

Research on the Operation Management and Optimization Path of Quarantine Hotels During Disasters from the Perspective of Emergency Shelters: a Case Study of Guangzhou, China

Ting Ye, Ke Huang², Chong Chen^{3, *}

¹School of Economics and Management, Guangzhou Huaxia Vocational College, Guangzhou 510935, China

²School of Management, Jinan University, Guangzhou 510632, China

³School of Hospitality and Management, Guangdong Engineering Polytechnic 510520, China

Abstract: In order to meet the demand for large-scale temporary centralized medical observation of public security emergencies, China has launched large-scale hotels as centralized quarantine places. The disaster operation mechanism of quarantine hotels needs to be optimized. Based on the constructivism perspective, this study selects quarantine hotels in Guangzhou, China as a case study. In-depth interviews and text analysis were used to explore the operation mechanism, risk and optimization path of quarantine hotels through dialogue with research literature on emergency shelters. The study adds to the story of urban resilience.

Keywords: Emergency shelter, Quarantine hotel, Operation mechanism, Operational risk, Optimized path.

1. Introduction

With the acceleration of urbanization process, the risks inside and outside the city continue to rise. As an important part of urban disaster prevention and public security construction, the management of emergency shelter needs further review and reflection. Major emergency epidemic disasters have the characteristics of contingency, sudden occurrence and strong epidemic [1], and it is urgent to fully dispatch social resources for active response. As an acute infectious disease emerging in recent years, COVID-19 has affected 200 countries and regions in the world since 2019. For the first time in China, hotels were used as centralized quarantine sites for the treatment of suspected cases, mild patients or observation of close contacts [2], setting up a multi-level prevention and control chain.

"quarantine hotel" is a special form of emergency shelters in urban disasters. Its original business service space attributes have quietly changed, and its operation mechanism has undergone important changes. However, the attention of all circles to the quarantine hotel is insufficient, the theoretical research is not sufficient, and the security incidents of the quarantine hotel occasionally occur. In the context of COVID-19, the research on the operation mechanism of quarantined hotels needs to be supplemented, in order to carry out beneficial discussions on the collaboration between the government and profit-making organizations from the perspective of emergency public security, and improve the relevant research on the social responsibility of hotels in specific situations.

2. Concept Definition

2.1. Emergency Shelters

Emergency shelters generally refers to a safe place where the relevant organizations, through scientific construction and standardized management, provide free basic life support, rescue and command for the people who need to be

transferred [3].

In the early 20th century, the United States, Japan and other countries began to study shelters and gradually established disaster prevention parks and other refuge systems. Practice in many countries has proved that in response to public safety emergencies, it is necessary to establish an emergency management organization system and make comprehensive decisions on the location of shelters. Based on the differences of management subjects, shelter operation organizations are usually divided into government management oriented type, asylum people independent operation type and government-civilian interactive operation type [4]. The basic idea of "building prepared communities" has important implications for the resilient operation of shelters. Since the Tangshan earthquake in 1976, the research on urban emergency shelters has been carried out in Chinese Mainland. In 2003, the SARS epidemic caused people to pay more attention to emergency shelters, and the related research increased rapidly after the Wenchuan earthquake in 2008. It is generally believed that the construction of emergency shelter is an important part of the urban public safety emergency system. In terms of types, existing studies focus on emergency shelters for natural disasters such as earthquakes and floods, while few studies focus on emergency shelters for health disasters. In terms of research content, the research focuses on the planning and evaluation of disaster avoidance and resettlement places [5], with little attention paid to the management and operation mechanism.

2.2. Quarantine Hotel

Quarantined hotels are not traditional academic terms. In the history of China, there have been temporary hospitals, temporary quarantine areas and other emergency shelters, such as the small-scale use of hotels for centralized quarantine during the influenza A (H1N1) epidemic in 2010. The common feature is that the government expropriates social space or places based on public security.

According to the Work Specification of Hotel Quarantine

Management Services for the Prevention and Control of Major Epidemic Cases drafted by Guangzhou Institute of Standardization in 2020, "quarantine hotel" refers to a hotel site temporarily used for medical observation and quarantine during a major epidemic. Faced with the quarantine pressure of a large number of inbound population, the hotel building has been urgently requisitioned as a centralized quarantine space by local governments because it "has the necessary

conditions of independent rooms and daily living" [6] and can quickly replace the quarantine function. In the closed-loop management of the whole process of entry, the quarantine hotel is in the middle link between the port of entry and the community, which provides an important buffer for epidemic prevention and control, and has the attribute of "quasi-public goods". However, the dual nature of business and emergency disaster prevention easily leads to management deficiency.

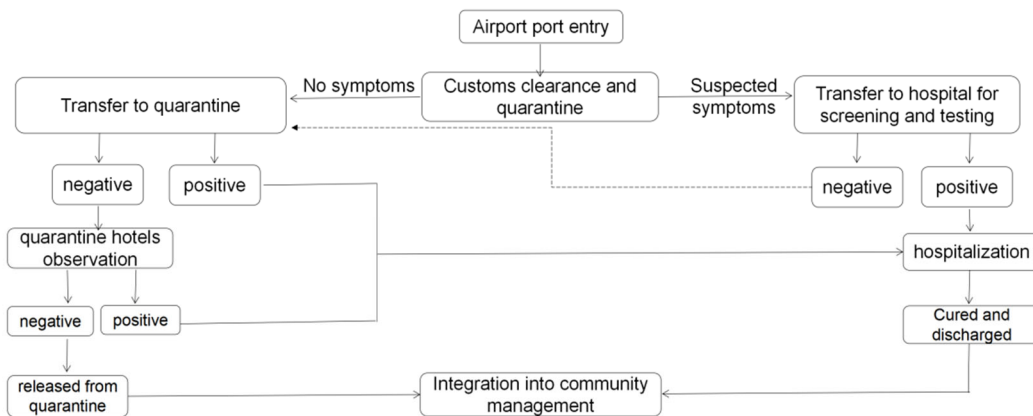


Figure 1. Closed-loop Management Process of Entry Personnel at Airports and Ports for COVID-19 Prevention and Control
 source: Code for closed-loop Management of the whole process of entry Personnel at Airports and Ports for COVID-19 Prevention and control

3. Research Design

This study takes the quarantine hotels in Guangzhou, China as a breakthrough point to explore the operation management and optimization mechanism of emergency shelter based on urban function transformation. As an international aviation hub, Guangzhou is at the forefront of epidemic prevention and control in China. According to the Health Commission of China's Guangdong Province, 90 percent of the country's inbound population in 2021, nearly 30,000 people are quarantined daily, most of them in Guangzhou. Data from the Guangzhou Bureau of Commerce shows that during the 26-month period from February 27, 2020 to June 20, 2022, Guangzhou transported more than 1 million passengers from 170 countries and regions and intercepted confirmed cases. Therefore, this study selected quarantine hotel in Guangzhou as the case. Due to the lack of research on emergency shelters for health disaster preparedness and the rapid change of COVID-19 as a new type of health disaster, qualitative research method was adopted in this study, emphasizing to deepen the research content in the context with the change of the actual situation. The survey lasted from December 2020 to May 2022. Through in-depth interviews and text analysis, the "maximum difference information saturation method" was used to select 14 staff members and quarantined persons from 5 quarantine hotels in Guangzhou (the name of the hotel was not disclosed due to confidentiality requirements). And the relevant data to complete the quarantine hotel overall operation mechanism, operation risk and optimization mechanism consideration.

4. Operating Mechanism of Quarantine Hotels in Guangzhou

Existing studies believe that emergency shelters and ordinary living places have similar functions in terms of space shelter [7], but the isolated people's habitual living

environment is destroyed and their psychological impact is strong. In order to meet the physical and psychological needs of those quarantined, the hotel has made important adjustments in its organizational operations.

4.1. Organization of Quarantine Hotels in Guangzhou

China's existing laws and regulations set up government requisition clauses for social emergency situations. Article 45 of the *Law of the People's Republic of China on the Prevention and Treatment of Infectious Diseases* clearly states that "in the event of an outbreak or epidemic of an infectious disease, in accordance with the needs of the control of the epidemic situation... The local people's governments at or above the county level shall have the right to... Temporary requisition of houses, vehicles and related facilities and equipment" [8].

Quarantine hotels in Guangzhou usually belong to two types: government-led hotels and government-private interactive hotels. Among them, government-led quarantine hotels are mainly state-run hotels. Hotels can also voluntarily apply to the government and become quarantine hotels after passing the examination. As the pressure from overseas imports continues to increase, the number of quarantined hotels in Guangzhou continues to rise. According to incomplete statistics, as of May 2022, there were nearly 200 quarantine hotels in Guangzhou, China, gradually shifting from commercial service space to public service space.

4.2. Selection Criteria for Quarantine Hotels in Guangzhou

The selection of quarantine hotel is a multi-objective decision-making problem, which needs to be analyzed in terms of economy, efficiency and fairness. In practice, the selection of quarantine hotels emphasizes the characteristics of sudden, infectious, high demand and low incidence in

response to public health emergencies [9]. *Novel Coronavirus Design Standard for Emergency Medical Facilities for Pneumonia and Infectious Diseases* requires that relevant sites should avoid schools, residential areas and other urban densely populated areas as far as possible [10]. *According to the Operational Guidelines for Emergency Management of Hotel Buildings for COVID-19 Temporary Quarantine Zones*, quarantined hotels should meet quarantine indicators in terms

of entrances, zoning, ventilation and sewage to prevent cross-infection. Due to the differences in population density and supporting facilities, the distribution of entry-quarantine hotels in the 11 administrative regions of Guangzhou is significantly different, and the population density is basically inversely proportional to the number of entry-quarantine hotels (except for some regions)[11].

Table 1. Quarantine Hotel Selection Requirements [12]

First Level Index	Second Level Index	Specific Requirements
Site conditions	Entrance and exit	Should be relatively independent and convenient transportation, do not share access with nearby residents
	Surrounding facilities	Near the transportation hub, near the hospital and other rescue centers
	Partition quarantine conditions	Should be in accordance with the quarantine area, clean area for partition quarantine and use, partition clear
	Room conditions	There are 50-200 guest rooms with open Windows (mechanical ventilation system), and non-carpeted floors are preferred
Hardware conditions	Air conditioning system	Separate air conditioning or variable frequency variable refrigerant multi-combination air conditioning is preferred, which should have fresh air supply system, filter system and all-air air conditioning system
	Elevator conditions	More than three elevators
	Water Supply and Drainage System	Perfect water supply and drainage, hot water and fire fighting facilities. Sewage treatment facilities should be set up outdoors
	Weak electricity system	With access control and network system
	Monitoring system	Equipped with video monitoring system, the room corridor without dead corner all monitoring, storage time is not less than 30 days
	Epidemic information management	Report abnormal information to community epidemic prevention department in time
	Other equipment	The lobby area is not less than 200 square meters, with clear flow lines of people and goods, good drainage leakage on the ceiling and wall, independent dining room and kitchen, independent logistics unloading space, and independent staff facilities

Source: Operational Guidelines for Emergency Management of Hotel Buildings for Use in COVID-19 Temporary Quarantine Areas

4.3. Quarantine Hotel Service Processes

According to the *Operation Guide for Emergency Management of Hotel Buildings Used in COVID-19 Temporary Quarantine Areas*, the service process of quarantine hotels has been substantially adjusted, adding closed-loop management of quarantine and weakening business services. Quarantined hotels will start special teams for hotel services, close restaurants and other public function Spaces, reduce check-in services, and strengthen daily monitoring and psychological counseling. Taking Haizhu District, Guangzhou, China as an example, the first batch of quarantine hotels was launched in January 2020. During the period of 2020, there were 1100 staff in the 14 centralized quarantine medical observation hotels (20% of which were members of the Communist Party of China). The hotel provides quarantine services such as "ten ones" and "love Guangzhou" through the "five person decision-making group" and "12 + 3" all-weather transfer mechanism.

5. Quarantine Operational Risks and Optimize Mechanisms of Hotels in Guangzhou

5.1. Quarantine Hotel Operation Risks in Guangzhou

The monitoring risk of the quarantine hotels refers to the

hidden danger of work caused by the imperfect access, assessment and exit mechanism of quarantine hotels. At present, the entry index of quarantine hotels emphasizes hardware over software, and no clear exit mechanism is proposed. Quarantined persons complained of poor service at individual hotels. Practice has proved that service omissions caused by poor supervision may lead to serious negative effects. Some studies have pointed out that the theory of "industrial ecology" can be adopted, and the life cycle assessment can be used to check the entry and exit of quarantine hotels in the whole process.

The operational risks of quarantine hotels are mainly reflected in the crisis of security resources protection in quarantine hotels, including the withdrawal behavior of hotel workers in the face of insufficient training and language violence in some workplaces. Security resources are the essential resource elements of the quarantine hotel, which are irreplaceable and provide power for the overall operation. According to the study, 15 percent of hotel workers in quarantine experienced varying levels of verbal and other workplace violence, and 90 percent experienced psychological or physical withdrawal. How to reduce the operational risk of the quarantine hotel is of great significance to the effective operation of the quarantine hotel.

The management risk of an quarantine hotel refers to the management vulnerability caused by changes in the management relationship of the quarantine hotel. Quarantine

hotels are mostly coordinated by the hotel, community, CDC, public security bureau and other departments. The overall management responsibility is unclear, the management boundary is relatively vague, and the specific work is easy to lead to loopholes. The COVID-19 infection of hotel staff occasionally occurs. How to define and perform the duties of quarantine hotels is facing a new test.

5.2. Optimization Mechanism of the Quarantine Hotel in Guangzhou

The identification and evaluation of risk is for better control and optimization. Facing the risk factors in isolating the operation of the hotel, the following optimization measures can be taken.

Starting from the operational life cycle of the quarantine hotels, a clear access, assessment and exit mechanism of the quarantine hotel should be formulated, and various work specifications and index systems of the quarantine hotel should be disclosed, so as to form a closed chain from access to exit. According to "dissipative structure fluctuation principle", collect internal and external feedback, carry out dynamic assessment, find and solve problems in time, and assess the effectiveness of the quarantine hotel. Carry out nonlinear information communication mechanism and open system, strengthen the effect of external supervision.

According to the *Emergency Response Law of the People's Republic of China*, the obligation division, responsibility attribution and capital budget of the quarantine hotel should be standardized [13]. Considering the effectiveness of emergency management, it is suggested that the government should take the lead and the hotel should be the main body to effectively manage the quarantine service process, quarantine and release procedures and personal privacy protection. In the experience of Haizhu District, Guangzhou, China, "hotel service special team" takes the main responsibility for the local sub district and signs the responsibility statement. The sub district office personnel will coordinate the prevention, control, disinfection, security and logistics support. The full-time staff of the hotel will be responsible for the implementation of the routine service and epidemic prevention of the hotel, and cooperate with the medical and psychological assistance services of the local medical team. In practice, it is necessary to further refine management measures and strengthen the nonlinear collaborative work among government, community and hotel departments.

From the perspective of safety culture theory, we should pay attention to the protection of safety resources for quarantine hotel employees to avoid the employees' withdrawal behavior. Psychological counseling and professional training should be done to solve problems such as workplace violence found in the investigation. At the same time, tour inspection frequency, timely response and supervision rectification of existing problems, pay attention to reversing the passive attitude in the construction of enterprise safety resources, and improve the special skills of quarantine hotel personnel such as emergency treatment and psychological counseling.

we should implement scientific epidemic prevention, empower with science and technology, and strengthen the contribution of modern science and technology such as intelligent tools and information means such as Internet of things, robots and unmanned vehicles to epidemic prevention. For example, many quarantine hotels in Baiyun District, Guangzhou, China use robots to deliver meals,

Liwan district uses unmanned vehicles to transport materials, and the elevator of quarantine hotels in Yuexiu district uses intelligent AI cameras to identify people who do not wear masks. There is still room for progress in other information methods, such as epidemic prevention codes and group communication.

6. Summary and Discussion

Quarantine hotel is a special form in which the hotel organization makes full use of its spatial attributes to fulfill its social responsibility. At present, the quarantine of hotels has three potential risks: supervision risk, management risk and operation risk. The optimization path focuses on four aspects: clarifying supervision mechanism and information disclosure system, clarifying management responsibility and management relationship, strengthening the mixed use of management means and technical means, and avoiding conflicts that may be caused by operation gaps.

In the post-epidemic era and the critical period of the transformation and development of the hotel industry, the extension of the spatial attributes of the hotel as a residential service space and the continuous expansion of its social responsibility is a new proposition that needs to be studied urgently. In the future, it is suggested that the government attach importance to the diversified values of the hotel, such as space placement, to build the safety resources for employees, and to give certain tax exemptions or economic compensation. The hotel is a commercial organization in a conventional state, which can be quickly used as an emergency shelter space for the government in the event of large disasters such as earthquakes and public health events. It can effectively improve the resilience of the city by building a "prepared community" through resilient operation.

Funding

"A Study on the Cross-cultural Adaptation of High-end Business Travelers in Guangzhou Hotel Communities", 2019 Provincial Youth Innovation Project of Guangdong Provincial Education Department, China (2019GWQNCX099)

References

- [1] Chai GJ. Characteristics and Coping Strategies of Major Emergency Epidemics[J]. *PLA Journal of Preventive Medicine*, 2004, 22(2):3.
- [2] Deng B, Hu Z, Wang H, et al. Discussion on the Centralized Quarantine Point for the Prevention and Control of the New Crown Pneumonia Epidemic[J]. *Southwest National Defense Medicine*, 2020, 30(07):618-621.
- [3] FAN CJ. Research on Site Selection Optimization Method for Comprehensive Response of Multiple Disasters[D]. Nanjing University, 2016.
- [4] Wang K. Lessons from the Great Hanshin Earthquake and Creative Revival[M]. Beijing: Peking University Press, 2009:217-209.
- [5] Yu HJ, Jin H, Dai XQ, et al. A Review of Domestic Research on the Construction and Planning of Disaster Shelters and Resettlement Sites[J]. *Journal of Ningbo Vocational and Technical College*, 2017, 21(02):95-100.
- [6] Liang H, Jiu M, Li HJ, et al. Compilation and Interpretation of the Operational Guidelines for Emergency Management of Hotel Buildings for Covid-19 Temporary Quarantine Areas[J]. *Construction Science and Technology*, 2020(06):19-26+41.

- [7] Wang H. Study on temporary indoor living space after disaster[D].Central South University of Forestry and Technology,2011.
- [8] General Office of the Standing Committee of the National People's Congress. Law of the People's Republic of China on the Prevention and Control of Infectious Diseases[M].China Democracy and Legal Publishing House.2013.[2021/6/30].<http://www.cstid.org.cn/hxyw/003010/003010001/20200210/5112.html>.
- [9] www.cstid.org.cn/hxyw/003010/003010001/20200210/5112.html.
- [10] Jia J,Ding JZ,Zou H. Site Selection Analysis of Emergency Medical Facilities for Public Health Emergencies[C].Proceedings of the Symposium of the Material Management and Marketing and Material Circulation System Theory Group of the Material Management Committee of the China Railway Society, 2008:322-327.
- [11] Editorial Board of Design Standards for Emergency Medical Facilities for Novel Coronavirus Pneumonia Infectious Diseases. Design standards for emergency medical facilities for novel coronavirus pneumonia infectious diseases[M].China Architecture and Building Press, 2021.
- [12] Guangzhou Municipal Bureau of Statistics. Administrative divisions of Guangzhou[EB/OL].(2021/12/21)[2022/02/21].http://tjj.gz.gov.cn/gzsq/content/post_2786710.html.
- [13] Science and Technology and Industrialization Development Center, Ministry of Housing and Urban-Rural Development, China Hotel Association. Operational guidance for emergency management of hotel buildings for COVID-19 temporary quarantine areas[EB/OL]. (2020-02-10)
- [14] Tang B. Discussion on the Management of Urban Emergency Shelters from the Perspective of Institutional Innovation[J].Urban Management and Science and Technology,2018,20(01):49-51.