

Trends and Challenges of Using Welfare Technology in Elderly Care

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ABSTRACT

There are several problems facing our society today that are caused by demographic changes, such as an increase in the ageing population. The rapid increase in the ageing population leads to increases in medical costs and a higher demand for care services for the elderly. The needs and burdens associated with elderly care are growing, but the human resources and costs to meet these needs are limited. Welfare technology has been suggested as an effective way to solve the discrepancy between higher welfare needs and limited resources. This study aims to explore the current trends and challenges of using welfare technology related to elderly care through literature review. Practical ways to expand uses of welfare technology are also provided. In order to make effective and practical use of welfare technology, public awareness and education, the cooperation of related organizations, the expansion and utilization of Living Labs, and the development and adoption of welfare technology are required.

Key words: *Elderly Care, Literature Review, Trends, Ageing, Welfare Technology.*

1. INTRODUCTION

Recently, many countries are experiencing demographic changes such as the ageing of their populations. Korea is no exception, and various problems arising from the increase in the number of the ageing population are developing faster than in other countries. According to Statistics Korea, the population over the age of 65 years was 11% in 2011, and it will be 24.3% in 2030, and 40.1% in 2060. In addition, the percentage of people over 85 was 0.7% in 2010, and it will be 10.2% in 2060 [1]. The growing number of elderly people means that the demand for elderly care and welfare services will increase in the near future. A healthy lifespan, the state of living without disease or injury, was 73.2 years as of 2015. This number indicates that people suffer for 8.9 years, about 12% of survival period, before they die [2]. Also, it is known that the 60% of elderly over 65 years have more than 3 kinds of chronic diseases [3].

However, family disintegration, women's advancement in society, and social isolation have occurred because of industrialization and modernization, and care for the elderly has shifted from being a family responsibility to a social responsibility. Moreover, accompanying the ageing populations are low birth rates, which lead to a decreased work force of young people. The total fertility rate, the average number of children a childbearing-age woman bears, in Korea was 1.172 as of 2016 [1]. As ageing populations increase, the need for

elderly care and medical expenses for the elderly will grow, but the resources and manpower to meet these needs will be more limited.

Facing these challenges, the demand for active and efficient welfare services is expected to increase. Therefore, it is urgently required to utilize science technology to establish and implement more efficient and effective welfare policies [4]. Welfare technology will be a reasonable instrument for solving the problem of difference between the rising welfare needs, quantitatively and qualitatively, and the limited resources that will be brought in the future [5]. Welfare technology will help reduce the public costs of elderly care and services [6], and is important to improve the quality of life and establish welfare equality for socially vulnerable people, such as the elderly and people with disabilities [7]. Welfare technology is also useful in providing sustainable emotional support for the elderly [8].

Based on this point, I explored the definition and use of welfare technology through literature review. Then, I suggest developmental plans for using welfare technology in practical ways.

2. LITERATURE REVIEW: WELFARE TECHNOLOGY AND ELDERLY CARE IN KOREA

2.1 Definition of Welfare Technology

Many definitions and descriptions regarding welfare technology exist, but there is still discussion of the concept [9]. The term 'welfare technology' is mainly used in Scandinavia, and used for environmental control, safety, and well-being, especially for the elderly and people with disabilities. A similar

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term ‘Ambient Assisted Living’ is used mainly in Europe [10]. The terminology of welfare technology used mainly in Northern Europe differs in emphasis. Denmark and Finland emphasize both health and care, Sweden emphasizes care, and Norway emphasizes the role of municipal government [5]. The concept of welfare technology, which started from simple technology applications, has expanded to include demographic development, restructuring of welfare systems, and information technology infrastructure, and it has changed to include not only simple applications but also system and service management [11]. According to the Nordic Centre for Welfare and Social Issues, the public sector of Nordic countries provide welfare services such as nursing, care, assistive technology, rehabilitation, physical therapy for people with special needs. Welfare technology assists in these services with technological solutions. In addition, welfare technology includes health, social services, education and training, and employment [12]. It is described as technical assistance that contributes to increased safety, security, social participation, mobility and physical and cultural activity that can help increase the ability of individual independent life, in spite of illnesses or social, mental, or physical disabilities (p.60) [13].

In Korea, the term ‘welfare technology’ is used, but like other countries there is no common definition. Welfare technology is defined as ‘to actively use science technology as a means of achieving the welfare purpose’ [5]. As a broad concept, it was defined as an innovation that overcomes welfare system and service inefficiency, and it is divided into institutional aspects and technological aspects. Institutional aspects of welfare technology include not only introducing new systems but also efforts and activities to supplement and utilize existing systems to improve the efficiency of welfare financing and delivery systems. The technological aspects of welfare technology refer to a narrow concept that science and technology, such as IT in the fields of health care or care services, serves as a means to improve the effectiveness of welfare services by helping or supporting daily life. Moreover, welfare technology is similar to social technology and appropriate technology in that it uses science technology to solve social problems, but the emphasis on value and application targets are different [14].

In addition, welfare technology has considerable potential to promote change in the social service delivery sector as well as the delivery systems down to the end user. It is also defined as a series of systems or innovative packages that aggregate knowledge, technology, related laws, administrative system, and equipment based on ICT (Information Communication Technology), intellectual property rights, and patents in order to solve the problems related to social welfare [15]. In this sense, welfare technology means the use of technology, including related systems and knowledge, in order to improve the quality of life of people in society.

Table 1. Comparing welfare technology, social technology, and appropriate technology

Division	Welfare technology	Social technology	Appropriate technology
Goal (value to pursue)	Improving the quality of life, efficiency	Human centered	Sustainability of the environment Improving the quality of life,
Coverage	Health-welfare sector	Health-welfare, medical, education, sanitation, environment, support for developing countries	Energy, water, medical, agricultural etc, but mainly environmental sector
Emphasis	Social innovation such as reorganization of technology or the improvement of the system. The needs of social welfare recipients	User-friendly, low cost through innovation	Meets community-wide conditions
Means of utilization	Legal-system including science technology	science technology	science technology

Source: H. Y. Kim et al(2013), p. 3 [14].

2.2 Welfare Technology and Elderly Care in Korea

In Korea, discussions for the convergence of welfare and science technology have occurred intermittently since 2013, but the definition of the concept, the classification, and the scope of application of welfare technology have not yet been discussed and agreed upon [7]. The Ministry of Health and Welfare conducted a business agreement with the ETRI (Korea Electronics and Telecommunications Research Institute) in 2013 to promote cooperation through the convergence of the health and welfare sector and the information-communication technology. This has enabled Korea to expect the actual results, such as R&D, needed to provide the customized health and welfare services required for health and welfare promotion. Korea can now develop a new ICT (Information Communication Technology) industry to realize the happiness of its citizens and the creation of economy, and to generate new health and welfare services based on ICT by applying information-communication technology in the health and welfare sector [16].

In 2014, a national security health robot was included in the thirteen tasks of the creative economic and industrial engine creation strategy, and the basic plan for a second intelligent

robot was laid out. The government's commitment includes the establishment of an artificial intelligence-based interactive dementia prevention management system. It includes expanding the use of chatting robot, so called ChatBots, as a means of mitigating the psychological solitude of the elderly [17]. Integrated health care, telemedicine, job information and emergency security care for the elderly who live alone is provided, but the function and support items are below the actual practical requirements, or expectation, of the recipients [18]. Therefore, the expectation for using welfare technology is increasing, but practical implementation is still only at the beginning stages.

2.3 Application of Welfare Technology

The welfare technology of Nordic countries is characterized by the development of their national strategies. Especially, Denmark is considered to be leading the development of welfare technologies at the national level. The Strategy for Digital Welfare 2013-2020 is being implemented to run 71 regional projects with the aim of disseminating telemedicine, effective cooperation in health care, welfare technology in nursing and care service programs, and applying digital courses. Sweden is encouraging the use of more welfare technologies to maintain the quality of nursing and care services. Finland focuses on high quality health and welfare services through their Innovation Village project [19].

Welfare technology is applied and embodied according to social need and imagination such as the consumer's needs, supplier's way of providing them, and the form of the benefits. Welfare technology can be used in almost all interpersonal services, and it provides effective welfare services to people with various needs. Various technologies have been introduced to help prevent and manage diseases, such as chronic diseases, and geriatric pain through the introduction of welfare technology. Welfare technology will be able to do the work which requires the assistance of others. Physically strenuous work and other handwork will be replaced by the welfare technology, and the human resources will be utilized efficiently. Welfare technologies have been developed or used in various fields, including communication support, assistive technology, daily life support, disease management and telemedicine, rehabilitation skills, leisure, and social and emotional support [19]. Examples of ICT-based services for the elderly are home security systems, telecare services, and smart care services. Safety systems are based on a smart phone-based home network structure aiming at prevention and prompt response to enhance the safety level of the elderly living alone. Home safety systems provide automated functions such as monitoring fire and gas leakage, emergency calls, and the dispatch of ambulance and fire trucks in case of an emergency. The local mobile service center has the service history of the elderly and is charged with the inspection of equipment. Telecare is a service model for elderly parents when they do not live with their children. This model led to the installation of various sensors in bathrooms, living rooms, bedrooms, and the establishment of infrastructure such as 911 emergency notifications and free telephone for health consultations. The telecare service model includes parents' health monitoring, automatic transmission of text messages to their children in the

event of a parental emergency, periodic phone service checks by the nurses, identification of hospital appointments and hospital related information, and immediate response service in emergencies. The SmartCare service model has been implemented for three years from March 2010 to March 2013 with services provided between patients and healthcare workers remotely located. Diabetes care services are an example of a smart care project. There is also a digital aging project. This shows that ICT is an essential tool to prevent the social exclusion and isolation of the elderly and to maintain their quality of life. Cyber neighborhood activities that spread social exchanges among the elderly through the Internet, cyber family programs in which the youth and the elderly participate together are typical examples [20].

In order to understand the current status of how welfare needs and technology are connected, the case of welfare technology application is presented. Park et al(2017) introduced welfare technology application cases based on welfare needs, functions, and technologies, focusing on people with special needs. Typical applications of welfare technology include RFID medication voice guidance terminal for the visually impaired, wearable robot SUBAR for lower-limb assistance, emergency monitoring system for the elderly living alone, functional game contents for the elderly, and the BOOGI robot for relieving depression in the elderly. Moreover, smart TV-based smart health care solutions for healthcare services, dysphagia rehabilitation monitoring systems using textile proximity sensors, and healthcare smart home exercise programs for obese elderly women to reduce the risks of metabolic syndrome are raised as examples. As a result of the analysis, it has been found that communication and network related studies are not enough to meet the needs of users [7].

3. DEVELOPMENT PLANS FOR USING TECHNOLOGY

The term 'welfare technology' is used, but it is not easy to access or use these applications in actual everyday life or in the field of social welfare. In other words, there are big differences in the actual use and utilization of welfare technology compared to the expectation of those working in academia and on policy. There is no doubt that the demand for the role of welfare technology will increase in the future as an effective means of responding to demographic changes. Nevertheless, the development and utilization of welfare technology in Korea is still in its infancy. In this regard, I would suggest the following developmental plans for using welfare technology.

First, public awareness and education are needed to recognize the necessity and importance of welfare technology as a response to social environment change. If you do not recognize the necessity and importance of welfare technology, you will not be able to utilize welfare technology. Therefore, in order to use welfare technology, the understanding and cooperation of people who working in the social welfare and its users is required.

Table 2. Examples of welfare technology application

Welfare Needs & Function		Examples	ICT Technology
self-reliance & self-help	1) self-care	RFID terminal for the blind to voice guide	IoT, Smart life service
	2) mobility	Wearable robot SUBAR for lower-limb assistance	ICT devices
	3) safety	Monitoring system for emergency recognition of the elderly living alone	5G(satellite radio waves), ICT devices
	4) leisure	Functional game contents for the silver generation	Digital contents
communication	1) oral communication	Voice annotation system for digital talking book	ICT devices
	2) written communication	Braille messenger for the blind	Smart life service, digital contents
	3) emotional interaction	Robot BOOGI for reliving depression in the elderly	ICT devices, IoT
networks	1) Economic activities	Mobile application and game to learn how to pay money for persons with autism	ICT devices
	2) using community utilities	Situated learning on community living skills among high school students with intellectual disabilities	5G(satellite radio waves), IoT, smart life service
	3) community activities	Ubiquitous based situated learning to improve social competence of students with developmental disabilities	Smart life service
health	1) Health care	Smart TV-based healthcare solution for healthcare service	Broadcasting & smart media platform service, smart life service
	2) rehabilitation	Dysphagia rehabilitation monitoring system using the textile proximity sensor	Smart life service
Other convergence		Healthcare smart home exercise program for obese elderly women to reduce the metabolic syndrome risks	Smart life service

Source: S. Y. Park et al(2017), p. 300 [7].

Second, various welfare technology should be developed and adopted widely. It can be seen that various technologies have been developed that improve the quality of life, but there is a limit to what welfare technology is and the effect that users can actually feel and experience in their daily lives. In order for welfare technologies contained in documents and policies to be practically used, various and effective technologies must be introduced into everyday life. In order to disseminate the developed welfare technologies, it is necessary to establish safety standards, set prices that are easy to afford, and support the cost of introducing services.

Third, the opinions of users should be reflected in the very first stages of development in order to develop user-oriented technology. Especially when the users are the elderly, welfare technology should be created to reflect their physical, psychological and cultural characteristics. This can be done in a cyclical manner by expanding and utilizing of Living Labs. Living Labs are environments of innovation and development which involve users from the beginning [21].

Fourth, training and education is needed to develop the ability to use technology effectively. If you do not develop the ability to use technology, no matter how good the technology is, it is useless. Staff working in social welfare as well as users should be educated to be aware of the correct use of the

technology available to them and be able to use them effectively.

Finally, the cooperation of related organizations and system construction should be conducted together. R&D projects and policy projects related to national welfare remain in the investment in development stage [4]. Construction of network among related organizations, including private and public sectors, and national support and policies are needed for the development of more advanced and innovative technology that meets the demands of welfare.

4. CONCLUSIONS

Welfare technology is attracting attention as a countermeasure against demographic and sociological changes such as the aging of populations, and expectations about its role and function are increasing. However, the use of welfare technology in Korea is still in its infancy and, to be effective in reality, there are many challenges that need to be overcome. Public awareness and education, cooperation of related organizations, expanding and utilizing of Living Labs, and developing and adopting welfare technology are required to make use of it in effective and practical. This study was

conducted through literature review, therefore practical experience and data should be accumulated and utilized in future studies to understand and realize the use of welfare technology in daily life.

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