

Accessibility Of Telemedicine in Rural Aging Scenarios

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Abstract. With the gradual popularization and application of the Internet and the aggravation of China's aging phenomenon since the 21st century. This paper find that telemedicine and related services are gradually emerging. However, there are still some problems with the feasibility of telemedicine. This paper uses the questionnaire survey method, uses the questionnaire star website to distribute 60 questionnaires to the elderly group aged 60 to 80, and uses SPSS to analyze the frequency and correlation of the questionnaire results. In addition, this paper is based on the data from the official website of the National Bureau of Statistics and other official websites. It analyzes the application status of telemedicine in the context of aging. It also analyzes the challenges that telemedicine faces. The study finds that most elderly people have some understanding of telemedicine and related services, and the younger middle-aged and elderly people (around 60 years old) have a higher awareness than the older elderly (aged 65 - 80 years old and above). However, the application of telemedicine in the elderly population still faces many deep-rooted problems, such as low technology acceptance and difficult operation. In response to these problems, this paper puts forward some feasible suggestions.

Keywords: Telemedicine; rural aging; rural elderly.

1. Introduction

According to the data of the seventh census in 2020. There are more than 121 million rural permanent residents aged 60 and above. They account for 23.81% of the total rural population. The aging level in rural areas is 5.1% higher than the national average. The degree of rural aging is deepening, and the areas with great demand for telemedicine are Qiandongnan and other regions. Combined with the data of the National Bureau of Statistics. It is estimated that the proportion of empty-nest elderly in rural areas will reach 45% in 2030. This will exacerbate the contradiction between supply and demand of medical resources. The demand for telemedicine is also increasing. However, data from 2020 showed that the utilization rate of medical care services for rural elderly people over 65 years old was 52.9%, far lower than that in cities (71.3%). This phenomenon reflects the lack of rural medical coverage. Moreover, the demand for rural telemedicine is inversely proportional to the rural medical coverage. The average self-payment rate for medical care for rural elderly people is 47%. The reimbursement rate for chronic disease management-related expenses (such as hypertension drugs) is only 35%. This puts significant economic pressure [1].

The Internet is not well used by middle-aged and elderly people in rural areas. The utilization rate of smart devices for most elderly people is only 31%, and they need their children to be by their side or to provide remote guidance. In this case, under the simulated 2G network (30% packet loss rate), the voice recognition accuracy of the remote diagnosis and treatment system drops to 65%, requiring dialect adaptation and optimization (such as increasing the Sichuan dialect recognition rate to 82%). In the actual implementation of rural telemedicine, various dialects or the elderly's understanding of how to use smart devices is also a major problem. In remote areas or areas with low population density, such as Inner Mongolia, telemedicine equipment needs to support offline functions. Telemedicine equipment also needs to integrate Mongolian voice interaction systems [2]. Telemedicine has significant potential in the rural aging scene. However, it needs to solve the problems of telemedicine

technology, the use of smart devices by the elderly, and economic feasibility. With the aging of the global population, the proportion of the elderly population continues to rise. The society's demand for elderly care services, medical insurance, etc., is growing. Since the 21st century, with the development of the social economy and the transformation of the population structure, the current situation of rural aging is becoming more and more obvious. It has become an important social problem that China urgently needs to solve. The data of the seventh census show that the degree of population aging continues to increase, and the aging trend is obvious. According to the census results, in 2020, China's population aged 60 and above was 264.02 million, accounting for 18.70%, of which the population aged 65 and above was 190.64 million, accounting for 13.50%. The proportion of the population aged 80 and above in the total population was 2.54%, an increase of 0.98 percentage points from 2010; the proportion of the elderly population aged 60 and above was 13.56%, an increase of 1.74 percentage points from 2010, and the aging trend was obvious. The aging of the population is accompanied by a high rate of aging, indicating that the internal structure of China's elderly population is also changing rapidly [3]. The elderly population is usually accompanied by a higher prevalence of chronic diseases, such as cardiovascular and cerebrovascular diseases, diabetes, etc. So the elderly have a more urgent need for medical services. This trend leads to a continuous increase in medical expenses, and the shortage of medical resources also aggravates the severe situation. Therefore, the traditional face - to - face medical model is particularly incapable of meeting the challenges of an aging society [4]. Smart medicine is an innovative medical model. It uses advanced technologies such as the Internet, big data, cloud computing and artificial intelligence. These technologies help to improve the efficiency and quality of medical services. Moreover, it provides elderly patients with a more convenient and personalized medical experience.

Therefore, it is of great significance to maximize the use value of telemedicine for alleviating the "disease without treatment" accompanied by rural aging. This paper investigates the status, challenges, and potential solutions of telemedicine through the integration of Wenjuanxing, SPSS, and relevant data collection methods. It aims to improve the accessibility and convenience of telemedicine services for the elderly, improve the health level of the elderly to a certain extent, and try to make the elderly in rural areas available for treatment.

2. Application of Artificial Intelligence Technology in Geriatric Healthcare

Artificial intelligence technology in disease diagnosis simplifies the patient's medical consultation process, accelerates the progress and speed of treatment, and enables patients to receive treatment more quickly. In addition, through these technologies, doctors can gather a broader range of patient information, which also provides valuable data for disease diagnosis. Nowadays, compared with some traditional medical methods, the elderly in rural areas can also use telemedicine. Doctors can diagnose diseases through remote communication with the elderly in rural areas, making communication between the two more convenient [5].

Artificial intelligence technology integrates human genetic information and individual physical characteristics in personalized treatment, precisely recommending targeted treatment plans and administering suitable medications to minimize drug abuse and its adverse effects on the body. Initially, the diagnostic robot is employed to diagnose the patient's disease, provide a preliminary assessment of the patient's condition, and subsequently offer personalized services tailored to the patient's needs, such as registration services. All these measures aim to enhance the convenience and effectiveness of the patient's treatment process [6].

Artificial intelligence has played a significant role in the research of elderly chronic disease management. Surveys indicate that numerous types of elderly care robots are being used in many countries, including daily care robots and emotion regulation robots. These robots can assist nurses and provide a range of nursing services, such as daily living support, rehabilitation, psychological care, and disease monitoring. To some extent, they can assist elderly patients with chronic illnesses in enhancing their living abilities, reducing negative emotions, and fostering disease recovery [7].

3. Study on Problems

3.1. The Level of Rural Medical Care is not High

Statistics indicate that the ratio of medical and health personnel to every thousand residents in rural China is approximately half that of urban areas. This disparity often results in the rural elderly experiencing difficulties such as inaccessible medical care and substandard medical services when they fall ill, significantly impacting their health and quality of life. Especially in the field of chronic disease management for the elderly, the scarcity of rural medical resources is particularly prominent. Due to the absence of professional medical equipment and staff, many rural elderly individuals cannot receive timely and effective management and treatment for their chronic diseases. This not only easily leads to the deterioration of their health conditions but also increases medical costs and social burdens. Additionally, because of the underdevelopment of network information technology in some rural areas, medical information for the elderly is relatively inaccessible, leading to difficulties in selecting medical services and understanding health knowledge.

3.2. Shackles of Habitual Thinking

In the digital era, telemedicine may be a blessing for the younger generation, but for the elderly, it may constitute an insurmountable "gap". Due to the inertia of traditional thinking, it may be tough for the elderly to change their existing habits and concepts for a period of time. In addition, they are not familiar with electronic products and lack an understanding of Internet technology. These factors lead to the failure of telemedicine in the elderly, who should benefit from it [4].

3.3. Challenges of Telemedicine

According to the data from the seventh population census conducted in 2020, there are over 121 million rural residents aged 60 and above, which constitutes 23.81% of the total rural population. The aging level in rural areas exceeds the national average by 5.1%. The degree of rural aging is deepening, and the areas with a large demand for telemedicine are Southeast Guizhou and other areas. According to data from the National Bureau of Statistics, it is estimated that by 2030, the proportion of empty nesters in rural areas will reach 45%, which will exacerbate the contradiction between the supply and demand of medical resources. Consequently, the demand for telemedicine is also on the rise. However, according to the 2020 data, the utilization rate of healthcare services among the elderly over 65 in rural areas was 52.9%, significantly lower than the 71.3% rate in urban areas. This disparity highlights the inadequate medical coverage in rural regions, where the demand for telemedicine is inversely proportional to the extent of rural healthcare services. Additionally, the average out-of-pocket medical expenses for the rural elderly amount to 47%, with only a 35% reimbursement rate for expenses related to chronic disease management, such as hypertension medication, indicating a considerable economic burden [2].

In rural areas, the elderly experience difficulties in using the internet, with the usage rate of smart devices among them being only 31%, requiring assistance from their children either in person or remotely. In this scenario, under a simulated 2G network with a 30% packet loss rate, the speech recognition accuracy of the remote diagnosis and treatment system decreases to 65%. Consequently, dialect adaptation optimization becomes necessary—for instance, increasing the recognition rate of the Sichuan dialect to 82%. Additionally, in the practical implementation of rural telemedicine, the use of smart devices by speakers of various dialects or the elderly presents a significant challenge. In remote areas or areas with low population density, such as Inner Mongolia, telemedicine devices need to support offline functions and integrate Mongolian voice interaction systems [7].

Telemedicine has significant potential in the rural aging scene, but it needs to be solved in a targeted manner in terms of telemedicine technology, the use of smart devices for the elderly, and economic feasibility.

4. Survey Process and Result Analysis

This paper uses the questionnaire survey method of WJX to distribute questionnaires to 60 elderly people ranging from 60 to over 80 years old and analyzes the data obtained. This paper uses the WJX website to distribute questionnaires. In the process of filling in the questionnaire, some elderly people are indeed not proficient in operating mobile phones, to fill in the questionnaire, but with the help of the younger generation at home (such as children and grandchildren), they completed the questionnaire, and the content filled in is relatively true and reliable. The following is the frequency and correlation analysis of different variables in this paper using SPSS.

Table 1. Knowledge of frequency analysis of telemedicine and related services

		Whether know about telemedicine and related services			
		frequency	percentage	Effective percentage	Cumulative percentage
Effective	Yes	32	80.0	80.0	80.0
	No	8	20.0	20.0	100.0
	Total	40	100.0	100.0	

From Table 1, it can see that in today's society, the majority of elderly people know about telemedicine, accounting for 80%, while the minority of people over 60 years old do not know about telemedicine accounting for 20%.

Since the Central Committee of the Communist Party of China and the State Council issued the "Healthy China 2030" Planning Outline in 2016, the Party Central Committee has launched a series of comprehensive and in-depth strategic deployments around digital governance, the construction of a digital China, and socialist modernization. The Outline points out that it is necessary to vigorously promote scientific and technological innovation, especially to achieve key breakthroughs in key technological fields such as smart medical care. This move has opened up broad space for the vigorous development of telemedicine, provided solid and strong policy support, and promoted telemedicine to a new stage of development [6].

Table 2. Correlation analysis between age and knowledge of telemedicine

		Relevance	
		age	Whether know about telemedicine and related services
age	Pearson correlation	1	.646
	Significance (two-tailed)		.000
	Number of cases	60	60
Whether know about telemedicine and related services	Pearson correlation	.646	1
	Significance (two-tailed)	.000	
	Number of cases	60	60
. At the 0.01 level (two-tailed), the correlation is significant.			

As shown in Table 2, the correlation between age and whether one knows about telemedicine is 0.000, which shows that age has a significant correlation with whether one knows about telemedicine and related services. The Pearson coefficient between age and whether one knows about telemedicine and related services is $0.646 > 0$, which shows that age is positively correlated with whether one knows about telemedicine, and the correlation is strong.

5. Conclusion

Through research, this paper found that most elderly people know about telemedicine and related services, and younger middle-aged and elderly people (around 60 years old) know more about telemedicine and related services than older elderly people (65-80 years old and above). However, the problems faced by telemedicine in the elderly population are more complex and deeply rooted. This paper puts forward some feasible suggestions for these problems. For example: national economic support; government-related subsidy policies; through institutional support or training, stimulate people's enthusiasm for actively participating in the development of rural medical care; arrange relevant personnel to popularize telemedicine-related knowledge to the elderly; ask professionals to guide the elderly to use telemedicine platforms. The main contribution of this paper is to deeply explore the potential problems that the elderly may encounter when using telemedicine services, and put forward corresponding solution suggestions. For example, simplifying the telemedicine process allows the elderly to obtain consultation and treatment advice from professional doctors in a simpler way. At the same time, arranging professionals for fixed-point teaching to ensure that they master the latest medical knowledge and technology it will not only help the elderly to enjoy telemedicine services more smoothly but also improve the utilization rate of medical resources. These suggestions have a certain reference value for alleviating the medical difficulties of the elderly caused by the aging problem in rural areas, and thus help improve the quality of life of the people.

Looking forward to future research directions, people will further deepen the breadth and depth of the research, and explore the problems encountered by the elderly in the process of using telemedicine from a more detailed perspective, such as visiting areas with a high degree of aging and collecting first-hand information.

Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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