"Internet Plus" home care management model for community elderly in China

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Abstract

Our country has long been facing a shortage of medical resources, and the contradiction between the demands of the people for a better life and the insufficient development of medical and nursing services is becoming increasingly prominent, especially with the growing aging population and the increasing demand for chronic disease management. The Internet hospital, online and offline cooperation, and other health management models are gradually becoming the development trend. However, the limitations of elderly people's use of "Internet Plus" technology may hinder their use of mobile healthcare. In this article, we discuss the "Internet Plus" home care management model for community-based elderly people. Through literature research and field surveys, we investigate the current status of community elderly care management and the application of "Internet Plus" home care management models. Applying the Delphi method, building on qualitative interviews and survey data, utilizing the ERG need theory framework, we selected 15 experts for two rounds of consultation to form the final draft of the "Internet Plus" home care management model for community elderly people. The results show that the health care problems of elderly people mainly include daily life care, health monitoring, and medication management. In the "Internet Plus" home care management model, the application of information technology such as remote monitoring, medical consultation, and intelligent devices has effectively improved the effectiveness and safety of community elderly care. We suggest strengthening the community elderly and their families' awareness and application of the "Internet Plus" home care management model, improving its effectiveness, and improving the quality and safety of community elderly people's home life.

Keywords: aged, family nursing, Internet Plus, Delphi method, home care management model

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1. Introduction

The aging population is becoming increasingly serious, it is estimated that by 2050, the proportion of people aged 60 and above will increase to 22% (DAI, 2021). The growing elderly population and the extended average life expectancy have led to an increasing burden of elderly care, imposing heavy burdens on individuals, families, and society, making elderly care an urgent social issue (ZHOU, 2022). At the same time, the development and application of Internet technology has provided new solutions for elderly care. Traditional home care management has problems such as opaque information, limited-service resources, and difficulty in meeting the individual needs of the elderly. Internet technology can achieve rapid information transmission and resource sharing, providing more convenient, efficient, and personalized care services.

Many successful elderly care service platforms both domestically and internationally are designed with the core concept of internet-based home care. The elderly care service market in Europe and America is relatively mature, with numerous enterprises launching products and services for "Internet Plus" home care management directed at the elderly. Asian countries such as Japan are actively promoting the application of "Internet Plus" home care management mode in elderly health management, achieving some success. International organizations, such as the United Nations, are also paying attention to the field of elderly care services and have released policies and guiding documents related to the "Internet Plus" home care management model. Currently, the "Internet Plus "elderly care management model for community elderly has received extensive attention and application in China. Some technology companies and leading elderly care institutions have begun to apply Internet technology to elderly care management, such as launching elderly monitoring devices, remote medical consultations, and online health management. In addition, some cities' governments are actively promoting the "Internet Plus "elderly care management model and building intelligent elderly care service centers in communities to provide more convenient and efficient care services for the elderly. Although the scale of "Internet Plus" elderly care in China is growing and has good development prospects, it also faces some problems. In February 2019, the National Health Commission issued a notice encouraging medical institutions to use Internet and other information technologies as platforms (GUO, 2023) to build nursing services that effectively connect "online reservation" with "offline services" and actively explore new nursing service models (NHC, 2019, 2022). At the same time, home caregivers, as the link between community medical personnel and elderly information transmission, can effectively assist community medical personnel in remote care management of the elderly (ZHANG, 2017).

The application of Internet technology can effectively solve the problems existing in the traditional home care management model, such as information asymmetry, insufficient service and resource, and difficulty in personnel management, improve the quality and efficiency of elderly care services, and facilitate precise management and service of home caregivers, while meeting the individual needs of the elderly. In addition, the elderly often has less social interaction and feel lonely, and the application of Internet technology can also provide a wider social platform, improve their quality of life and happiness. In conclusion, the "Internet Plus elderly care management model" for community elderly in China is an innovative way of life that integrates Internet technology into elderly care services in communities, providing more convenient, efficient, and personalized elderly care services.

1.1 Objectives of the study

This study explored on "Internet Plus" Home Care Management Model for Community Elderly in China. Specifically, this study identified the different services being offered to elderly people in the community to explore and research a new model suitable for home care of elderly people.

2. Theoretical framework

The ERG theory of needs, developed by American psychologist Clayton Alderfer based on Maslow's hierarchy of needs suggests that people's needs may not necessarily develop in the five-stage model of Maslow, but may overlap and alternate. For example, after fulfilling existence needs, a person may first pursue growth needs instead of relatedness needs. In addition, the ERG theory proposes that when one type of need cannot be fulfilled, people will shift their attention to other types of needs to satisfy themselves. The ERG theory of needs divides people's needs into three categories: existence needs, relatedness needs, and growth needs. Existence needs refer to a person's basic needs for breathing, food, water, and other material needs. People have a desire to fulfill these basic life needs, and if these needs are not met, they will be in a state of insecurity and unhappiness. Relatedness needs refer to people's need for belonging and interpersonal relationships. Different people have different social needs, but interaction between people is crucial for psychological health and happiness. Growth needs refer to a person's attempt to go beyond oneself and meet the demands of personal growth. These needs involve exploration of new ideas, learning skills and knowledge, and so on.

Figure 1. The ERG Theory of Needs Model

The theoretical framework of the ERG theory of needs suggests that people's needs can be categorized into three types. Fulfilling these needs can increase people's sense of happiness and satisfaction. Therefore, when constructing the "Internet Plus" home care management model, attention should be paid to the impact brought by different types of needs to meet the needs of elderly people in the community.
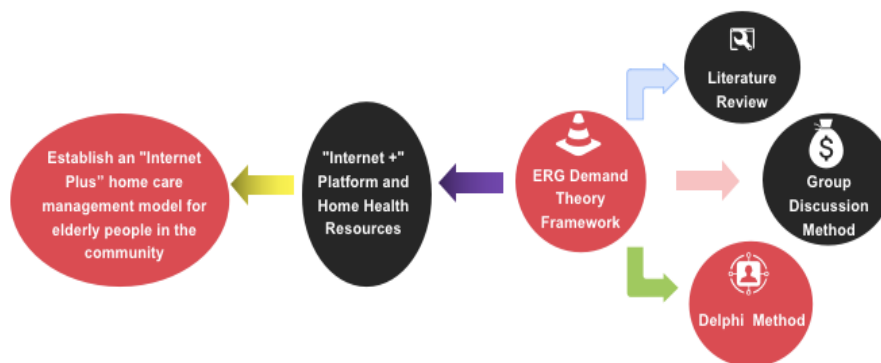

Figure 2. Conceptual Framework

3. Methods

Research Design - Mixed Method was use in this study. The aim of this study was to establish an "Internet Plus" home care management model for elderly people in the community by fully utilizing home health resources based on the "Internet Plus" platform and promoting the health of elderly people together. The research team was established, and a literature review was conducted. Expert consultation was conducted using the

Delphi method. Based on the ERG demand theory framework, 15 experts were selected and consulted twice through qualitative interviews and questionnaire surveys. The final version of the "Internet Plus" home care management model for elderly people in the community was developed.

Setting and Participants - Literature Review. Based on the ERG demand theory framework and relevant literature review of domestic and foreign "Internet Plus" home care management services, this study aimed to explore the willingness of elderly people in the community to use these services and their demand for them. The research team conducted induction, sorting, and summarize of the information on the current development status of "Internet Plus" home care management services and the construction and application of information platforms. They referred to related content on "Internet Plus" home care management services and initially established the community elderly "Internet Plus" home care management service module content indicators. Group Discussion Method. The research team consisted of nine members, including two professors, one director of nursing, and six master students of nursing. They held group meetings to discuss whether the content setting of the "Internet Plus" home care management services for community elderly was reasonable. They modified and improved the content to form the first formal expert consultation table. The research team was also responsible for developing the model, compiling expert consultation tables, establishing an expert database, and analyzing and summarizing data.

Delphi Method as follows: Inclusion criteria for experts. Experts in the fields of community care, geriatric care, general medicine, clinical nursing, and public health with rich theoretical knowledge and practical experience, familiar with the research area; Intermediate title or above; Work experience of more than 10 years; Bachelor's degree or above; Willingness to participate in two rounds of expert consultations. Exclusion criteria for experts. Experts who self-evaluated as "unfamiliar" or "very unfamiliar" with the research content in the consultation table; Researchers who choose to withdraw or do not participate during the consultation process. Number of experts: The selection and number of experts are important for improving the validity of the Delphi method (Lee, et. al., 2014). Some studies have shown that when the number of experts is close to 15, increasing the number of experts does not significantly improve the accuracy of the results, domestic scholars recommended that the number of Delphi expert consultations be between 10-50 people (Ping, 2003). Therefore, 15 experts were selected to construct the research plan.

Research Instruments - In order to obtain the required data from Chinese provinces among randomly selected 15 experts and a total of 122 community elderly residents, the researcher made a questionnaire as the main tool to collect information. Researcher used and reference books and other reference materials to construct the questionnaire items. In order to help the participants better understand the questions, prevent language barriers and avoid confusion, the questionnaire was used in both Chinese and English, and all were multiple-choice questions. The questionnaire was divided into two parts, with a total of 27 items. The first part is about the community general situation, community residents' demographic data survey, a total of 12 questions; The second part is about the community elderly residents of endowment service needs and demand that occupy the home on the Internet survey, a total of 15 questions by using LIKERT Scale response 4 points, respectively, specifies the very need 4 points, 3 points, 2 points do not need to remember, don't need to remember one point.

At the same time, after the questionnaire was drafted, the researcher submitted the questionnaire to the instructor and the college experts for opinions, suggestions and recommendations. After approval, researchers distributed the questionnaire to the target respondents and managed it accordingly. If necessary, corrections or modifications were made, and the feedback was included in the revision of the tool. Since then, researchers have to at least 122 people has carried out the pilot test, to determine the validity and reliability of the instrument, those who participate in the pilot test are excluded from the actual investigation. The researchers used Cronbach's Alpha to calculate and analyze the results to assess the reliability and feasibility questionnaires described above.

Data Gathering Procedures - The researcher collected relevant information and data from various books,

articles, journal critiques, electronic data, and other studies. Before distributing the questionnaire, the researcher submitted it to their supervisor for validation and approval. Subsequently, the researcher discussed with the medical director and the human resources department to obtain authorization to conduct the study. After finalizing the research tool, the research team conducted an electronic expert consultation, summarize, and analyze the expert opinions and suggestions received in the first round promptly and determine the content of the next round of expert consultation based on the results. After the second round of expert consultation, the experts' opinions were converged, and the consultation ended. The researcher then distributed the survey forms, recorded the responses, conducted statistical analysis, and wrote the relevant findings. During the research process, the researcher applied ethical considerations and obtained appropriate consent from the participants.

Data Analysis - To carefully summarize and analyze the responses of the respondents, the researchers acknowledged the use of different statistical tools to process the data. SPSS software was used for data analysis, frequency and composition ratios were used for counting data, and feasibility scores were used for quantitative data. The researcher utilized the following tools in interpreting and analyzing the gathered data. Frequency distribution is statistical analysis to determine the tally of respondents who answered for a certain item on the questionnaire. This assisted the researcher in determining the mean of each item on the questionnaire. Weighted Mean was applied to identify the average value of the answers of each participant on each item considering the weight for each answer. This provided the numerical significance of each item on the questionnaire. Ranking helped in identifying which items on the table are the lowest, highest, and which goes in the middle of those two. It was used for making it easier for researchers and readers of the study on determining which of the things on the list of questions is the most important. Mean aided in determining the value of the questions, which was included in surveys based on the number of respondents correspondingly to the parameters presented.

Ethical Considerations - The first step in conducting research was to obtain approval from the main researchers, community management, and the research ethics committee before issuing an informed consent form to the participants in order the researchers to collect their viewpoints. Participants were informed about the purpose of the study and had the option to withdraw if they did not wish to participate. All individuals involved in this study received official consent, and their anonymity and confidentiality were protected.

4. Results and discussion

Table 1 describes the characteristics of the participant profiles and summarizes the sample distribution for each variable. The proportion of males and females is about 54.1 percent and 45.9 percent, and this distribution can be used to understand the sex ratio of the respondents. From the age distribution, most of the respondents were between 60 and 69 years old, accounting for 64.8% of the total sample, and the distribution of other age groups was relatively small. From the distribution of gender and age, the percentage distribution of male and female elderly residents in different age groups can be calculated by comparing the proportion of men and women in different age groups.

The distribution of education level among the respondents can be seen: 45.1 percent had primary school or below education level, 42.6 percent had junior high school education level, 7.4 percent had senior high school or vocational school education level, and 4.9 percent had college or above education level. The relationship between education level and other variables could be explored. For example, it is possible to calculate the difference in the proportion of healthy versus unhealthy for different levels of education. According to the distribution of health status of the respondents, the proportion of healthy and unhealthy was 50 percent each. According to the monthly income distribution of the respondents, 23 percent of them had an income below 2000 yuan, 44.3 percent had an income between 2000 and 3000 yuan, 23.8 percent had an income between 3001-4000 yuan, and 9 percent had an income above 4000 yuan. The relationship between good health, income level and living conditions can be analyzed.

From the understanding of the "Internet Plus" family nursing management mode, 80.3% of the respondents

understood this mode, and 19.7 percent did not understand it. According to the proportion of respondents who were proficient in operating the currently developed smart products or operating systems, 75.4 percent were proficient in operation, and 24.6 percent were unskilled in operation. From the proportion of respondents who frequently participated in community organization activities for the elderly, it can be concluded that those who frequently participated accounted for 73 percent, and those who did not frequently participated accounted for 27 percent. According to the demand of the respondents for "Internet Plus" community home care model, 77.9 percent of them had a demand, and 22.1 percent had no demand.

Table 1

Percentage Distribution of the Respondents Profile

GENDER	Frequency	Percentage %
Male	66	54.1
Female	56	45.9
AGE		
60-69	79	64.8
70-79	29	23.8
80-89	12	9.8
90 ys old and above	2	1.6
EDUCATIONAL LEVEL		
Primary school or below	55	45.1
Junior high school	52	42.6
Vocational school or high school	9	7.4
College or above	6	4.9
HEALTH CONDITION		
Healthy	61	50.0
Unhealthy	61	50.0
MONTHLY INCOME		
Below 2000 yuan	28	23.0
2000-3000 yuan	54	44.3
3001-4000 yuan	29	23.8
Above 4000 yuan	11	9.0
LIVING CONDITION		
Living Alone	13	10.7
Living with children	60	49.2
Living with spouse	45	36.9
Other	4	3.3
Number of Children		
1	2	1.6
2	32	26.2
3	41	33.6
4	33	27.0
More than 4	14	11.5
Contact with Elderly Services provided by social organizations and companies		
Yes	88	72.1
Occasionally	19	15.6
No	15	12.3
Have you heard about the "Internet Plus" home care management model?		
Yes	98	80.3
No	24	19.7
Are you proficient in operating the currently developed intelligent products or operating systems		
Yes	92	75.4
No	30	24.6
Do you frequently participate in senior activities organized by the community?		
Yes	89	73.0
No	33	27.0
Do you have a demand for the "Internet Plus" community home care model?		
Yes	95	77.9
No	27	22.1

The statistical significance of Table 2 is to evaluate the importance and demand situation of different elderly services, and by calculating the mean and standard deviation of each service, the services can be ranked and interpreted. According to the data in Table 2, it can be concluded that "Intelligent Elderly Care Products and

Equipment Services" was rated as the most important service, with an average score of 2.9016. Said the service was considered essential by the respondents.

Table 2
Elderly Services

Services	Mean	Std. Dev	Rank	Interpretation
Intelligent Elderly Care Products and Equipment Services	2.9016	0.87585	1	*Necessary*
Home Care Call Service	2.8361	0.99885	9	*Necessary*
Housekeeping Call Service	2.8197	0.99600	10	*Necessary*
Shopping Call Service	2.8934	0.95179	2	*Necessary*
Online Consultation Service	2.8689	0.93553	4	*Necessary*
Offline Accompanied Medical Visit Service	2.8525	0.95062	8	*Necessary*
Cultural and Entertainment Activity Service	2.8115	0.93889	11	*Necessary*
Psychological Counseling Service	2.7623	1.01276	14	*Necessary*
SOS Emergency Phone Service	2.8607	0.95619	6	*Necessary*
Offline Medical Service	2.8607	0.96480	6	*Necessary*
Remote Medical Service	2.8852	1.00574	3	*Necessary*
Rehabilitation Treatment Service	2.7869	1.01419	13	*Necessary*
Electronic Health Record Service	2.8033	0.95033	12	*Necessary*
Healthcare Service	2.6967	0.96970	15	*Necessary*
Shared Information Service	2.8607	1.00672	6	*Necessary*
COMPOSITE MEAN	2.8934	0.75850		Necessary

Legend: 4.00-3.5 (Very Necessary), 3.49-2.5 (Necessary), 2.49-1.5 (Not Necessary) and 1.49-1.0 (Not Necessary at all)

"Shopping Call Service" and "Remote Medical Service" were also rated as very necessary services, with an average score of 2.8934 and 2.8852, respectively. Other services such as "Home Care Call Service" and "Housekeeping Call Service" were considered relatively important but scored slightly lower. The last few services such as "Psychological Counseling Service" and "Healthcare Service" received lower scores but were still considered necessary. These results show that respondents have a high demand for smart elderly care products and equipment services, shopping phone services, Remote Medical services, and other aspects, while the demand for psychological counseling services and medical services is relatively low. This information is instructive for agencies and organizations providing services for older people to allocate resources and improve services based on demand.

The qualitative interview method was used to interview five elderly people in the elderly community service center. Before the interview, the purpose and methods of the study were explained to the respondents, the consent of the respondents was obtained, and the respondents were clearly informed that they could withdraw from the interview or refuse to answer a question at any time. The interview data were only used for this study and personal privacy would be kept confidential. The interview found that the respondents were very supportive of the new family nursing management model, because compared with the traditional pension service model, the new pension model can not only improve the utilization of social resources and the efficiency of pension service, but also can add special service content, especially intelligent service.

The statistical significance of Table 3 is to assess whether differences in responses to geriatric services across demographic characteristics are significant. By calculating t/F and p values, it was possible to determine whether there were significant differences in the response to elderly services among different demographic characteristics. Based on the data in Table 3, it can be concluded that the difference in gender responses to elderly services is not significant, that is, respondents of different genders evaluate elderly services similarly. There were significant differences in the respondents' age, education level, living conditions, number of children, contact with geriatric services provided by social organizations and companies, understanding of the "Internet plus" home care management model, skilled operation of currently developed smart products or operating systems, and frequent participation in community organized activities for the elderly. Factors such as health status, monthly income, and the need for the "Internet plus" community home care model of the respondents did not significantly differ in terms of elderly service responses.

These results indicate that age, education level, living conditions, children number, contact social

organizations and companies to provide elderly services, understanding of the new nursing model and intelligent products and proficiency, and to participate in the activities of the community elderly frequency, etc., will have an effect on elderly service response. This information is important for designing and promoting strategies for elderly services, targeting services to specific populations, and ensuring the acceptability of services.

Table 3

Difference in Responses on Elderly Services When Grouped according to Demographics

Respondent's Profile	t/F-value	p-value	I
Gender	1.421	0.236	Not Significant
Age	3.423	0.020	Significant
Educational Level	4.089	0.008	Significant
Health Condition	0.127	0.722	Not Significant
Monthly Income	0.506	0.679	Not Significant
Living Condition	3.217	0.025	Significant
Number of Children	3.039	0.020	Significant
Contact with Elderly Services provided by social organizations and companies	4.084	0.019	Significant
Have you heard about the "Internet Plus" home care management model?	12.973	0.000	Significant
Are you proficient in operating the currently developed intelligent products or operating systems	7.799	0.006	Significant
Do you frequently participate in senior activities organized by the community?	5.385	0.022	Significant
Do you have a demand for the "Internet Plus" community home care model?	0.371	0.544	Not Significant

The management process of the new family nursing management model mainly included three processes. The inclusion of service objects and the formation of management teams, community management and stage evaluation. Firstly, a management team was established to manage the elderly patients and healthy people online and offline, led by family doctors and community nurses, with the cooperation of family caregivers. Secondly, the online management set up a port for community medical staff and a port for family caregivers, and the offline management set up two ports for community medical staff and family caregivers. Each of the four ports had corresponding contents to manage the elderly in the community. Finally, to the elderly health management, a comprehensive evaluation of the community corresponding health plan according to the results of the assessment, as shown in figure 3.

The Cronbach's Alpha coefficient of the total questionnaire in this study was 0.933. When Cronbach's Alpha coefficient is ≧0.7, the internal consistency of the questionnaire is good, that is, the questionnaire has passed the reliability test (WAN, 2014).

5. Conclusions and recommendations

After the first round of expert consultation, according to the opinions and suggestions of experts and the results of group discussion, thirteen new contents, five modified contents, two merged contents and three deleted contents were added, and forty-six items in five parts were finally determined. The detailed contents are shown in Table 5. After the second round of expert consultation, four secondary indicators were added according to expert opinions and suggestions after discussion: public health doctors, the purpose of establishing family caregivers, training methods of family caregivers, and assessment methods of family caregivers. Add the referral and follow-up in the 5.2 offline platform for the secondary indicator. The follow-up management in the second-level indicator 5.1 online platform was modified to appointment management; The health knowledge base in the online platform of level 2 indicator 5.1 was modified to the health knowledge base of elderly residents. After two rounds of expert consultation, the "Internet plus" home nursing management model for the elderly was finally formed, including five parts, including service objects, management team members, selection

and training content of family caregivers, implementation methods and management content, with a total of forty-six items.
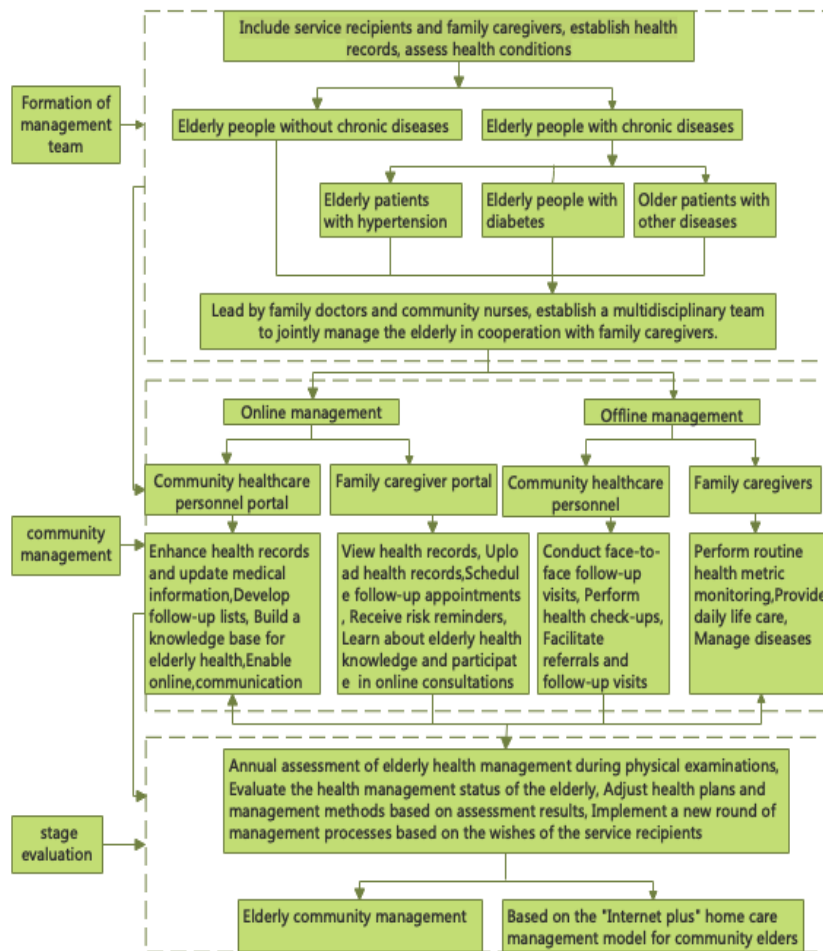

Figure 3. Management flow chart of "Internet plus" family nursing management model for the elderly

This research institute to build community "Internet plus" in the elderly home care management mode applies only to their own or with help from family to participate in the remote management of old people, for the empty nest and don't use the Internet platform of the elderly, unable to realize the remote management. For these people, local community health service institutions should carry out classification management according to the home care resources of the elderly, namely telenursing group, telenursing plus offline nursing group, and complete offline nursing group, to optimize the allocation of community health service resources and nursing human resources, so as to improve the coverage and satisfaction rate of basic public health services and community care for the elderly. In order for more community elderly people to understand and accept the "Internet Plus" home nursing management model, it is necessary to actively carry out publicity and promotion activities. Community newsletters, social media, and the Internet can be used to inform older people about the benefits and use of the model. Provide training and educational opportunities to help older people in the community become familiar with and master the skills needed to use the "Internet plus" home care management model. Training sessions, seminars or online educational resources can be offered to enable older people to learn and increase their use of the model. To ensure that the elderly in the community can use the "Internet plus" home care management mode smoothly, to provide the necessary technical support and network connection. Dedicated technical support teams can be established to solve problems during use for older adults and ensure that they have a stable and reliable Internet connection. According to the special needs and habits of the elderly, the user

interface is designed to be simple, intuitive, easy to operate and adaptable. To ensure that the interface layout is clear, the font size is appropriate, and to provide simple and clear operation guidance, so as to improve the satisfaction of the elderly with the use of "Internet plus" home care management mode. When promoting and using the "Internet plus" home care management model, data security and privacy protection measures should be strengthened. Ensure that personal information and care data used by older people are protected and comply with relevant privacy policies, laws and regulations.

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