The Impact Mechanism of Promoting Smart Medical Care Technology on Medical Equity and Policy Optimization Recommendations

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Abstract: With the rapid development of Chinese society and the progression of aging, the problem of uneven distribution of medical resources has become apparent, and medical justice has increasingly attracted social attention. Smart medical care technology enhances access, quality, and efficiency of healthcare services, reducing disparities in healthcare among different regions, economies, and social groups, thus promoting fairness in medical care. First, this paper examines how smart medical care technology affects medical equity, focusing on enhancing resource allocation efficiency, expanding access to medical services, and ensuring information sharing. In addition, it analyzes the challenges of smart medical care in the promotion and application process, such as backward infrastructure, digital divide, and privacy protection. In conclusion, based on our analysis, we propose policy optimization suggestions, including increasing financial support, optimizing the legal environment, and improving public digital literacy, aiming to promote the development of smart medical care technology and alleviate the problem of medical injustice.

1. Overview of Smart Medical Care Technology

1.1 Definition and Characteristics of Smart Medical Care

Smart medical care is an efficient, accurate, convenient, and comprehensive new medical and health service system based on traditional medical care. It integrates modern information and communication technology (ICT), big data analysis, artificial intelligence (AI), cloud computing, and the Internet of Things (IoT). Smart medical care not only focuses on treating diseases but also emphasizes health management, disease prevention, and the comprehensive interconnection of information.

The characteristics of smart medical care are primarily reflected in the following aspects. The first characteristic is high information. All medical and health data can be collected in real-time and stored digitally for analysis and sharing. The second characteristic is intelligent service. Healthcare professionals use algorithms and AI technologies to diagnose accurately and develop personalized treatment plans. The third characteristic is ease of use, as the mobile healthcare app or online service platform allows for more flexibility and higher speed in health consultation, appointment scheduling, and treatment. The fourth aspect is precise decision-making, as leveraging big data analysis and cloud computing technology provides scientific support for medical decisions. The fifth is resource optimization. Smart medical care integrates and configures medical resources efficiently, improving medical services' coverage and utilization efficiency [1].

1.2 The Primary Application of Smart Medical Care Technology

Smart medical care has been widely used in many aspects of medical health management. In the medical services sector, we have introduced functions like telemedicine, virtual consultations, digital medical records, and smart guidance, enhancing the convenience and effectiveness of healthcare services. Telemedicine technology addresses the shortage of medical resources in remote areas, allowing high-quality healthcare to reach a broader population [2].

When managing individual health, patients can track their health markers in real time using

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devices like wearables and medical apps on their phones, which is crucial for effectively managing chronic conditions like cardiovascular diseases and diabetes. Additionally, the application of AI technology in medical imaging diagnosis, drug research and development, and gene sequencing analysis has greatly improved the accuracy of diagnosis and accelerated the listing speed of new drugs.

Smart medical care enhances the intelligence level of hospital operations by optimizing medical processes and improving service quality with a fine scheduling system and medical resource scheduling platform while optimizing the medical institution management system. Big data analysis can provide decision support for medical institutions, facilitate the formulation and implementation of health policies, and make the supply of medical services meet actual needs.

The development and application of smart medical care not only improves the efficiency of medical services but also creates opportunities for transforming and upgrading the medical industry. It is expected to become one of the effective ways to solve the problems of medical imbalance and medical equity. Figure 1 shows the industrial chain.

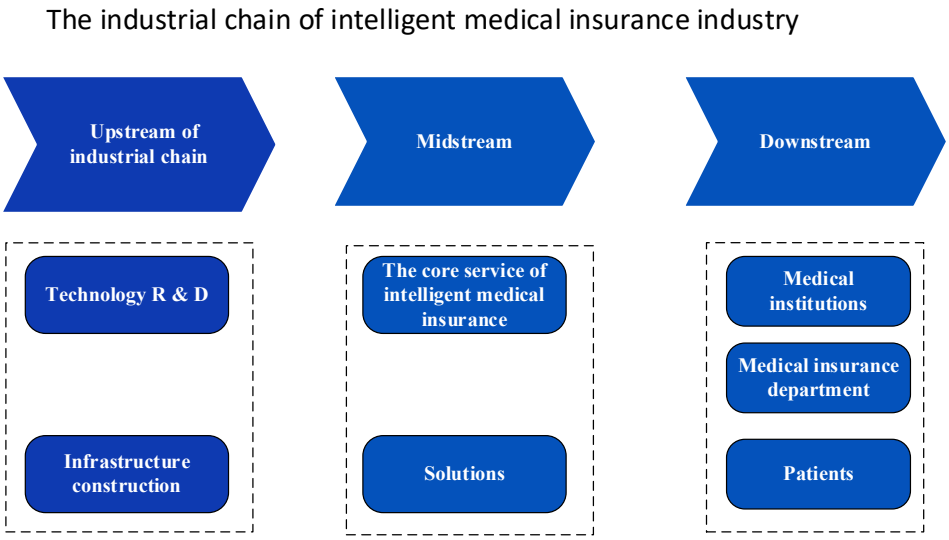

Figure 1 Smart medical care technology industry chain

2. The Influence Mechanism of the Promotion of Smart Medical Care on Medical Fairness

2.1 Positive Influence

2.1.1 Improve the Accessibility of Medical Services and Mitigate Regional Disparities

The advancement and promotion of smart medical care technology has significantly improved the availability and reach of medical services, particularly in regions with limited access to traditional healthcare due to geographical constraints. Using telemedicine, patients in rural areas can connect with specialists in city hospitals instantly through the Internet, receiving immediate medical advice and diagnostic services without the need to travel long distances or incur high expenses. Furthermore, due to the widespread use of mobile technology and smart devices, patients in remote areas can now access the Internet using their smartphones or other portable devices. This enables them to obtain medical information and access resources similar to those available to urban residents. It reduces regional health disparities from uneven medical resource distribution, achieving universal health coverage and promoting balanced medical service development.

2.1.2 Optimize the Allocation of Medical Resources and Reduce the Gap between Urban and Rural Areas

There is a significant imbalance in acquiring medical resources between urban and rural areas, and the popularization and application of smart medical care provide an innovative solution. By combining and evaluating extensive medical-related big data, the government and medical facilities

can more accurately determine the need for medical resources in different areas, forecast future patterns, and optimize resource allocation decisions. By utilizing smart medical care tools like telemedicine and online health services, we can distribute high-quality medical resources from urban areas, which have abundant healthcare facilities, to rural regions that are often underserved. This approach will enhance the medical service capabilities in rural areas and help bridge the gap between urban and rural healthcare access. Our promotion of basic medical equipment and simple diagnostic tools in rural areas will support local doctors in enhancing their diagnosis and treatment skills, leading to increased and improved primary healthcare services for residents. In the long run, an optimized allocation of medical resources will help to ensure equal access to comprehensive health services, allowing everyone to receive basic medical care and health services equitably. Figure 2 illustrates health care resources allocation.

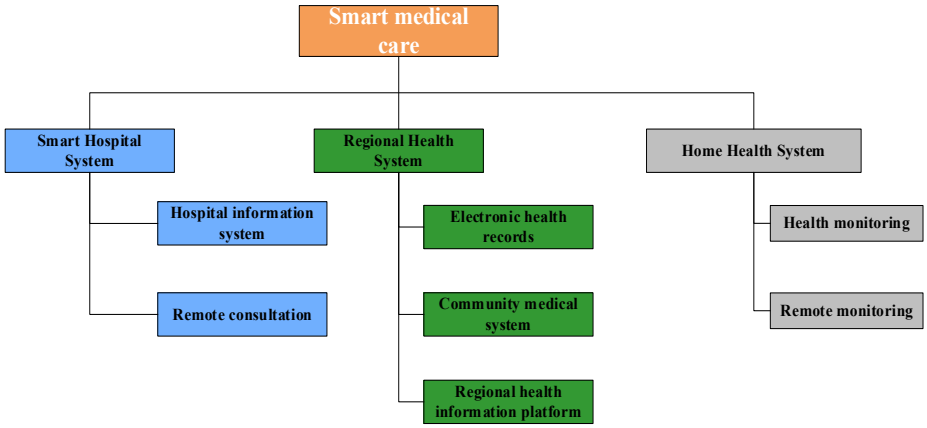

Figure 2 Health care resources allocation

2.1.3 Improve the Quality of Medical Services and Protect the Rights and Interests of Patients

Smart medical care directly and positively impacts improving medical service quality. The powerful calculation and analysis ability of artificial intelligence can assist doctors in making accurate and detailed diagnoses, while other high-tech equipment can perform more complicated treatment and surgical operations. For instance, intelligent image analysis assists in detecting small tumors or lesions in their early stages [3]. At the same time, the organized management of electronic health records prevents the loss of patients' historical data and ensures the delivery of consistent medical care. These advancements can enhance the effectiveness of treatment, lower the rate of medical errors, and guarantee patient safety. As medical services become more transparent, patients can gain a better understanding of their health and treatment process, enhancing communication and trust between doctors and patients while also preserving patients' rights to be informed and make choices. By utilizing a real-time tracking feedback system, medical institutions can effectively monitor and improve the quality of their services. It ensures that patients receive timely, effective, and safe medical care. Protecting patients' interests is crucial for enhancing overall satisfaction with medical services and promoting fairness within the healthcare system.

2.2 Negative Impacts and Challenges

First, technical barriers lead to information inequality. The rapid popularization of smart medical care has also produced information inequality. While telemedicine and electronic health data significantly enhance the availability of medical services, they depend on users having basic technology skills and access. In some remote areas and among older adults, limited education, computer knowledge, or economic constraints may hinder their ability to operate the necessary technology. As a result, these individuals may need help to fully benefit from the conveniences of smart healthcare, leading to disparities in access to information services. Additionally, users need to constantly learn and adapt to the rapid updating of medical software and applications, which may be challenging for some users. Therefore, technology popularization and user training have become essential links to realizing medical equity [4].

Second, data security and privacy protection issues have occurred repeatedly. With the

popularization of smart medical care, many personal health information and sensitive data are transmitted and stored online. It brings significant challenges to data security and personal privacy protection. Without proper information security measures and privacy protection policies, patients' information might be accessed or misused by unauthorized third parties, undermining patient trust and hindering the social acceptance and widespread application of smart medical care technology. In addition, if the data is exposed, it could cause permanent damage to patients, including identity theft and fraudulent medical insurance. Hence, creating a reliable data protection system and legal framework for privacy is crucial for smart medical care's successful and long-lasting progress.

Third, the widespread use of advanced healthcare technology is not proportional to the growth of local economies. The rapid spread of smart medical technology is usually connected to the economic progress of a region. Medical institutions in economically developed areas usually have stronger financial support and technology accumulation, so they can quickly implement smart medical care solutions. In contrast, medical institutions in economically underdeveloped areas may find it difficult to keep up with it due to a lack of technology and funds. The disparity could widen the divide in the quality of healthcare services among various areas and present a fresh challenge to healthcare equity. Hence, the government and society must implement efficient strategies to reduce the disparity in using smart medical technology across different regions and guarantee that all patients have access to high-quality medical services regardless of their geological location or financial situation [5].

3. Suggestions for Policy Optimization

3.1 Strengthen the Popularization and Training of Smart Medical Care

In dealing with the inequality in the popularization of smart medical care technology, it is necessary for us to take a series of measures to strengthen the popularization and training of technology. Government departments should take the initiative to establish a comprehensive knowledge-sharing platform. This platform should provide information about smart medical care services, the application of new technologies, and guidelines for using these technologies safely and effectively. Information can be disseminated through various media channels, including television, radio, and the Internet. The information should include all age and social demographics to ensure that individuals from all backgrounds can access the necessary information regarding their physical well-being and health [6].

Second, the government should offer face-to-face education and operation training courses in community centers, public libraries, and rural classrooms for specific groups, such as older adults, low-income families, and people living in remote areas. These classes need to cover fundamental computer skills, utilizing online medical tools, and tracking personal health with smart devices. Experienced teachers or medical professionals lead the training, ensuring its quality and focusing on its practical application.

Third, the government needs to invest the necessary resources to build and upgrade educational infrastructure. It should also support the development of online training resources through financial assistance. It will enable the creation of multimedia and interactive teaching content that is entertaining and effective. Through innovative educational methods, such as game-based learning and virtual reality (VR) simulation, users are attracted to participate in learning to improve the learning effect.

Fourth, non-profit organizations and community centers are irreplaceable in publicity and education. They are encouraged to organize lectures, seminars, and interactive exhibitions in communities, directly engaging with people, addressing their questions and concerns, and providing targeted education and support. Community participation is particularly essential in promoting the acceptance and adoption of technology, especially in the early stage of popularization [7].

Finally, to ensure the smooth progress of popularization and training, the government should establish a feedback and evaluation mechanism to monitor the effectiveness of educational initiatives. In addition, they adjust the strategy according to the actual situation to ensure the

effective use of resources and realize the fair popularization of smart medical care.

3.2 Improve the Supervision and Evaluation Mechanism of Smart Medical Care

With the continuous development of smart medical care, ensuring the security and privacy of personal health information is becoming much more important. Technology oversight and assessment mechanisms should be enhanced by establishing a robust protection framework that is comprehensive, efficient, and trustworthy. This framework must encompass all data processing stages, including collection, storage, utilization, and transmission.

In legislation, the government must formulate or update relevant laws and regulations to provide a clear legal basis for protecting data associated with smart medical care. The legislation must require that obtaining and utilizing health data is contingent upon users' explicit permission and that data usage must be disclosed during collection. Furthermore, precautions such as encryption and anonymity must be implemented to safeguard data from unauthorized access or disclosure. Government departments should establish an independent regulatory body responsible for the review and supervision of smart medical care service providers. This institution regularly evaluates and audits the security of these platforms to ensure they have implemented national standardized data protection measures. When violations are detected, timely penalties should be enforced and addressed strictly according to the law as a warning.

In addition, regulators should be responsible for evaluating smart medical care services and technologies used, providing certification services, and establishing a list of smart medical care services and products consumer trust [8]. Third-party evaluation and certification can enhance the transparency and credibility of medical services and help consumers better identify and choose safe and reliable services. We have increased public awareness of data privacy and security by emphasizing the importance of personal information protection and providing basic knowledge through public education programs and media outreach. It is suggested that people know their rights and learn to use various tools to maintain their data privacy, such as access rights to view and manage personal data and how to report data leakage correctly. In addition, it is very important to establish an inter-departmental cooperation mechanism. Health departments, information industry departments, and network security institutions should cooperate to build a multi-level and comprehensive network security protection network. We actively collaborate with international organizations and countries to enhance global data protection standards and protocols for smart medical care, addressing the challenges of cross-border data flow in a globalized world.

In improving the supervision and evaluation mechanism for smart medical care, it is essential for government agencies, legislators, regulatory bodies, service providers, and the general public to collaborate in establishing a transparent, open, and secure multi-participation monitoring system. This is crucial to safeguarding privacy and data security while benefiting from technological advancements.

3.3 Optimize the Allocation and Distribution Mechanism of Medical Resources

Given the imbalance between the popularization of smart medical care technology and regional economic development, we should adjust and optimize the allocation and distribution mechanism of medical resources. Specific actions involve creating a coordinated system for developing regional healthcare, promoting high-quality medical resources to move towards less developed regions, and grassroots with the help of special funding and policy support. Additionally, we use smart medical care to optimize the exchange and sharing of medical resources in the region and encourage medical groups and large-scale hospitals to establish cooperation mechanisms to realize resource sharing and talent complementarity. Moreover, the government should decrease the economic barrier to accessing smart medical care by providing subsidies and improving the medical insurance system, making it more widely utilized and inclusive.

3.4 Improving the Quality of Medical Service and Patient Satisfaction

Improving the quality of medical service and patient satisfaction is essential in realizing medical equity. We can achieve this goal by adopting smart medical care to provide more personalized,

accurate, and efficient medical services. We recommend that medical institutions adopt the "Internet + medical service" model to enhance the efficiency of the diagnosis and treatment process and reduce patient waiting times. We establish a patient-centered service model and constantly optimize and upgrade medical services, thus improving patients' medical experience. Furthermore, there is a need to create a thorough system for evaluating the quality of medical services, use patient feedback as a key factor in enhancing medical services, constantly enhance the medical service procedures and surroundings, and guarantee that patients receive top-notch medical care.

4. Conclusion

The rapid development of smart medical care technology provides unprecedented opportunities for improving the quality of medical services and access to medical resources, particularly in distant regions. Smart medical care has the potential to narrow the gap between medical services and achieve a fair distribution of medical resources. By promoting telemedicine systems, intelligent services, and personalized medicine, smart medical care can improve treatment accuracy and effectiveness and patient satisfaction, protecting their rights and interests. However, its promotion process also faces technical barriers and data security issues, and relevant policies and measures need to be implemented to keep pace with the times and solve these challenges.

Due to the varying growth of smart healthcare across regions and its high technical requirements, we suggest policy measures like promoting smart healthcare and user education, enhancing oversight and evaluation of smart medical care, optimizing medical resource allocation, and enhancing medical service quality. We advocate for increased investment in education and public-private partnerships to ensure information security and privacy protection, promote the widespread use of smart medical care, and provide significant benefits for all communities.

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