



# Study of Home Care System Based on Community Resources

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## Abstract

Population aging is an objective trend of current social development and a problem that most countries generally face, meanwhile it is also a major issue that China must face and solve in its modernization. Under the background of the implementation of the national strategy to actively respond to the population aging during the “14th Five-Year Plan” period, the policy measures are accurate, and the management services are refined, and continuously meet the omnidirectional, multi-level and specific needs of the elderly. Model research has become one of the focus studies of sustainable social development. Combined with the reform of the home-based care model in the Wuhan Jinyinhu community, this paper discussed the construction of a physiological item monitoring service, as one part of the home care system is constructed based on community resources. The research methods mainly adopt the methods of investigation, tracking, interview and observation, etc., to scientifically and systematically evaluate the user itinerary, characteristics and advantages of home-based care for the aged, and to explore and analyze the pain points of community home-based care for the aged. Conclusion the elderly pay more and more attention to their physical and mental health by using qualitative research to analyze their needs, and their individual needs are quite different; More effective and rational allocation of community resources; Improve the service level of community home care. Enhance the importance and user experience of the elderly to the community home care service system. This study provided a reference basis for the development of community home care services for the elderly in Wuhan, and also offered an inspiration for the follow-up theoretical research on the service needs of the elderly.

**Keywords:** *Community; Home care for the aged; Service Design; Aging*

## 1. Introduction

The problem of population aging in modern society has gradually become prominent. By the end of the 20th century, the total number of elderly people in my country has ranked first in the world, and many provinces and cities across the country have become population-oriented areas [1]. According to the National Bureau of Statistics of China's the Seventh National Census Bulletin (No. 5) of the National Bureau of Statistics of China, the aged 60 and above accounted for 18.7%, and the aged 65 and above accounted for 13.5%. Compared with the Sixth National Census in 2010, the proportion of the aged 60 and above has increased by 5.44%, and the proportion of the aged 65 and above has

increased by 4.63%[2]. Under the background of the implementation of the national strategy to actively respond to the aging of the population during the “14th Five-Year Plan” period, the policy measures are accurate, and the management services are refined to continuously meet the omnidirectional, multi-level, and specific needs of the elderly.

In 2019, the elderly population of China over the age of 65 accounted for 12.6%. According to the World Population Prospects 2019 issued by United Nations, by 2030, the proportion of 65-year-old in China will increase by 16.9%, and by 2050 it will reach 26.1%, approaching Japan's current aging level. [3]

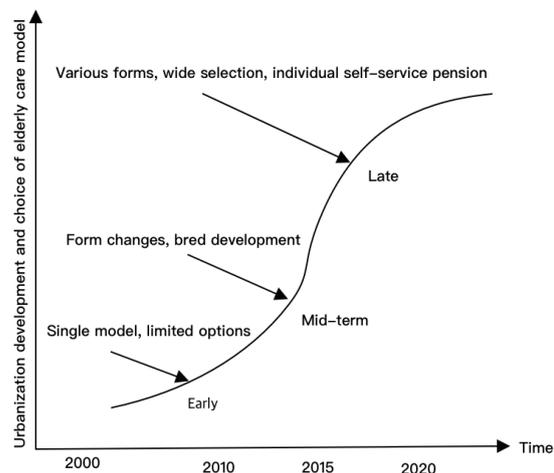
According to market research and analysis, there are currently three main models for elderly care in China,

one is home care, the second is community care, and the third is nursing home care. In the future, more than 90% of the elderly in China will adopt the home care model. The vast home care service market will surely give birth to the development of the elderly care industry.

He Wenjong [4] (2009), Xi Heng, and Qu Shaoguo [5] (2014), given the defects and reasons of China's current social pension security system, proposed to build a fairer and more sustainable social pension security system. Fujita Katsura [6] (2000) made a comparative study of the social security of the elderly between China and Japan from the perspective of the endowment insurance system and medical insurance system. Ding Shaoqun and Wang Xin [7] (2012) studied the reform of the rural sustainable old-age security system. Cao Yuling [8] (2011) completed a systematic analysis of the evolution of China's elderly care service models and proposed the concept of building a "moderately inclusive" urban elderly care service system. Tian Yijiao [9] (2013) studied community elderly care services through the practices experiences in developed countries such as the United Kingdom, the United States, Japan, and other European countries.

## 2. Physiological monitoring of home care

The development of urbanization and the tight supply of resources have aggravated the pressure on social pensions, causing social pensions to become more serious. The current urban old-age care model mainly focuses on institutional, home-based, and community-based elderly care, and most of them are aid and restrictive types. The quality and level of services are far from social elderly care [10], the society urgently needs a more advanced type. An innovative elderly care model that is open, flexible, meets various elderly care service needs, and is sustainable and circular to adapt to the mature urban elderly care in the future. Figure 1 shows the S-curve diagram of the urbanization process and the choice of the social pension model. The primary pension model is single, and the choices are limited; the middle and late stages have various options and a wide range of options, reflecting the individual self-service pension mode.



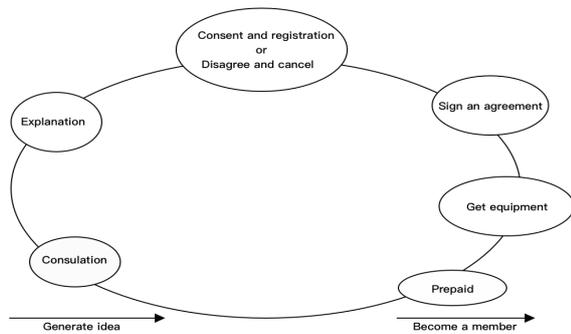
**Figure 1** Urbanization process and choice of social pension model S-curve

Home-based care is an old-age care model with the family as the mainstay and community service as the supplement. In terms of service content, it mainly provides life care for the elderly, medical health, and spiritual care in the family scene, and the allocation of community resources in the home care is significant. The diversification of community resource allocation, with government departments, social organizations, enterprises, and volunteers in social activities and the full support of human and financial resources, provides resource guarantee for community elderly care services.

This paper combines the daily monitoring itinerary of the physiological items of the elderly to reflect the home care service model. The mortality rate of cardiovascular disease in the elderly is much higher than that of cancer. In China, more than 1 million older adults die every year due to sudden cardiovascular diseases, and lack of timely treatment is the main reason. The elderly often panic when they encounter sudden illnesses without accompanying them. For this reason, the system designs manage and maintains the classified information of various physiological items (such as heart rate, blood pressure, step counting, sleep quality, and others) for the registered elderly at home. The information transmission help platform can immediately notify the nearby grid staff to go to the elder's home for assistance. At the same time, the guardian can also receive the answer from the elderly through the smart health bracelet for the first time. Thus, the elderly can be safe, and their children can work with peace of mind. Also, it is convenient for government management.

### 2.1. Physiological item user journey map

The user's journey map must be first established to build a daily monitoring service for the elder's physiological items, as shown in Figure 2.



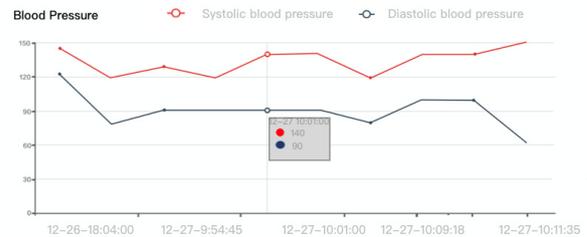
**Figure 2** Daily monitoring of elderly physiological items user journey

At first, the registered community elders and their guardians will consult the community service providers and community grid members about related physiological services, then the service provider issues publicity materials and explains the service items and operation procedures in detail. If the elderly agree to participate in the daily monitoring service of physiological items, they should sign a service agreement. The service party will provide smart health bracelets and other equipment, test equipment, explain the operation steps, pre-pay completed by the elderly, and become a daily monitored member of the physiological items simultaneously. The system will register to submit information. If the elder does not agree to join it, the service will be canceled.

## 2.2. Physiological item monitoring system construction

### (1) Blood pressure monitoring

Blood pressure is a critical physiological index for the elderly. Many diseases are related to abnormal blood pressure, leading to fatal diseases such as stroke and coma. For the elderly who become members of the daily monitoring of physiological items, the community service provider will focus on inputting the blood pressure data measured by the elderly, or upload the blood pressure data from time to time through the intelligent bracelet device, and use the smart device to actively monitor the blood pressure changes of the elderly to generate blood pressure monitoring report. If the blood pressure is abnormal, the system will remind the abnormality, distributed to the grid staff and the elderly guardians through the intelligent bracelet device. The grid staff could provide door-to-door assistance when necessary, and the elderly guardians can also make requests to the community service providers. The system can provide inquiry service on the disease history of the elderly, which also ensures that the elderly can receive timely assistance. The blood pressure monitoring data curve of the elderly is shown in Figure 3.



**Figure 3** Curve of blood pressure monitoring data for the elderly

### (2) Heart rate monitoring

Heart rate is a significant physiological indicator like blood pressure. The heart function of the elderly is generally weak. Some older adults have coronary heart disease, some of them have even undergone heart surgery, such as heart bypass surgery, and other older adults suffer from cardiac arrest, which causes brain hypoxia and coma. If there is no one around, it will be a dangerous situation. For this reason, the system has set up the registered elderly as the daily monitored members of the physiological items. The community service providers centrally enter the heart rate data measured by the elderly, upload the heart rate data from time to time through the intelligent bracelet device, and use the smart device to monitor the heart rate of the elderly. According to the activity monitor changes, then heart rate monitoring reports could be generated. If abnormalities are detected, the reminder information will be distributed to grid staff and elderly guardians through smart devices to ensure that the elderly can receive timely assistance. The heart rate monitoring data curve of the elderly is shown in Figure 4.



**Figure 4** Curve of heart rate monitoring data curve for the elderly

## 3. Research case analysis

The system studied in this paper has been put into commercial application in the Wuhan Jinyinhu community. The community belongs to Dongxihu District, Wuhan in Hubei Province, which consists of 10 communities. The Jinyin Lake in the community is an ecological integration of development, tourism, and ecological protection. It has beautiful natural scenery, attractive human geography, and good infrastructure and closely relies on Wuhan, forming a corner of the East Lake New Technology Development Zone and the Wuhan Economic and Technological Development

Zone. More than 200,000 residents in the community, of whom nearly 25,000 are over 65 years old. At present, the system has been in operation for nearly two years, and the number of registered home-based older adults is nearly ten thousand. The system sends one piece of monitoring data every 10 seconds from 7:00 in the morning to 8:00 in the evening. An elderly user has

4,680 items in a day, and 1,000 people total 4.68 million items. Among them, 20% of the data is the physiological data of blood pressure and heart rate. There are about 936,000 pieces of physiological data, and approximately 680 million pieces of physiological data have been collected in two years. Figure 5 Example analysis.

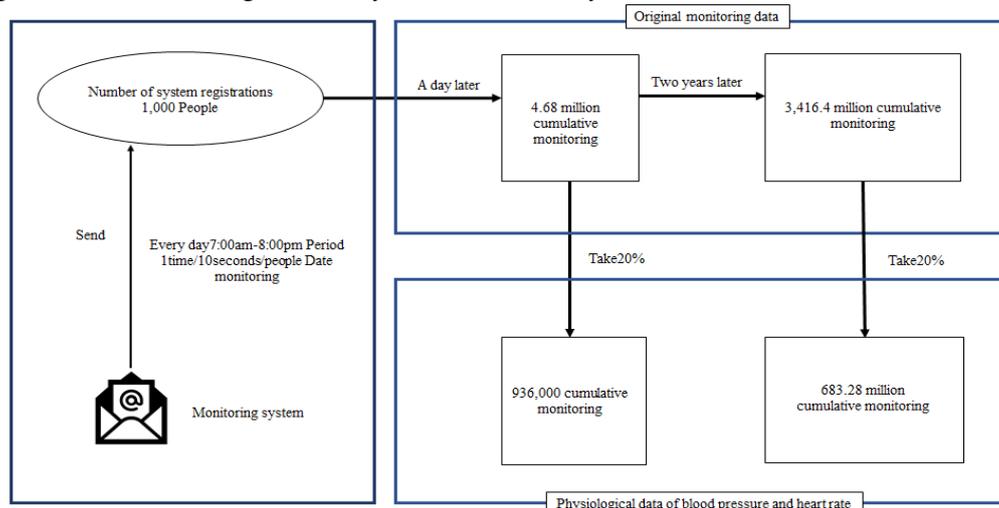


Figure 5 Example analysis.

Through the daily uninterrupted monitoring of the physiological items of the registered elderly, the advantages of the system are as following, first, the heart rate, blood pressure and other physiological signs of the elderly could be daily unattended automatic monitoring; second, this system is connected with the community service network to achieve information storage and transmission; third, the system provides a caring service; fourth, as the back-end data of the system has increased greatly, the analysis result is closer to the reality; finally, a stable communication channel between the elderly and the service party has been established.

#### 4. Conclusion

As one of the home care systems based on community resources, this paper discussed the construction and design of a physiological monitoring system for the elderly. The study adopted user journey maps, everyday physiological items of blood pressure, and heart rate monitoring service design, combining with the commercial applications in the Wuhan Jinyinhu community. It derived a practical construction based on community resources and the needs of the elderly's home care service system, realized the monitoring of blood pressure and heart rate of the elderly, and personalized emergency services optimized the home care service experience of the elderly, and provided a practical reference for the elderly care model.

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