

Effective Approaches to Strengthen Public Health Disease Control

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Abstract: Public health is an important component of China's economic and social development, which has significant practical significance for both public health and social stability. Therefore, the article explores the important role and practical problems of strengthening public health disease control, and proposes effective implementation paths, such as doing a good job in top-level planning and design, improving disease control plans, strengthening the construction of disease control teams, and promoting disease control innovation. By studying the article, we aim to address the challenges faced by traditional public health disease control, enhance the effectiveness of control, and promote stable social development.

Keywords: Public health diseases; Chronic diseases; Infectious diseases; Control

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1. Overview of public health disease control

The purpose of public health disease control is to establish a scientific and meticulous defense line to eliminate or reduce the threat of major diseases to the health of the population. The control process focuses on prevention, always taking pre-control of diseases as the core, establishing a sensitive monitoring and early warning system, identifying existing disease risks in a timely manner, and reducing the harm and risks of diseases. At present, health education, immunization, and environmental intervention are all primary prevention measures in public health disease control. By popularizing disease knowledge, promoting immunization programs, and improving living environments, preliminary control of diseases can be achieved. In addition to primary prevention, secondary prevention measures will also be implemented, such as regular screening of key groups, such as the elderly population, to strengthen screening for hypertension, hyperlipidemia, and hyperglycemia ^[1].

2. The important role of strengthening public health disease control

The control of public health diseases is crucial, as it plays an important role in public health and the entire society. From the perspective of the people, epidemic situation monitoring, vaccination, isolation of infectious sources, and other measures can cut off the transmission routes and avoid the outbreak and prevalence of tuberculosis, hepatitis, influenza, COVID-19, and other infectious diseases. At the same time, people are also threatened by chronic diseases. Through measures such as early screening and diagnosis, health education, and risk factor control, the harm of chronic diseases can be reduced and the public's health life can be extended. From a cost perspective, effective control of public health diseases can reduce regional medical burden. For example, during outbreaks of infectious diseases, effective control can prevent patients from clustering in hospitals and prevent the collapse of medical resources. From the perspective of social operation, effective control of infectious diseases, chronic diseases, and occupational diseases reduces their impact on regional society and directly affects the stable operation of society. For example, in the prevention and control of major infectious diseases, strong public health prevention and precise emergency response are key supports for coordinating “epidemic prevention and control with economic and social development”^[2].

3. The practical problem of strengthening public health disease control

3.1. Inadequate top-level planning and design

The problem of inadequate top-level planning and design in strengthening public health disease control is mainly manifested in the following aspects: the construction of laws, regulations, and standard systems lags behind practical needs, there is a lack of detailed provisions for newly emerging infectious diseases, and the definition of practical issues such as “information reporting time limit, responsibility exemption, and social mobilization authority” is vague. The support for the prevention of public health diseases is far lower than that in the medical field, and the structure of financial investment is imbalanced. Cross-departmental collaboration needs to be improved, and a unified coordination mechanism has not been established, making it difficult to form a joint force^[3].

3.2. The disease control plan is incomplete

At present, there is a problem of incomplete plans for public health disease control. For example, the prevention and control plan in the region is “universal”, only referring to and drawing on excellent plan experience, without supplementing and improving it according to the actual situation in the region. There is a lack of differentiated disease prevention and control measures for different types of infectious diseases. The plan is not updated in a timely manner, and there is a lack of clarity on the transmission characteristics of mutant strains, management of asymptomatic carriers, and new detection technologies. There is a disconnect between the plan and the actual situation. There is a lack of more detailed prevention and control plans in key populations and places, such as welfare homes, elderly care institutions, schools, etc., which are densely populated places with weak targeted disease control; Elderly people, pregnant women, children and other groups are more prone to illness and lack personalized prevention and control strategies. The implementation process of disease control plans has not established a scientific evaluation and adjustment mechanism, which makes the control process tend to be “static” and difficult to adjust dynamically according to the actual situation^[4].

3.3. The disease control team is relatively lagging behind

At present, the public health disease control team is relatively lagging. Team building is the key to disease prevention and control, but it faces situations such as structural imbalance and weak capabilities, which seriously affect the effectiveness of public health disease control. At present, the public health disease control team is facing a large gap in core positions, with a prominent contradiction of “fewer people and more tasks”. There is a general shortage of full-time personnel in areas such as health emergency response, health education, and information management, especially in some remote areas. The public health disease control team is facing the problem of an unreasonable team structure, such as the current high age of the team, a relatively low proportion of young backbone under 35 years old, and a decrease in the proportion of personnel with backgrounds in preventive medicine and public health. The knowledge and on-site disposal capabilities of the public health disease control team are lagging, and many on-duty personnel are not familiar with newly emerging infectious diseases or prevention and control technologies. When facing complex clustered epidemics, they lack experience in on-site disposal ^[5].

3.4. The reform measures for prevention and control have not been upgraded

At present, public health disease control is still relatively weak in terms of prevention and control innovation methods, relying on traditional work models and the introduction of modern technology is relatively small. This is mainly reflected in the weak ability of intelligent monitoring and early warning, the single source of monitoring data, and the strict data barriers among various departments, leading to data fragmentation. The analysis of disease control relies on manpower, and there are few applications of big data mining and artificial intelligence assistance, which leads to a lag in analytical capabilities. Although system platforms such as chronic disease management and immunization planning have been established, there is a lack of coherence and intelligence among these platforms. The use of traditional communication methods in health education has little effect, and there is limited application of new communication channels such as short videos and social media, which cannot meet the requirements of disease health education ^[6].

4. Effective ways to strengthen public health disease control

4.1. Do a good job in top-level planning and design

Relevant departments should start with top-level planning and design in strengthening public health disease control. In terms of improving laws and regulations, we will promote the revision and implementation of the Infectious Disease Prevention and Control Law and the Regulations on Emergency Response to Public Health Emergencies, refine and improve some of their provisions, and provide support for the prevention and response to newly emerging infectious diseases. The relevant departments need to address the issue of imbalanced financial investment and increase the proportion of investment in the field of prevention. For example, in terms of financial support, central and provincial public health special funds will be established to focus on supporting laboratory upgrades, talent team building, scientific research and development, and capacity building in remote areas ^[7]. The relevant departments should establish a collaborative mechanism to solve the problem of “fragmentation and fragmentation”. For example, establishing a specialized committee to coordinate the responsibilities of various departments such as health, disease control, customs, agriculture, education, market supervision, transportation, and publicity, forming a cross-departmental cooperation model, enhancing exploration and cooperation in areas such as sudden infectious diseases and serious occupational

diseases, and building a joint prevention model for public health diseases ^[8].

4.2. Improve disease control plans

The relevant departments should promote the improvement of disease control plans. Firstly, we need to implement a ‘one place, one policy’ approach. At present, there is a problem of copying and pasting in most regions, and the control of public health diseases lacks regional and targeted measures. Relevant departments need to strengthen regional investigations, such as understanding the ratio of permanent residents to floating population in the region, the distribution of medical resources in the region, and the types of high-incidence infectious diseases in the past. Based on the actual situation of the region, targeted prevention and control strategies should be formulated to make prevention and control more in line with the actual situation of the region and more targeted. Secondly, pay attention to differentiated prevention and control. Implement differentiated prevention and control strategies based on the type of disease, such as respiratory diseases mainly relying on site ventilation and mask wearing standards; Intestinal infectious diseases mainly relying on strengthening health education and standardized disposal of vomit; for insect-borne infectious diseases such as dengue fever, the focus is on strengthening the monitoring of the Breto index and cleaning up breeding grounds. Strengthen the prevention and control of key places and key populations again. Adopt differentiated strategic plans for key locations, such as nursing homes or welfare institutions, with clear closed-loop management of staff and regular frequency of nucleic acid/antigen testing; For special places such as primary and secondary schools or kindergartens, targeted treatment should be carried out according to the actual situation. Childcare institutions should focus on morning and afternoon inspections and toy disinfection, while universities should focus on dormitory management and cross-regional flow approval; Enterprises should establish the spacing between workshop workstations and clarify the ventilation standards for dormitories in disease prevention and control. For key groups ^[9], personalized strategies can be adopted, such as simplifying the vaccination notification process for the elderly and establishing a dedicated green channel for them. For pregnant women, establish a green channel for disease intervention. Finally, establish a dynamic evaluation mechanism. In the process of dynamic evaluation, dynamic monitoring measures should be established to monitor the implementation of control measures in real time, such as collecting data every week or month to evaluate the effectiveness of control measures. Optimize and adjust control measures based on feedback to ensure that they meet requirements ^[10].

4.3. Strengthening the construction of disease control teams

At present, public health disease control is facing the problem of lagging team building. Relevant departments need to coordinate and arrange team building, formulate supporting institutional systems, and improve the level of disease control teams. In terms of team building, relevant departments should implement staffing standards and focus on grassroots and remote areas with heavy tasks. For special positions such as information management, health education, and microbiological testing, a minimum personnel ratio red line should be set to eliminate the practice of “one person holding multiple positions” ^[11]. The relevant departments need to optimize and improve the training and education mechanism, with a focus on addressing the problems of knowledge aging and insufficient on-site disposal experience faced by the current control team. In specific training and education, we will implement a training model that combines both regular and urgent training. ‘Ping’ refers to establishing regular training on infectious disease control, with a focus on emerging infectious

diseases, enriching personnel's theoretical knowledge in relevant areas, and understanding how to identify and prevent infectious diseases quickly. Urgent refers to establishing practical training, based on the actual situation in the region, establishing a mechanism for full-process real-life exercises, focusing on training rapid risk assessment and decision-making abilities under conditions of incomplete information and limited resources, and enhancing the overall quality of the team. The training methods can be selected from distance education and situational education. Distance education is the construction of an information-based education platform that uploads high-quality course videos from the region online, forming a "classic epidemic case library" and a "failed training library". Personnel choose to log in to the platform in their spare time to watch videos, enhancing the ability of grassroots personnel to deal with complex diseases. Situational education refers to constructing vivid situations based on cases, stimulating people's interest in learning through a lively atmosphere, and lowering the threshold for understanding. The talent introduction mechanism is to solve the problems of "inability to attract" professional talents and "shortage" of high-end talents. Relevant departments should change the traditional concept of talent introduction and open up green channels for talent introduction, such as formulating talent plans for scarce and high-level majors, establishing positions such as "weekend engineers" and "specially appointed experts", and allowing higher-level disease control experts and university professors to take up temporary or part-time positions at the grassroots level without transferring their relationships ^[12]. In the talent process, we can also explore ways of cooperation between universities, strengthen contracts with universities, and introduce professional talents. In order to enhance personnel's work enthusiasm and improve their sense of professional identity, relevant departments need to establish sound incentive and assessment mechanisms. For example, optimizing the salary and welfare mechanism appropriately to keep it above the market average and have a higher attractiveness to talents; Do a good job in performance evaluation, design evaluation indicators according to the requirements of public health disease control, identify personnel problems through evaluation feedback, urge them to correct the problems, and apply the evaluation results to rewards and punishments. Reward outstanding personnel and punish those with poor performance, creating an atmosphere of reward and punishment constraints ^[13].

4.4. Promote innovation in disease control

Relevant departments should promote a "multidimensional integration" intelligent monitoring and early warning system based on the trend of digitization and intelligence. For example, strengthening collaboration among multiple departments, developing a data sharing directory, promoting data sharing among departments, and breaking down data barriers. Using big data and artificial intelligence to construct an early warning model for infectious diseases, identifying abnormal clustering of "fever, cough, diarrhea, and rash" in the population in a timely manner, and improving the ability to identify infectious diseases ^[14]. In public health disease control, attention should be paid to the application of big data and artificial intelligence technology, such as building simulation models through relevant technologies to infer the trend of epidemic outbreaks, resource consumption, etc., and adjust and optimize based on the feedback of the models to enhance the ability of public health disease control. Relevant departments should strengthen the application of new media promotion in disease and health education, such as opening new media accounts, regularly recording short videos about chronic diseases, infectious diseases, and occupational diseases, and transforming obscure medical knowledge into content that is popular and enjoyable for the public. At the same time, big data analysis technology is used in health education to analyze users' health needs and

behavioral habits, and push targeted articles or short videos to enrich users' health awareness and provide assistance for public health disease control ^[15].

5. Conclusion

In summary, the purpose of public health disease control is to ensure the physical health of the public and maintain social stability. To this end, the article proposes specific action strategies from the perspective of strengthening public health disease control, such as promoting the revision and implementation of the Infectious Disease Prevention and Control Law and the Emergency Regulations for Public Health Emergencies, establishing a dedicated committee to coordinate the responsibilities of various departments including health, disease control, customs, agriculture, education, market supervision, transportation, and publicity, and forming a cross departmental cooperation model; Implement “one place, one policy”, focus on differentiated prevention and control, and establish a dynamic evaluation mechanism; Optimize and improve the training and education mechanism, talent introduction mechanism, solve the problems of “inability to attract” professional talents and “shortage” of high-end talents, and improve the incentive and assessment mechanism; Strengthen the application of technologies such as big data and artificial intelligence in public health disease control, while using new media to reform the disease health education model. Due to space limitations, we will continue to explore measures to strengthen public health disease control and promote sustainable social development in the future.

Disclosure statement

The author declares no conflict of interest.

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