention and treatment of the epidemic have fever, sore throat and other symptoms, the medical office will organize expert consultation and do nucleic acid testing and lung CT screening for COVID-19 for them free of charge. ④The dean, secretary, and the director of the nursing department regularly visit the fever clinics and isolation wards to give condolences to the nursing staff who stick to their posts and send them supplies, understand their difficulties in their work, and give them encouragement and support. ⑤In the early stage of the epidemic, the nursing department provided emotional counseling to the nursing staff temporarily staying in the hotel, organized face-to-face seminars, exchanged anti-epidemic experiences, encouraged nurses to tell and vent their feelings at work, and helped nurses release their emotions and vent their anxiety. ⑥The hospital-level nursing humanistic care group organized four "Xinyu" mandala public welfare counseling micro-classes online to give positive psychological intervention to front-line nurses, so that they can face work with a good attitude and mental outlook, which can also improve their immunity and enhance disease resistance. ⑦Nurses are protected and evaluated when they feel any discomfort. We encourage nurses with anxiety or insomnia to seek help from the psychotherapists who are on duty 24 hours a day in our hospital. They will evaluate them and help them cope

potential stress and depression. ⑧After the anti-epidemic work is over, the nurse will be quarantined in the hotel for 14 days, then do nucleic acid testing and lung ct. When the results are normal, they can be released from quarantine and can be reunited with their families.

(6) Patient management: COVID-19 patients have isolation requirements and their special psychological needs. We require nurses to pay attention to patients' diet, urination, defecation, sleep, psychology and other conditions, and focus on handover work, especially to strengthen nurse-patient communication. If necessary, contact family members for family support. Some survey results show that physical pain, the closeness of the environment in the isolation ward, the uncertainty of the treatment effect, and the death news of other patients may lead to psychological problems such as tension, anxiety, fear, despair and so on. Family members will also have negative emotions such as tension and anxiety (9). In this regard, we will ask the psychotherapist to provide psychological counseling to the patients and their families.

## **1.2 "Machine": configuration and management of instruments**

(1) Multi-channel deployment: ①According to the needs of our work, our hospital timely deployed the medical and nursing equipment of COVID-19 intensive care center, especially ventilators, fiberoptic bronchoscope, mobile nursing treatment devices, high-flow oxygen therapy equipment, electric attractors, etc.; the disinfection equipment such as plasma disinfectant and ultraviolet lamp donated to our hospital should be replenished to the treatment center in time. ②The nursing team of Guangdong Province reported to the epidemic prevention and control headquarters to prepare the equipment based on the gaps in the relevant equipment in our hospital. So far, this team has deployed 2 ECMO, donated 4 ventilators and 60 oxygen atomization machines to our hospital, providing effective guarantee for the

treatment of critically ill patients. ③Establish a list of equipment and status, and designate the ICU nurse of our hospital to be responsible. After use, the disinfection team is responsible for timely disinfection and maintenance to ensure its standby status.

(2) Comprehensive training: Give full play to the professional advantages of each hospital's nursing team, achieve knowledge sharing, and hold multiple related trainings. ①The nursing department of our hospital has made "Hospital Prevention and Control COVID-19 Nursing Should Know". The contents include COVID-19 's knowledge and skills, disinfection and isolation, occupational protection, work responsibilities and processes in COVID-19 's ward, as well as the types and precautions of ventilators, high-flow oxygen therapy and other equipment currently in use, carry out online learning, video demonstrations and other forms of training. ②Before taking up their posts, the team nurses of Guangdong Province learned about the models, functions and usage of critical equipment in our hospital, such as ventilators, high-flow oxygen therapy instruments, blood gas analysis instruments, etc., in the demonstration classroom of the respiratory and critical care department of our hospital. ③Experts from the Guangdong Province Medical Team held a remote video training meeting to conduct professional training on the standardized use of ECMO rescue equipment.

(3) Standardized disinfection treatment: By consulting the literature, COVID-19 intensive care linkage team, provincial nosocomial infection experts and hospital infection experts in our hospital discussed together. Feasible disinfection methods were formulated for stethoscope, sphygmomanometer, electrocardiogram (ECG) monitor, infusion pump, micropump, fiberoptic bronchoscope, reusable protective mirror and so on. In addition, two video training sessions were held on the disinfection of instruments and equipment such as fiberoptic bronchoscope, the main points of

protection and psychological adjustment of medical staff to ensure that everyone knows.

### **1.3 "Material": including the management of information on protective materials, narcotic drugs and the first category of psychoactive drugs**

(1) Application for protective equipment: Make a list of material requisitions. For medical protection supplies that are in short supply, the daily consumption of the department is determined based on the number of patients and staff, and establish an online material application and supply group to facilitate contact. Draw up a list of commonly used protective and disinfection supplies in each isolation ward, arrange for personnel to clean up the inventory before leaving get off work at 5 pm and fill out the form before 8 pm to apply for materials, which will be reviewed online by the material supply department, and the leader of the logistics support team organize personnel to deliver to each ward the next morning to ensure a planned supply and use, so as to ensure sufficient supply and not use it blindly, which can promote the smooth progress of medical and nursing work.

(2) Management of protective equipment: Pack the protective equipment needed by medical staff to enter the isolation ward, including protective clothing, isolation gowns, goggles, N95 respirators, disposable hats, surgical gloves, shoe covers, boot covers, etc. When the staff changes their protective clothing, the disinfection team will give one to each person to avoid waste. For a limited number of special protective equipment, such as positive pressure headgear, it is managed by the head nurse of our hospital who is responsible for the overall coordination of COVID-19 intensive care center, and can only be distributed after the team leader of the treatment center evaluates the risk and agrees.

(3) Information management of quarantine area: In addition to the necessary marking guidelines for the quarantine area, the information communication among contaminated areas, potential pollution areas, clean areas, as well as

information communication between the entire quarantine ward and the outside, must be smooth and timely to ensure the smooth progress of the work. In order to ensure the smooth communication of information, in addition to regular equipment such as computers and printers for doctors and nurses workstations, each area is also equipped with 2 mobile nursing treatment devices, 2 public walkie-talkies, and 2 tablet computers that can take pictures and surf the Internet, and one mobile phone, and each head nurse is also equipped with a walkie-talkie. In addition, the medical office, nursing department, hospital infection management office, public health department and other major business management departments are equipped with walkie-talkies to facilitate communication and online data transmission, to maintain the smooth flow of information, to ensure that problems are found and solved in a timely manner.

(4) Management of narcotic drugs and the first category of psychoactive drugs: Because COVID-19 intensive care center treats critically ill patients and severe patients, they need to perform more invasive operations, such as ECMO, tracheal intubation, fiberoptic bronchoscopy, etc., so the sedation and analgesia of patients is particularly important, which leads to the inevitable use of narcotic drugs such as morphine and sufentanil. In order to ensure safety, we have arranged for the head nurse of ICU and a senior nurse to manage strictly according to the rules of "Management of anesthesia and first class psychotropic substances". Every day, they are responsible for checking the doctor's orders, patients, dosage and empty ampoules of anesthesia and first-class psychotropic substances, keeping use records and checking registrations, and filing them.

### **1.4 "Method": formulation and implementation of rules and regulations**

(1) Develop a working system and standard operating procedures(SOP): The operational efficiency of the management system is reflected not only in the responsiveness to emergencies, but

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also in the predictability and prevention plans for emergencies. On January 16, 2020, when our hospital received the first suspected case of COVID-19, the leaders of the hospital immediately convened the "Nursing Quality and Safety Management Committee". They have successively formulated the "working system of the critical isolation ward", "the transfer process of suspected patients", "daily disinfection measures of the isolation ward", "final disinfection measures of the isolation ward", "application and standardized use system of protective equipment during the epidemic", "logistics support system" and other rules and regulations, and the SOP such as "method of wearing and taking off Protective clothing", "the method of dealing with the fog of the goggles". After the establishment of COVID-19 intensive care center in Jingzhou City on February 16, according to the new environment, we reorganized the work responsibilities and processes of each scheduling system, and made the electronic file of "COVID-19 Nursing should know of Jingzhou Central Hospital", so that everyone can learn at any time.

(2) Supervision and implementation: The effective implementation of various rules and regulations is an important guarantee to prevent nosocomial infection and ensure that the work is carried out in an orderly manner. Each ward of COVID-19 critical treatment Center has a head nurse of our hospital and a head nurse of Guangdong Province. They go to the ward every day to grasp the basic situation of patients in the ward, and at the same time they are responsible for nursing quality management in the region, standardizing nursing behavior, and ensuring the effective implementation of various rules and regulations. The head nurse in charge of the general coordination in our hospital is responsible for the environment of the ward, the supply of protective materials, the liaison between the staff of our hospital and the staff of Guangdong Province, and the internal and external contact of the critical isolation ward. The director of the nursing

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department and the deputy director of the nursing department participate in the handover of the intensive care center every morning. They go to the ward to understand the operation of nursing work in order to discover problems in time, communicate in time, and solve them in time.

### 1.5 "Environment": layout transformation and process improvement

(1) Reasonable layout and clear logo: Nosocomial infection experts and nursing experts from our hospital and the Guangdong team jointly conducted on-site inspections of the environment of the COVID-19 intensive care center, and carried out the layout transformation of the "three areas and two passages" to ensure that each area was clearly marked.

(2) Prevention and control supervision, escort: Set up a 24h prevention and control supervision team to supervise the whole process of putting on and taking off protective equipment by various staff to ensure effective protection. At the same time, monitoring should be installed in the area where the protective equipment is taken off to ensure the standardization. We can supervise the garbage in the area of wearing and taking off the protective equipment through monitoring and guide the cleaning staff to clean up in time.

(3) Use the platform to facilitate management: The head nurse in charge of the overall coordination work makes videos of the layout and process of each regional environment. The head nurses of our hospital and the head nurses of the Guangdong team in each isolation ward jointly regulate the required treatment and nursing supplies and designated placement positions in the area. They upload to the WeChat group by taking photos or recording small videos in order to better implement the work.

## 2 Quality control, continuous improvement

### 2.1 Implement the morning handover of the integration of doctors and nurses

The report of the handover work starts at 7:50 every morning, and the time is controlled within 40 minutes. This process stipulates the required participants, standardizes the handover process and the focus of the handover work. The nurses who participated in the handover included members of COVID-19 's intensive care linkage team, responsible nurses on the night shift and responsible nurses on the day shift. After the completion of the reporting work, the responsible nurses will go directly to the isolation ward to hand over the patients one-to-one after doing the protection. First of all, a senior nurse reports on the overall situation of the admission of patients in COVID-19 intensive care center and the issues that need to be coordinated as a whole, such as the physical discomfort of the staff at work, etc.; secondly, nurses and doctors in the general intensive care ward report the condition of the patients; finally, the nurses and doctors in the isolation ward for critically ill patients report the condition of the patients. The focus of the handover work of nurses in the general intensive care ward is the vital signs, diet, defecation and urination, skin and nucleic acid screening of patients, especially oxygen therapy, oxygen saturation, prone position ventilation, sleep, psychological status and other special conditions. In addition to the above contents, the handover work of nurses in the isolation ward of critically ill patients also needs to hand over ECMO, maintenance of various pipes of mechanical ventilation and monitoring of indicators. The handover work of doctors and nurses has its own emphasis. The director of the department, the head nurse and the director of the nursing department give reminders and requirements from the perspective of management. at the same time, we all carry out simple training on diagnosis and treatment norms and nursing norms.

## **2.2 Implementation of the three-level nursing round**

Implement the three-level nursing round management chain of the director / deputy director

of the nursing department-the head nurse-the head of the responsible group. The responsible group leader implements the ability level management, and she is responsible for arranging the nursing work of the members of the group and conducting targeted rounds on the members of the group, so as to grasp the basic treatment and nursing of the patients. The head nurse enters the isolation ward for ward rounds and bedside guidance after taking part in the daily morning handover work report, which focuses on controlling the weak links and providing guidance on the difficult problems in the nursing process; the director or deputy director of the nursing department goes to the isolation area every afternoon to inspect and supervise the treatment and nursing of patients, with emphasis on guiding nurses, training nurses, quality control and checking the implementation of the core system.

## **2.3 Fully communicate, strengthen cooperation and coordination**

In order to methodically implement the nursing work of COVID-19 intensive care center, the members of COVID-19 's intensive care linkage team have a clear division of labor and point-to-point contact with the person in charge of each link. Through the head nurse to understand the nursing work, collect the existing problems, each team leader to understand the physical and mental status and needs of the nursing staff, and then they communicate timely and fully on Wechat. Members of COVID-19 's intensive care linkage team hold a short meeting after attending the handover report every morning. the main purpose of the meeting is to get an overall overview of the admission and nursing work of patients in the treatment center; to understand the working status and physical condition of nursing staff; to feedback the current problems in work; to put forward proposed solutions and remedial measures for the problems that can be solved. It is proposed that the problems that cannot be solved for the time being be discussed and negotiated by all personnel. Events that need to be coordinated by other departments or



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need to be reported to the leader will be coordinated after reporting to the leader, and the opinions and suggestions for improvement will be announced the next day to ensure mutual cooperation and timely coordination among personnel, so that the end of each day is clear.

Relevant studies have proved that only by using scientific management means can we achieve the purpose of improving work quality and efficiency (10). COVID-19 's severe and critically ill patients are in critical condition, change rapidly, and are often complicated with a variety of complications, which seriously threaten the lives of the patients (11). Support the medical team and the medical staff of the designated hospital to cooperate deeply, learn and make progress together in clinical medical care, and carry out work in an orderly manner in many aspects, such as logistics and material support, external liaison, and so on. it can not only ensure high-quality respiratory and critically ill specialist medical and nursing services, but also minimize the time consumption of supporting medical teams to adapt to the environment of designated hospitals and be familiar with relevant processes. In this way, we can race against the clock to save the patient (12).

## Result

As of March 20, 2020, 95 confirmed patients were admitted to the Intensive Care Center of our hospital, including 23 critically ill patients, 72 ordinary critically ill patients, 6 deaths, a mortality rate of 6.3%, and an average hospitalization time of 20 days. Our hospital carried out 3 ECMO cases, 16 CRRT, 7 invasive mechanical ventilation, more than 80 non-invasive ventilation, and more than 80 high-flow oxygen therapy. A total of 63 nurses from 23 hospitals in Guangdong Province rushed to our hospital. The nursing work in the ward operated in an orderly manner, with efficient team cooperation and tacit understanding. As a result of the state's policy of free treatment for COVID-19 patients, COVID-19 patients received effective

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treatment and care, reducing the financial burden for patients and their families. So far, all anti-epidemic medical staff have carried out nucleic acid tests and lung CT examinations, and no cases of medical staff have been infected.

## 4 Limitations

The choice of hospitals may have certain geographical restrictions, and the system of each hospital may be slightly different. The successful experience of this scheme can provide reference for the nursing management system of infectious disease treatment centers in large medical institutions in the future. however, it still needs to be explored and improved in the management practice in the future. This management method can be applied to research in more regions and hospitals in the future.

## Discussion

Efficient nursing quality management method is crucial on preventing the spread of the COVID-19 epidemic and ensuring the operation of emergency isolation ward orderly. Taking the five elements of quality management "human, machine, material, method and ring" as the starting point, and based on the principles of full communication, mutual cooperation and timely coordination, our hospital makes the nursing team of COVID-19 intensive care center composed of nurses in many hospitals operate efficiently. This not only strengthens the positive response and effective response of the nursing system, but also ensures the quality of nursing work and the safety of nursing staff. At the same time, there are also some challenges in our hospital: (1) There are inadequate preparation for public health emergencies and the shortage of protective materials in the early stage of the epidemic, and the emergency response ability of nursing staff needs to be improved. (2) The training of nursing staff of Guangdong Province is insufficient. In case of emergency, only short-term training has been given to them, increasing their time to adapt to the new environment and new tasks.

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Therefore, it is suggested that hospitals at all levels should establish emergency nursing management system and build professional emergency nursing team. In the next anti-epidemic plan, our hospital is not only to do a good job in the screening of asymptomatic COVID-19 patients, but also to do a good job in the follow-up and reexamination of COVID-19 patients after being cured and discharged from the hospital.

### Declarations

#### 1. Consent to publication

We declare that all authors agreed to publish the manuscript at this journal based on the signed Copyright Transfer Agreement, and followed publication ethics.

#### 2. Ethical approval and consent to participants

Not applicable.

#### 3. Disclosure of conflict of interests

We declare that no conflict of interest exists.

#### 4. Funding

None.

#### 5. Availability of data and material

We declare that the data supporting the results reported in the article are available in the published article.

#### 6. Authors Contributions

All authors contributed to the final manuscript. Mo Fu. designed the study. Juan Ding. and Mengyun Yang. wrote and revised the manuscript. Mo Fu. critically reviewed the manuscript and supervised the whole study process.

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## 8. Authors biography

None.

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