Empirical Research on Implementation Paths of Combination of Medical Services and Elderly Care in Communities Based on Artificial Intelligence

Xinbo Liu
School of Economics and Management Jiangsu University of Science and Technology Zhenjiang, China

Keywords: Artificial Intelligence (AI), Elderly Care Services, Aging Society.

Abstract: According to statistic analysis, there are more than 0.2 billion people of 65 years old and above in China, accounting for 14.2%. Aging will directly cause further highlighting of elderly care pressures. The multi-classification orderly Logit statistical analysis made by SPSS software shows that an elderly care mode is a factor which should not be neglected and affects happiness of old people. As a form of elderly care modes, traditional combination of medical services and elderly care in communities has a lot of problems. The paper proposes a suggestion of integrating artificial intelligence (AI) and combination of medical services and elderly care in communities. Through analysis of a large size of data based on AI, an "algorithm model" is established for testing and training, thereby making scientific judgement and formulating rational scheme decisions and implementation paths.

1 INTRODUCTION

As stipulated in traditional standards of the United Nations, the population of a country represents an aging society if its elderly population of 60 years old and above accounts 10% of the total population, or that of 65 years old and above accounts for over 7% of the total population. By the end of 2021, the population of 65 years old and above in China has increased to 200.56 million, accounting for 14.2% of the nationwide population (Netease 2021). Hence, positive coping with population aging becomes a long-run strategic task for the country. As for worldwide experience in coping with population aging, scientific progress has created very important technical conditions. It is an important measure to realize smart and healthy elderly care using the new generation of information technologies, so as to practice the strategy of "healthy China".

It is of an important research value to solve problems existing in Chinese elderly care industry through application of the Internet, AI as well as advanced and effective comprehensive technologies for diagnosis and treatment (Jin, Xia, Zhang, et al., 2018). In recent years, combination of medical services and elderly care has become the focus of scholars. A lot of scholars such as Jin Xinyu, Wang Hongyu, Liang Yu, Wang Xiaohui, Sun Yanling and Zhang Jie have discussed strategies on linked development of AI and combination of medical services and elderly care from perspectives such as Big Data analysis and cloud computing. AI and combination of medical services and elderly care further highlight huge advantages brought by development of technical conditions. For example, by analyzing a lot of data, AI establishes algorithm models for testing and training, makes scientific judgements and formulates rational scheme decisions and implementation paths. Its powerful computing efficacy far exceeds the ability level to be reached by common humans. Through formulation of standards for AI elderly care products, especially standards for common intelligent detection equipment products of physical health indexes and data services, medical workers can be helped to deal with various complicated matters and problems. As argued by the author, there are good scientific conditions for construction of "intelligent elderly care ecology" with technologies such as AI, while high-quality medical nursing technologies can permeate into every link of elderly care services, which will become an elderly care mode with good development prospects. AI will integrate all the online and offline medical and elderly resources to make up defects in

Liu, X.
Empirical Research on Implementation Paths of Combination of Medical Services and Elderly Care in Communities Based on Artificial Intelligence.
DOI: 10.5220/0011897100003613
In *Proceedings of the 2nd International Conference on New Media Development and Modernized Education (NMDME 2022)*, pages 9-14
ISBN: 978-989-758-630-9

traditional combination of medical services and elderly care, thereby creating a brand-new mode of combination of medical services and elderly care in communities based on AI.

2 PROBLEMS IN TRADITIONAL COMBINATION OF MEDICAL SERVICES AND ELDERLY CARE IN COMMUNITIES

In the elderly population, empty-nest elderly people account for a large proportion (eg. The empty-nest elderly people in Jiangsu Province account for over a half of old people in the whole province), while the problem about their sense of happiness has drawn more and more attention from the social public people. Recently, the author used SPSS software to make multi-classification orderly Logit statistical analysis on 878 pieces of effective sample data in Jiangsu Province and obtained regression results in Table 1 through a reverse screening method (in view of the article length, related operation processes are omitted. Readers with interest in it can contact the author).

Table 1: Regression results of multi-classification orderly analysis on influential factors of sense of happiness of empty-nest elderly people.

	Variable	Estimated value	Standard deviation	Wald value
Dependent variable	Unsatisfied	5.187***	0.870	35.555
	Common	8.447***	0.926	83.168
Independent variable	Physical health	0.438***	0.129	11.537
	Degree of participation in recreational and sports activities	0.672***	0.154	19.108
	Mate	0.472*	0.130	13.217
	Degree of family harmony	0.262*	0.124	4.476
	Annual income of family	0.391***	0.096	16.436
	Degree of worry about life	0.592*	0.157	14.150
	Degree of concern for government and society	0.218*	0.193	9.485
	Elderly care mode	0.906**	0.207	16.236
Model fitting	Total chi-square of model	173.175		12
	-2 log likelihood	891.535		0.000

Note: *, ** and *** stand for significance on the statistical levels of 10%, 5% and 1% respectively.

As shown in Table 1, there are diversified influential factors on the sense of happiness of empty-nest elderly people, among which the elderly mode is a factor which cannot be neglected. As for the elderly care mode, the service combining medical services and elderly care in a community means that the community provides the elderly with medical and health services and elderly care services, mainly aiming at satisfying elderly care service demands and medical service demands of old people. In recent years, with upgrading of the living standards and medical conditions, the average lifespan of humans has been increasingly prolonged, while the emphasis and pursuit of lie quality have become the targets pursued by old people. Combination of medical services and elderly care is an important content in national implementation of elderly work. However, during actual practicing, there are certain difficulties mainly as follows. Firstly, as for quality of medical and elderly care services: old people suffer organ aging and degradation of body functions, while sudden attack of some diseases such as myocardial infarction requests timely medical treatment, so that communities and medical organizations should provide timely aid. However, they lack these medical conditions, so that care for old people's demands is insufficient; services are not proactive; and service contents are of low levels. As pointed out by scholar Zhu Hengpeng: the pain point of combination of medical services and elderly care is "medical" other

than “elderly care”. Secondly, as for conditions of medical services and elderly care: due to unbalanced development of domestic economy, community services for home care of elderly develop on different levels, leading to differences between different regions and communities; and in particular, if old people fail to take care of themselves in daily life, professional elderly care service organizations should provide professional elderly care services, but rescue effects are not satisfactory due to limited medical and nursing conditions in communities. Thirdly, as for supervision of medical services and elderly care: due to lack of standardized standards and training for industrial services, practitioners differ in professional competences which are generally very low, while the service quality is not satisfactory; and there are potential dangers for safety in home based care for the aged, such as occasional occurrence of abuse, killing of old people or encroaching on their properties by nannies.

3 ANALYSIS OF ADVANTAGES OF COMBINATION OF MEDICAL SERVICES AND ELDERLY CARE IN COMMUNITIES BASED ON AI

Elderly care based on AI is a new industrial form emerging in recent years, boasting wide development prospects. A lot of nation-level policies have been issued to support it. Development of the Internet technologies and application of the 5G technology further prompt the leaping development of the intelligent elderly care field. As believed by some scholars, compared with traditional elderly care modes, AI has advantages in four aspects including information data, resource integration, manpower substitution, and high efficiency and precision (Yang 2019). As a whole, advantages of elderly care based on AI are mainly manifested in the following four aspects:

3.1 Advantages in Data Collection

Through analysis, research and judgement of big data of elderly care services, AI service platforms can optimize and integrate service supply, thereby knowing real demands of old people and providing them with more personalized services. Through the IoT technology such as wearable equipment, physiological information data of old people can be collected in real time. Then, through big data analysis, reliable guarantee can be provided for discovery of potential health and safety problems. By establishing relatively interactive high-tech facility platforms with good entertainment effects and knowledge functions, inviting old people to join them and making them master use functions as soon as possible, their daily communications will be strengthened. In this way, their mental satisfaction will be enhanced, thereby improving their life quality in old ages.

3.2 Advantages in Resource Integration

Intellectualized information sharing is not limited by time or space and can more rationally arrange use of various service resources to reduce waste. Information-based platforms of home based care for the aged can interconnect elements such as old people, families, communities and medical organizations to realize information sharing, so that demanders, suppliers and supervisors of services will get what they want and play respective roles. In this way, an industrial chain of elderly care services will take shape more easily, thereby motivating enterprises to realize innovation.

3.3 Advantages in Big Data Accuracy

Involvement of the AI mode breaks the traditional running mode that requests in-person operations of doctors throughout the medical treatment. Autonomous research and judgement and decision making ability of intelligent machines play a positive role in reducing manpower cost, greatly increasing working efficiency and quality of medical organizations and doctors and reducing irrational medical expenditures (Xiang, Wang, 2019). By recording various data of the served targets and accurately mastering old people’s living habits, medical histories, hobbies and other information, more intelligent, personalized and professional services can be provided for old people. For example, luminous and ultrasonic methods are used to stimulate the cortex to cause generation of cortex neuron electric signals, thereby improving patients’ motion conditions. Through continuous tracking and analysis of health data, potential lesions will be found for timely treatment (Moore, Loft, Clegern, et al., 2015). In addition, potential demands of old people will be predicted more accurately besides active supply of effective and thoughtful services.

3.4 Advantages in Fitting with Services

Human demands are classified into different levels. For most old people, physiological, safe and emotional accompanying nursing is still necessary. As for the material living, both old people and their families desire high-quality products and services with rational prices. As for health demands, a lot of old people with various chronic diseases need timely and effective rescue especially upon the attack of diseases. Szanton et al. (Szanton, Wolff, Leff, et al., 2014) made systematic research on provision of community medical services and elderly care services such as nursing, rehabilitation and daily care to African disabled old people living in America with low income, finding that their living quality is obviously improved. Design concepts of AI products conform to people's real life, liberate people's physical labour and start focusing on old people's living status quo from emotions. By connecting big data, modernized intelligent products can store and analyse people's languages, behaviours and thinking habits. Old people can make obstacle-free communications in voice with intelligent products at any time and any place, and know diversified information without going out.

4 IMPLEMENTATION PATHS OF INTEGRATION BETWEEN AI AND COMBINATION OF MEDICAL SERVICES AND ELDERLY CARE IN COMMUNITIES

4.1 Construction of AI Platforms

AI has unlimited potential in ensuring and improving people's livelihood by big data. It is necessary to establish powerful AI platforms, so as to enhance application of AI in the medical field and promote mode innovation and business type innovation. These platforms include medical health information of the entire population, integration of medical service information, and integration of elderly care service information, and provide medical institutions and care homes with comprehensive intelligent services. It is also necessary to promote the integrated innovation in AI technology, information technology and medical and nursing services, and establish a work pattern based on synchronous management of information sharing, multi-department linkage, disease diagnosis and treatment and health management. The development of AI-based community elderly care is indispensable from public participation and support. The government should enhance propaganda and guidance, and help people know about significance and importance of AI-based elderly care. Combination of medical services and elderly care extends and expands traditional elderly care concepts. Especially in the era of population aging, it is necessary to rethink construction of connotation relations and inevitable logic among AI, medical services and elderly care. For this purpose, the whole society should form an ideological consensus, break the barrier between two resources, namely elderly care and medical services, enhance effective integration, provide old people with health consultation and tutorship, daily life care, physical and mental health care, intelligence entertainments or the like, and make them live an insured, active and happy life.

4.2 Perfection of Collaborative System

In general, public products and services are mainly provided by the government which plays a very important role in AI-based governance of community elderly care services. Combination of medical services and elderly care in communities is an important system innovation. To realize mutual integration and interconnection of the two fields, namely medical services and elderly care, the government should strength its own responsibilities in combination of medical services and elderly care in communities, enhance construction of governance abilities, and in particular focus on development and application based on AI technologies. At present, smart care service system for the old in China is not smooth enough, remaining in a start stage. In the future, the development of smart care service system for the old will depend on quicker establishment of a smart management system, as well as better combination of industry-university-research fields of smart care (Wang, Xiang, 2019). It is necessary to perfect services and supervisions, guide establishment of healthy and orderly industrial orders, promote benign development of the industry, and enhance multi-department coordination and cooperation. Governmental departments involved in combination of medical services and elderly care in communities, such as civil administration, health, finance, education and judicial departments, should confirm respective responsibilities, cooperate with each other and give powerful policy support.

Intelligent information platforms should be built to realize multi-departmental cooperation in promoting industrial development of medical services and elderly care. Restrictions on social medical organizations to configure large medical equipment and plan for reserved space should be relaxed. Elderly care organization setting licenses should be cancelled, while standard pilot demonstrative construction of household services should be carried out. In addition, the market mechanism should be introduced to promote information-based development of elderly care organizations. Elderly care service organizations are supported to voluntarily integrate professional service providers, so as to implement services such as housekeeping, food delivery and remote medical service. Assistance should go to elderly care service organizations in value-added services such as intelligent guardianship, health management and emergent aid (Sun, Fu, 2016).

4.3 Improvement of Service Experience

Application of AI in combination of medical services and elderly care in communities depends on high-tech products. Main functions of product R&D are centralized in intelligent medical services and healthy elderly care. For the purpose of building an AI industrial ecosystem and promoting integral development of professional intelligence and technological intelligence, development of intelligent elderly care products should focus on practicality and economic efficiency. It is necessary to accelerate application of intelligent sensors and medical case big data, enhance application in aspects such as latent disease screening, chronic disease management, rehabilitation process management or the like, provide accurate medical services, increase supply of medical resources and satisfy demands of old people. For example, community intelligent access control systems, emergent alarming systems, quick contact systems or the like can be provided; intelligent home such as audio and visual aid equipment should be perfected to make old people's life convenient, enhance safety care and effectively extend their motion scope and space; and mobile social contact and service platforms suitable for the old can be developed, while operation essentials should be easy to learn and master, and these platforms can be used as accompanying aids for basic communications to make their life more interesting. As for establishment of medical organizations, provision of services and capital attraction, it is necessary to exert positive effects of the market. Through combination of public service supply by the government and purchase service supply by the market, the service efficiency and quality can be improved. The 5G technology will surely "promote generation" of various application scenes of elderly care services, thereby making integration of resources more flexible and convenient. In this way, different organizations will make increasingly closer interactions and integration. "Zero distance" can be further realized in boundaries between different subjects. "A decentralized, diversified and network-based cooperation structure will enhance the ability of information sharing between subjects of cooperative governance, so that a complete industrial chain of social elderly care services can be built through complementarities and cooperation of respective resources and cluster effects of social elderly care will take shape" (Zhang, Lu, 2019). Under guidance, social power and social resources will play a great demonstrative role in combination of medical services and elderly care in communities, so as to solve a lot of problems which are difficult to tackle. For example, voluntary workers, volunteers and non-profit organizations can play a role; through cooperation with universities and enterprises, R&D of AI-based elderly care service products can be accelerated; policy support and capital assistance are enhanced; and cooperation between social power and traditional medical public organizations can be promoted. It is necessary to make organic combination of government, market and social power, thereby co-making AI play a role in home based care for the aged.

4.4 Cultivation of Versatile Talents

China starts the elderly care undertaking a little late, but enters the aging stage very quickly, thereby facing more complicated problems. In addition, the quantity and professional level of existing nursing workers can hardly satisfy the increasing demands for development of elderly care in communities. As found in the research, only a few of people with relatively weak occupation quality work on careers such as elderly care and medical rehabilitation, so a lot of problems and diversified demands brought by rapid population aging cannot be satisfied, while supply-demand imbalance exists. It is necessary to reconstruct a talent cultivation system focusing on occupation education, encourage medical colleges and universities to add relevant medical care majors, enhance study of expertise of elderly care in particular in professional cultivation proposals, and open a batch of AI related courses. It is necessary for relevant persons to master necessary medical

knowledge in many fields such as medical image recognition, electronic medical resources, drug R&D and organizational data analysis, and guarantee a certain time of on-post training in the practice. AI should play a full role of cooperation in the field of pharmaceutical services. For example, simple and repeated work such as prescription checking, prescription filling and drug distribution in the traditional sense can be assigned to AI, so that the personnel can have more time and vigour to make self-improvement and try hard to become irreplaceable high-quality pharmacists who can provide personalized and individualized high-end pharmaceutical services (Zhao, Yu, Tian, 2019). It is necessary to enhance training of community workers and cultivate a professional team familiar with use of AI smart elderly care products and appliances as well as a professional medical team for diagnosis, thereby guaranteeing material and cultural demands of old people.

5 CONCLUSION

Original contributions and innovations of the paper are mainly embodied in the following aspects: aiming at problems in traditional combination of medical services and elderly care in communities, the paper illustrates that the AI based combination of medical services and elderly care in communities has advantages of being more timely, comprehensive, real, more efficiency in integration of medical service and elderly care resources, optimal and more accurate in medical and elderly care services provided by big data, and more fitted in medical and elderly care services, thereby proposing realization paths of integrating AI with combination of medical services and elderly care in communities. These paths include: enhancement of top-layer design, construction of AI platforms and elimination of information isolated islands; application of policy motivation, perfection of coordinated systems, and linkage with medical organizations and communities; improvement of service experience, expansion of effective supply and improvement of service quality; cultivation of versatile talents, construction of high-quality human resource for elderly care services, etc.

ACKNOWLEDGMENT

This work was supported by the Project of education reform research of higher education in Jiangsu Province (2021JSJG624).

REFERENCES

Jin, X. Y., Xia, Q., Zhang, W., et al. (2018) “Medical-and-Care Wisdom linkage” Pension Model Research and Exploration. Strategic Study of CAE, (2): 92-98.

Moore, M. E., Loft, J. M., Clegern, W. C., et al. (2015) Manipulating Neuronal Activity in the Mouse Brain with Ultrasound: A Comparison with Optogenetic Activation of the Cerebral Cortex. Neuroscience Letters, (604): 183-187.

Netease. (2021) State Statistical Bureau Releases Latest Population Data: Over 200 Million of Population Aged 65 Years Old and Above!. https://3g.163.com/dy/article_cambrian/GUIDC03K0530ICNH.html/?load_id=22.

Szanton, S. L., Wolff, J. W., Leff, B., et al. (2014) Capable Trial: A Randomized Controlled Trial of Nurse, Occupational Therapist and Handyman to Reduce Disability among Older Adults: Rationale and Design. Contemporary Clinical Trials, (1): 102-112.

Sun, Y. L., Fu, J. Q. (2016) Status Quo and Development Suggestions of Smart Elderly Care in Chengdu. Labor and Social Security, (S1): 138-140.

Wang, X. H., Xiang, Y. H. (2019) Research and Exploration on the Intelligent Care Service System for the Aged People. Study and Practice, (5): 88-97.

Xiang, Y. H., Wang, X. H. (2019) A Research on the Elderly Health Management in the Age of Artificial Intelligence. Journal of Xinjiang Normal University (Edition of Philosophy and Social Sciences), (4): 98-107.

Yang, F. (2019) Innovative Logic and Practical Path of Smart Elderly Care Development. Administrative Tribune, (6): 133-138.

Zhang, J., Lu, Y. (2019) A Study of Cooperative Governance Mode of the Pension Service in the Context of Sharing Economy. Journal of Hohai University (Philosophy and Social Sciences), (1): 79-86.

Zhao, W. M., Yu, X. Y., Tian, K. (2019) Thoughts on the Development of Pharmacists in the Field of Artificial Intelligence. Health Economics Research, (8): 52-55.

Zhu, H. P. (2017) Pain Spot of “Combination of Medical Services and Elderly Care”: “Medical Services”, not “Elderly Care”. China State Finance, (24): 36-38.