

Management of Large-scale Temporary Vaccination Site for COVID-19

Han Xiaoling^{1#}, Zeng Ping^{1#}, Yan Ling¹, Chen Hongxian¹, Su Zhenjiao¹, Liu Meijie¹, Ye Qiao^{1*}

¹*Nursing Department, Zhuhai People's Hospital (Zhuhai hospital affiliated with Jinan University), Zhuhai, Guangdong Province, China, 519000*

[#]*Han Xiaoling and Zeng Ping are co-first authors.*

^{*}*Ye Qiao is the corresponding author. Email: Wzs_0610@126.com; <https://orcid.org/0000-0001-6520-8038>.*

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ABSTRACT

As the global battle against COVID-19 continues, large temporary vaccination sites are facing the dual pressure of epidemic prevention and control and universal vaccination. As the undertaker of the largest COVID-19 vaccination site in Zhuhai, how to ensure that the recipients receive the COVID-19 vaccine in an orderly manner under a high-intensity and high-pressure medical environment is a critical issue medical administrative workers need to consider. Since participating in the vaccination mission, our hospital has adopted multiple prevention and control systems, rationally planned the layout of vaccination sites and the vaccination process, in order to improve the efficiency of vaccination. From March 27, 2021 to April 9, 2021, a total of 35,550 people were vaccinated against COVID-19 at our center. In this paper, we summarized the main points of implementation, aiming to provide a reference for other centers in the administration of large-scale temporary vaccination sites for COVID-19.

Keywords COVID-19; Vaccination; Vaccination sites; Prevention and control; Management

INTRODUCTION

Coronavirus Disease 2019 (COVID-19) is an acute infectious pneumonia, also known as Novel Coronavirus Pneumonia. It has been included in the “People's Republic of China's Infectious Disease Prevention and Control Law” Class B infectious diseases, and is managed as a Class A infectious disease ^[1]. Vaccination is a powerful weapon to control the spread of COVID-19 ^[2-3]. In March 2021, the Joint Prevention and Control Mechanism of the State Council (JPCMSC) issued a notice that China has entered the stage of “free vaccination for all people”. In this stage, the service of “vaccinating all people who should be vaccinated is implemented for people who meet the vaccination requirements. Through the orderly implementation of vaccination, an immune barrier is expected to be constructed to block the spread of the domestic COVID-19.

Our hospital undertook the work of the largest temporary vaccination site for COVID-19 in Zhuhai City,

Guangdong Province. Started from March 27, 2021, the vaccination site of the Municipal Sports Center has been opened to the public, and approximately 2,000 people were vaccinated on the first day. As of April 9, 2021, 35,550 people have been vaccinated at this vaccination site. Among these people, 1 person had symptoms of redness and swelling at the inoculation area, 24 people had dizziness symptoms, and 9 people had needle faint symptoms. No one had shown any symptoms of infection. The venues were running well and all the recipients completed the vaccination efficiently. It has been a test and challenge for the hospital to ensure that all recipients were vaccinated while not causing cross-infection and minimizing the impact of the epidemic on the normal medical work. Under the “normalization” of the pandemic, based on the principles of infection prevention and control, measures such as environmental layout, personnel management and training, and disinfection and quarantine have been implemented to ensure the health and safety of staff and recipients, and to ensure the smooth operation of vaccination work.

In this paper, the comprehensive management and implementation experience is summarized, with the aim to provide a reference for other centers in the management of large-scale temporary vaccination sites for COVID-19.

THE LAYOUT AND MANAGEMENT OF FUNCTIONAL AREAS

Epidemiological information collecting area

In order to avoid the massive gathering of people, the hospital sets up a one-way flow channel for the recipients in accordance with the process of “pre-inspection and triage → Waiting for consultation → Consultation and registration → Vaccination → Observation”. The epidemiological information collecting area is set up at the entrance, and the “1-meter line” sign is posted on the ground. The recipients are required to line up to enter in an orderly manner. Before entering the vaccination site, recipients must wear a mask and show the “Yuekang code” to the volunteers. The Yuekang code is a QR code that determines whether the recipient has tested positive for COVID-19 or closely contacted COVID-19 patients. After the temperature detector shows that the recipients have no fever, they are allowed to enter the number picking area from the entrance. A quick hand disinfectant is provided next to the channel for hand disinfection. If the recipient has a body temperature of $\geq 37.3^{\circ}\text{C}$, they will be guided to a special area to wait and measure the temperature again. If the fever persists, they will be directed to the fever clinic and registered, and the on-site area will be disinfected. The one-way channel management distinguishes the routes of the staff and the recipients into and out of the vaccination point, which can reduce the gathering of people, reduce cross-infection, and help staffs to screen each recipient in an orderly manner.

Self-service number picking area

The online reservation system is used to control the flow of the recipients per unit time. In the self-service area, the recipient can register and get the number through the self-service equipment. Because there are recipients who have not made an appointment for vaccination in advance, in order to ensure that every recipient who comes for vaccination and meets the vaccination conditions can also complete the vaccination efficiently and orderly, four self-service number picking devices, numbered A-D, are set up in

the number picking area. Recipients who have not made an appointment in advance can make an on-site appointment and pick up the number on the device A, while the recipients who have made an appointment can register and pick up the number on the other three number picking devices (B, C, and D).

Consultation and waiting area

Four waiting areas, A, B, C, and D, are set up in the center of the venue. Each waiting area is placed with 20 chairs. The seat pitch is more than 1 meter. After getting the number, the recipients will enter the waiting area corresponding to the appointment number according to the volunteer guidelines and ground signs. When there are many people waiting for consultation, the two sections upstairs and downstairs will dynamically adjust the number of people waiting. The waiting area route is a one-way passage. Volunteers at the entrance are responsible for educating the vaccination precautions and asking whether the patient is fasting. Recipients are required to read the “Informed Consent for Emergency Use (Trial) of New Coronavirus Inactivated Vaccine in Guangdong Province” in advance. Volunteers at the exit will promptly guide the recipients to the doctor registration area according to the order of calling numbers. A consultation office is set up in the waiting area, where a clinician will give professional knowledge explanation and guidance to the recipients.

Registration and vaccination area

There are four vaccination areas (A, B, C, D), corresponding to four waiting areas described above, each area has 5 registration and vaccination card slots, and each vaccination unit is relatively independent. The area is more than 5 square meters, divided into doctor registration office and nurse vaccination office. The vaccination unit is equipped with cold chain special refrigerators, card readers, computers, printers, medical trash cans and other facilities, and is provided with fixed baffles for shelter to protect the privacy of the recipients. The vaccination area is strictly controlled. Twenty vaccination units work at the same time to effectively divert the population. Each vaccination unit has one patient, one room, one doctor and one nurse^[4]. All items are disposable, providing a good vaccination environment for the recipients to reduce the risk of infection. An LED screen is set at the entrance of the vaccination unit, which scrolls the inoculation information of the recipient and reminds the recipient to go to the corresponding vaccination unit for vaccination. The doctors in the vaccination area conduct vital signs examinations and assessment of contraindications to the recipients according to the “New Coronavirus Vaccination Technical Guidelines (First Edition)”^[5-6], and check the recipients’ ID cards to provide information on immunization planning System registration. After the doctor’s examination, the nurses in the vaccination area will vaccinate the recipients. Check all information again before vaccination, and issue vaccination card after vaccination, and indicate the patient’s personal information and vaccination information, including vaccine manufacturer, first vaccination time, observation deadline, and second vaccination time. After inoculation, the recipients will be guided to the observation area by volunteers.

Observation area

There are four observation units (A, B, C, D) in the observation area, and the recipients are seated

according to their numbers. A TV is placed in each observation area to broadcast the precautions after COVID-19 vaccination. Two doctors and four nurses will conduct inspections to observe the clinical response of the recipients after vaccination. During the observation period, volunteers in each area guide the patients to download and register the “Yue Miao APP” to record the body temperature and possible adverse reactions within 7 days after vaccination. For people with adverse reactions after vaccination, volunteers will promptly guide them to a nearby hospital for treatment, and those who have no discomfort after 30 minutes of observation will be guided by volunteers to leave the venue through the exit channel.

Treatment area for suspected abnormal reaction after vaccination

In order to shorten the rescue time and ensure the safety of the vaccine recipients, the abnormal response treatment area is set up in the observation area, equipped with two experienced emergency doctors and four nurses with experience in emergency and critical illness. The abnormal reaction treatment area is equipped with sufficient rescue equipment and medicines, which are kept and counted by special personnel every day. Two rescue beds, ventilator, oxygen supply and negative pressure suction device, defibrillator, tracheal intubation, and ECG monitor are placed. There is a separate emergency channel outside the disposal area, and an ambulance is on-site at the exit of the emergency channel. If the ambulance leaves the vehicle to transfer the vaccinated person, the organizer will dial 120 for emergency deployment of an ambulance to replace it.

Exit inspection area

The exit inspection area is set outside the patient observation area. A security guard and a volunteer with medical and nursing work experience are arranged to check the recipient’s vaccination card and remind the recipient to use the “Yuemiao APP” for follow-up and make appointments for the second vaccination. After the recipients stay for 30 minutes without any abnormal reactions, they will be guided by volunteers to leave from the one-way exit channel to avoid crowds at the exit.

PERSONNEL MANAGEMENT

Recipient management

After the recipients undergo epidemiological investigation and temperature measurement at the entrance, they enter the corresponding waiting area, vaccination area and observation area in an orderly manner according to ground signs. Medical staff and volunteers who participated in the inspection of the waiting area conduct the education of COVID-19 epidemic prevention and control according to documents ^[4], and instruct the recipients to wear masks correctly, seven-step handwashing, cough etiquette, epidemic medical observation, and home quarantine. The recipients usually have confidence in the vaccine, but they may also concern about adverse reactions ^[7-8]. Nurses and volunteers in the observation area carry out post-vaccination health education for the recipients. If the inoculation site has redness, lumps, or low fever, it is normal for vaccination and does not require special treatment. It will usually relieve itself within two or three days; abnormal reactions mainly include urticarial, maculopapular rash, laryngeal edema, angioedema, allergic

purpura, thrombocytopenic purpura, local allergic necrosis, anaphylactic shock ^[6]. The recipients will be guided to throw used cotton swabs, masks, and any tissues containing secretions into the yellow medical trash can.

Staff management

Establish an integrated management team

The medical staffs of various departments are selected to establish a comprehensive management team. The team leader is the deputy dean in charge of preventive health care. The core members are composed of the director of the preventive health care department, the head nurse, the medical department commissioner, and the information department commissioner. The working group formulated the vaccination workflow based on the “Technical Guidelines for the Prevention and Control of Novel Coronavirus Infection in Medical Institutions (First Edition)” and the “Diagnosis and Treatment Plan for Pneumonia Infected by the Novel Coronavirus”. The contents include pre-inspection and triage of recipients, disinfection and isolation, staff protection, vaccination, observation, emergency response plans for adverse reactions, and medical waste treatment. The medical department, the hospital infection management department, the nursing department, the pharmacy department, the laboratory department, the security department, and the logistics department cooperate with each other to ensure that the temporary vaccination points can be efficiently dealt with in various emergencies.

Staff training

All doctors and nurses participating in the vaccination must be trained by the CDC and obtain a vaccination certificate after passing the assessment. The training content is based on the relevant regulations and requirements from the “People's Republic of China Vaccine Management Law, Suspected COVID-19 Vaccination Abnormal Response (AEFI) Monitoring and Handling Points”^[9], “Vaccination Unit Setup and COVID-19 Vaccination Organization and Implementation”^[10] and “Technical Guidelines for Vaccination against COVID-19 (First Edition)”^[5]. The content mainly includes: COVID-19 vaccination procedures and precautions; monitoring and handling of common suspected abnormal vaccination reactions, knowledge and work requirements related to the COVID-19 vaccine; safe vaccination techniques; immunization information registration and management requirements, etc. In order to help the staff involved in the vaccination work to clarify the responsibilities, procedures and cooperation of each position during the vaccination period, and to ensure the orderly progress of the vaccination work, all volunteers, cleaning staff and security personnel participating in the vaccination work will be trained. The training content includes basic knowledge of COVID-19, work process, hand hygiene, standard prevention, disinfectant configuration, communication skills, temperature measurement method, vaccination precautions, garbage classification system, etc.

Daily maintenance

According to the requirements of documents ^[4], mobile water handwashing sinks, non-contact faucets, and sanitary facilities such as hand disinfectants and paper towels should be set up in places frequently

operated by medical staff such as inoculation areas, observation areas, and rescue areas. Consultation and registration doctors are required to wear work clothes, disposable surgical masks and disposable caps. The nurse in charge of vaccination must wear work clothes, anti-seepage disposable isolation gowns, disposable work caps, medical surgical masks, disposable latex gloves, and disposable shoe covers. Recipients should wash their hands correctly at all times when hand hygiene should be performed, and the masks should be replaced within 4 hours. Volunteers, cleaning, security and other staff must wear surgical masks correctly during their work.

Workforce arrangements

Under the normalization of the epidemic situation, in order to minimize the number of personnel in contact between the nurse and patient, the nurses involved in vaccination will be regularly scheduled ^[11]. The staffs must ensure adequate rest, ensure sufficient workforce, and ensure that they are prepared to respond to emergencies every day. The vaccination workforce has a scientific and sufficient configuration, with 70 fixed positions, all of whom have undergone strict training and examinations to hold their posts. Among them, there are two emergency doctors, 4 emergency nurses, 4 temporary inspection guides, 6 pre-inspection and triage staff, and 15-20 daily volunteers. They preach the vaccination process and precautions for patients, monitor blood pressure, and prepare hot water, wheelchairs, and tissues for the masses. The waiting area and the observing area are equipped with small candies, drinking fountains, observing time display screens, and televisions. A supervision team is set up to check the wearing of masks of citizens entering the hall every day, whether the COVID-19 prevention publicity notices in each area of the scene are eye-catching, the concentration of disinfectant in the venue, and the frequency of disinfection.

STRICT MANAGEMENT OF EQUIPMENT, MATERIALS AND SURROUNDING ENVIRONMENT

Organizers need to ensure that the medical staff participating in the vaccination meet the protection standards, and prevent employees from carrying out vaccination work without protection or insufficient protection level. Each vaccination unit is equipped with special medical instruments and vaccination materials, such as sphygmomanometers, stethoscopes, thermometers and other disinfection and isolation supplies, and must be kept by dedicated personnel, regularly disinfected and replaced, placed at designated locations, and strictly enforced handover records. Protective materials such as disposable masks, hats, isolation gowns, etc. are placed at fixed points and quantified, and refilled at fixed points three times a day to ensure that each medical staff can get the materials in the shortest time and use them normally. All items are clearly marked and placed in categories, such as sterile items, clean items, and contaminated items to prevent cross-infection.

Rescue vehicle and rescue item management

A dedicated person will count warehouse materials, first aid drugs and rescue vehicle supplies every day to ensure that the rescue equipment is in normal use. Emergency supplies are added according to the actual situation to ensure that the emergency supplies are adequately stocked.

Cold chain management of vaccines

Vaccination venues are equipped with a cold chain room, each vaccination unit is equipped with a medical refrigerator to store vaccines (vaccine storage temperature is 2-8°C) ^[10], equipped with a thermometer to monitor the temperature of the refrigerator, strict cold chain management system, and give full play to the cold chain efficiency. The transportation, storage and use of vaccines meet the national cold chain management requirements. Special personnel are assigned to monitor the temperature of the vaccine, register the vaccine in and out of the warehouse, and regularly check the vaccine, establish and improve the cold chain equipment archives, and ensure that the accounts are consistent and the special items are dedicated.

Information equipment management

The vaccination site is equipped with information equipment, including computers, printers, code scanning machines, ID card readers, and verification devices, which can realize the functions of scanning code in and out of the warehouse, scanning code inoculation, and vaccination information printing ^[10]. A TV is placed at the entrance of the inoculation unit and the observation area, scrolling the remaining time of the observing of the recipients, prompting and guiding the recipients. A designated person is assigned to inspect and maintain various equipment to ensure that all auxiliary tools are in normal use.

Environmental disinfection management

Disposable medical equipment, utensils and articles are used on-site, one person and one thing. Stethoscopes, sphygmomanometers, clinical thermometers, etc. are disinfected once for each use, and reused diagnosis and treatment instruments, appliances and articles are disinfected and sterilized in strict accordance with the “Technical Guidelines for the Prevention and Control of New Coronavirus Infection in Medical Institutions (First Edition)” ^[4]. All items in the vaccination unit between two shifts, door handles, sphygmomanometers, chairs in the waiting area and observation area, desktops in the vaccination area, computer screens and keyboards, and the surface of medical equipment are disinfected with 1000mg/L chlorine disinfectant.

Management of medical waste

COVID-19 is mainly spread by droplets and direct contact. In accordance with the standard precautionary principle ^[4], yellow medical trash cans and black household trash cans are placed in the vaccination area, observation area, restroom and exit respectively, containing citizen secretions, contaminated materials, cotton swabs, disposable medical and domestic garbage. Cotton swabs, self-destructing syringes, disposable syringes and other medical wastes used after vaccination should be treated as medical waste. Volunteers introduced the garbage classification standards to the citizens, instructed patients to wrap them with paper towels when sneezing, and discard the paper towels and pressure-stopping cotton swabs into the yellow trash can. Medical waste is strictly managed, and special marks for medical waste are implemented.

HUMANISTIC SUPPORT

Guidance throughout

Volunteers are arranged at the entrance, number picking area, waiting area, vaccination area, observation area, and exit of the venue to guide the whole process, and the venue distribution map and vaccination flow chart are posted on the walls of each area, and guidance signs are posted on the ground. These signs enable the recipients to quickly and orderly enter the designated areas and vaccinate throughout the entire process, saving time to a certain extent, avoiding crowds, and enhancing the recipient's vaccination experience.

Support and assistance

During the vaccination process, there are staff members who patiently explain to the recipients, answer questions, and deliver correct and scientific information to the public. They also provide psychological counseling services to the recipients of emotional anxiety to relieve their bad emotions. Within the scope of their capabilities, they provide assistance to the rationalized needs of the recipients. Particularly, volunteers will focus on the vaccination work of recipients with low education level and elders, and guide them to use the "Yue Miao APP" to fill in information and follow up. Volunteers accompany the disabled recipients throughout the process to prevent the occurrence of adverse events such as falls due to the special terrain of the venue.

Multi-modal health education

At the entrance of the venue and in each obvious area of the venue, there are publicity and education knowledge posters, focusing on how to wear masks, correct hand hygiene, and publicity announcements about vaccination. Volunteers handed out a new coronavirus prevention manual to citizens. The hospital's official website and WeChat public account publish articles and notifications about vaccination. A TV is placed in the observation area, and multimedia tools such as videos and PPT are used to loop various protection knowledge, observation and quarantine precautions, and observation of adverse reactions after vaccination.

Vaccination

Convenience services

Disposable masks and hand sanitizers are provided for the recipients in each area of the venue to provide convenience for the recipients. Drinking fountains, disposable paper cups, and snacks are placed in the observing area for the recipients to pick up. The display screens in the inoculation area and the observation area only announce the appointment number of the recipient, and personal information such as the recipient's name is hidden to fully protect the recipient's personal privacy. There is a reasonable design distance between the inoculation area and the observation area to reduce floor crossing, roundabouts and round trips. The site complies with the barrier-free design principle, and the handrails in the passage facilities are kept unobstructed to create a safe vaccination environment for the recipients with reduced vision or

mobility impairments. In all places where there is a need to queue and wait, back seats are installed and TVs are installed in the waiting area to improve the satisfaction of the recipients.

Vaccination time

The working hour of the vaccination site is between 08:00 to 20:00 to ensure uninterrupted vaccination work, so that students do not miss school and employees do not miss work.

Satisfaction of the recipients

During the vaccination, the actual needs of citizens have been fully considered at different levels. Moreover, empathy and in-depth and meticulous work play an important role in resolving the contradictions between doctors and patients during the epidemic prevention and control period, which helps ensure the public opinion stability.

EFFICIENCY ANALYSIS

From March 27, 2021 to April 9, 2021, a total of 35,550 people were vaccinated against COVID-19 at the sports center. Among these people, 1 had redness and swelling at the inoculation area, 24 had dizziness, and 9 had fainting reactions post-injection. No infection was reported by the recipients and staff.

CONCLUSION

To sum up, the key points of the management of large temporary vaccination sites include strict implementation of cleaning and disinfection measures, strengthening the management of citizens who come to vaccinate, formulating corresponding vaccination procedures and emergency plan procedures, and attaching importance to the management of staff, environment, and supplies. In our temporary vaccination center, with the emphasis on the management key points listed above, the COVID-19 vaccination work has been carrying out smoothly. Therefore, we believe the management experience detailed in this paper could provide a reference for future emergency management work of the large-scale temporary vaccination.

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STATEMENT

There is no conflict of interest in this article.

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