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# Research on the Application Status of Intelligent Medical Visit Companion Services in Older Patients

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***Abstract:*** In the world, the trend of population aging is becoming more and more obvious, leading to the increasing demand of the older people population in medical services, and the traditional medical visit companion services can no longer meet the diversified and complex needs of the older people groups. Using advanced technologies such as artificial intelligence, the Internet of Things and robotics, the intelligent medical visit companion services brings customized health management, full consultation and medical guidance services to older people patients, with the aim of optimizing their medical experience and living standards. This paper deeply discusses the basic concept, development and application mode of intelligent medical visit companion services, and analyzes the personalized medical visit companion services mode for the older people, the technology-guided medical visit companion services mode and the integration of medical and medical visit companion services. At the same time, it also discusses the difficulties encountered in the technical applicability and data confidentiality of the intelligent medical visit companion services, and puts forward some strategies for optimization. In the context of the increasingly severe aging population, intelligent medical visit companion services will play an increasingly critical role, especially in reducing the tension of medical resources, improving the quality of medical care and life of the older people show a huge space for development.

***Keywords:*** *Intelligent medical visit companion services; An aging society; Personalized service; Older patients; Medical integration*

## 1. Preface

With the continuous increase in the proportion of the global older population, older patients have become a common group in medical institutions. This group often suffers from various chronic diseases, and even multiple chronic conditions, leading to the need for older patients to frequently visit hospitals for treatment [1]. During the treatment process, older patients always face challenges including medication management, health monitoring, and communication with doctors [2]. However, the traditional medical visit companion model often seems inadequate in meeting these diverse and complex medical needs, especially in the context of a shortage of medical resources and insufficient care capabilities of family members [3]. The traditional medical visit companion service mainly relies on human assistance, which not only fails to achieve real-time health monitoring and medical consultation, but also often cannot handle sudden health problems or sudden increases in medical needs of patients.

Facing the shortcomings of the traditional medical visit companion service in dealing with the diverse needs of older patients, the intelligent medical visit companion service integrates advanced artificial intelligence, Internet of Things, and robot technologies to provide older patients with comprehensive medical visit companion, health condition monitoring, and medical guidance services, thus optimizing the medical treatment process and quality of life of older patients. With the continuous improvement of technological levels, the intelligent medical visit companion service is playing an increasingly crucial role in addressing the global aging trend [4]. In the future, with the continuous progress of 5G communication technology and intelligent medical devices, the intelligent medical visit companion service is expected to be more widely promoted, and thus more effectively adapt to the needs of the global aging society.

At present, with the continuous development of intelligent medical visit companion technology, its application models have also shown rich and diverse changes. At this stage, there are mainly several service models such as robot - based medical visit companion, intelligent voice assistants, and health

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monitoring platforms [5]. These service models each have their own characteristics, but at the same time, they inevitably face numerous tests such as the difficulty of technical implementation, user adaptation, and personal privacy protection [6]. At present, there are a certain number of applications of intelligent medical visit companion services among older patients. A review of various application forms of intelligent medical visit companion services, their advantages and the dilemmas they face plays a crucial role in promoting the development and widespread use of this field. It is expected to provide valuable references for future technological innovation and policy formulation.

## 2. The concept of intelligent medical visit companion services

### *2.1. Definition and characteristics of intelligent medical visit companion services*

Intelligent medical visit companion services is based on modern technologies such as artificial intelligence, Internet of Things, robotics, and big data, tailored for older people patients, patients with mobility difficulties, and groups with special care needs[7]. The service model is dedicated to providing customized whole-process consultation, health management and medical assistance. The core purpose is to use intelligent equipment and platforms to improve and complement traditional medical visit companion services, thereby enhancing the patient experience.

The core advantages of the intelligent escort system are reflected in the following aspects: ① Customized health plan: according to the patient's personal health information (including medical history and daily living habits) and real-time physiological indicators monitoring (such as heart rate, blood pressure and other data), the intelligent escort system can provide patients with exclusive health guidance and medical care. ②All-weather companionship and support: regardless of whether the patient is treated in the hospital or recuperating at home, the intelligent companion system can achieve all-weather companionship and medical assistance, effectively reducing the loneliness and anxiety of patients. ③Highly intelligent interactive experience: Using advanced technologies such as speech recognition and natural language processing, the intelligent escort system can communicate smoothly with patients and provide professional medical consultation and detailed disease introduction [8].④Dynamic health monitoring and immediate feedback: The system monitors the patient's health status in real time by connecting smart wearable devices (such as health monitoring bracelets, smart clocks, etc.), and can quickly inform the doctor or the patient's family of the monitoring results.

### *2.2. Different types of intelligent medical visit companion services*

#### *2.2.1. Remote diagnosis*

Through video communication and telemedicine systems, online consultation allows patients to communicate with their doctors, relatives or companions in real time. This service is especially suitable for patients with limited mobility and older people living in remote areas, bringing them convenient and quick consultation and health management assistance.

#### *2.2.2. Virtual consultation*

With the help of intelligent voice assistant and virtual reality technology, we can provide patients with accompanying consultation, information inquiry and medical consultation services. Through voice interaction assistants, artificial intelligence dialogue robots and other means to communicate with patients, to achieve comprehensive emotional companionship and health guidance.

#### *2.2.3. Physical consultation*

Physical medical visit companion services provide physical companionship and related services to patients through intelligent robots and automated devices[9]. For example, escort robots can walk with patients, remind them to take medications, and help with examinations. These robots not only improve service efficiency, but can also respond quickly in emergency situations.

## 3. Application mode of intelligent medical visit companion services

### *3.1. Personalized escort mode for older people patients*

A personalized consultation service program tailored for older people patients, which aims to provide exclusive consultation support for each older people person according to their health status,

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treatment requirements, daily behavior patterns and mental conditions[10]. The key of this program is to improve the methods and details of medical visit companion service by using information collection and in-depth analysis, so as to ensure that older people patients can not only receive necessary medical help in time, but also enjoy spiritual comfort and improve the quality of life during the medical treatment process. In this model, a variety of means are used to collect the patient's physical indicators (such as blood pressure, blood sugar, body temperature, etc.), and this information is combined with the patient's historical medical history, daily behavior patterns, and psychological status to create a dedicated consultation plan[11]. For example, if a patient is facing high blood pressure symptoms and mood swings at the same time, the system will correspondingly increase the frequency of drug use prompts and emotional care services to ensure that the patient's health status is fully monitored during treatment. At the same time, the system will automatically adjust the escort method according to the patient's preference. For virtual patients, the system will provide remote consultation services[12]; For patients who need face-to-face consultation, the system will assign a professional to accompany them on-site. These services will be adjusted in real time based on the latest health information of patients to ensure the adaptability and effectiveness of services.

The personalized medical visit companion services model includes health monitoring, drug reminder, emotional care, and choice of escort mode. The implementation details of these services are tailored to the patient's actual health status, individual needs and individual preferences. The implementation contents of the personalized medical visit companion services model are shown in Table 1.

*Table 1 Implementation contents of personalized Medical Visit Companion services model*

| Service content | Implementation mode | Applicable object | remark |
|---|---|---|---|
| Health monitoring | Collect health data such as blood pressure, blood sugar and body temperature regularly | Patients with chronic diseases such as hypertension and diabetes | Data is automatically updated to reflect the patient's health status in real time |
| Drug reminder and management | Provide medication reminder and medication time tracking | Patients with long-term medication needs | Adjust the frequency of reminders according to the patient's health status and preferences |
| Emotional care | Provide emotional comfort services, such as regular care phone calls or text messages, video calls, etc | Older people patients with large mood swings | Support is provided according to the patient's mental health status |
| The way of accompanying patients matched | Remote consultation, virtual consultation or manual consultation | Patients who prefer remote consultation or who are unable to accept manual consultation | Automatic matching of escort modes according to patient preferences enhances personalized experience |
| Personalized treatment plan design | Tailor treatment based on health data and historical medical records | All older people patients | Each patient can have their own medical support and accompanying plan |

Through personalized service strategies, the system can optimize the consultation arrangement in real time to ensure that older people patients always receive efficient and comprehensive care during the diagnosis and treatment process. This model not only helps patients to improve the efficacy, but also can ease the emotional burden of patients, and improve the happiness index and psychological security of older people patients.

### *3.2. Technology-driven medical visit companion services model*

The technology-driven medical visit companion services model relies on modern technologies such as artificial intelligence (AI), Internet of Things (IoT) and robotics, and the new system of medical visit companion services built realizes the automation and precision improvement of escort work with the help of intelligent devices and data analysis methods. The key point of this system is to use scientific and technological innovation to improve the efficiency and quality of medical visit companion services, so as to ensure that older people patients receive fast and thoughtful care and satisfaction in treatment and daily life.

Under this technology-assisted medical visit companion services model, the AI program can conduct in-depth analysis of the patient's health information and behavior habits, and then update the service content and method in real time. For example, smart devices can track the vital signs of the older people (such as heart rate, blood sugar level, blood pressure and other indicators) in real time, and

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integrate living environment data with medical records to carry out comprehensive data analysis, so as to predict potential health risks, and immediately start an early warning or reminder mechanism once abnormalities are found[13].

Using the advanced technology of the Internet of Things and relying on sensors and smart devices, the system can monitor the patient's health status in real time and quickly synchronize the data to the cloud for in-depth analysis[14]. For example, once an irregular heartbeat is detected in a patient, an intelligent algorithm can assess a potential health hazard and then order an intelligent robot to perform an emergency rescue or communicate with a physician through a telemedicine system[15]. This service model not only improves the intelligence and automation of the medical visit companion services, but also quickly captures the fluctuations of the patient's health status, providing a more secure and comfortable experience for older people patients during treatment.

### *3.3. The combination of comprehensive medical service and medical visit companion services*

The combination model of comprehensive medical service and medical visit companion services is committed to creating a three-dimensional and diversified service structure. This model not only focuses on the needs of patients to accompany patients, but also deepens the linkage between medical and medical visit companion services, and promotes the efficient operation of medical processes and the comprehensive coverage of patient care through information sharing and resource integration [16]. Under this model, patients enjoy the integrated service of consultation and medical treatment, forming a more coherent and thorough medical experience [17]. This is especially for the older people and patients with chronic diseases, greatly improving the effectiveness of treatment and quality of life.The combination mode of comprehensive medical service and accompanying consultation service is shown in Figure 1.

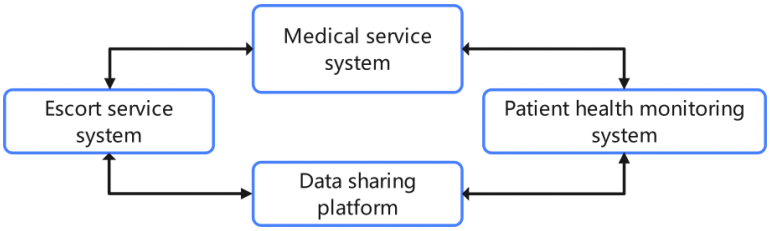


*Figure 1 Integration Model of Comprehensive Medical Services and Companion Services*

As shown in Figure 1, the new service model that integrates comprehensive medical treatment and accompanying consultation achieves synergies through the following core links: Medical service system: covers the diagnosis and treatment of patients, plan formulation and treatment process. Medical visit companion services system: According to the treatment needs and emotional conditions of patients, to carry out escort, emotional care and health care. Data Sharing Platform: Ensure the smooth exchange of information between medical services and Medical Visit Companion services, enabling real-time updates of patient health information[18]. Patient Health Monitoring System: Utilizes sensors and smart devices to continuously monitor patients' health conditions and transmit real-time data to both medical and Medical Visit Companion service terminals.

In this model, the medical and escort teams obtain a consistent data presentation through the information exchange platform, and can update the patient's treatment and care plan in real time. Once the patient's health data fluctuates, the consultation system can intelligently adjust the service strategy (such as the frequency of consultation, medication tips, etc.) according to the data changes, so as to ensure that the health management of patients during treatment and recovery gets continuous attention.

## 4. Challenges and optimization strategies of intelligent medical visit companion services

### *4.1. Challenges faced by intelligent medical visit companion services*

#### *4.1.1. Technical challenges*

The key of intelligent medical visit companion services lies in the advanced technology and confidentiality. However, the biggest technical problem is data security and privacy protection. The intelligent diagnosis system deals with the health data of many older people people, and if the information is unfortunately leaked or improperly used, it will bring great risks to the personal privacy

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and life safety of patients[19]. At the same time, for older people people who are not familiar with high-tech products, the operation of intelligent diagnostic equipment is often too complicated and difficult to quickly get started. Problems such as complex interface design and cumbersome operation steps will make older people patients feel confused or even resistant in the application process, which will affect the efficiency and promotion of services.

#### *4.1.2. Changes in acceptability and needs of older people groups*

Due to the gap in cultural heritage and educational resources between regions, the attitudes of older people groups towards the application of intelligent technology show obvious differences. Especially in areas with blocked traffic, older people have a relatively poor understanding of intelligent accompanied medical treatment[20], and the difficulty of promoting technology further amplifies this phenomenon. In addition, the adaptability of the older people group to the new technology is relatively weak, a large number of older people patients feel unfamiliar with the intelligent escort system, and some even have resistance. Psychological barriers and lack of trust also deepen the older people patients' resistance to the service, thus restricting the wide application of intelligent escort system. The older people population is more accustomed to the traditional medical model and has a strong resistance to technology-centered services, which makes it difficult for the older people population to fully accept the intelligent escort system as a substitute for medical treatment.

### *4.2. Optimization strategy of intelligent medical visit companion services*

#### *4.2.1. Optimization strategy at the technical level*

First, develop an age-appropriate intelligent diagnosis platform. The interface of the platform should be concise and clear to avoid complex operation processes. The screen display should adopt large font size, clear ICONS and high contrast color matching to facilitate the identification and operation of older people patients[21]. At the same time, in order to enhance ease of use, the system can be embedded with voice recognition technology, so that patients can complete operations through voice commands, such as booking appointments and inquiring doctor information. This not only reduces the older people's dependence on text input, but also improves the older people's affinity for the system. Voice recognition technology can use the existing voice assistant API access to ensure the accurate recognition of voice commands[22]. In addition, the operation process of the platform should be simplified as much as possible, with core functions placed in a prominent position to help older people patients quickly grasp the use of the method.

Second, strengthen data security and privacy protection measures to ensure the security of older people patients' health data during transmission and storage. Implement a high level of encryption (such as AES encryption algorithm) for all collected health data to prevent information leakage or illegal tampering[23]. At the same time, anonymisation technology is applied to ensure that no information that can identify patients is disclosed in the process of data storage and analysis[24]. Older people should have informed consent and control over the use of their information, and platforms should provide privacy Settings that enable them to access, update or remove their personal health records at any time. [20] Such measures help to increase users' trust in the platform, while ensuring that the privacy rights of the older people are respected and upheld to the maximum extent possible[25].

#### *4.2.2. Optimization strategies to enhance the acceptability of older people groups*

First, develop digital technology training programs. In view of the needs of the older people for intelligent medical visit companion services, it is necessary to periodically hold "digital skills training courses for the older people" without changing the living environment, such as community centers, medical institutions, and apartments for the older people [26]. These training sessions will be conducted by professionals or enthusiastic volunteers and will cover practical content such as how to operate smart devices, the use of voice commands, and how to make service appointments and inquiries. During the training sessions, the older people will be provided with smart devices that are easy to operate (such as touch screens, voice assistants, etc.), and will be coached to operate the devices through voice commands or simple touches[27]. In the teaching process, we should try to use easy to understand language, reduce the use of professional terms, and give clear and detailed step guidance in operation demonstration, to ensure that every student can operate and master key skills. [22] After the completion of the training, in order to solve the problems and confusion that the older people may encounter, a dedicated technical support hotline and online counseling platform should also be provided to ensure that the older people can smoothly use the intelligent medical visit companion services in daily life[28].

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Second, the family and friends to accompany the model. in order to enhance the sense of identity of the older people group to the intelligent medical visit companion services, it is possible to launch a collaborative escort model of relatives and friends. Through the specially developed family side application, the relatives of the older people can grasp the patient's companion status and health status at any time[29]. Through this program, relatives can understand the patient's health indicators, doctor's advice information, visit plans and other information, and provide advice and comfort at the remote end[30]. Operationally, relatives need to be registered in the program and tied to the patient account, and then can access the corresponding information under rights management. In addition, relatives can also use the video call function to communicate with patients in real time, giving the older people the necessary emotional support. Especially when patients feel uneasy or confused, relatives can quickly give psychological comfort, reducing the dependence and anxiety of patients on unfamiliar escorts [31]. This joint consultation model not only increases patients' sense of peace of mind, but also improves relatives' trust and participation in the consultation service[32].

## 5. Prospect

### *5.1. Future prospects of intelligent medical visit companion services*

In the face of the accelerating aging of the global population, intelligent medical visit companion services are expected to play a key role in the future to meet the needs of the older people population for medical services. In the future, with the continuous progress of 5G, artificial intelligence, Internet of Things, robots and other technologies, intelligent medical visit companion services will show a higher efficiency, more customized and more integrated service model[33]. At the technical level, the wide application of 5G communication technology will promote the realization of instant data exchange and remote communication in intelligent medical visit companion services, and greatly improve the response time and service quality of services. Intelligent algorithms will further accurately optimize the health management of patients, and use deep learning and data analysis technology to customize more intimate health monitoring and recommendations for older people patients.

With the continuous innovation of robot technology, the physical nature of medical visit companion services will also usher in a leap forward development. In the daily life of older people patients, intelligent robots will take on more critical tasks and be able to provide diversified services including physical examinations, health status monitoring and daily consultations. With the continuous evolution of big data technology, the intelligent diagnosis system will be able to gather multi-party medical and health information, so as to output more accurate health assessment and treatment recommendations [34]. In the future, intelligent medical visit companion services will not be limited to simple escort function, but also expand to chronic disease management and disease prevention, so as to improve the quality of life of the older people population and effectively alleviate the burden of the medical system.

### *5.2. Future research direction*

First, the combination of artificial intelligence and big data. In this field, researchers will be committed to using advanced deep learning methods to analyze data for the health status of older people groups, and then create more personalized health management programs and prediction algorithms, aiming to improve the pertinancy of services. Second, the optimization of human-computer interaction will focus on optimizing the human-computer interaction interface, especially the deepening application of speech recognition and sentiment analysis technology, with the aim of enhancing the user friendliness of the intelligent escort system[35]. With the help of natural language processing technology, the communication experience between the older people users and the system is improved, and the difficulty of technical operation is reduced[36]. Third, privacy protection and ethical issues. In the context of the increasingly extensive application of big data, how to protect user privacy will be the core issue of research. Future research will involve finding a balance between technological innovation and privacy protection, ensuring the security of older people users' data through encryption and depersonalization, and strengthening regulations to regulate the use of data. Fourth, the study of social acceptance. The study will also focus on the older people's acceptance of intelligent medical visit companion services, analyze how cultural differences, education levels, economic conditions and other factors affect the older people's intention to use, so as to promote the extensive promotion of intelligent medical visit companion services in society.

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## 6. Conclusion

As an innovative solution to the challenges of an aging society, intelligent medical visit companion services have shown great potential in improving the medical experience and quality of life of older people patients. The service integrates artificial intelligence, Internet of Things and robotics to create customized health monitoring, emotional comfort and medical guidance for older people patients to meet their complex and varied needs. However, issues such as the applicability of the technology and the security of personal data remain difficult to promote. In the future, with the continuous improvement of the technical level, intelligent consultation is expected to play a greater role in reducing the pressure on medical resources, improving the efficiency of medical services and optimizing the health management of the older people. To achieve this goal, we must further promote technological innovation, improve the policy system, and enhance the identity of the older people population to the service.

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