



## Discussion on the Management Method of COVID-19 Infection Prevention in Medical Residents

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### Abstract

**Background:** To explore the homogenized management method of infection prevention and control in medical resident under COVID-19 epidemic situation.

**Methods:** Overall, 268 members in Ningbo Medical Group which was participating in the management of novel coronavirus pneumonia in Wuhan, China were managed homogeneously in terms of personal cleaning and disinfection of articles, prevention and control of infection in life, training and assessment of relevant infection knowledge in hospitals.

**Results:** In the epidemic situation, the homogenization management of infection prevention and control in the resident of medical team is an important measure to block the transmission link.

**Conclusion:** 1. Conduct homogenization management on the training of hospital infection knowledge for medical staff. 2. Conduct homogeneous management of effective assessment of training knowledge. 3. Conduct homogenization management from personal cleaning and disinfection, as well as infection prevention and control in daily life.

**Keywords:** Medical resident; Homogenization management; COVID-19; China

### Introduction

The novel coronavirus pneumonia is a highly infectious disease (1) discovered in 2019. Until 18:00 central European time on 5 Apr, there were 1,136,851 confirmed cases and 62,955 deaths worldwide, involving 208 countries and regions, among them, Apart from china, the United States, UK and Italy are the worst-hit regions. In China, Wuhan and its surrounding areas have become a disaster area for disease transmission. As of 5 Apr 2020, according to the official data of the Health Commission of Hubei Province, there were 82875 cases among 31 provinces in China, including 67803 cases in Hubei Province, accounting for 81.8%; 3335 deaths, including 3207 cases in Hubei Province, accounting for

96.1%. How to control the epidemic effectively as soon as possible and is a global concern.

To relieve the pressure of medical institutions in Hubei Province, improve the timeliness and effectiveness of treatment for patients, especially the critical patients, and reduce the number of deaths, as of Mar 2, 2020, National Health Commission of the People's Republic of China has convened 344 national medical teams from all over the country, 42322 medical and nursing personnel have been sent to Hubei. To facilitate management, many medical teams from other provinces have taken over the hospital in comprehensive organizational system.

Ningbo Health Committee sent a medical team composed of 268 members to support Wuhan

with the necessary medical equipment, and took over two areas of wards for critical patients in Guanggu District, Tongji Medical College, Huazhong University of science and technology. Medical personnel who were close contacts with patients with novel coronavirus pneumonia are also high-risk groups of infection. The medical team carried out infection prevention and control in the residential area where the medical staff gathered by homogeneous management and there were no infections among the medical team. This paper summarizes the homogenization management method of in comprehensive organizational system of COVID-19 Epidemic Situation. It can be used as a reference for other medical teams around the world. It can also provide reference for other countries' medical staff to focus on regional infection prevention and control.

## Materials and Methods

### *Homogeneity management*

The staff of the medical team came from several hospitals in Ningbo, Zhejiang Province, China. There were differences in the level of working hospital, discipline and working experience. There were bound to be differences in team members' understanding and practice of nosocomial infection. It was great significance to establish a standardized homogeneity management. Our approach was as follows:

### *Establish hospital infection prevention and control team and System formulation*

The medical team set up a leading group for infection prevention and control in the form of three-level management organization structure, the Secretary of the temporary Party committee shall be the group leader, who shall be the person in charge, with two deputy group leaders, they are first level in the organization structure. Two special supervisors for infection prevention and control. There was a special administrator for infection prevention and control in each ward, they were second level. There was a member for infection prevention and control in each group of nurses or doctors, they were third group. The

management mode was progressive layer by layer to ensure that each group, each ward and each medical team has personnel for infection prevention and control. Team members were responsible for the implementation of the system, daily supervision and regular inspection. All the group conduct regular supervision and inspection on the implementation of the system every week, make summarization and feedback regularly to improve the system.

The team successively formulated and launched the first and second editions of the prevention and control system for nosocomial infection of Ningbo medical team. The infection prevention and control leading group also guided the completion of the transformation of the pollution area, semi-clean area and clean area of the resident hotel, and clarified the process of in and out of the hotel. Make clear the disinfection process of individual rooms, public areas of hotels and commuting vehicles, and make clear the allocation method of disinfectant, place and time of disinfection and other rules.

### *Training and Implementation infection prevention and control knowledge*

The medical team carried out the training of infection prevention and control knowledge in the medical staff's residence. The training content included not only the knowledge of infection prevention and control at work, but also the contents in the residence life. The infection prevention and control management team and experts released learning points and operation videos from time to time in the WeChat group, and team members sign in to learn through smart phones to avoid personnel gathering. Theoretical assessment and operation shall be assessed by video conference. All these measures ensured the homogenization of infection prevention and control knowledge training and assessment.

### *Homogenization of round trip resident process*

After leaving the novel coronavirus pneumonia ward, the medical staff should take off the protective equipment used in the ward according to the infection protection process, wash their

hands, change the new medical-surgical mask, put on the outgoing clothes and prepare to return to the residence. On the way back to the residence, do not take off the mask for talking with colleagues. After returning to the residence, they should change to the resident's coat and hang the outgoing clothes which would be disinfected regularly with ultraviolet rays in the hall, and the stuff soaked and disinfected the sole of shoes. Wash hands following hospital regulations before and after changing clothes. Before entering the personal room, take off the resident's coat, and enter after the standard hand washing. Changed the clothes and pants at the porch again, and then went bath with flowing hot water. When bathing, pay attention to wash the head, face, eyes, nose and mouth. If pollution or exposure was suspected, wiped and disinfected the nasal cavity with Iodophor or wash it with normal saline. Change clothes, shoes and socks after bathing. Washed the changed clothes in time. If any suspected pollution was found, soaked and disinfected with disinfectant containing 250-500mg/L chlorine for 10min and dry them after cleaning.

Before starting from the residence to the hospital, make corresponding preparations, change the clothes you wear for work, put on the outerwear layer by layer at the door of the room and in the hall, pay attention to the change of the external temperature to prevent cold. At the same time, change shoes and socks for working, put on medical surgical masks, take special vehicles to the hospital, and enter the cleaning area from the special channel for medical personnel.

The above processes were posted at the residence and hospital clothing change place, and there were label prompts at the door of the room. There were infection prevention and control management personnel in the residence and hospital for irregular inspection and assessment. To ensure the homogeneity of infection prevention and control on the way to and from the resident.

#### ***Homogeneity management of infection-related monitoring***

Carry out daily routine monitoring on the health status and occupational exposure of medical staff

(2), and found out problems in time, mainly including 1) Monitored the temperature of medical team members twice a day, the measurement time was 8:00 a.m. and 16:00 respectively, and the thermometer was used by individuals alone. After use, used the chlorine-containing disinfectant to soak and disinfect. Did not eat, drink or had intense physical activity half an hour before measurement. If it exceeded 37.3 °C, it reported it in time. The symptoms and signs of novel coronavirus pneumonia was monitored at the same time, such as cough, sputum, sore throat, dyspnea, and so on. 2) Monitored the occupational exposure of medical team members, such as the slippage of masks, the rupture of protective clothing, the exposure of blood and body fluids of skin and mucous membrane, sharp instrument injury, etc., and make corresponding records.

#### ***Homogenization of residential protection Personal protection requirements***

It was forbidden to leave the living room, go to other people's rooms or public areas without permission, when was not for working or special requirements. In public areas of resident hotels, such as lobbies, corridors and restaurants, medical-surgical masks should be worn (3). Did not meet or visit others privately, wear medical surgical masks and keep a distance of more than 1 m when communicating. Exercise indoors properly.

#### ***Disinfection requirements of the resident***

1) The room should be clean, dry and ventilated frequently. The windows should be opened at 10 a.m. and 4 p.m. every day for ventilation for 20 min to half an hour. At 10:00 a.m. and 4:00 p.m. every day, 75% ethanol or 500 mg/L disinfectant containing effective chlorine should be used to wipe the door handle, window handle, various buttons, etc. for at least two times. The medical staff lived alone and without wearing medical surgical masks in the room. 2) They used 75% ethanol to wipe and disinfect glasses and mobile phones before going to work and after returning to the resident and disinfected at any time in case of pollution. 3) When using disinfectant, pay attention to safety. 75% ethanol was mainly used for wiping and disinfection.

Because it was volatile, flammable and explosive, did not spray for disinfection, and was not close to the fire source. Chlorine containing disinfectants was corrosive and irritant so gloves should be worn when using it, and when disinfecting clothes, it should not be mixed with other preparations such as washing liquid to prevent the generation of irritant toxic gases.

### ***Hand hygiene***

It was required to wash hands frequently in daily life, such as after going out or into the room, before eating or drinking, before defecating, after coughing and sneezing. They could wash hands by flowing water or quick-drying hand disinfectant.

### ***Dining process and precautions***

The restaurant was an important place for medical team members to gather and communicate. It was necessary to strengthen the management during the dining period, mainly to: 1) Adjusted the dining time according to the total number of staff. To reduce the density of people, we should eat in different periods. 2) Before eating, hand hygiene should be carried out first (wash hands with flowing water for 20 sec or disinfect hands with quick dry disinfectant for 15 sec), and medical-surgical masks should be worn when taking meals. When eating, put the mask away and put it on a proper clean table with the outside facing up. 3) Did not sit on the opposite side and keep a proper distance (more than 1m) during the meal. After the meal, they wore a medical-surgical mask and return to the room quickly.

### ***Disinfection and air purification of medical resident***

#### ***Cleaning and disinfection of special vehicles for the resident***

The internal surface of the vehicle should be cleaned regularly every day. In case of pollution, the vehicle would be disinfected at any time. The disinfectant containing effective chlorine 500mg/L used for disinfection. After wiping, the window should be opened for ventilation.

### ***Cleaning and disinfection of public areas of resident hotels***

Public areas such as elevator buttons and door handles should be cleaned and disinfected per 4-6 h. 75% ethanol should be used for disinfection.

In public areas such as the hotel gate, elevator room, restaurant entrance, etc., quick-drying hand disinfectant was equipped, and the hand hygiene flow chart pasted to facilitate the hand hygiene of medical personnel and all other personnel entering the resident and reduce the chance of cross-contamination.

### ***Management of resident air conditioning***

To prevent cross-infection caused by the central air-conditioning system in the resident, the central air-conditioning system in the whole resident should be stopped. If the temperature allowed, the best air purification method was to strengthen the window ventilation.

### ***Equip with disinfection products***

Quick-drying hand disinfectant, chlorine-containing disinfectant, and commonly used skin and mucous membrane disinfectant (75% ethanol, iodophor, etc.) need to be equipped in the resident to facilitate the use of medical personnel.

## **Results**

Since the whole medical team took over the two critical areas of Guanggu hospital, Tongji Medical College, Huazhong University of science and technology, 173 patients with novel coronavirus pneumonia in severe and critical situation have been admitted and 158 have been discharged as of Mar 31, with a cure rate of 91.3%. However, through the strict homogeneous management of infection prevention and control, the nucleic acids of all the team members were negative.

## **Discussion**

The novel coronavirus pneumonia was a new epidemic disease that the world needs to face together. Medical team building and off-site rescue

in comprehensive organizational system was a new attempt and rescue mode.

In this new mode, because of the great difference in the departments and its infectious disease prevention and control knowledge between medical staff, it was worth exploring how leaders and managers carry out homogenization management in infection prevention and control to avoid the spread of disease in the team.

In this study, Ningbo medical team improved the knowledge and practice of infection prevention and control of medical staff from different hospitals and departments by homogenization management of system development, training and learning, resident life management and process development. In addition, the management and control of the resident, vehicle disinfection management, air conditioning management, equipped with disinfection equipment, etc., there was no infection in the returned members until now. In this regard, it is of great significance to carry out homogeneous management of infection prevention and control in the medical resident.

Because of time constraints, the relationship between homogeneity management of infection prevention and control and outcomes has not been systematically studied. If we can combine the clinical data in future research, the superiority of homogeneity management of infection prevention and control in the medical resident would be more convincing.

## **Conclusion**

In this study, we verified the following notes: Conducting homogenization management on the training of hospital infection knowledge for medical staff; conducting homogeneous management of effective assessment of training knowledge; and conducting homogenization management

from personal cleaning and disinfection, as well as infection prevention and control in daily life.

## **Ethical considerations**

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

## **Conflict of interest**

The authors declare that there is no conflict of interest.

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