The Feasibility and Demand Research of Smart Healthcare Electronic Records Based on the Big Data

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Abstract: The paper used an online questionnaire to investigate the opinions of smart healthcare among medical and non-medical staff in China. Through the data collection and analysis, the paper will focus on whether smart medical platforms have demand and feasibility in the current market. Moreover, the author will give application suggestions and development prospect analysis of the smart medical platform base on the current situation of smart healthcare and society.

Keywords: big data; smart healthcare; electronic health records

1 Introduction

Nowadays people have generated many personal health information in medical consultation, preventive health care, and other kinds of activities. However, the complex information and the lack of effective platforms lead to insufficient use of the abundant information. Therefore, a platform of smart healthcare electronic records, which can integrate personal health information to facilitate consultation and medical treatment, is considered to build.

The author used a questionnaire to investigate the demand, feasibility, and possible drawbacks of the platform to explore the prospect of the platform.

1.1 Design of the questionnaire

Before formulating the questionnaire, the author first learned about the current situation of smart medical records by looking up information in China. At the same time, the author referred to other related questionnaires and determined the main structure and specific content. The questionnaire is set with 15 questions and consists of 2 parts. The first part is the basic personal information, which is gender, age, and occupation. The second is the survey of two groups of people's demand for the platform. The questionnaire was tested on a small scale before officially sending and some questions were modified after testing.

1.2 Distribution and collection of questionnaires

The survey was conducted online, through the questionnaire star website (https://www.wjx.cn/) to generate an electronic version. The questionnaire was distributed in QQ, WeChat, and other platforms, and a total of 301 were recovered. After finishing that, the author screened out some illogical questionnaires as waste papers. The final number of valid questionnaires is 300.

Among the 300 people surveyed, people over 45 years old accounted for 45%, totaling 135 people; there are 56 medical industry-related staff and 244 non-medical staff.

1.3 Statistical methods for questionnaire data

The paper uses SPSS to analyze the reliability and validity of statistics through frequency analysis and cross-analysis methods.

2 Analysis of survey results

2.1 Survey samples

Among the 300 valid samples, 56 people (18.67%) are medical staff and 244 (81.33%) are non-medical staff. Since the questionnaires were distributed randomly, it can be seen from the statistical results that non-medical staff are more common and tend to answer the questionnaires than medical staff.

In terms of age distribution, there are 7 (2.33%) respondents under 18, 94 (31.33%) respondents between 18 and 30 years old, 64 (21.33%) respondents between 30 and 45 years old, and 135 (45.00%) respondents over 45. The questionnaire is mainly targeted at young and middle-aged people (18-45 years old), which is in line with the Chinese demographic structure.

From the identity distribution of medical staff, there are 10 attending doctors (17.86%), 8 nursing positions (14.29%), and 38 other positions (67.86%).

In terms of geographic distribution, the sample data collected involve a total of 12 regions (Jiangxi, Guangxi, Henan, Gansu, Shandong, Guangdong, etc), with wide regions in the Middle East part of China.

2.2 Description of statistical analysis results

2.2.1 The aspects that have applied Internet technology in hospitals

The survey shows the staff in the hospitals indicating that there has been some use of Internet technology in their hospitals. The majority use of intelligent healthcare is the collection of relevant data within the hospital (76.11%), such as test results, medical records queries, and others. It suggests that most of the current intelligent healthcare programs focus on facilitating communication within the healthcare system.

The intelligent response rate in emergency resources allocation, remote surgery, and teaching is relatively small (5.80%, 7.85%, and 10.24% respectively), which indicates that intelligent medical technology is still less used in different hospital departments and medical

systems. It means that the system has taken shape but hasn't played a role in building an information bridge between different medical systems yet. In future development, while focusing on communication between hospitals and patients, we should also try to break down the barriers between hospitals, strengthen mutual sharing and recognition in different institutions and medical systems, and reduce duplicate expenditures.

2.2.2 The frequency of the following situations occurred during the consultation or reception

73.66% of respondents indicate that they had met duplicate examinations during cross-hospital consultations, 65.33% had met a low level of medical equipment, and 62.33% had encountered non-recognition of examination reports in different hospitals. Only a relatively small number of respondents (44.67%, and 56.66%, respectively) had met missing consultations due to losing examination reports and transfer to another hospital due to unsatisfactory hospital treatment. These two types of problems occurred occasionally. This suggests that problems related to the health care system, such as duplicate medical tests and non-recognition of test reports, are very common in the process of consultation and reception, while problems related to patients, such as loss of reports and unsatisfactory treatment, are less likely to occur. Smart healthcare focuses more on communication between patients and doctors at present. But the construction of mutual sharing and the recognition of medical and health information still need improving in the future.

2.2.3 The willingness to use the platform and some concerns

There is some divergence between healthcare and non-healthcare staff on the issue of the willingness to use the platform. Among respondents, the medical staff indicates their willingness to use the platform during consultation and reception. Moreover, 41 of them (73.21%) show a strong willingness in using the platform. As for non-medical staff, 4 respondents (1.64%) indicate their unwillingness, and only 136 of them (55.74%) have a strong willingness.

The results show that the willingness of medical staff is higher than non-medical workers. This may be due to the different understanding of smart healthcare between the general public and healthcare workers.

Regarding the concerns of the people who are willing to use the platform, 35.96% of the respondents are afraid of privacy leakage, 24.72% worry about the cost of using the platform, and 19.90% are worried the platform is cumbersome. From this, it can show that people are mainly concerned about privacy protection. Nowadays, the public is paying more attention to privacy protection. Therefore, we should focus on strengthening the protection of privacy, so as to reduce the leakage of privacy and safeguard the public's rights.

2.2.4 Perceptions of the benefits of smart healthcare

The respondents' views on the benefits of smart healthcare have a high response rate for convenience and time-saving (31.26%, and 27.54%, respectively); a lower response rate for safety and precision compared to convenience and time-saving(13.88%, and 16.83%, respectively); the lowest response rate of 10.49% for low cost.

In developing smart healthcare, the convenience and time-saving advantages of the Internet should be maintained, while strict privacy protection measures should be implemented, firewalls should be strengthened to further protect privacy, and pricing should be reasonable.

Survey responses that the public most hope that the platform can solve the redundancy process of cross-hospital consultation (13.05%), the problem of inconvenient carrying of paper reports (13.05%), and repeating examinations (12.81%). Therefore, when building the platform, it should not only consider data collection but also focus on data combination, analysis, and application, which will help to break down the information asymmetry barriers.

2.2.5 Personal health management

51.33% of the respondents take regular physical examinations, 22.33% irregularly take physical examinations, and 26.33% don't have the habit of physical examinations. Regarding living habits, 69% can maintain good ones, which can be further improved. The biggest reason for not maintaining good habits is the lack of execution, which is as high as 58.82%. And, taking regular physical examinations is significant in maintaining good habits ($p<0.05$). The proportion of those taking regular physical examinations with good living habits is 85.06%, which is significantly higher than the proportion of those irregularly taking physical examinations and those who seldom have physical examinations. 50.63% of those who don't take regular examinations can't maintain good habits, significantly higher than the average of 31.00%. This shows that people who take regular physical examinations may pay more attention to their physical conditions.

The CPC Central Committee and the State Council have proposed a plan to build a healthy China in 2035, in which the establishment of a health policy system and the enhancement of health maintenance capacity are mentioned. In the construction of the platform, it can timely remind users of regular physical examinations, detect and analyze users' physical data, and tailor health management solutions for users according to their physical conditions and living habits, which can promote the development and process of building a healthy China.

3 Conclusion

After collecting and analyzing data, the author makes the following conclusions regarding the feasibility and demand for Smart Healthcare Electronic Records.

(1) For healthcare staff, smart healthcare is currently highly popularized and well-accepted, providing good ground for popularizing the smart medical system. The next step can focus on strengthening the recognition of medical information in cross-hospital, which will improve the efficiency of diagnosis and treatment and save costs without repeated examinations. However, it is not recommended to directly use old records due to the intentional avoidance of duplicate tests. And it is still necessary to carry out re-examinations if needed, with the results in the platform used as a control for statistical purposes.

(2) For the general public, the results reflect that more than half of the people are willing to use smart records even worrying about

privacy protection. The concept of smart medical records has been recognized by most people and has the conditions for implementation.

In summary, the author believes that the platform of smart medical records currently has the demand for implementation, and putting it into use will give a more optimized experience. It is recommended to build the corresponding system along with a one-to-one personal account. Keeping accounts safe and genuinely serving the people is what people expect smart medical records to meet their needs.

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Fund Project: " Internet+ smart medical shared records based on the big data " of the 2022 Jiangxi University Student Innovation and Entrepreneurship Training Program. (202210421087)