Emergency Prevention and Control of Urban Traffic Under the Background of Pandemic

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Abstract: In this outbreak of novel coronavirus, China has halted the spread of the virus in the country. However, in the process of epidemic prevention, there are still some problems in urban traffic emergency prevention and control. Therefore, this work reviewed the entire phase of the epidemic, clarified the time and characteristics of each stage, put forward some suggestions on the traffic emergency prevention and control policy, and finally carried out a supplementary study on the epidemic risk grade standard issued by the State Council.

1. Introduction

In the outbreak of novel coronavirus, China has halted the spread of the virus, and the confirmed cases in many provinces have been eliminated. In this process, the traffic control measures initiated by each city have played a positive effect. However, it should be noted that in this process, the control measures introduced in various regions are not based on strict policies, but are more based on the real-time judgment made by relevant departments and leaders in response to the epidemic. As a result, there may be problems of excessive or improper epidemic prevention in some places. Therefore, in view of the outbreak and spread of acute pandemic, it is necessary to establish and improve relevant policies and regulations.

2. Traffic Emergency Prevention and Control Problems Exposed in the Epidemic

China has invested a lot of manpower and material resources in this novel coronavirus epidemic. Although the domestic epidemic has been effectively controlled, there are still many problems in traffic emergency prevention and control when reviewing the whole process of fighting the epidemic. For example, in the early stage of the outbreak, many provinces and cities dug up roads and even highways to prevent the disease from spreading further; Wuhan, Wenzhou and other places exposed the loopholes of urban traffic emergency prevention and control due to the uncontrolled epidemic; after the domestic epidemic situation was controlled, the imported cases broke through the layers of "blockade". These problems remind people that during the period of prevention and control of acute pandemic, there are still many loopholes in the aspects of stage division, evaluation of urban virus transmission ability, stage evaluation and relevant policies and regulations in urban traffic emergency prevention and control.

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Fig. 1 Workers blocking roads

(Source: Internet)

3. Thoughts of Prevention and Control Countermeasures

3.1 First, it is necessary to determine the stage division of traffic emergency prevention and control

In the above cases of road closures, the highways and village roads cutting behavior belongs to the excessive epidemic prevention due to the spread of the epidemic. Although some provinces and cities are not closely related to Hubei Province in terms of geography and economy, they still carry out uniform brutal management. The main reason is that the city administrators lack the basic ability to understand the stage of the epidemic in their cities. The same is true for some administrators in the worst-hit areas who do not realize that strict control measures should be taken.

Therefore, in the emergency prevention and control of urban traffic in response to acute pandemic, it is necessary to make clear its stages and processes. Zhou Wenzhu [1] believed that in this situation, traffic emergency prevention and control should be divided into four stages, and differentiated traffic response measures should be taken, which are divided according to the transmission and control of the virus. According to the latent initial period, rapid transmission period, continuous transmission period and recovery period of virus transmission in cities, the countermeasures of urban traffic emergency prevention and control should include traffic warning, traffic ban, traffic restriction and traffic relief. How should the stages be divided? There is no consensus yet. At present, the epidemic situation in China has been effectively controlled, this work tried to classify the transmission of virus in stages combining the novel coronavirus epidemic.

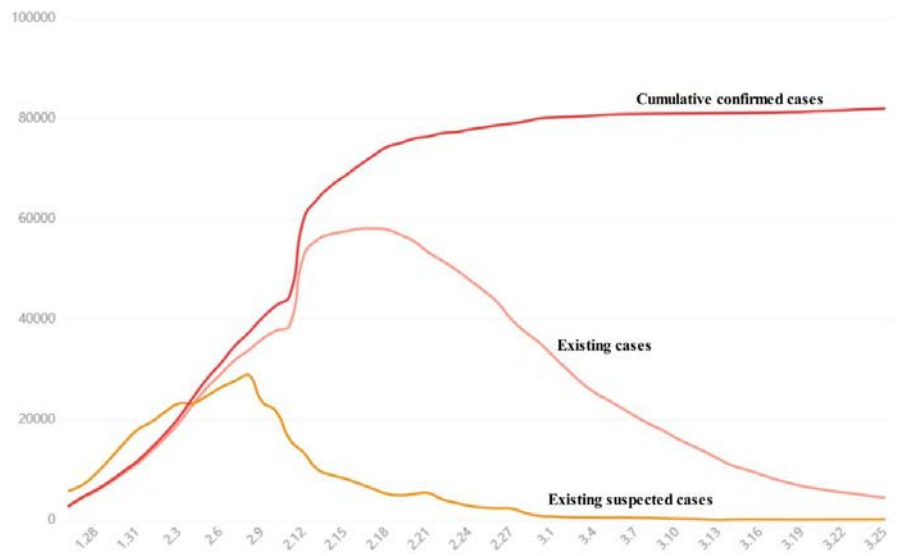

Fig. 2 National trend of novel coronavirus epidemic

(Source: https://voice.baidu.com/act/newpneumonia/newpneumonia/?from=osari_pc_3#tab1)

(1) Latent initial period (2019.12.1-2020.1.22)

First, it should be clear that the latent initial period should begin with the emergence of confirmed cases nationwide. If the virus is detected, the whole country should be put on alert because of the convenient transportation. According to relevant reports, as early as December 1, 2019, the first confirmed case of the novel coronavirus developed on that day [2]. Therefore, it can temporarily consider that the initial incubation of the virus began on that day. The period is due to end on January 22.

(2) Rapid transmission period (2020.1.23-2020.2.11)

On January 22, 2020, Hubei Provincial Health Commission launched the level 2 emergency response on that day. On 23, Wuhan City was "locked". The confirmed cases in the country have an exponential upward trend in the short term, and this stage has the characteristics of rapid transmission period from the cumulative diagnosis and the number of confirmed cases. The rapid spread of the virus ended on February 11.

(3) Continuous transmission period (2020.2.12-2020.2.17)

During this period, the virus entered a period of continuous transmission. As can be seen from Fig. 3, there was a sudden and rapid increase in confirmed cases on 12 February. The reason is that in order to facilitate patients to receive treatment in time according to the standard of confirmed cases, Hubei Province has added "clinical diagnosis" to the classification of case diagnosis in Hubei Province. Many suspected cases and patients without conditional detection are judged as confirmed cases according to clinical diagnosis, which can improve the success rate of treatment. Existing cases grew slowly during the continuous transmission period, which lasted until 17 February, and the disease began to be initially controlled.

(4) Ending recovery period (2020.2.18-3.29)

Since February 18, there has been a downward trend in the existing confirmed cases, indicating that the epidemic has been effectively controlled and the spread of the virus has entered the recovery period. As of March 29, 2020, the epidemic situation in China has been under control, and many provinces have begun to return to work, and some provinces even open restaurants. At present, the imported cases from abroad should be mainly guarded against.

3.2 It is necessary to consider the virus spreading ability of the city when formulating the plan from city clusters to the whole country

Under the background of regional coordinated development, the flow of population with large scale, high density and high frequency is inevitable. In the process of urban planning and construction, there is always a contradiction between urban development and urban disaster prevention. This novel coronavirus epidemic also reveals the shortcomings and weaknesses of urbanization in China. At present, most regions in China are developing the urban agglomeration pattern which focuses on regional single center or multi-center, which inevitably leads to the phenomenon of high population agglomeration. In this case, if an epidemic occurs in a central city of the region with convenient transportation, the virus will be carried and spread out rapidly from point to surface, causing further spread of the epidemic. In this context, it is necessary to do a good job of research on the urban virus transmission capacity based on the current information.

The study of urban virus transmission ability can be carried out from many aspects. Based on the theory of "flow space", the correlation between urban network and epidemic transmission network can be evaluated from the perspective of urban network, and the virus transmission ability of target city can be summarized [3]. Based on the application of big data technology, the city needs to complete the statistics and drawing of the digital map of the epidemic situation as soon as possible during the epidemic situation, including the spatial distribution of the source of the epidemic situation, the spatial path of the epidemic spread, and the distribution of the susceptible population, and then carry out scientific and effective prediction and evaluation of the development of the epidemic situation through the analysis of the pandemic model [4]. In the process of studying urban virus transmission capacity, theoretical and technological advantages of urban network and big data should be combined to cover both macro and micro aspects comprehensively. The theory of urban network should be the theoretical basis for evaluating the transmission ability of urban virus in advance, which can measure the virus transmission ability of a single urban node, but this is not enough. The quantity and distribution of individual case data is extremely important information in the transmission of acute pandemic. If omitted, further spread of the epidemic may occur. Therefore, it is necessary to collect such information by means of big data, and at the same time to predict the number and flow direction of potential cases. This method may be a more accurate and timely way to evaluate the virus-spreading ability of the target city.

3.3 Improve relevant policies

After the SARS virus incident in 2003, China has made obvious progress in the prevention and treatment of epidemic. For example, during the novel coronavirus epidemic this year, the government responded quickl, and established hospitals like the model of Xiaotangshan in many places. However, the outbreak of the virus still made China's urban life suffer a relatively serious impact. Therefore, it is necessary to continue to reflect deeply from this public health incident, and try to sum up the loopholes in policy that need to be made up.

(1) Epidemic prevention and control of pandemic should be included into the urban comprehensive disaster prevention and mitigation plan as soon as possible

Throughout this current special planning content, there are special plans for the prevention and control of earthquakes, floods, fires, and other natural disasters. However, this novel coronavirus epidemic also shows that it is not enough to just cooperate with the health care sector to plan the layout of the health care facilities. In view of the acute pandemic that are not common in daily life but will have a profound impact once they arise, it is necessary to have a bottom-line thought and include them in the future territorial and spatial planning. In this special plan for the prevention and control of pandemic, we should distinguish it from the traditional layout plan of medical and health facilities. The prevention and control characteristics of pandemic are different from those of ordinary diseases. Its core content is to control and reduce the spread and harm as far as possible. It should belong to an emergency plan that is only activated in an emergency. At the same time, it is necessary to pay attention to the flexibility of planning for the transmission route, pathological diversity, and uncertainty of acute

pandemic. It is also necessary to admit that the work in this area is aimed at the field of health care, so medical workers should be given a certain speaking right in the planning.

(2) Policies should be quantified and transparent

The document *Guidelines on Scientific Prevention and Control of the Novel Coronavirus Epidemic Prevention and Control with Precision-based Policies and Levels* issued by the State Council shows the guidance on the recovery of the epidemic after the quantification of policies. In accordance with the instructions in this document, the regions are also methodically resuming work. The quantitative policy provisions are operable. Therefore, in the future planning, there should be a relatively authoritative and unified quantitative standard in each stage of traffic emergency prevention and control for pandemic emergencies. This standard and real-time epidemic data should be transparent and open to the public, to enable the public to understand the rationality of the policies issued by the government at all stages.

(3) Pay attention to the actual management effect under the new technology management

The concept of "smart city", which was popular in previous years, has been fully tested in this outbreak. Guo, a man from Henan province, was quarantined for concealment of his overseas living history, after breaking through multiple layers of security checks at Beijing Capital Airport, Beijing West Railway Station, Zhengzhou Railway Station and Zhengzhou Subway. The "smart city" under the protection of a variety of technologies is still quite fragile. Additionally, looking back at the entire epidemic period, in the early stage of the latent epidemic, Wuhan City did not find the source of the virus in time, and did not effectively control and predict the trajectory of patients' behavior, resulting in the outbreak of the virus. In the period of rapid transmission and continuous transmission, local governments do their own work, and even block transportation out of fear of the disease. Without reasonable material allocation mechanism and reasonable channel of capital flow, Hubei Province and other provinces performed not well in traffic emergency prevention and control measures. At the beginning of the recovery period, due to the lack of prevention against imported cases from abroad, many public health incidents with near misses resulted in the postponement of the local work and school resumption plan, which caused serious economic and social impact.

Therefore, it is necessary to recognize the problems in the management level and make up for management loopholes. In any case, urban management should abide by the barrel principle. No matter how developed the scientific and technological means are, if there are loopholes in the management system, the previous efforts will still be wasted.

4. Understand and Evaluate the Epidemic Risk Level of Cities

The epidemic risk level was put forward in the document *Guidelines on Scientific Prevention and Control of the Novel Coronavirus Epidemic Prevention and Control with Precision-based Policies and Levels* issued by the joint control mechanism of the State Council on February 17, 2020. On February 25, 2020, the relevant departments of the state held a press conference on the joint prevention and control mechanism, introduced the precise implementation of measures to do a good job of epidemic prevention and control at different levels, and classified 301 regions of the country into epidemic risk levels. In the *Guidelines*, regions are divided into three grades according to population and incidence, namely, low-risk, medium-risk and high-risk areas, and traffic emergency prevention and control are conducted at different levels. Low-risk areas should implement the "preventing foreign imports" to fully restore normal production and living order. Middle risk areas should implement the strategy of "external prevention and internal protection", and restore normal production and life order as soon as possible. High-risk areas should implement the strategy of "internal protection, external prevention, and strict control", and gradually restore production and life order according to the epidemic situation. In the *Guidelines*, the criteria for risk delineation are as follows: taking the county and urban areas as the unit, no confirmed cases or no new confirmed cases for 14 consecutive days as the low-risk area; new confirmed cases within 14 days, no more than 50 cumulative confirmed cases, or more than 50 cumulative confirmed cases, no aggregated epidemic within 14 days as the medium-

risk area; and more than 50 cumulative cases, with aggregated epidemic occurring within 14 days as the high-risk area.

In terms of the spread stage of the epidemic, the classification of the risk level was published late, which belongs to the measures to guide and coordinate the prevention and control of the epidemic and the recovery of economic and social order, and belongs to the grading standard of urban traffic emergency prevention and control at the end of the recovery stage. It can also be seen that it still lacks relevant guidance documents in the first three stages and has not yet prepared ahead of time in policy. It is necessary to establish accurate indicators and stage standards, so that the epidemic can be effectively controlled through traffic emergency prevention and control measures in the early and middle stages of transmission.

5. Summary

This epidemic has caused serious economic losses to China, but it still has positive effects. The visualization of epidemic data, footprint analysis of potential patients, multi-platform information coordination and standardization, vertical management and other techniques and management methods have made people suffer as little harm as possible during this epidemic period, and exposed a lot of shortcomings. They are all valuable lessons, and in the future, China will be more confident when facing pandemic.

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