Research on Cognitive Level to Internet Medical Treatment of Residents in Remote Areas and Its Influence Factors

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Abstract. Internet medical service is a comprehensive medical service based on information technology and modern medicine, providing a powerful means to solve the imbalance of medical resources. However, in real life, some residents in remote areas do not know about the internet medical services. In this paper, patients' perceptions and wishes were statistically analyzed using a questionnaire method, descriptive analysis and multivariate logistic regression analysis. The results showed that age, practice qualification, annual household income, and preferred hospital were the influencing factors for patients' awareness of online healthcare. Meanwhile qualification, satisfaction with hardware and software facilities, satisfaction with service attitude, satisfaction with communication ability, and satisfaction with treatment plan were the influencing factors of patients' willingness to use Internet medical care. The promotion of Internet medical services in remote areas needs to be strengthened.

Keywords: Internet medical treatment, remote medical treatment, residents in remote areas

1 Introduction

In a narrow sense, internet medical service refers to online medical service. In a broad sense, internet medical service refers to making the use of internet technology to provide health services throughout the whole process of health management, appointment and registration, online consultation, diagnosis and treatment, remote consultation, electronic prescription, disease rehabilitation, etc. Internet medical service started in 2000, and online medical consultation was represented by Dingxiangyuan [1]. In the following ten years, many medical enterprises such as good doctors emerged. The real development of internet medicine in China started from the "12th Five-Year Plan" period, with the establishment of star enterprises such as Doctor Chunyu and Doctor Pingan. In 2014, the state began to issue support policies, and under the promotion of capital, it showed a situation of a hundred flowers blooming. Pharmaceutical e-commerce such as Dingdang Express began to work, and the application scenarios from the patient side and the doctor side were constantly enriched. During the "13th Five-Year

Plan" period, there were policy swings, forming a development trend of first suppressing and then increasing. From 2016 to 2018, business model innovation was difficult to break through, capital investment enthusiasm tended to be rational, policy strength was reduced, and industry development was hindered and entered a slow development stage. With the release of the Opinions of the General Office of the State Council on Promoting the Development of "internet plus Health Care"", the favorable policies have pushed the development of internet health care up again, and the profit models such as internet hospitals have become increasingly clear. Under the catalysis of the COVID-19 that broke out at the end of 2019, the continued outflow of prescription drugs, and the expectation that the bottleneck of medical insurance payment will be gradually broken. The internet medicine will enter the stage of accelerated development and continue to derive new business forms [2].

China has a large rural population, most of which are concentrated in remote areas. The demand for health services is large, and it is difficult to see a doctor. In most remote areas, the traffic is inconvenient, and it is not easy for people to get out. If conditions permit, poverty-stricken areas should focus on exploring the inclusion of internet diagnosis and treatment services in the scope of medical insurance payment, so that rural poor people can use the medical resources of big cities without going far away. Internet medicine relies on modern and rapidly changing network technology, efficiently integrates high-quality medical resources, and provides diagnosis and treatment services for patients at different times and in different regions. As an important project in the national golden health project, internet medical care has benefited some minority areas [3]. For example, based on the development of big data, Guizhou Province will improve the general medical model, build an internet medical system, and work with developed provinces to build a "flat, zero-distance" remote service platform for public medical institutions across more provinces and cities, complete the high-speed exchange of medical information, promote the development of China's health care sharing and opening, and accelerate the pace of accurate poverty alleviation. County-level hospitals have covered the internet medical network, covering many remote areas, even poor counties. However, there are many difficulties in the operation of internet medical projects, and the utilization rate is low. Most doctors have not really participated in internet medical treatment. This paper analyzes the cognitive status quo and influencing factors of patients in remote areas of China on internet medical services, and provides reference basis for further promoting internet medical services in China [4].

2   Research objects and methods

2.1   Research objects

From August 2020 to August 2022, This research randomly selected 3 hospitals in Shannan city, Tibet Autonomous Region from the county-level hospitals that have provided internet medical services to investigate patients, then used a combination of stratified sampling and simple random sampling to randomly select 3 poor county hospitals in remote areas from 28 county-level hospitals that have provided internet medical services. The survey randomly selected 10 departments from the inpatient department and

outpatient department of each hospital, and then randomly selected 20 patients from the selected departments and wards, totalling 600. The questionnaire was distributed by the survey team on the spot, and was directly recovered after filling in and answering. 600 questionnaires were distributed to both inpatients and outpatients. The incomplete questionnaires were removed, and 580 valid questionnaires were recovered, with an effective rate of 96.7%. The basic information of the respondents is shown in Table 1.

Table 1. Basic information of research objects (table credit: original)

Index	Category	Number of cases	Proportion (%)
Gender	Male	293	50.5
	Female	287	49.5
Age	Under 20	75	12.9
	Between 20 to 29	124	21.4
	Between 30 to 39	115	19.8
	Between 40 to 49	125	21.6
	Over 50	141	24.3
Qualification	Junior college and above	61	10.5
	Senior middle school	41	7.1
	Junior middle school and below	478	82.4

In this survey, there were 293 males, accounting for 50.5%. There were 287 women, accounting for 49.5%, and the proportion of men and women were basically the same. In terms of sample age distribution, the proportion of patients under 20 years old is the lowest, because there are fewer patients under 20 years old. The proportion of patients over 50 years old was the highest, because there were the most patients over 50 years old. This is consistent with the research content and research situation of this paper. In terms of the distribution of education level, because residents were located in remote areas, their education level is generally not high. The proportion of junior middle school and below was the highest, up to 82.4%. The proportion of junior college and above only accounted for 10.5%. To sum up, the sample distribution in this paper is relatively reasonable, consistent with the situation in this paper, and has certain representativeness, so can continue to conduct empirical analysis.

2.2   Research methods

The research adopt the on-site questionnaire survey method. According to the purpose of the study and referring to the domestic and foreign questionnaires on internet medical cognition research, the preliminary designed questionnaire was invited to experts for evaluation and revision, and the questionnaire was finally confirmed. The trained investigation team distributed and instructed the respondents to fill in the questionnaire at the hospital and collected it on the spot. The questionnaire contains two parts. The first part is the basic information of the respondents. The second part is about the medical habits and expenses of patients, the overall cognition of internet medical care, the

willingness to use internet medical services, and suggestions for developing internet medical care. In order to collect the historical consultation data of internet medical services and explore the relevant factors that affect the demand of internet medical services in the implementation and promotion process. In this paper, three hospitals were investigated on the spot, and in-depth interviews were conducted with relevant principals, experts and doctors to make full preparations for the selection of influencing factors, data collection and processing. At the same time, this article also interviewed ten patients randomly to understand their cognitive level of internet medicine and suggestions for improvement.

This research uniformly code the questionnaire data, use Epidata 3.0 to establish a database, enter the data by double entry method, set strict logic control and verification procedures, and logically check and clean up the data. We conducted descriptive statistical analysis, chi-square test and multivariate logistic regression analysis on the survey data. Then use Excel software to establish a database, SPSS22.0 software to carry out statistical analysis, and the counting data is described and the multivariate logistic regression analysis showed that the willingness of medical staff in poor areas to use internet medicine and the influencing factors. $P<0.05$ was statistically significant.

3   Results and analysis

3.1   Cognitive level and its influence factors

The survey results showed that most of the patients said that they did not understand or did not understand internet medicine at all, accounting for 55.3% and 38.6% respectively. Only 6.0% of the patients understood internet medicine, and their awareness was generally low. The investigation results of cognitive level to internet medical treatment of residents in remote areas are shown in Table 2.

Table 2. Investigation results of cognitive level of residents in remote areas (table credit: original)

Cognitive Level	Number of cases	Proportion (%)
Know nothing	321	55.3
Not very clear	224	38.6
Have a quite understanding	35	6.0

Firstly conducted a single factor analysis of the residents' awareness of internet medical care in remote areas. The results showed that the respondents' gender, age, education level, residence, family annual income, preferred treatment unit and treatment type had an impact on the awareness of internet medical policy ($P<0.05$). Then took the patients' awareness of the internet medical policy as the dependent variable, and took gender, age group, education level and residence, family annual income, preferred medical unit, and medical category as the independent variable. The research used the orderly multi-classification logistic regression to analyze, and took the Logit function as the link function. The results of the multifactor logistic regression are shown in Table 3.

Table 3. Multiple factors logistic regression of cognitive level of residents in remote areas (table credit: original)

Variable	Partial regression coefficient	Standard error	Wald value	OR value	P value
Age group	1.625	0.256	4.865	5.182	0.027
Qualification	1.521	0.238	10.954	4.056	0.011
Annual household income	1.961	0.621	3.254	8.516	0.008
Preferred hospital	1.117	0.128	3.621	6.633	0.004

The survey population did not have a high level of knowledge of internet medicine. Age, education level, family annual income, preferred hospital are the main factors that affect whether the respondents know the internet medical policy. There was no statistically significant difference between people under 20 years of age and people over 50 years of age in their awareness of internet medicine. People aged between 20 and 50 have a high awareness of internet medicine. The lower the education level, the lower the awareness of internet medicine; The lower the family income, the lower the awareness of internet medical care [5]. The people who first choose to see a doctor in a township health center do not understand the internet medical policy more than those who seek medical treatment in a hospital at or above the county level. Further investigation found that some patients were hospitalized because of their own or family members' illness, and only learned about internet medicine in the hospital.

3.2   Use willingness and its influence factors

In terms of the willingness to use internet medicine, 85.9% of patients are willing to use internet medicine, accounting for the vast majority. The survey results are shown in Table 4.

Table 4. Investigation results of use willingness of residents in remote areas (table credit: original)

Use willingness	Number of cases	Proportion (%)
Willing to use	498	85.9
Not willing to use	82	14.1

Single factor analysis of residents' willingness to use internet medical services in remote areas. The results showed that the degree of education, the satisfaction of software and hardware facilities, the satisfaction of disease description, the satisfaction of service attitude, the satisfaction of communication and guidance ability, and the satisfaction of examination and treatment plan had statistically significant differences on the impact of internet medical use intention (P<0.05). Multivariate logistic regression analysis was carried out with the factors P<0.05 in the single factor analysis as independent variables. The results showed that education background, satisfaction with software and hardware facilities, satisfaction with service attitude, satisfaction with

communication ability and satisfaction with treatment plan were independent influencing factors of patients' willingness to continue to use the internet for medical treatment. Table 5 shows the regression results.

Table 5. Multiple factors logistic regression of use willingness of residents in remote areas (table credit: original)

Variable	Partial regression coefficient	Standard error	Wald value	OR value	P value
Qualification	2.162	0.253	9.541	5.553	0.036
Satisfaction of software and hardware facilities	1.253	0.631	9.625	6.221	0.041
Satisfaction of service attitude	1.894	0.124	9.951	1.254	0.011
Satisfaction of communication ability	2.019	0.125	8.716	7.844	0.009
Satisfaction of treatment program	1.324	0.256	4.882	8.552	0.012

The survey population has a high degree of willingness to use internet medical services. Education, satisfaction with software and hardware facilities, satisfaction with service attitude, satisfaction with communication ability and satisfaction with treatment plan are the main factors that affect whether the survey subjects are willing to use internet medical services. However, age, family income and other indicators have no significant difference in influencing willingness to use. Educational background, satisfaction with software and hardware facilities have a high impact on the willingness to use. The patients with higher education background and higher satisfaction with software and hardware facilities have a stronger willingness to continue to use internet medicine. In addition, service attitude satisfaction and communication and guidance ability satisfaction also play an important role in whether patients continue to use internet medicine. Therefore, improving service attitude and communication ability are the main methods to enhance patients' trust and willingness to use medical services [6].

4　Suggestions on promoting internet medical care in remote areas

4.1　Strengthen propagandism efforts

Patients in remote areas have a low awareness of internet medicine, and age, education level and family income have a significant impact on the awareness rate of internet medicine. Middle-aged and elderly patients with low educational background and low family income generally work in household farming for a long time. Due to the restrictions of living environment and economic conditions, they have relatively few opportunities to access the policies and information related to internet medical care [7].

Residents in remote areas are mainly middle-aged and elderly residents and students, and their education level is generally not high. It is suggested that the government departments, aiming at the middle-aged and elderly residents and students with low education level, increase the publicity of internet medical care at the grass-roots level by distributing brochures, posting posters, concentrating policy interpretation, and door-to-door propaganda. Grass-root medical institutions can set up a consultation service desk, print the relevant knowledge of internet medicine on the medical records, strengthen the publicity of patients' admission, and rely on the publicity of free clinic activities to improve patients' awareness of internet medicine, reasonably guide critical patients to choose internet medical services, and promote the popularization of internet medicine in remote areas. Internet plus publicity is one of the means of hospital publicity, which plays an important role in hospital publicity. Compared with traditional publicity methods, online publicity has greater appeal and is an important way for the outside world to understand the hospital and communicate with the hospital. Under the internet situation, the publicity work of the hospital, especially the release of medical information, can help patients understand the technical level of the hospital, guide patients to see a doctor correctly, and optimize the medical treatment mode. With the rapid development of the internet, the limitless possibilities of the propaganda position are slowly being stimulated. The new form will change the original role and value of the media in the propaganda position and give it new connotation and role. Publicity has improved the sense of participation of employees, stimulated their enthusiasm for work, strengthened the cohesion of hospitals, and promoted residents in remote areas to understand internet medical care [8].

4.2   Improve infrastructure construction

The survey results show that the satisfaction of software and hardware facilities has a high impact on the willingness to use. The higher the satisfaction of residents in remote areas with the software and hardware facilities of the hospital, the stronger their willingness to continue to use the internet for medical treatment [9]. Therefore, improving the software and hardware facilities of the hospital is one of the important means to improve the participation of residents in remote areas in internet medical care The rapid development of "new infrastructure" such as cloud computing, AI and big data will also promote the development of internet medicine. At the same time, the policy support from the central government to the competent departments and local governments has also injected a tonic into the development of internet medical care. 5G provides network support for internet medicine and can be applied in the fields of remote monitoring, remote consultation, and remote control [10]. With 5G high speed and low time delay, doctors thousands of miles away can consult in high definition, and doctors can successfully operate for patients thousands of miles away. AI makes doctors' diagnosis more time-saving and efficient. At present, the construction of internet hospitals is pressing the fast forward key. At present, China has successfully built more than 160 internet hospitals. Facing the future, with the rapid development of information and communication technologies such as 5G, cloud computing, AI, and the continuous enrichment and improvement of relevant policies, internet medicine will gradually mature

and create more benefits for social life. Explore the vertical field of internet diagnosis and treatment. It is to provide internet diagnosis and treatment services for individuals, such as intelligent medical treatment, triage, follow-up consultation, pharmaceutical services, health management, etc. All users of the platform must pass the real-name authentication of the public security system, and the medical records are traceable [11].

4.3   Optimize treatment technology

High-quality examination and treatment programs, on the one hand, require internet medical doctors to have a higher level of theoretical knowledge, on the other hand, they also need internet medical doctors to have the ability to explain science more in line with the actual situation of local patients. Improve the enthusiasm of doctors and attract excellent doctors into the system of internet medical care. The participation of skilled doctors is an important guarantee for the sustainable and healthy development of internet medicine. Internet medical enterprises should create ways to meet the needs of doctors to increase their legitimate income and improve their professional level, and standardize the process to protect doctors' rights and interests. The hospital should be able to increase the training of hospital internet medical personnel to establish a professional internet medical talent team and carry out the daily maintenance and operation of internet medical, so as to ensure the normal operation of the internet medical system. At the same time, it should also regularly organize medical personnel to participate in the training of internet medical operation process, In order to facilitate the medical staff at all levels to have a comprehensive understanding of the operation process of the internet medical system; It is necessary to establish a strict internet medical access mechanism, and the national and provincial health departments must strictly check in the process of carrying out practical work. Only hospitals that meet various industry standards can carry out internet medical treatment, and the professional technical level of hospitals that carry out internet medical treatment, and the software and hardware equipment of the internet medical system should be able to meet the relevant requirements. Only after passing the assessment in all aspects can the relevant hospitals obtain the job certificate to participate in internet medical care and officially carry out internet medical activities, which plays a very important role in reducing the risk of internet medical care and ensuring the safety of patients' medical treatment. While providing convenient and high-quality medical services for the masses, it also improves the overall level of medical care, effectively improves the doctor-patient relationship, and enhances the willingness of residents in remote areas to use internet medical care [12].

5   Conclusions

This paper uses descriptive analysis and multivariate logistic regression analysis to statistically analyze 580 patients' cognition and desire for internet medical care in Shannan City, Tibet Autonomous Region. 55.3% of the patients did not know about internet medicine, 38.6% of the patients did not know about internet medicine very well. The results of multivariate logistic regression analysis showed that age group, education

level, family annual income, preferred hospital were the influencing factors of patients' awareness of internet medical care. 85.9% of patients were willing to use the internet for medical treatment. The results of multivariate logistic regression analysis showed that, qualification, satisfactions of software and hardware facilities, service attitude, communication ability and treatment program were the influencing factor of patients' willingness to use internet medical care. Based on the investigation, we suggest to strengthen propagandism efforts, improve infrastructure construction and optimize treatment technology to increase utilization rate of internet medical care.

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