Social Medicine and Health Management (2024)
Clausius Scientific Press, Canada

DOI: 10.23977/socmhm.2024.050218
ISSN 2616-2210 Vol. 5 Num. 2

# *Research on the use status and strategy of smart wear in rural "silver hair" group*

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***Keywords:*** Smart wearables; elderly health; "silver-haired" demographic

***Abstract:*** Smart wearable devices are more and more widely used in the field of health management. The rural elderly have become the most prominent group in need of health management, and their health problems will become an increasingly serious social problem. Through semi-structured interviews and selected elderly people under different economic conditions for interviews and records. The study found that despite the significant advantages of smart wearable devices, the penetration rate in rural areas is still low, mainly limited by factors such as economic conditions, technology acceptance, device ease of use and information privacy concerns. Based on this, the author puts forward policy recommendations to further promote the application of smart wearable devices in rural "silver hair" groups, and calls for multi-party cooperation to jointly build a cardiovascular disease prevention system to meet the needs of rural elderly people.

## 1. Introduction

With the acceleration of global population aging, cardiovascular disease (CVD) has become one of the leading causes of death and disability worldwide. According to relevant data, it is estimated that by 2030, cardiovascular diseases will cause more than 23 million deaths worldwide [1]. In 2019, the mortality rate of cardiovascular diseases was still the first cause of death of residents in China, and cardiovascular diseases in rural and urban areas accounted for 46.74% and 44.26% of the causes of death, respectively [2]. More than 80% of the global burden of cardiovascular disease occurs in low - and middle-income countries, but the understanding of the importance of risk factors comes mainly from developed countries [3]. In China, especially in rural areas, due to multiple factors such as economic conditions, uneven distribution of medical resources and relatively weak health awareness of residents, the incidence and mortality of cardiovascular diseases continue to rise, posing a serious threat to the health of the elderly.

In this context, how to effectively prevent and manage cardiovascular diseases, especially for the rural "silver hair" group, has become an urgent problem to be solved. IDC's "China Wearable Device Market Quarterly Tracking Report" shows that in 2022, China's adult smart watch market sales reached 17.18 million units, and smart bracelet market sales reached 12.76 million units. According to the planning of the Ministry of Industry and Information Technology, in 2025, China's independent research and development and production capacity of smart wearable devices will reach the world's advanced level [4]. As a new health monitoring tool, smart wearable devices have

gradually shown great potential in the prevention and management of cardiovascular diseases with their characteristics of miniaturization, portability, real-time monitoring and automatic processing. For the rural "silver hair" group, smart wearable devices can not only provide real-time and accurate health data, but also alleviate the problem of strained medical resources to a certain extent, and help the elderly better manage their health conditions.

However, despite the promising application of smart wearable devices in cardiovascular disease prevention, there are still many challenges in the promotion and use in rural areas. On the one hand, due to the limitations of economic conditions and differences in cognitive level, the acceptance and utilization rate of smart wearable devices among rural elderly people is relatively low; On the other hand, the use and maintenance of equipment also requires a certain amount of technical support and training, which may be difficult to guarantee in rural areas. Therefore, this study aims to explore the application status of smart wearable devices in the prevention of cardiovascular disease in the rural "silver hair" group, analyze the problems and obstacles in the promotion and use process, and put forward corresponding solutions and suggestions.

## 2. Literature review

Smart wearable device is a general term for intelligent design and development of wearable devices using wearable technology for daily wear. The Outline of the "Healthy China 2030" Plan proposes to develop Internet-based health services, cultivate a number of distinctive health management service industries, and explore and promote the development of wearable devices, smart health electronic products and health and medical mobile application services [5].

The application prospect of smart wearable devices in the field of health management has attracted extensive attention from the academic community. Existing studies have explored the impact of smart wearable devices on the health of the elderly from different perspectives. Mercer has revealed the far-reaching impact of smart wearable devices from the psychological level: they not only serve as instant feedbacks of health data, but also subtly awaken the health awareness of the elderly through their reminding function, and encourage them to embrace regular exercise, thus promoting a significant improvement in the overall quality of life [6]. The Piwek team focused on the functional level and analyzed in detail the wide application of smart wearable devices in daily health monitoring, such as accurate step counting, real-time heart rate monitoring and deep sleep analysis, which built a convenient and instant self-health management platform for the elderly, making health management accessible. From the perspective of target user groups, Kononova et al. explored how smart wearable devices, through their activity tracking function, effectively stimulated the enthusiasm of elderly people who originally lacked exercise habits and brought them new exercise motivation. The contribution of Swartz and other researchers is that, starting from the dimension of intervention effect assessment, they deeply studied the specific role of activity tracking intervention on the formation of sustained exercise habits in the elderly. Their research found that setting and achieving step goals and getting support from a virtual community are the two core elements that promote long-term exercise habits and improve exercise adherence in older adults. This finding provides strong empirical support and optimization direction for the application of smart wearable devices in the field of health promotion for the elderly.

By exploring the role and effect of smart wearable in the prevention of cardiovascular diseases in the elderly, this paper strives to improve the health level and quality of life of the elderly, and provides scientific basis for the research and development and application of smart wearable devices. In the future, with the continuous progress of technology and the in-depth promotion of applications, the role of smart wearable devices in the prevention and management of cardiovascular diseases in the elderly will be more significant.

## 3. Research methods

By studying the status quo and willingness of rural elderly people to use wearable health devices, the author selected the data of rural elderly people in Zaozhuang city for research. The aging rate of permanent residents in Zaozhuang city is relatively high, which has strong representativeness and research significance. The main data collection method in this paper is semi-structured interview, which is used to study and collect the health status of the elderly, the demand for wearable health devices, and the use of them. Collect and screen smart wearable related literature, including academic papers, technical reports, policy documents, etc. This paper classifies the literature, summarizes the use status quo, application effects and challenges of smart wearable devices in rural elderly groups, analyzes the shortcomings of existing studies, and defines the innovation points and research directions of this study. Through field observation and in-depth interviews, we will have an in-depth understanding of the real experience and feelings of the elderly when using smart wearable devices, as well as the effects and problems of the devices in practical applications. Through this study, we expect to provide theoretical support and practical guidance for the popularization and promotion of smart wearable devices in rural areas, so as to promote the in-depth development of cardiovascular disease prevention and improve the health level and quality of life of rural elderly people.

## 4. The use of smart wear in rural "silver hair" groups

The popularity of smart wear in the rural elderly population is relatively low, which is mainly limited by many factors. First of all, the acceptance and cognition of the rural elderly to the emerging technology products is generally low. They have long relied on traditional elderly care services, and lack of understanding and experience in using emerging technology products such as smart wearable devices [7]. Secondly, the cost of smart wearable devices is relatively high, which may be a burden for rural elderly people with relatively limited economic conditions. They may be more inclined to buy basic necessities of life rather than invest their money in such high-tech products. In addition, the technological literacy of the rural elderly is generally low, and they may lack the basic skills and knowledge necessary to use smart wearable devices. Even if they own the device, they may abandon it because they can't operate it or can't take full advantage of its capabilities.

### 4.1. Limited cognition and acceptance

The elderly in rural areas have long been accustomed to the traditional way of life, and generally have a low cognition and acceptance of emerging technology products, and lack of understanding of smart wearable devices, which may be considered complex and difficult to master [8]. Family support has an important impact on the elderly's use of smart wearable devices. "Smart wearable devices, I've heard of them, but I haven't used them. Not many people use it in our village, so I didn't pay much attention." Rural elderly people generally have low scientific and technological literacy and lack the basic skills and knowledge necessary to use smart wearable devices. Even if a device is purchased, it may be abandoned because it does not operate or cannot make full use of its features. The family can help the elderly understand and use the equipment, providing necessary technical support and psychological support. In addition, the attention and care of family members will also enhance the willingness of the elderly to use the device. The community environment also affects the willingness of the elderly to use smart wearable devices. If there is a good technology climate and publicity in the community, older people are more likely to accept and use these devices [9]. At the same time, health services and volunteers in the community can also provide

necessary help and support for the elderly. "To be honest, I don't know. I've heard that these devices can monitor health data, such as heart rate and blood pressure, but I don't think I need them because I'm in good shape."

### 4.2. Economic factors

The relatively high price of smart wearable devices may become a big obstacle for rural elderly people to buy. The price of smart wearable devices varies by brand, model, function and market positioning, from high-end and expensive products to cost-effective entry level devices. High-end smart wearable devices of some well-known brands, such as smart watches or health bracelets with comprehensive health monitoring functions, high-precision sensors, long battery life and fashion design, may be expensive, usually ranging from hundreds to thousands of yuan [10]. Their financial circumstances are limited and they may be more inclined to spend their money on basic living expenses rather than buying such non-essential items. Price and cost performance are important factors affecting the purchase decision of the elderly. "Is that so? That sounds good. Still, I'm a little worried about the price. Is the equipment expensive? I might as well save a few hundred dollars to buy food and drink. "The elderly are usually more concerned about cost performance, so the equipment should provide a reasonable price and good performance.

### 4.3. Usage habits and resistance

The elderly are often accustomed to using what they are familiar with, and may be resistant to new things. Smart wearable devices, as an emerging technology product, may not be consistent with their usage habits, leading to their reluctance to try. Living habits and cognitive patterns formed over a long period of time make the elderly need more time and energy to adapt and learn when facing new things. "Yes, I am a more old-fashioned person, used to using old-fashioned things, those mobile phones, watches ah, I just look dizzy, too complicated, sounds good, but I am afraid of trouble." They may feel that the existing way is sufficient to meet the needs, there is no need to try new things. Modern technology products such as smart wearable devices are often accompanied by high technical thresholds and complex operation processes, which is a big challenge for elderly people who are not familiar with electronic products. They may worry that they won't be able to learn, or that they won't be able to solve problems when they encounter them. "Well, you have a point. Then I can try, but someone must teach me." The ease of use of devices is also a key factor affecting the willingness of older people to use them. The elderly may face problems such as decreased vision and inflexible fingers, so the device should have a concise and clear operating interface and easy-to-operate functions.

### 4.4. Privacy and security concerns

Some elderly people may be concerned about the function of smart wearable devices to collect personal health data, fearing personal privacy disclosure or data misuse. The elderly have a strong sense of personal information protection, and they may worry that smart wearable devices will reveal their private information, such as health status and location information. "(nodding) Yeah, I do have concerns about that. There is a lot of talk about personal information leakage on the Internet, and I am worried that these devices will spread my health data, what if they are used by the bad guys?" In addition, faced with massive amounts of health data and complex analysis results, they may also feel at a loss and develop information anxiety. "How do I know this data won't be seen by others? What if the device company sells the data to someone else? Society is so dangerous now." There are also concerns about the safety and stability of the equipment, and concerns about

problems during use. Although the impact of information privacy concerns on the use of smart wearable devices by the elderly is not significant, it is still a factor to be considered. Older people may be concerned about their health data being leaked or misused, so devices should provide reliable data protection measures [11].

## 5. Improve the willingness of rural "silver hair" group to use smart wear strategy

Chronic diseases are the troubles of many middle-aged and elderly people, and smart wearable devices have important applications in chronic disease monitoring. With the improvement of health awareness, the elderly are increasingly looking to manage their health through technological means. Older people with poor health may be more inclined to use smart wearable devices to monitor their health. In order to improve the scientific and technological literacy of rural elderly people and the willingness to use smart wear, we can start from the following aspects:

### 5.1. Strengthening science and technology education and training

The government should regularly organize science and technology training courses and lectures, invite science and technology experts or volunteers to explain the use of smart wearable devices, functions and advantages for the rural elderly. Meanwhile the training content should be close to the actual life of the elderly, pay attention to practicability and ease of operation, and volunteers should use easy-to-understand language to explain, and the ease of use of equipment is also a key factor affecting the willingness of the elderly to use. The elderly may face problems such as vision loss and finger inflexibility, so the device should have a simple and clear operating interface and easy-to-operate functions; We should leverage the Internet and mobile communication technologies to create online learning resources tailored for the elderly, including video tutorials and interactive Q&A sessions, enabling them to study at their convenience, anytime and anywhere.

### 5.2. Promote easy-to-use smart wearable devices

Research and development of products suitable for the elderly: science and technology enterprises are encouraged to develop smart wearable devices with practical functions, easy operation and moderate price according to the characteristics and needs of the elderly; The company should optimize the user experience by improving the ease of use and comfort of the device for the elderly, such as using large fonts, voice assistants, and other functions to facilitate their use. Additionally, the government should strengthen publicity and promotion through TV, radio, village radio stations, and other channels, highlighting the positive role of smart wearable devices in enhancing the health management and convenience of life for the elderly.

### 5.3. Building a support system

The local government should establish a community support network by relying on communities, village committees, and other grass-roots organizations to build a support system aimed at improving the scientific and technological literacy of rural elderly people. This network will provide them with technical consultation, troubleshooting, and other related services. Furthermore, the local government should encourage family participation by motivating family members to actively engage in the process of enhancing the scientific and technological literacy of their elderly relatives. Family members can assist the elderly in learning to use smart wearable devices and other technological products. Additionally, the local government should introduce voluntary services by encouraging social forces, such as college students and science and technology volunteers, to

participate in the initiative to improve the scientific and technological literacy of rural elderly people. These volunteers can offer one-to-one counseling and support to the elderly.

### 5.4. Strengthen policy guidance and financial support

The national government can introduce relevant policies to encourage technology enterprises to develop smart wearable devices tailored for the elderly. To incentivize such development, the government can grant preferential policies such as tax relief to qualified products. Furthermore, the government should increase capital investment to support research and development in this field.The government and all sectors of society can increase capital investment in the promotion of scientific and technological literacy of rural elderly people for training, equipment procurement, support system construction,etc.The government and relevant institutions can promote the popularization of smart wearable devices in rural elderly people by formulating policies and strengthening publicity. For example, relevant policies can be introduced to support the purchase and use of smart wearable devices by the elderly, while strengthening publicity and education to improve the scientific and technological literacy and health awareness of the elderly.

## 6. Conclusion

Cardiovascular disease is one of the highest mortality diseases in the world, and its incidence is increasing year by year and showing a younger trend. As a high incidence group of cardiovascular diseases, the cardiovascular health monitoring of the elderly is particularly important. Smart wearable devices, such as smart watches and smart bracelets, can monitor heart rate changes in real time and provide timely health warnings for the elderly through the built-in heart rate sensor, thus effectively preventing the occurrence of cardiovascular diseases. Chronic diseases are the trouble of many middle-aged and elderly people, and smart wearable devices have important applications in chronic disease monitoring [12]. With the improvement of health awareness, the elderly are increasingly looking to manage their health through technological means. Therefore, older people with poor health may be more inclined to use smart wearable devices to monitor their own health. Economic ability is an important factor affecting the purchase and use of smart wearable devices by the elderly. With the improvement of living standards, more and more elderly people can afford to buy these devices. However, for older people with poorer economic conditions, the price of smart wearable devices may still be a barrier. Older people's acceptance of new technologies also affects their willingness to use smart wearable devices. Some older people may be conservative about new technologies, worried that they won't be able to master how to use them or worried about technology safety. Therefore, improving the acceptance of technology among the elderly is the key to promoting smart wearable devices. In the future, with the continuous progress of technology and the in-depth promotion of applications, smart wearable devices will play a more important role in the prevention and management of cardiovascular diseases in the elderly. However, with the advancement of technology and the popularity of smart wearable devices, more and more manufacturers have begun to pay attention to the rural elderly market and launch products that better suit their needs and budgets. At the same time, the government and all sectors of society are also actively promoting the concept of smart elderly care and encouraging the use of smart wearable devices to improve the quality of life and health of the elderly.

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