
Ethical Use of Web-based Welfare Technology for Caring Elderly People Who Live Alone in Korea: A Case Study

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Abstract

This study examined ethical ways to use welfare technology in a situation where the demand for non-face-to-face welfare services using Cloud based healthcare systems had increased rapidly in caring for elderly people who live alone. Through focus group interviews with social workers related to the care of elderly people who live alone, in-depth interviews were conducted on the current situation, problems, ethical issues, and development directions arising in the implementation of welfare technology. The main areas of interest were focused on improving safety in caring them using IoT technology and enhancing emotional support in preventing lonely deaths using companion robot and AI speaker. Issues such as the need for individualization, client-centeredness, privacy, self-determination, competence, informed consent, right to know, convenience, and advocacy were identified as important ethical

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considerations related to use of welfare technology. The research results suggested that various stakeholders should participate in the development of ethical indicators and welfare technology for the ethical use of welfare technology.

Keywords: Welfare technology, ethical indicators, IoT, AI, elderly people who live alone, community care.

1 Introduction

Korea is an aging country with a world-class low birth rate. Due to the serious level of low birth rate and aging population, the proportion of the elderly population is 16.4% in 2020, leading to a super-aged society [1]. Some rural areas have already entered super-aged society, with the elderly population exceeding 30% [2]. Accordingly, the problem of hollowing out in the local community and the lack of care is emerging as a serious social issue that Korean society must jointly respond to.

Due to the increase in the elderly population, the number of elderly people who live alone also continues to increase. The proportion of elderly people who live alone was 16.0% in 2000, but now it approaches 20% in 2021 [3]. Since elderly people who live alone are reported to have weaker social support network and higher level of depression than those who live with their families [4], they are the top priority for community care. Accordingly, through integrated case management in the local community, the government dispatches life managers for elderly people who live alone to provide health support, as well as to take care of and prevent lonely death. The function of integrated care for them has been further strengthened as community care pilot projects have been implemented.

Community care is a policy that supports the elderly, disabled, and mentally ill who need care to receive services tailored to their individualized needs in their own living space and to live a stable life in the community [5]. As part of the in-home service for the elderly, it started as a pilot project in 2018 and aimed to establish a “Community Integrated Care System” by 2025. Community care supports comprehensive care so that care recipients can live a healthy and safe life in the local community through services according to the needs of clients in the three areas of housing, health care, and welfare and care [6].

Care for elderly people who live alone is traditionally carried out through face-to-face contact and interaction between service providers and users.

However, recently, with the development of technology, non-face-to-face care services have been expanded as ICT-linked services have been used. As social distancing was strengthened due to the COVID-19 pandemic, local community social welfare facilities were closed, and the use of services was restricted by quarantine passes. Elderly people who live alone were alienated from society and a gap in care occurred. Welfare technology has emerged as a new alternative to non-face-to-face services that can minimize the gap in care. Providing a companion robot with an interactive function that supports detection of gas lock, illuminance, and daily movements as a service linked with ICT is a representative example of the incorporation of welfare technology for elderly people who live alone at home [7].

The need for welfare technology has become more prominent as non-face-to-face services increased due to the COVID-19 pandemic, and the demand for care using welfare technology is expected to increase to supplement the existing face-to-face services in the post-COVID-19 era [8]. Therefore, even in community care, where analog methods are dominant, discussions are expanding in Korea how to utilize and apply human technology, that is, human technology that combines technology with welfare, as a new alternative to the care gap for elderly people who live alone [9].

Since social care that relies on human work develops through the relationship of empathy and interaction between service users and providers, there is a unique characteristic that cannot be replaced by science and technology [10]. However, the reality is that it is difficult to rely entirely on human labor force because care is labor-intensive. In social disasters where human-to-human contact is restricted, the need for non-face-to-face services using welfare technology is bound to increase.

Already in Europe, welfare technology is applied to improve social participation and quality of life, as well as support daily life and life safety of the elderly, under the recognition that welfare technology is a future-oriented way in relation to the supply shortage of care workers and the efficiency of care. The scope of application has been expanded [11], and it has been discussed that welfare technology should be human centered [12]. Hofmann (2013) emphasized that welfare technology should be used ethically for humans [13]. This is because welfare technology does not exist as a technology itself but can be recognized as a valuable tool only when it functions positively for the lives of vulnerable clients. Therefore, ICT-linked services in social welfare should be utilized for humans within the scope that does not infringe on human dignity. ICT-linked services for elderly people who live alone are positive in that they prevent lonely deaths, support safety, and provide

emotional support [14]. However, there has not been an in-depth discussion on how much welfare technology can supplement and replace the functions of care provided through face-to-face interaction, and how to secure user's rights and ethical issues that may arise from ICT-linked care services.

All services for humans should be conducted faithful to the ethical principles based on the value of human dignity. More ethical measures should be devised so that the rights of clients are not violated for services targeting the vulnerable, such as elderly people who live alone [15]. Although the necessity and effectiveness of the use of technology in social welfare services are being discussed, the discussion for the ethical use of welfare technology is limited to privacy protection, and measures related to the comprehensive rights of service users have not yet been proposed.

Therefore, this study aims to find ways to develop ethical welfare technology in caring for elderly people who live alone by identifying the current situation of ICT-linked welfare services used in community care and the ethical problems that arise in the process of using them. The detailed research topics of this study are as follows. First, it examines the status and problems of welfare technology for elderly people who live alone. Second, it identifies ethical issues raised in the process of using welfare technology for elderly people who live alone. Third, it proposes a plan for the use of ethical welfare technology in caring for elderly people who live alone.

This study is meaningful in that it is a pioneering study for the ethical use of welfare technology, and it is expected to be helpful in finding ways to develop human technology to maximize the rights of clients.

2 Theoretical Background

2.1 Community Care and Use of Welfare Technology

Technological development affects the direction of interventions with clients. In the past, the development of medical technology made it possible to deinstitutionalize the disabled and the elderly [16], which led to the development of in-home welfare and case management services. Likewise, the current development of information and communication technology gave birth to a new concept and system of "welfare technology" in the welfare field. In Korea, it was in the early 1990s that home welfare services for clients in need of care were expanded mainly in the local communities. With the establishment of home welfare service center attached to the social welfare center, case management was conducted by private institutions so that the

disabled and the elderly could be connected to local resources at home as part of community protection. Since then, case management has been expanded to support clients with complex needs and become a major function of community social welfare centers since 2013 [17].

The Korean government also recognized the need to protect the local community for the vulnerable and implemented a case management pilot project in 2009. Since 2012, the Ministry of Health and Welfare established the “Hope Welfare Support Group” to push ahead case management for the vulnerable based on the local community. In 2018, integrated case management was carried out nationwide [18]. With the increase of elderly people who live alone with complex needs such as economic, medical, psychological, and mental health needs, comprehensive community is further needed. In an aging Korean society with low birth rate and aging population, elderly people who live alone and have weak social networks and resources are the top priority in community care. To respond to problems such as life stability, depression, and lonely death of elderly people who live alone in the local community, the government has implemented the “Community Care” project as a pilot project from 2019 to strengthen the existing integrated case management function. The goal is to establish an integrated care system for the local community by 2025 [19].

Elderly people who live alone and receive community care services spend most of their time alone at home, although a life manager regularly visits their home or makes phone calls. Therefore, the problems of their life safety and the risk of lonely death are always present. Providing continuous monitoring using ICT or IoT and providing emotional support with companion robots using artificial intelligence are positive applications of technology to stabilize the lives of elderly people who live alone.

Welfare technology, which means the convergence of welfare and technology, refers to the application of advanced technology to the field of welfare. Welfare technology is discussed to innovatively solve social problems as well as support the life of clients by applying ICT-linked technology to the welfare area [20, 21]. Already in Europe, the need for welfare technology has emerged since the early 2000s, and care services using technology have been provided to help clients spend their old age in local communities [22]. Welfare technology is used in various areas such as communication support, life safety support, daily life support (medication, exercise, etc.), disease monitoring, leisure and entertainment, rehabilitation, emotional and social support (companion robot), walking support (wearable), service robot, and virtual care [23]. Therefore, it has the function of improving the quality

of life by promoting self-management and social participation of clients or patients [24].

As an example of the use of welfare technology, Seoul City conducted a pilot project in 2017 as a safety management solution project for the vulnerable elderly, and 7,500 households are using the IoT non-face-to-face care services in July 2020 [25]. Similar smart home services began in 2019 as a leading project for “Community Care.” Of course, there have been many cases where welfare technology has been applied before that, but it is only recently that it has been applied in earnest in community care. Smart home service is an auxiliary technology that supports clients to lead independent lives at home by using technologies such as the Internet of Things (IoT) and artificial intelligence (AI) [26]. Bucheon City and Hwaseong City, which are participating in the community care pilot project, have distributed AI speakers, home IoT, and companion robots to check the safety of elderly people who live alone in 2020. In the case of Cheonan City concerned about the lack of care due to COVID-19, artificial intelligence and Internet of Things (IoT) technology are used to distribute and utilize care robots that tell the time to take medication or take a walk [27]. In addition to community care pilot areas, the number of ICT-linked services to support the living safety of elderly people who live alone and to prevent lonely deaths is increasing depending on the conditions of each local government [28].

As the effect of care services using ICT, Seoul City reported that 135 possible deaths were prevented from 2018 to July 2020 by using the safe care IoT for single-person households [29]. SK Telecom, in cooperation with local governments, conducted the “Happy Community Artificial Intelligence Care” project for elderly people who live alone from 2019, and surveyed the effectiveness of the project for 670 service users. As a result, 73.6% of elderly people who live alone used AI speaker every day, and 7% of users confirmed that their sense of happiness increased compared to before [30, 31].

2.2 Ethics of Welfare Technology Use

Research papers were searched in the Korea Citation Index of the Korea Research Foundation to understand domestic research trends on the use of ICT in caring for the elderly. As of January 2022, there were 847 papers first searched for “elderly care,” and 15 papers directly related to the use of ICT in elderly care when detailed search was conducted with “ICT” and “welfare technology.” These papers were published after 2017 and have focused on the necessity and application of welfare services using ICT as a complementary

mechanism to solve the present issues such as the gap in elderly care due to aging population, the blind spots in care due to the increase in elderly people who live alone, and the problems of their safety and lonely deaths [32–34]. These studies mainly presented the status, necessity, and application of ICT-linked services, and some studies discussed design and evaluation directions [35, 36].

However, in previous studies, there are no papers dealing with ethical issues that may arise in the use of human technology or ethical directions for human-centered use. Kim Soowan et al. (2021) points out that research related to welfare technology in Korea is limited to model development or introduction of fragmentary cases [37], and Choi Soyun suggests that ethical indicators should be developed and presented so that welfare technology can be used as human-centered rather than technology-oriented [38]. If human services targeting humans are conducted without ethical guidelines, the possibility of unethical practice that violates individual rights cannot be excluded. Therefore, human service professionals promulgate the code of ethics and practice based on ethical principles [39].

Reamer (2021) emphasized that technology-linked welfare services should guarantee the right to self-determination through informed consent based on the value of human dignity, respect privacy, protect clients from conflicts of interest, and be used in a way that can benefit individuals and society [40].

Ethical issues that can arise when using technology for humans have already been actively discussed in Europe. Conflicts of interest with various parties, alienation of users due to the use of advanced technologies, confidentiality of third parties, equality of access and fair distribution, and conflicts related to instrumental rationality and respect for human beings are major ethical issues that should be considered in services using welfare technology [41, 42].

However, most of the ethical issues related to the use of technology are mainly presented with a focus on developers and users in artificial intelligence (AI). As shown in Table 1, the Korean Artificial Intelligence Ethics Association (KAIEA) enacted the Artificial Intelligence Ethics Charter in 2019, “to secure the safety of artificial intelligence at the global and human level, and to use artificial intelligence as a tool for human happiness and convenience,” and presented detailed ethical principles for developers and users [43]. The Ministry of Science and Information Technology presented human dignity, common good of society, and purposiveness of technology as three principles of human-centered AI ethics, and suggested human rights protection, privacy

Table 1 Principles of AI ethics

KAIEA	MSIT	UNESCO	EU
– The relationship between humans and AI	– Human rights protection	– Proportionality and do no harm	– Respect for human autonomy
– Good and safe AI	– Privacy protection	– Safety and security	– Prevention of harm
– Ethics of AI developers	– Respect for diversity	– Fairness and non-discrimination	– Fairness
– AI consumer ethics	– Non-infringement	– Sustainability	– Explicability
– Shared responsibilities and sharing of interest	– Publicity	– Right to Privacy, and Data Protection	
	– Solidity	– Human oversight and determination	
	– Data management	– Transparency and explainability	
	– Responsibility	– Responsibility and accountability	
	– Safety		
	– Transparency		

protection, respect for diversity, non-infringement, publicity, solidarity, data management, responsibility, safety, and transparency as detailed requirements to realize the basic principles [44]. Despite these efforts, in January 2021, in Korea, the AI chatbot “Iruda” caused social repercussions due to ethical issues such as discrimination and hatred against women and the disabled, resulting in the suspension of the chatbot services [45].

By proposing the “Artificial Intelligence Ethics Recommendations,” UNESCO proposed that artificial intelligence technology be used for the purpose of respecting human rights, developing environment and ecosystem, embracing diversity, and promoting peaceful and just society [46]. The European Commission presented respect for human autonomy, prevention of harm, fairness, and explicability as AI ethical principles [47].

Although the AI ethics principles are positive in that they provide universal guidelines for developers and users, there is also a critical view that it lacks specificity as a guide for practitioners [48]. In addition, AI ethics is mainly discussed with a focus on developers and users, and it is not appropriate to apply it to ethical issues of welfare technology related to various stakeholders.

In social welfare services, social workers play a pivotal role in the service delivery process, and the life manager plays an important role in the delivery of care services. Therefore, the ethical sensitivity of human resources related to care services also affects the ethical use of welfare technology.

Since the current AI ethics principle is not an ethical principle related to ICT-linked welfare services, there is a limit to using it as a guideline on ethical issues that may arise in the process of using technology-based care services. In recognition of this problem, Choi (2022) argues that detailed guidelines and indicators for the ethical use of welfare technologies are needed in social welfare fields [49].

3 Research Method

3.1 Research Participants

This study was conducted as a qualitative study of focus group interviews. For the sampling of research participants, random sampling of critical cases useful for providing maximum information was used [50]. Therefore, a total of nine social workers, who are participating in the pilot project at the community care center in Bucheon, Gyeonggi-Do and community-tailored care programs in Seoul City, were involved in this study. The basic characteristics of participants are shown in Table 2.

3.2 Data Collection Method

For data collection, focus group interview (FGI) was used to obtain sufficient information on the research topic through interactive participation among

Table 2 Characteristics of participants

No	Gender	Affiliated Institution	Position	Work Experience
1	Male	Community care center	social worker	16 years
2	Male		Social worker	17 years
3	Male		Social worker	2 months
4	Female		Social worker	4 years
5	Female		Social worker	1.6 year
6	Female		Social worker	2 years
7	Male	Senior center	Social worker	18 years
8	Male		Social worker	13 years
9	Female		Social worker	7 years

research participants. FGI was conducted in January 2022 in a non-face-to-face real-time online meeting as social distancing was strengthened due to COVID-19. Semi-structured questionnaires were used for each research topic. The question categories include “the status of welfare services linked to ICT,” “problems and ethical issues in the service delivery process,” and “development plans for the use of welfare technology.” For sufficient data collection, before the FGI, each participant was provided with information about the research description by phone and e-mail so that they could lead to in-depth discussions at the FGI.

To secure the reliability and validity of the qualitative data, the researcher directly performed the entire FGI, and proceeded for 1 hour to 1 hour and 30 minutes for each group. The contents of the FGI were recorded with the consent of the participants, and after writing the transcript, the contents corresponding to each question were categorized through content analysis.

3.3 Ethical Consideration of Research

For ethical consideration of the research, it has been approved by the institutional ethics review committee of the researcher’s affiliated university (NSU–202112-001). After explaining the purpose of research, the method and procedure of interviews, and the right to refuse the research, based on the approved research description and consent forms, the researcher provided questioning opportunities. In addition, the research was conducted with the voluntary written consent from the research participants after guiding the scope of personal information use, the processing method of interview contents, and the protection of personal information.

4 Research Results

4.1 Current Status of Care Services Using ICT and AI

Table 3 shows ICT-linked services for elderly people who live alone. Safety care IoT for monitoring the lonely death and living safety and companion robots and AI devices for psychological and emotional support are mainly used. Safety care IoT is to check the safety of elderly people who live alone to prevent danger and lonely death by detecting the safety situation such as illuminance, motion detection, and electricity use. Bucheon City’s “Caring Plug” and Seoul City’s “Safe Care IoT” have different names for each local

Table 3 Safety care IoT, companion robot, and AI speaker

	Safety Care IoT	Companion Robot & AI Speaker
Service Target	Those aged 65 or older living alone who do not have a caring family	Those aged 65 or older living alone who do not have a caring family
Purpose	Life safety and prevention of lonely death	Psychological and emotional support, information, and recreational support
Function	Checking the living response of elderly people who live alone through illuminance, electricity consumption, humidity, carbon dioxide concentration, and movement	<ul style="list-style-type: none"> – Cozy doll with AI function: medication map, walk time reminder, number game or word game, weather alert, etc. – AI Speaker: Call 119 in case of danger

government, but the purpose and method of ICT-linked welfare services for elderly people who live alone were similar.

The selection of safety care IoT service targets is a method in which social workers determine eligibility according to the priorities of elderly people who live alone in the community, guide the service, and install it in each household with the consent users. It is a method of always monitoring the elderly's life reactions by checking the movement of the elderly, electricity use, and illuminance through devices installed in the home of elderly people who live alone.

The information on the devices installed in each household is transmitted to life manager's smart phone and monitored by the life manager, and community welfare center monitors and manages the entire elderly people who live alone and use the service. If there is no change in power or illuminance or motion is not detected for a certain period, an alarm is sent to the person in charge, including life manager, and regular monitoring is performed to prevent risks even if an alarm does not occur.

Companion robots and AI speakers are used for emotional support and life security of elderly people who live alone with weak social networks. Companion robots and AI speakers not only provide information related to daily life as they have artificial intelligence functions, but also support the leisure activities of the elderly as they are equipped with word and arithmetic play functions. These services are used by applicants among elderly people who live alone and need social, psychological, and emotional support.

4.2 Ethical Issues and Improvement Direction in ICT-Linked Welfare Service Delivery

Ethical issues and improvement direction in the service delivery process using welfare technology were identified as shown in Table 4.

4.2.1 Individualization

Because the functions of IoT devices are applied in the same way to all households, the monitoring accuracy is poor in the case of the elderly who rarely watch TV or move less, and the problem of privacy invasion can be caused in the process of checking by life manager over the phone to understand the exact situation.

In addition, there were cases where companion robot in which the program was set did not match the unique characteristics of the client. Therefore, the necessity of using welfare technology according to the characteristics of the client was suggested.

“There are people who haven’t watched TV for a long time, and even if I call them and ask them how they are doing, at first they like it, but later on, there are people who ask if I should watch TV more now.” (Participant 3)

“Some people bring their companion robots because they don’t like the AI and they say it’s interrupted because they say it at a set time.” (Participant 7)

Table 4 Ethical issues and improvement direction in ICT-linked welfare service delivery

Ethical Issues	Improvement Direction
Inability to fit individual circumstances	Individualization
Problems that do not fully consider the user’s situation	Client-centered
Older people have difficulty in operating devices	Convenience
Digitally underprivileged	Advocacy
Distrust of IoT functions	Well informed consent
Differences in intervention according to the job competency of life managers	Competence
Invasion of privacy in the monitoring process	Privacy
Conflict between self-determination and paternalism/ lack of alternatives	Self-determination
Lack of sufficient explanation about the scope of information use	Rights to know

4.2.2 Client-Centered

IoT and companion robots are not designed and developed to fit the circumstances and characteristics of each client, there are some parts that are not suitable for the living situation or environment of elderly people who live alone. Accordingly, there has been the view that welfare technology should be developed and utilized focused on users rather than providers.

“Since there is no customized service for the elderly because we are providing the same service in common, it becomes service-centered that we continue to support instead of being user-centered.”
(Participant 2)

4.2.3 Convenience

The use of safety care IoT and companion robots alleviates care gaps and blind spots, but there were parts that were difficult for the elderly who were not familiar with using digital devices to operate. Although social workers and life managers explain the operation of the device to the elderly, the opinion was suggested that convenience needs to be strengthened to make it easier for the elderly to use and operate it.

“At first, there are things that are unfamiliar to the device, and explaining to the elderly consumes energy and is difficult to understand, and I think that such a process is a bit consuming.”
(Participant 6)

4.2.4 Advocacy

In the case of elderly people who live alone, there are many digitally underprivileged people, so not only the devices but also the Wi-Fi environments affect the use of smart devices in ICT-linked services. In addition, although ICT-linked welfare services are needed, there are blind spots in digital welfare that are not selected as service targets because they do not meet the target criteria. Therefore, it was confirmed that realistic support for the digitally underprivileged should be provided so that elderly people who live alone and need the use of welfare technology can receive services.

“We supported IoT devices for those who have smart phones and who are interested in and know how to handle machines.”
(Participant 5)

“If there is no wireless internet or anything like that installed at home, we did something wrong in the beginning, but now what we call care plug is LTE method, so we supported it.” (Participant 1)

“The blind spots in welfare services are elderly people with ambiguous economic level. Unless elderly people who live alone are the beneficiary or the upper rank, they cannot receive care services.” (Participant 8)

4.2.5 Well Informed Consent

For elderly people living alone who are unfamiliar with digital devices, the need to proceed with consent through detailed explanation and sufficient notice was suggested when installing IoT devices. Although social workers selected elderly households who needed ICT-linked welfare services through case meetings and installed them after providing guidance on devices and obtaining consent, some elderly people who live alone felt that IoT devices were monitoring them or did not sympathize with their needs. There were cases in which they shut off the power of IoT devices for these reasons. Therefore, the need for sufficient informed consent was suggested.

“At first, elderly people who live alone said that they would take care of it, so they agreed that it was okay even if they had no experience in using it, but after installing it and using it for a day or so, there are people who refuse to agree to take it right away because they say they are being watched.” (Participant 8)

“Even though the client agreed to it with patience, but after installing it, he took it out again and threw it away secretly.” (Participant 4)

4.2.6 Staff Competency

Unlike other ICT technologies that are mainly used in the relationship between developers and users, IoT-linked welfare services go through a process of delivery among developers, suppliers (local government), providers (social workers, life managers), and users. That is, several stakeholders are involved in the process of ICT-linked welfare services. Among them, social workers and life managers work for life safety in a face-to-face relationship with elderly people who live alone, so their work performance capability, situational judgment ability, and sensitivity are key factors determining the quality of service.

Above all, since it is possible to respond quickly to the risks of clients according to the situational judgment of life managers, it is necessary to improve their work skills through education that can share on various situations and cases.

“I think how much life manager puts their mind to it will be a little more variable, and there will be a little part about the skill level. When the light suddenly goes dark, whether it is a device error or a user problem, experienced life managers can respond with sensitivity.” (Participant 9)

4.2.7 Privacy

The most important ethical issue in the use of ICT-linked welfare services is privacy infringement. When perceived as an invasion of privacy, it leads to distrust of IoT devices. This is a case where safety care IoT device is recognized as a hidden camera, or they perceive that they are being monitored. Furthermore, there were cases where life manager’s feedback to the client about the monitoring results was perceived as an invasion of privacy, not as monitoring for safety. Accordingly, information needs to be provided from the user’s point of view so that the client can trust, and a positive support relationship between the client and the life manager needs to be formed.

“When we contacted them, they were a little anxious about invasion of privacy, and there were times when they felt a little uncomfortable” (Participant 4)

“There was a lot of talk about whether it was a hidden camera or not. So, I visited a certain house and he put a lot of tissue paper in the hole” (Participant 5)

“There are people who actually feel that they are being watched.” (Participant 8)

In addition to invasion of privacy, it was also discussed that more active efforts were needed to ensure privacy. There was no institution that had guidelines on how to safely manage and dispose information collected for personal safety. Social workers tried to ensure the rights of clients with their respective ethical sensitivities. Through these interview results, it was confirmed that specific guidelines for guaranteeing the rights of clients should be presented.

“Personal information of the elderly can be easily viewed by anyone using the PC, so I set a password.” (Participant 6)

4.2.8 Self-Determination

Because refusal of service cannot be enforced, social workers experience an ethical dilemma between the autonomy of the user and the compassionate intervention of the expert. A client's right to self-determination should be respected, but there is also an ethical responsibility to provide services for clients in need of services. Therefore, it was confirmed that social worker should assist elderly people who live alone so that they can make the best choice for themselves by providing sufficient information while guaranteeing the right to self-determination.

“It is really necessary for this family, but what should I do when he refuses? As a result, should I give priority to self-determination or the risk that may arise in the future?” (Participant 1)

4.2.9 Rights to Know

Depending on the function of the ICT-linked welfare service, the client's private information can be provided to the developer or a third party. It can also be used for research purposes. Most of the research participants did not know the exact information about the scope and contents of the client's information collection, the storage method and deadline, and the scope of use. It was confirmed that the client's right to know about the collection, use, and disposal of private information should be sufficiently guaranteed.

“The AI capabilities have been expanded so that the speaker is now collecting all the noise in it, even when it is powered off.” (Participant 4)

5 Discussions and Suggestion

This study was conducted to find a direction for ethical technology utilization in elderly care by exploring the status, ethical issues, and development directions of ICT-linked welfare services for elderly people who live alone. For this purpose, focus group interview was conducted for social workers who have experience in using welfare technology in community care. As ICT-linked welfare services, safety care IoT was used for the safety of elderly people who live alone, and AI (companion robots and speakers) was used for their emotional support.

Issues in the delivery system include (1) inability to fit individual circumstances, (2) problems that do not fully consider the user's situation,

(3) elderly people who have difficulty in operating, (4) digitally underprivileged, (5) distrust of IoT functions, (6) differences in intervention according to the job competency of life managers, (7) invasion of privacy in the monitoring process, (8) conflict between self-determination and paternalism/lack of alternatives, (9) lack of sufficient explanation about the scope of information use.

Individualization, client-centered, convenience, advocacy, well-informed consent, competence, privacy, self-determination, and rights to know were presented as development directions for these delivery system issues.

Discussions and suggestion based on the research results are as follows.

First, ethical guidelines and principles should be presented so that welfare technology can be used ethically. In a situation where ICT-linked welfare services are expanding, social workers in each social welfare facility are referring to the Code of Ethics enacted in 2001 by the Korean Association of Social Workers. NASW (National Association of Social Workers) included details of ethical standards related to the use of technology in its Code of Ethics in 2017 to strengthen the ethical practice of social workers in the process of providing services to clients using digital and information technology [51].

Table 5 shows ethical indicators related to the use of welfare technology by referring to the contents derived from the focus group interviews and the NASW. Existing ethical indicators related to AI are being discussed in terms of developers and users. Since social worker plays a pivotal role in the process of using the developed technology for ICT-linked care services, ethical indicators should be presented in the support relationship between the provider (social worker) and the user (elderly people who live alone). Accordingly, applicable indicators of ethical welfare technology utilization are presented as shown in Table 5. The indicators were developed in terms of client rights and interests and provider responsibility in consultation with experts on the contents of focus group interviews.

Second, several stakeholders should participate in the development process of welfare technology. As non-face-to-face services are expanded due to COVID-19, the demand for the use of welfare technology is increasing. In addition, ICT-linked welfare services are expected to expand in each country as an alternative to compensating for the shortage of care workers due to the increase in the number of care consumers.

The result that the characteristics and needs of users in the social welfare field are not considered in the process of using welfare technology developed in the field of science and technology is because technology for humans

Table 5 Indicators of ethical welfare technology utilization

	Category		Indicators
Client rights and interests	Client interests		Technology-linked service is tailored to the individual circumstances of the client. Technology-linked service is tailored to the individual needs of the clients. Technology-linked service is convenient for clients to use
	Client rights	Informed consent	Inform clients of agency's policy for technology-linked service. Evaluate client's ability to use technology-linked service. Obtain prior consent from clients before observing client's daily information or allowing the observation to third parties.
		Privacy	Guarantee the confidentiality of all information in the process of service delivery. Do not provide information to third parties without the client's consent. Do not infringe on the privacy of clients in the process of service delivery.
		Autonomy	Obtain voluntary consent from clients. There is no coercion in the decision-making process. Respect the right to refuse the use of service.
Provider responsibility	Service provision	Rights to Know	Provide accurate, timely, and specific information clients need to know. Inform about the scope, content, processing method, storage and disposal of information.
			Considering the use of digitally underprivileged groups. There are no obstacles (cost burden, data use, device specifications, etc.) that restrict service use. Evaluate the effectiveness of service use regularly.
	Professional competence		Providers have the knowledge and skills to provide technology-related services. Understand and comply with policies and laws related to technology-related services.

is developed not human-centered but technology-centered. ICT for elderly people who live alone should be developed and utilized most suitable for them in consideration of their various characteristics. Therefore, it is necessary to collect the opinions of various stakeholders in the process of utilizing welfare technology. Elderly people who live alone and social workers closest

to the clients should cooperate to develop the most suitable technology for the elderly.

Finally, this study is meaningful in that it is a pioneering study for the ethical use of welfare technology in Korea, an IT powerhouse. However, since this study was conducted focusing on a limited scope related to community care for elderly people who live alone, there is a limit to expanding and generalizing research findings to various welfare technologies. Through follow-up research, it is necessary to specify development measures to utilize ethical welfare technologies in various fields.

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