



## Research Article

# Allocation and Management of Nursing Human Resources for COVID-19

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## Abstract

To cope with the COVID-19, it poses a severe challenge to the nursing human resources management in hospitals. Our Nursing Department responds scientifically, focusing on comprehensive training, dynamic deployment, effective supervision, incentive support, psychological counseling, etc. From the starting point, we maximized the development of existing human resources, improved the utilization of human resources, and prevented the transmission of covid-19 in hospitals. The special efforts are of great significance to ensure that all nursing work is completed with high quality.

**Keywords:** COVID-19; Nursing Human Resources; Deployment; Management

## Introduction

The COVID-19 can spread rapidly in a short time. While there are still many unknown fields in human understanding of this disease, how to establish a rapid response mechanism in the face of the sudden and rapidly spreading mass input covid-19 patients is a huge challenge for hospitals, among which the most important is to redeploy human resources. Our hospital is a Hubei province regional medical center. On January 21, 2020, our hospital was identified as one of the Jingzhou city COVID-19 fever outpatient

medical institutions for fixed-point treatment. For the treatment of critically ill patients in fixed-point hospital medical institutions, the nursing department actively participated in the functions of management departments, under the condition of existing personnel, through targeted training, dynamic allocation, effective supervising, motivating support, and psychological counseling. We did utmost to develop human resources, improve the utilization of human resources, and ensure covid-19 prevention and control during our

special time work and normal medical care work smoothly. The report is as follows.

## 1. Materials and methods (Practice)

### 1.1 Training in stages for different periods of the epidemic.

COVID-19 has attracted widespread public attention due to its strong infectivity. In the early stage of the epidemic, the etiological characteristics, epidemiology, clinical manifestations, treatment and nursing, isolation and discharge standards of covid-19 are still under exploration, and the majority of medical staff still have insufficient understanding of it and lack sufficient prevention and treatment experience. Therefore, it is particularly important to strengthen the training of nursing staff and improve their scientific understanding of covid-19, so that they can master disinfection, isolation measures and self-protection knowledge. Due to the rapid response and timely training, from January 16, 2020, our hospital admitted the first suspected patient with new COVID-19 pneumonia, to March 1st, no case of nosocomial infection occurred in the medical staff in the fever clinic and isolation wards.

#### 1.1.1 At the beginning of the epidemic, basic knowledge about COVID-19 was popularized.

On December 30<sup>th</sup>, 2019, the Health and Medical Committee of Wuhan City of our province issued the emergency notice of "Treatment of Unknown Virus Infected Pneumonia" for the first time. Our hospital collected relevant information in a timely manner and asked the hospital's medical staff to be more vigilant and better protected. We focused on training in hand hygiene, wearing masks, putting on and taking off protective clothing and isolation clothes, using goggles, procedures for entering and leaving the quarantine area, and disinfection and quarantine. Relevant standard operating procedures (SOP) have also been developed to

facilitate the correct implementation of medical staff. At the same time, we conducted three-levels training at the college-area-department, including propaganda of prevention knowledge and special lectures. At the same time, the hospital experts were organized to answer questions, so that the medical staff had a certain understanding of covid-19 in the early stage of the epidemic and had a basic awareness of protection.

#### 1.1.2 During the admission and treatment phase, we focused on training in prevention and control knowledge.

The main route of transmission of covid-19 is through respiratory droplets and close contact, there is a possibility of aerosol transmission in a relatively closed environment when exposed to high concentrations of aerosol for a long time (1). Therefore, strict disinfection and isolation is an important means to cut off the transmission path. Our hospital conducted comprehensive training on nosocomial infection prevention and control of covid-19, placement and management of covid-19 patients, disinfection measures of covid-19 and personal protection of medical staff through batch training, WeChat, DingDingYun classroom and other online learning. The training and interpretation of the "COVID-19 Diagnosis and Treatment Plan" (the first to seventh edition) and "COVID-19 Prevention and Control Plan" (first to fifth edition) issued by the National Health Commission in a timely manner with constantly updated knowledge and ideas. At the same time, key points of nasopharyngeal swab collection technology, invasive mechanical ventilation technology, non-invasive ventilator use technology, and high-flow oxygen inhalation technology were demonstrated. The three-level Nursing Department-Area-Department management increased the supervision and guidance, and we took the implementation of nurses' protective measures as an important content of the three-level quality control, and our supervision of the Nursing Department ensured the implementation of nurses'

protective work and obtained protective effects.

## **1.2 Reasonable deployment of nursing human resources and real-time adjustment according to changes in epidemic situation**

The allocation of nursing human resources is the basic condition to ensure the quality of nursing work. When responding to the sudden attack of new COVID-19 pneumonia, we made it a priority to ensure adequate nursing human resources, such as fever clinic, infection department, respiratory and critical care department, ICU, etc., so that the nursing work was done with high quality.

### **1.2.1 Set up an emergency command team for human resources for epidemic prevention and control of nursing staff.**

The director of the nursing department served as the team leader and was fully responsible for the operation of nursing human resources for the prevention, control and treatment of the new COVID-19 pneumonia. The eight head nurses served as deputy team leaders and were responsible for coordinating the nursing staff in the area under their jurisdiction. A nursing department officer was responsible for combining the information of the number of patients in hot hospitals, the number of suspected cases, the number of patients in isolation wards, the number of patients in ordinary wards, the number of critically ill patients, the number of working nurses and other information. The emergency command team dynamically evaluates the number of nurses to be deployed, the job requirements, etc., based on the latest workload and the development of the epidemic.

### **1.2.2 Establish the admission qualification of nursing staff for the epidemic prevention, treatment.**

Nursing staff for the prevention and control of the covid-19 epidemic need to complete pre-employment screening and covid-19

knowledge training, excluding the following personnel: within 1 year of training nurses, pregnant women, lactating women, age>50 years, history of chronic diseases (hypertension, heart disease, diabetes, chronic nephritis, autoimmune diseases and tumors, etc.), obvious depression and anxiety, those with acute fever and those who have a history of Wuhan travel within 14 days. Those with no history of Wuhan travel within 14 days need to be screened for body temperature before going to work.

### **1.2.3 Establishment of three-level echelon manpower reserve**

In the face of the epidemic challenge, in the face of life challenges and threats, the hospital nursing staff canceled leave, and immediately went into a state of readiness.

#### **1.2.3.1 The first echelon**

The first echelon team was formed by rapidly deploying 79 people from the departments of infection, respiratory and critical illness, ICU and other departments. These included 1) 2 provincial support nursing experts: an ICU head nurse and ICU nursing backbone went to Wuhan Jinyintan Hospital on January 23, 2020 to support the treatment of covid-19 patients; 2) 20 support nurses in Jingzhou city: a deputy director of the nursing department, a head nurse in the ward and 17 nursing backbones went to the Chinese Medicine Hospital in our city for support; 3) The first isolation ward was established on January 16, 2020, with 38 beds and equipped with 40 nursing staff, and began to treat suspected cases. 4) Fever outpatient allocation of 17 people: implementation of the 24-hours work system.

#### **1.2.3.2 The second echelon**

We selected nurses with good ideological, professional, psychological and physical capability, combined with personal desire, from each ward to take the positions of supervisor nurses and nurse practitioners as the master for covid-19 epidemic

prevention and control, and treatment. The nursing team was formed a total of 300 people. Based on the patient's admission, our hospital established 4 new COVID-19 pneumonia isolation wards on January 22, January 23, and February 1, respectively, with a total of 164 beds, and deployed 140 nurses to the post. On February 16, 2020, the Jingzhou covid-19 intensive care center was officially opened in our hospital. It can accept and treat 100 patients with severe diseases, including 10 ICU beds and 112 nurse. Another 48 personnel are in reserve.

### 1.2.3.3 Third echelon

Backup support personnel were 107 in total. 90 people were selected from the emergency department, the hospital's critical care specialists nurses, and hospital-level general nurses to form a reserve team of isolation ward rotation personnel; 17 people were selected from the operating room and disinfection supply center to form a reserve team of the clinic rotation personnel.

### 1.2.4 Flexible scheduling based on actual workload

On the basis of the number of suspected/confirmed patients, the development trend of the epidemic, and the number of nursing staff on assignment, the special management team of human resources for epidemic prevention, control and nursing carried out dynamic assessment on the manpower needs of the epidemic prevention, treatment and nursing team. According to the tasks of nursing care for epidemic prevention and control, the job requirements of head nurses and nursing staff were refined, job responsibilities were formulated, and the principles of deployment were clearly defined.

#### 1.2.4.1 Fever clinic

Due to the return of some people from Wuhan, our hospital issued a fever clinic from

January 21 to January 23, 2020. It implemented a 24-hour working system and received an average of more than 300 people per day. The Nursing Department urgently deployed 2 head nurses and 15 nurses to regularly support the fever clinic.

**Responsibilities:** Responsible for checking the temperature, triage and registration of patients with fever; to guide patients to register, pay fees and maintain the order of medical treatment; health education; be responsible for the environment of fever clinic and disinfection of articles. **Job**

**requirements:** The head nurse is required to have emergency work experience and strong ability of emergency communication. The nurses should master the protection points, covid-19 basic knowledge, certain communication and health education ability. **The principle of deployment:** Considering the significant decline in the operation volume in our hospital during the epidemic period, the nurses in the operating room and disinfection supply center are the mainstay, and the nurses in each ward are used as reserve personnel of the isolation ward. **Scheduling principles:** Due to the shortage of protective materials and the balance of the use of protective materials, there are 2 daily nurses (8:00-17:00) in the day shift, 2 people in the blood sampling shift (8:00-13:00), 2 disinfection nurses and one person in the item preparation shift (8:00-17:00), two night nurses (17:00-08:00). The head nurse (8:00-17:00) is responsible for overall management. On January 24th, the patient number of fever clinics decreased significantly, with more than 70 person/times per day, and some shifts were immediately adjusted: shortened working hours and reduced the physical and mental burden of nurses, the working hours of the 2 day shift triage nurses are 8:00-13:00, 13:00-18:00; the work hours of the 2 night shift triage nurses are 18:00-24:00, 00:00-08-08:00. These avoided unnecessary waste of human resources, while reducing excessive staff turnover.

#### 1.2.4.2 Isolation ward

After the expert decision of our hospital, the

isolation ward was in three separate buildings. On January 16, 2020, the first COVID-19 isolation ward was established. With the number of suspected/confirmed patients diagnosed every day, the number of suspected/confirmed patients rapidly have increased afterwards. On Sunday, January 23, and February 1, our hospital has successively established other 4 isolation wards, with a total of 202 beds in 5 wards. On February 16, 2020, Jingzhou COVID-19 Intensive Care Center was officially opened in our hospital, which can treat 100 severe patients. The nursing department deployed 300 nurses from the second echelon for the four aspects. The job responsibilities, job requirements, deployment principles and scheduling principles are as follows. **Job responsibilities:** The COVID-19 Intensive Care Center mainly treats critically ill patients; the other five isolation wards mainly treat mild patients. **Job requirements:** 1) COVID-19 critical care center: staff with rotation experience in the intensive care unit, skilled in nursing skills such as non-invasive ventilator, invasive mechanical ventilation, closed sputum aspiration technology, high-flow oxygen inhalation, blood and gas analysis, prone position ventilation technology, and continuous renal replacement therapy (CRRT) technology. 2) The first-fifth isolation ward: more than 2 years of ward work experience, the hospital level humanistic care team members are preferred. 3) Each ward is equipped with 2 to 4 head nurses: The COVID-19 Intensive Care Center is equipped with 4 head nurses, all with critical illness-related work experience; each of the other 5 wards has a nurse with more than 5 years of management experience, and with a new head nurse within 2 years' experience to assist. **Allocation principle:** select nurses with good ideological, professional, psychological and physical capability from each ward, with the supervisor nurse and nurse practitioner as the main choice. **Scheduling principle:** follow the principle of "implement treatment and care,

ensure patient safety, ensure adequate rest for nurses, and save protective equipment". Based on this, the nursing department came up with a guide template for scheduling, and the head nurses in each isolation ward can make fine adjustments according to the specific situation. The COVID-19 Intensive Care Center operates 4 hours per shift and rotates 6 times a day, the time is: 8:00-12:00; 12:00-16:00; 16:00-20:00; 20:00-24:00; 00:00-04:00; 04:00-8:00. Each isolation ward was divided into 3~5 responsibility groups according to the number of patients and their conditions. Each group had 3~5 responsible nurses, relatively fixed staff, attention to the hierarchy, and four liners. Working day shift 1 (8:00-13:00), day shift 2 (13:00-18:00), midnight: 18:00-01:00, night shift: 01:00-08:00. In addition, disinfection classes are arranged every day, the personnel are relatively fixed and full-time, who are responsible for disinfection, isolation and occupational protection of the wards. One coordinator, responsible for online application for materials and liaison within and outside the quarantine area. The nurse takes a rest every 4h-7h shift. When each new isolation ward is established, two "seed" nurses who are familiar with the isolation ward's working procedures and responsibilities will be drawn from the first isolation ward to work in the new ward, and at the same time dynamically add new personnel for the first training and actual combat in an isolation ward.

### 1.3 Psychological counseling, focusing on humanistic care

#### 1.3.1 Pay attention to the first-line nurses and give physical and mental support

The prevention and treatment of COVID-19 has arduous tasks and a special working environment. The physical and psychological conditions of front-line nurses have been in a state of stress for a long time, which will cause physical and mental health damage, resulting in endocrine disorders and reduced immunity of the body, thereby increasing the risk of infection. Faced with

this situation, we are physically and mentally provided support to front-line nurses. 1) The leader of the hospital leads specially-assigned personnel to collect protective equipment, to ensure adequate supply of front-line protective equipment and eliminate worries of front-line staff. 2) The hospital and the hotel signed an agreement to provide temporary accommodation for employees free of charge, and all staff in the infected area can apply for admission. Reasonably arrange the diet and contact the nutrition department at the same time for the front-line staff to adjust the diet to ensure adequate nutrition. 3) Medical staff involved in the prevention and treatment of the epidemic are organized to have the Medical Service expert consultation and free screening for symptoms such as fever. 4) The dean, secretary, and director of the nursing department regularly visit the fever clinic and isolation ward to give condolences to the nursing staff who hold the post, send consolation materials, understand the difficulties in the work, and give encouragement and support. 5) In the early stage of the epidemic, the nursing department conducted emotional counseling on the nursing staff temporarily staying in the hotel, and organized a face-to-face symposium to encourage nurses to tell their feelings in the work, helping nurses release their emotions and anxiety. 6) The hospital-level nursing humanistic care group organized four "heart healing" mandala public service counseling micro-classes online, to carry out positive psychological intervention on the first-line nurses, so that they can face the work with a good attitude and mental outlook, improve immunity and enhance disease resistance.

### **1.3.2 Encourage nurses to establish positive energy**

Faced with the epidemic, some nursing staff were overly nervous and frightened, being overly cautious in their work and even daring to contact the patients, as reported before (2). Therefore,

through active positive publicity, we arouse the nurse's sense of mission and responsibility, and stimulate the honor of nurses to perform the sacred duty of saving lives and helping wounds, so as to fully mobilize the enthusiasm of nurses in each position. Let nurses understand that fighting "COVID-19" is not only the current central work of the hospital and the country, but also a major event that concerns everyone's vital interests. Therefore, everyone has an obligation to make contributions to prevention and treatment. Through the news media and the hospital's official website in a timely manner, the hospital's first-line nurses who fight against "COVID-19" were given timely publicity, and a one-time condolence subsidy was issued as soon as possible in accordance with national policies, and a COVID-19 epidemic prevention subsidy was issued once a week.

## **2. Result**

From January 16, 2020 to March 23, 2020, our hospital has set up 5 isolation wards and one COVID-19 intensive care center. More than 700 medical personnel were deployed to participate in the frontline of epidemic prevention and control. There were more than 100 outside helping medical teams. More than 240 patients with COVID-19 were treated, including more than 100 critically ill patients. The nasopharyngeal swabs were collected more than 3000 times. Extracorporeal Membrane Oxygenation (ECMO) was carried out for 3 cases. Continuous Renal Replacement Therapy (CRRT ) was carried out for more than 10 people, invasive mechanical ventilation more than 10 people, noninvasive ventilation more than 80 people, and high flow oxygen therapy more than 80 people. In-hospital patients per day is about 400-700 persons in our hospital general wards. During the epidemic period, there was not one case of nosocomial infection among medical staff, patients and family members in the fever outpatient clinics, isolation wards and general wards. It not only guarantees the smooth progress of the epidemic

prevention and control work, but also guarantees the safety of the staff and patients in the isolation and general wards.

### 3 Discussion

#### 3.1 Scientific nursing human resource allocation is the cornerstone to ensure the quality of nursing during the epidemic

Whether the staffing of clinical nurses is adequate or not is directly related to the quality of care and the safety of patients (2). The principle of the allocation of nursing human resources in the wards is not only to maintain the consistency of work, but also to ensure nursing staff to have a full rest, so as to avoid the infection caused by the decline of the health of nurses due to excessive fatigue (3). The COVID-19 spreads quickly in a short time, the hospital is faced with the sudden and rapid increase of batches of imported COVID-19 patients, the reconfiguration of human resources is the core task. In response to the sudden COVID-19 attack, our hospital has always make it a priority to ensure adequate human resources for front-line care. Under the premise of comprehensive training, the human resource nursing needs of epidemic prevention and control were firstly evaluated according to the number of suspected/confirmed patients, the trend of epidemic development, and the number of nurses dispatched abroad. Combined with the content of job responsibilities and job requirements, the unified deployment principle has been formulated, the nursing human resource management has been effectively carried out, the redistribution of human resources has been realized, and the utilization rate of human resources has been improved, so that the nursing work will not cause confusion due to emergencies, and has played a positive role in the high-quality completion of the special tasks of preventing and treating COVID-19 and a lot of other routine nursing work.

#### 3.2 Giving physical and mental support to clinical frontline nurses doing prevention, control and treatment of COVID-19 is the motivation to ensure the orderly development of nursing work.

In the face of sudden outbreaks, medical staff are retrograde, but in the face of sudden major disasters, the number of nursing staff involved in responding to public crisis is limited. Therefore, most of the nursing staff deployed from various clinical departments have no experience and sufficient preparation. In the face of public crisis, there will be psychological dysfunction (4). The nursing work of COVID-19 patients is not only heavy, but also dangerous. The nursing staff entering the ward of COVID-19 suffer from the challenge of physical and psychological limits, especially in the early stage, when there were many problems in the material conditions and the coordination of various work. This kind of condition causes the first-line nursing staff to bear the huge psychological pressure in addition to the work pressure, and the anxiety, the fear and so on situation occur more commonly. Studies (5) have shown that it is of great practical significance to reduce the health damage caused by psychological stress, reduce the work efficiency decline caused by stress, and reduce the insecurity risk caused by errors in judgement and response. Through various incentive methods, humanistic care, professional lectures and other forms, our hospital allows the nursing staff to objectively view and accept the stressful environment, correctly evaluate their actual adaptability, and properly predict the coping effect, thereby improving stress tolerance threshold. At the same time, through the "Healing Heart" mandala public welfare counseling micro-class, the first-line nurses are guided and relieved to maximize the active psychological defense mechanism to improve the adaptability of nursing staff.

In short, facing the sudden COVID-19 epidemic, the Nursing Department actively organized and coordinated personnel training, scientific deployment and incentive support,

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effectively carried out nursing human resource management, realized the redistribution of human resources, and improved the utilization rate of human resources, played a positive role in the high-quality completion of the special tasks of prevention and treatment of COVID-19 and a large number of other routine nursing work.

## 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

We followed the requirements for ethical approval and consent to participants.

### 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

Juan Ding contributed to the conception, design and data analysis. Yujiao Yan contributed to data collection and writing of the paper. Mo Fu contributed to revision and proof-reading.

### 7. Acknowledgement

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### 8. Authors' biography

None.

## References

1. General Office of National Health Committee. The General Office of the National Health and Health Commission Notice on Printing and Distributing the COVID-19 Diagnosis and

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Treatment Program (Trial Version 7) [EB/OL]. (2020-03-03)[2020-03-08].

<http://www.nhc.gov.cn/xcs/zhengcwj/202003/46c9294a7dfe4cef80dc7f5912eb1989.shtml>.

2. Jianrong W, Liming Z, Chang W, Yanlan M, Zhiying F. Nursing human resource management in response to SARS. *Chinese Journal of Nursing*, 2003, 38(8):637-640.

3. Shaomei S, Weijiao Z, Qiaoqin W, Bei L, Xu D, Xunlin W. Research progress of nursing manpower allocation. *Chinese journal of nursing management*, 2018, 18(4):433-436.

4. Hua Z, Hao L, Wei M, Xia L, Yun W. Investigation on the psychological stress response of civilian nurses in military hospital to earthquake disaster. *Journal of Nursing Science*, 2014, 29(2): 13-14.

5. Yueran Z, Ningning J, Hongyuan T, Xi Z, Xuan M, Lisha Y, et al. Practice and discussion of preventive psychological counseling for nursing staff in SARS designated hospitals. *Chinese Journal of Nursing*, 2003, 38(9):731-732.