

# Effect of Nursing Management in General Wards of General Hospitals Under Novel Coronavirus Pneumonia Epidemic

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**Abstract:** *Background:* The Novel coronavirus pneumonia, referred to as neocoronavirus pneumonia, is characterised by interpersonal transmission and high infectivity atypical early symptoms that are difficult to identify, and general susceptibility of the population. In the face of the epidemic, the work of general wards in general hospitals still needs to be carried out and the flow of people is relatively dense, which may easily lead to the occurrence of nosocomial aggregation of infection if effective protective measures are not taken. *Purpose:* Healthcare workers in general wards are facing the double pressure of disease treatment and epidemic prevention and control, aiming at the early detection of suspected patients, isolation of potential sources of infection, and cutting off all possible transmission routes through hierarchical quality control management to reduce the incidence of nosocomial infections in patients and their families, and the risk of occupational exposure of healthcare workers, in order to protect the safety of patients and healthcare workers in general wards. *Methods:* It is proposed to implement a stratified, hierarchical and all-round management strategy for patients and healthcare personnel in general wards: including epidemic prevention and control training for healthcare personnel, nursing human resources deployment, and management of daily life and psychological care; patients are classified into newly-admitted patients, common patients, special patients and suspected patients, and different protective and isolation measures are taken for different categories of patients. Management was carried out in 6 aspects, including patients' ward environment disinfection, common instrument and equipment handling, specimen collection and transfer, medical waste disposal, daily life, and accompanying staff. *Results:* from December 2019 to April 2020, 128 patients with suspected neocoronavirus pneumonia were found in the general ward, 20 patients were diagnosed with neocoronavirus pneumonia among the suspected patients, and 2 health care workers were infected. *Conclusion:* The risk of infection of patients and medical staff in general ward can be greatly reduced by implementing hierarchical and comprehensive management strategy. In particular, it effectively blocked the transmission of the virus in the incubation period of such high-risk and easy to miss the diagnosis of cases.

**Keywords:** Novel Coronavirus Pneumonia, General Ward, General Hospital, Nursing Management

## 1. Introduction

The novel coronavirus pneumonia, also referred to as neocoronavirus pneumonia, is facing an epidemic, and the work of general wards such as neurology, cardiovascular and

cerebrovascular, haematology and operating theatres in general hospitals still needs to be continued [1-4]. The novel coronavirus pneumonia is characterized by strong infectivity, has atypical early symptoms that are difficult to recognise, and is generally susceptible to the population [5-8].

The National Centre for Disease Control and Prevention (NCDC) has declared the disease to be included in the national category B infectious diseases, with measures to prevent and control it as a category A infectious disease [9]. The crowd in general ward of general hospital is densely populated, and if effective protective measures are not taken, it is easy to lead to the occurrence of congregate infections in the hospital. Healthcare workers in general wards face the double pressure of disease treatment and epidemic prevention and control, and it is crucial to protect the physical and mental safety of patients and healthcare workers in general wards. In this study, a hierarchical and graded all-round management strategy was implemented for patients and healthcare workers in the general ward, which greatly reduced the incidence of nosocomial infections among patients and their families and the risk of occupational exposure of healthcare workers in the general ward after the implementation of the strategy. It is summarised as follows.

## 2. Management of Medical and Nursing Staff

### 2.1. Establishment of Thematic Classes for Pre-service Training in Epidemic Prevention and Control

The hospital has set up a special classroom on the prevention and control of new coronavirus pneumonia with the help of the Internet and mobile phone client platform, and uploaded real-time updated national policy documents and training programmes to the special classroom in various forms of notices, courseware, videos and so on. Specific prevention and control contents include the diagnosis and treatment plan of the novel coronavirus pneumonia [10, 11], the infection prevention and control of hospital [12, 13], the process of wearing and taking off protective equipment [14], the environmental disinfection and isolation system in each ward [14], and the process of collecting and transferring specimens and medical waste. Through the mobile phone medical and nursing staff are reminded to learn the new coronavirus pneumonia prevention and control content in a timely manner and complete the online training and assessment, part of the training content was been pre-service trained by the head nurse and nursing backbone after been deployed to various temporary posts, then started to work after passing the assessment.

### 2.2. Nursing Human Resources Management

Unified deployment and dynamic deployment of nursing staff by the nursing department. The head nurse of the general ward makes overall planning, scientific management and reasonable arrangement of nursing personnel, following the principle of meeting the needs of the frontline of the hospital's anti-epidemic work, following the principle of nursing staff, at the same time, take into account the safety and security of patient in the department. On the basis of voluntary enrolment of nurses in the department to

participate in the frontline anti-epidemic work, specialist nurses, professional and technical leaders, nursing operation experts, and nurses with strong physical qualities were selected as mobile nurses for deployment by the Nursing Department at any time. Head nurse sets up nursing echelons according to the total number of patients in the department, the grading of their conditions, and the nursing workload, ensure the normal operation of the wards. The head nurse establishes an emergency plan for human resources to ensure adequate manpower deployment.

### 2.3. Management of Daily Life

Healthcare workers who are responsible for the treatment of coronary pneumonia are also highly infective, also should keep away for crowds. Temporarily vacant wards in the department should be used as temporary accommodation for healthcare workers. Medical care lounge should be regular disinfection and ventilation pay attention to individual safety protection, do not move around, do not share personal belongings such as brushteeth, 3 nutritious meals per day are provided by the hospital staff canteen, when two people are eating at the same time in the room, they should avoid sitting opposite each other, keep 1 meter's distance and wear a surgical mask throughout except for eating and drinking; healthcare workers carry out self-monitoring of their own health daily and report to the department; Use 75% alcohol to wipe and disinfect, personal belongings such as mobile phones, keys, glasses, etc; daily necessities are ordered by scanning the applet of WeChat code for purchasing daily necessities by the staff in the hospital, and the hospital's volunteer team is responsible for delivery. If there is no accommodation in the department, it will be reported to the management of the Human Resources Department of the hospital to arrange accommodation in the ward or student dormitory.

### 2.4. Psychological Care

Firstly, to assess the psychological state of nurses, it is proposed to use special assessment scales for anxiety, depression, stress, coping, the severity of stress, sleep quality, etc, and assess nurses in the form of questionnaires on a regular basis, so as to objectively and dynamically understand the physical and mental state of nurses; secondly, to learn about psychological topics and carry out on-line training on psychological prevention of epidemics by analysing the results of the survey and assessment and making use of the micro-credit platform; and lastly, to provide psychological support and assistance to nurses who need. Finally, psychological support and assistance, for nurses in need of psychological counselling and support, the head nurse or the nursing department can carry out initial communication and assistance, or use the hospital's psychologists to give guidance and support, or turn to the "psychological assistance hotline" in various provinces and cities across the country.

### 3. Patient Management

#### 3.1. Process for Managing Newly Admitted Patients

Ask detailed questions about medical history, contact history, regional history, and complaints (whether accompanied by fever, diarrhoea, cough, etc.); measure body temperature; inquire about outpatient lung CT report; wear a mask if the patient's condition permits; sign a commitment letter for hospitalisation during the prevention and control of the new coronary pneumonia epidemic; arrange for observation in a single ward for 14 d, closely observe the patient's clinical manifestations, and measure the patient's temperature in the morning and the evening once a day, and transfer to other wards only if any suspected symptoms related to new coronary pneumonia have not appeared in 14 d; if suspicious symptoms appear in 14 d, immediately put medical surgical masks on the patient and his caregiver and report to the medical department or the hospital's general duty officer. If there is no suspicious symptom related to new coronary pneumonia within 14 d, then the patient can be transferred to other wards; if there is suspicious symptom within 14 d, immediately give the patient and the caregiver to wear a medical surgical mask, report to the medical department or the hospital's general duty, and ask for an expert group to conduct a consultation; if it is confirmed that the patient is a suspected patient, healthcare personnel should take protective measures according to the hospital's infectious disease department, and the diagnosis and treatment environment of the treatment area, medical equipment, and the patient's belongings are strictly in accordance with the Disinfection Technical Specification for Medical Facilities (DTSM). The diagnostic and treatment environment, medical equipment and patient's belongings in the treatment area should be cleaned and disinfected in strict accordance with the Technical Code for Disinfection in Medical Institutions.

#### 3.2. General Patient Care

(1) Management of environmental hygiene and disinfection in wards: Ventilation is strengthened in wards to keep the air fresh, and items are arranged in an orderly manner to maintain tidiness. The floor and surfaces of articles are disinfected daily by wiping with 1000 mg/L chlorine-containing disinfectant, and then the residual disinfectant is removed with clean water. At least 1 bottle of rapid hand disinfectant is provided for every 2 beds, and each ward is equipped with 1 household rubbish bin. (2) Nursing staff perform hand hygiene before and after contact with each patient. (3) Medical waste is initially treated on site by nursing staff and then brought back to the sewage room for centralised treatment. (4) After patients are discharged from the ward, windows are opened to ventilate the ward before final disinfection is done, and all fixed items in the ward are disinfected by wiping with 1000 mg/L chlorine-containing disinfectant, and then water is used to remove any residual disinfectant. Commonly used instruments and equipments such as stethoscope, sphygmomanometer, cardiac monitor,

etc. were disinfected by wiping with 75% alcohol, and then placed in the clean area after drying naturally.

#### 3.3. Special Patient Care

(1) Ward environmental hygiene and disinfection management is based on the management of general patient wards, and each ward is provided with one additional medical waste bin, disposable isolation gowns, and disposable medical latex gloves. (2) Nursing staff perform general nursing operations and hand hygiene before and after contacting each patient. (3) When nursing staff perform special operations such as sputum suction care, tracheotomy care, sputum specimen and pharyngeal swab collection, and other high-risk operations, they will take contact isolation measures to deal with the process; medical waste is cast into a closed medical waste bin and cleaned up on a daily basis. (4) The final disinfection of the ward after patients are discharged from the department is the same as that of the ward for ordinary patients. The ventilator is disinfected by a ventilator disinfectant, and the ventilator pipeline is first soaked with 1000 mg/L chlorine-containing disinfectant, and then sealed and wrapped in layers of double-layered green plastic bags, and finally sent to the disinfection and supply centre for treatment.

#### 3.4. Management of Suspected Patients

If there is a suspected patient in the general ward, he should be isolated in situ and wait for transfer. Final disinfection of suspected patients after discharge from the department is the same as that of confirmed patients with new coronary pneumonia, with air disinfection followed by opening windows for ventilation and then final disinfection. (1) Items: (a) Medium and highly dangerous items, such as respirator tubes that come into contact with patients' secretions, are disinfected by immersion in 2,000 mg/L chlorine-containing disinfectant, while other items that do not come into contact with patients' secretions are disinfected by immersion in 1,000 mg/L chlorine-containing disinfectant, and then packaged in layers of double-layered green plastic bags labelled "Special Infection" and placed in the lift room for temporary disinfection. ", placed in the lift room temporary storage by the disinfection and supply centre centralized cleaning and disinfection and then sterilized with ethylene oxide. (b) low-risk items such as thermometers, sphygmomanometer cuffs and other items that can be disinfected by immersion, by the department using 1000 mg / L chlorine-containing disinfectant immersion, and then use water to remove the residual disinfectant, dry and put into a clean container for spare parts. Stethoscopes, sphygmomanometers, infusion pumps, etc. are disinfected by wiping with 75% alcohol. (3) Ventilator use ventilator disinfectant for disinfection. (2) Medical fabrics: bed sheets, pillowcases, curtains and other medical fabrics are wrapped in double-layer orange bags in closed layers, marked with "special infected" logo, placed in the lift room temporary storage, and recovered by a person in accordance with the infected fabrics to be cleaned and disinfected. (3) bedding, mattresses: (a) obviously contaminated

bedding using double-layer medical waste packaging bag layered airtight wrapping, in accordance with infectious medical waste for disposal; (b) obviously contaminated bedding, mattresses through the patient channel transported to the outdoor open area, using 1000 mg / L chlorine disinfectant disinfectant spray, and finally disposed of in accordance with the medical waste; (c) no obviously contaminated bedding, mattresses, etc., through the patient channel transported to the "special plus", and then to the "special plus". (iii) Non-obviously contaminated bedding, mattresses, etc. are transported through the patient's passageway to the "special heating and disinfection room", where they are disinfected at 60 degrees Celsius. (4) Wastes: All wastes in the ward are disposed of in accordance with medical wastes. Injurious wastes are put into sharps box for sealing and then wrapped in medical waste bags with gooseneck knots; infectious wastes are wrapped in double medical waste bags with gooseneck knots, labelled with Chinese labels and marked with "Suspected New Crowns", and put into the transfer box in the lift room for temporary storage.

### 3.5. Patient Life Nursing

Every day, the nurses who are in charge of the general affairs shift are responsible for helping patients and accompanying staff to order meals, inventorying patients' daily necessities and counting their needs. Priority is given to recommending patients and accompanying staff to scan the QR code of the hospital canteen to order food online, and for patients without smart phones, the nurse will contact the hospital canteen to order food. We counted the varieties and quantities of daily necessities and essential items for special care of patients, such as Chinese sheets, bedpans, commodes, etc, and reported the list of items for requisition to the head nurses. The head nurse of the department orders and receives daily necessities instead of the patients by scanning the QR code of the staff's daily necessities, and reports the list of the patients' special care necessities to the Supervision Office via Enterprise WeChat, and the hospital is responsible for contacting the suppliers.

### 3.6. Escort Management

In principle, there is no escort for self-care patients. If the condition of the patient is critical and requires an escort, each patient is limited to one regular escort. Other non-accompanied family members are not allowed to visit, and online communication through telephone and video is encouraged. During the period of prevention and control of the new coronavirus pneumonia epidemic, the implementation of a hierarchical, graded, all-round quality control management model for healthcare personnel and patients in general wards can timely and effectively identify suspected patients, isolate potential sources of infection, cut off transmission routes, in order to prevent cross-infection and the spread of the epidemic, which not only ensures the safety of healthcare personnel, patients, and accompanying staff, but also saves medical resources.

## 4. Implementation and Evaluation of Effectiveness

### 4.1. Objects of Implementation

The patients and health care workers who were in the general ward of our hospital during the period December 2019-April 2020 were selected for the study. During the period of December 2019-April 2020, The average number of hospitalized patients was 12,754 per day, and the average number of hospitalized people was 8,692 per day.

### 4.2. Results

There were 128 suspected cases of neocoronavirus pneumonia identified in general wards, 20 suspected patients were diagnosed with neocoronavirus pneumonia, and the number of healthcare workers infected was two.

## 5. Conclusion

During the outbreak, Our hospital was recognized as a main designated hospital for COVID-19 patients [15]. To summarize the experience of nursing management in preventing nosocomial infection of COVID-19 in general wards of general hospitals: (1) For medical staff: (i) Conduct knowledge and skills training related to COVID-19, they can work only pass the training examination; (ii) Establish a nursing human resource allocation mechanism, train specialist nurses, professional and technical leaders, nursing operation experts to be mobile nurses, ready to be shifted at any time; (iii) Quarantine is carried out in strict accordance with the system, ensure the supply of living materials; (iv) Psychological assessment of nurses was carried out; (2) For patient: (i) Classify patients and take different nursing measures for different patients: a. Newly admitted patients were asked about their medical history, contact history, regional history, symptoms and signs, and arranged to be observed in an isolation ward for 14 days before corresponding treatment; b. General patients and special patients shall be well managed from the environmental disinfection of wards, the operation requirements of nursing staff, the disposal of medical waste, and the terminal disinfection of wards after graduation; c. Suspected patients should be isolated in place, waiting for transport, and items in wards should be disinfected with confirmed COVID-19 patients; (ii) To provide patients with daily necessities, special care necessary supplies, provide hospital online ordering service. (3) The level of escorts: (i) strictly control the number of escorts; (ii) Refuse visits to avoid cross infection; (iii) The hospital provides online meal ordering and daily necessities.

In summary, it has effectively blocked the continued transmission of the virus in high-risk and easily missed cases in the incubation period. It not only ensures the life safety of medical staff, patients and caregivers, but also saves medical resources and improves medical quality. It is recommended to establish an emergency reserve echelon for human

resources, specifically designated for rapid deployment during emergencies. Additionally, it is crucial to implement specialized training programs in infectious disease nursing, enhance the provision of humanistic quality education, offer psychosocial support services, ensure efficient administrative logistics support, promptly disclose relevant information, and enhance nurses' capacity to effectively manage epidemic situations.

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