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Introducing technology to support older people living at home – a qualitative study of ethics from the perspective of care professionals

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Abstract

Today's demographic shift towards an aging population is increasing health challenges, and technologies need to be developed to support older people. The national policy in Finland is that older people have the right to live in their own homes for as long as this is safe and meets their needs. However, introducing technology comes with ethical challenges and requires new skills of care personnel. The ethical aspects of technology need to be discussed in more depth.

This study aimed to explore the ethical competence of care professionals who work with older people concerning the introduction of technology that supports living at home and to reveal the issues in this area that need development. The study was based on an electronic survey of 14 care professionals working in home care and used a descriptive qualitative study design. Inductive content analysis revealed four main categories: professional ethics, decision-making, change brought about by technology, and factors affecting the introduction of technology.

This study shows that care professionals, regardless of their level or field of education, recognize professional ethics as a factor that guides their everyday work. However, it seems that ethics are not always realized in practice. To meet older peoples' needs and wishes decision-making and individual assessment play an important role when introducing technology.

The introduction of technology to support living at home among older people has a strong ethical dimension and requires strong professional ethics. The present study suggests that care personnel have insights into these ethical aspects, but that training, guidelines and operative models are needed to support care professionals' ethical thinking and decision-making. The results of this study can help health care organizations identify care personnel's training needs and requirements for a clear, uniform process to introduce technology.

Keywords: aging, ethics, home care, professional competence, technology

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Introduction

The world's population is aging. The number of people over 65 will grow to 1.6 billion by 2050, which is approximately 16.5% of the world's population. In Finland, the number of older people will increase to 1.52 million by 2050, which is approximately 22.7% of the Finnish population [1]. The demographic shift towards an aging population increases health challenges and creates a need to develop technologies to support older people [2]. The Finnish government has included improving services for older people in its strategic themes and aims to develop the quality and resourcing of home care and to introduce new methods and technologies to the field [3]. The National Smart Ageing and Care at Home (KATI) program aims to meet these goals by implementing new technologies and digital services to promote the well-being, aging and care of older people at home in Finland [4].

The majority of the older people in Finland lives at home [3]. According to the national policy, older people have the right to live in their own homes for as long as this is safe and meets their needs [5]. Technology can enable living at home independently [2,6] and offer new options and solutions that support older people's autonomy and privacy. Moreover, technology can allow professionals to offer better services and care [7].

The introduction of technology comes with ethical challenges such as cost-effectiveness, privacy, autonomy, informed consent, dignity, safety, and trust. Some of these challenges can be difficult to overcome [8]. The perceptions of the challenges and everyday needs related to living at home may differ between people who live at home and their family members [9]. When discussing autonomy, it is important to acknowledge the fine line between improving and limiting individuals' lives [8].

Technologies should be personalized following the real needs of the elderly population [10,11]. The issue of who has the right to decide whether to use the technology and whether it protects the privacy, dignity, and liberty of the person using it should be considered. Careful consideration is also needed of whether the technology supports mobility, companionship, and social engagement, and finally, of whether the technology is accessible to all equitably [12].

The introduction of technology in the home care setting requires new skills of personnel: new ways of working [13,14] more thorough ethical thinking [13,15] and decision-making skills [15]. Digitalization has increased the need for ethical competence and common ethical guidelines, and operating models are needed to support health care workers [16,17]. The ethical aspects of technology are not discussed to the same degree as their usefulness, accessibility, and effects on the relationship between clients and health care professionals [18]. Care professionals should be encouraged to discuss and reflect on the ethical issues related to technology [19]. More research on introducing technology in the home care context is needed [20] as no models exist to analyze the ethical pitfalls [10].

This study aimed to explore the ethical competence of care professionals working with older people in relation to introducing technology that supports living at home. The study also aimed to reveal the issues that need development in this area. This study was part of a larger development project and was conducted by the Oulu University of Applied Sciences which was also one of the sub-implementors of the KARITA project. This project was one of the regional projects of the KATI program.

Material and methods

We used a descriptive qualitative study design, and gathered data via an electronic survey. The purpose of the survey was to help us understand the views and perceptions of the participants [21], in this case the care professionals' perception of their competence. The self-developed survey (Appendix 1) was formulated based on the literature. The survey and cover letter were pre-tested by 10 people, all of whom had experience working in social and health care environments. Based on the feedback we made changes to the survey and cover letter. The open-ended questions (10) aimed to determine what the care professionals thought of their knowledge regarding ethical issues. The questionnaire also contained background characteristics (Table 1) and multiple-choice questions about the technology in use and how the care professionals evaluated their ethical competence in introducing technology that supports older people living at home. The purpose of these questions was to focus the participant's thinking on the themes of the questionnaire. The home care personnel working with older people living at home in Oulu, Finland were approached through their supervisors by email. A total of 14 home care professionals participated in the survey.

Ethical considerations

This study was carried out following the guidelines of the Finnish Advisory Board on Research Integrity [22]. It was approved by the Welfare Services of the City of Oulu (7265/07.01.04.02/2022). Participation was voluntary and all the participants were informed in writing. They were also informed that responding to survey was considered informed consent. All the data were collected, stored securely and accessed by only the researchers. The participants were assured that the results would be anonymized.

Table 1. Demographic characteristics of participants.

Characteristics		Participants (n=14)
Age group (years)	18–24	2 (14.3%)
	25–34	4 (28.5%)
	35–44	2 (14.3%)
	45–54	4 (28.6%)
	55 or more	2 (14.3%)
Profession	Practical nurse/enrolled nurse/carer	9 (64.3%)
	Registered nurse	3 (21.4%)
	Care assistant	-
	Other	2 (14.3%)
Work experience in home care (years)	0–4	3 (21.4%)
	5–9	5 (35.7%)
	10–14	3 (21.4%)
	15–19	1 (7.2%)
	20 or more	2 (14.3%)

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Data analysis

The research data were approached through inductive, i.e., data-driven content analysis, a commonly used method of qualitative research that aims to describe the phenomenon under study in a condensed and general form [23]. This approach is recommended if there is not enough prior research on the phenomenon or if knowledge is fragmented. There are no systematic, accurate or simple guidelines for how to analyze qualitative data, which is a challenge for researchers [23,24.] The aim is to produce data abstracts that summarize the main categories and themes and provide indications of potential theoretical relationships [25].

Data analysis began by both researchers studying the data together and looking for relevant data related to the research problem. The original expressions extracted from the material were reduced and broken into open codes. The simplistic expressions were then read through, and the researchers separately looked for concepts describing similarities and differences. Concepts describing the same phenomenon were grouped and combined into categories, which were then named to describe the content. The separately formed subcategories were compared and discussed on several occasions. The subclassification was fairly consistent, and the final subcategories (n=85) were formed based on discussion. The subcategories were then organized into categories (n=20) and main categories (n=4). A sample of the content analysis is presented in Appendix 2.

Results

Inductive content analysis revealed four main categories related to care professionals' ethical competence when introducing technology that supports living at home: professional ethics, decision-making, change brought about by technology, and factors affecting the introduction of technology. These categories are discussed more carefully below. The participants evaluated their ethical competence in introducing technology that supports living at home as average, good or excellent. Only one participant evaluated her knowledge as very poor. Table 1 presents the demographic characteristics of the participants.

Professional ethics

The survey indicated that the personnel have strong competence in professional ethics and ethical principles. Respect for older people's own will and autonomy, equality, humanity, and human dignity were emphasized as the guiding values of their work. Furthermore, professionalism was seen as part of ethical competence. Professional ethics influence the background of all activities in care professionals' work but are not always easy to define. Ethics is involved in all the following categories.

> "Responsibility, communality, initiative, equality, autonomy, respect, and respect for human dignity guide my daily work" (P2)

Decision-making

As discussed earlier, professional ethics guided the participants' daily work and they emphasized the importance of respecting older people's own will and autonomy. However, these values are not always fulfilled in practice. Most answers showed that the older people's opinions were not considered in introducing technology. The participants stated that decisions were often made in multidisciplinary teams, without the precense of the older people. Participants emphasized the importance of including the older people and their family members in decision-making.

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"Autonomy may not be realized if the technology is taken into use against the client's own will." (P3)

The study showed that individual evaluation plays an important role in decision-making. Factors that need to be considered when introducing technology are the need, suitability, and benefits from the older people's perspective. The participants emphasized the importance of needs assessment and agreed that technology must be given on the right grounds.

"During the care needs assessment, a need is identified that could be met by utilizing technology. After this, as a nurse, I recommend to the client and family member the introduction of the service." (P9)

From the perspective of the suitability of the technology, care professionals must consider older people's health, cognitive skills and functional capacity, as well as the safety of the technology. The participants highlighted that memory issues and dementia raise more ethical questions that they must consider, especially around safety.

"It may be safer for someone with dementia to have a nurse physically administer the medication than for the client to take it alone from a digital medicine dispenser." (P5)

Benefits for the older people must be considered when introducing technology. The participants stated that it is important to evaluate whether the older people understand the meaning of the technology. One participant mentioned that technology is beneficial only if it helps older people's problems. Participants noted age as a factor that affects whether technology benefits the older people. They stated that technology is unsuitable for the oldest individuals and that individuals between 50

and 60 benefit the most. Some participants claimed that organizational guidelines affect decision-making. Also, technology can be introduced through different projects.

"It's also good to assess the client's state of health, for example, is the client's condition good enough to enable them to take the medicine from the digital medicine dispenser or press the pendant alarm, is the technology useful then?" (P2)

Change brought about by technology

The participants recognized that introducing technology changes the services for older people living at home. It might not only reduce the services but also the need for the services. Technology can reduce or change the type of visit. Face-to-face contact might become remote. Some participants noted that for some older people, reduced visits increased their autonomy, but others were concerned that technology would reduce older peoples' social interaction and quality of care.

"Physical services provided by humans are being reduced all the time and replaced by technology, and the quality of care suffers. The nurse's visit may be the only social event of the day for older people." (P12)

Most participants recognized the different stakeholders who benefit from the introduction of technology. They believed that when technology was granted on the right grounds, it enabled older people to stay safe at home and could make their life easier and support more independent living. It increased not only safety but also the feeling of safety. Technology also reduced the work and worry of family members.

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"The client can live a more independent life. For many clients, technology has provided security and ease of life." (P5)

Home-care units and their personnel also benefited from the introduction of technology. The participants noted that technology could support personnel and reduce their workload and worry. Home-care units also benefitted from fewer home-visits. Furthermore, the participants recognized that technology could bring savings to society and benefits to service providers. Some participants were uncomfortable with the idea that technology companies would benefit and profit from technology being introduced to the older people.

"Sometimes it lightens the workload of the nurse's visit, offers the opportunity to monitor the client's activity through the systems." (P9)

Factors affecting the introduction of technology

The participants highlighted culture and language barrier as challenges to explaining and understanding the introduction of technology. If the technology is not automatically available in older people´s native language, this could cause difficulties. The older people's professional background and previous skills were seen as implementation facilitators. Lack of skills and individual learning also challenged the introduction of technology. The economic aspect was highlighted in both a positive and negative sense. Technology may reduce service fees, but the older people's financial situation may bring challenges.

"A game of chance. Some learn, some don't. Applies to clients, family members and personnel" (P12)

Other older people's positive experiences and interest in receiving and learning how to use technology were seen as positive factors in introducing

technology. Furthermore, a positive atmosphere and positive attitudes of older people and their family members, as well as easy and clear introduction of the technology were highlighted as conducive factors. Anti-technology attitudes were seen as a possible reason for increased home visits. Prejudice and the refusal of technology were pointed out as limiting factors, but the reasons for refusal were not specified.

"Positive atmosphere, encouraging the customer and relatives, informing them of technological solutions" (P9)

Care professionals' guidance skills play an important role in the success of technology introduction. Ensuring that the older people and relatives know how to use technology and using versatile methods such as clear guidance both verbally and in writing, as well as plain language instructions, promote the introduction of technology. Furthermore, the participants shared that encouragement, practicing together, and repetition of instructions should be utilized. The participants highlighted familiarization with technological devices and how to use them to ensure competence. Similarly, orientation and guidance were perceived as an important means to ensure the competence of the personnel in the use of the technology. Care professionals, not relatives alone, should monitor older people's usage and competence in using the technology.

"This is ensured by familiarizing the personnel and by clearly guiding the client and their family in use, both verbally and in writing." (P2)

Functional services, appropriate devices, and simple operating systems were perceived as conducive factors and ways to ensure older peoples', family members' and personnel's ability to use technology. Functional technology is perceived as useful when it works properly. Data security and privacy

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were also highlighted as ethical challenges to introducing technology.

"They make everyday life easier, and they should be introduced without prejudice" (P14)

Most of the participants claimed that no training was arranged related to technology introduction. In some organizations training and orientation were arranged when required e.g., for the use of devices. Only one participant mentioned ethics training connected to technology. The participants highlighted a need for more training and its continuation. It should be ensured that everyone receives training in using devices and more information should be available about utilizing technology.

"There should be more information about the utilization of technology, where to get it, what is available, and the contact persons for each device." (P1)

When asked for their feelings and thoughts regarding the introduction of technology, the participants highlighted several issues related to the attitudes of both the personnel and decision-makers. Personnel awareness, positivity, joy, and open-mindedness were seen as factors conducive to the successful introduction of technology. Quality of care was a case of concern as the use of technology increases. The participants perceived technology as useful but were concerned that decision-makers would not understand that technology cannot replace care professionals. Despite the positive sides of development and introduction of technology, it often lacks humanity. Technology is seen to reduce personnel costs and bring savings. One participant saw the use of technology as aiming to reduce the number of clients and the workload during the work shift, which leads to older people's well-being being overlooked.

"It's useful but I'm afraid the decision-makers don't realize that technology doesn't replace care professionals" (P4)

Discussion

The care profession requires strong professional ethics, and the work is guided by a solid set of values and common ethical principles. Professional ethics emphasize cooperation, professionalism, and respect for the work of others. Ethical principles also support ethical decision-making in daily work [26-28]. Technology is more easily accepted by care professionals if it supports the ethical standards of care [29]. This study shows that, regardless of their level or field of education, care professionals recognize professional ethics as a factor guiding their everyday work.

The care professionals in this study had a generally positive attitude toward introducing technology. They felt that technology that supports living at home has the potential to improve the safety and independence of older people as well as to support their family members and home care personnel. Previous research has also shown that care professionals describe technology as important for older people to gain confidence and independence and enable safe living at home [15]. The care professionals agreed that technology can be an effective addition to supporting living at home as long as older peoples' needs and wishes remain at the center of introducing the technology and that older people benefit from using it. Successful introduction of technology to support living at home requires consideration of the impact of the technology on the older people's life. Similar results have been obtained in other studies [20,11]. The care professionals also shared that ensuring the competence of the older people and their family members in using technology through versatile methods

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promotes the introduction of technology. This is in line with a previous study that has shown that confidence and being able to use technology easily influences older people's willingness to use it [30].

Another important finding was that decision-making and individual assessment play an important role in introducing technology to the older people. Older people living at home are a diverse group with different digital competence, knowledge, needs, and preferences regarding technology [20,31] and thus careful individual assessment is crucial. Care professionals need to assess older peoples' care needs and preferences, as well as align and adjust the introduction of technology to those needs and preferences. Furthermore, it is important to carefully reflect on the benefits of the technology and compare them to the potential disadvantages and ethical implications [32].

Our study reveals that care professionals have concerns about the use of technology and recognize the ethical challenges in everyday work related to its introduction. Previous studies have made similar findings regarding the ethical concerns of care professionals, such as obtaining adequate consent from older people, especially those with dementia [19,33]; ensuring meaningful human contact [33]; and ensuring fair technology access [33,34]. Decision-making related to technology has a strong ethical dimension, especially around funding [15]. Care professionals are also worried that increasing the use of technology aims to make care work more efficient and replace face-to-face contact with older people. They worry that some stakeholders have motives that may not be aligned with the personnel's values. Managers might present the introduction of technology as part of quality improvement, whereas care professionals see it as part of efficiency demands. This causes a collision of interests between the rationality of the managers and the professional values of care. [20].

The results of this study indicate that time pressure, lack of knowledge, scattered information, and a lack of common guidelines can result in work ethics not being realized in practice. These findings suggest a clear need for training, information sharing, common guidelines, and operative models to support care professionals' ethical thinking when introducing technology to the older people. Estrada-Hernandez's [35] study also shows a lack of formal structure, models, or guidelines on approaching ethical dilemmas and highlights the importance of ethics training for technology. Furthermore, Mac-Innes [15] found a need for training that addresses the knowledge and skills related to decision-making, not only the availability and technical aspects of technology. Our study indicates that care professionals have different training needs, and that purposeful training can positively affect personnel's attitudes toward technology. Similar findings have also been reported by Guise and Wiig [13].

Limitations and trustworthiness of the study

The study had some limitations, such as the method chosen. Using a survey did not allow interaction with the participants to clarify their answers and make sure they understood the questions as we intended [21]. We aimed to minimize misunderstandings with pre-testing, enhancing surveys' trustworthiness and validity [36]. Using a different method such as interviews could have provided a more in-depth understanding of this topic and enhanced data saturation, which is needed for obtaining the greatest possible understanding of the study topic [37]. Although gathering data from different sources, i.e., triangulation, may increase credibility, it is not always possible and needs to be decided on by the researchers [38]. The main limitation of this study was the small sample size.

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Most of the participants' responses were brief, and it can be difficult to use content analysis effectively as the method requires rich data [39]. Brief responses imply that important considerations may have remained outside of this study and affected the saturation of the data. Nevertheless, our findings reflected those from related work. Quotations were used to confirm the connection between the results and the data [39]. The data were analyzed by two researchers, which enhances the credibility of the study [37]. To improve the quality of the reporting, we used the COREQ criteria and a checklist [40].

We approached the participants through their supervisors, and thus we cannot be entirely sure that the survey reached all the intended home care professionals or their reasons for taking part or not taking part in the survey. In addition, we studied this topic from only the care professionals' perspective and in a geographically small area. We acknowledge the geographical limitation of the study and that it is important to view this topic from different stakeholders' perspectives to understand the ethical concerns that might arise when introducing technology that supports living at home. This study was conducted in one organization, so the results may not be generalizable to other contexts.

Conclusion

The introduction of technology that supports living at home among the older people has a strong ethical dimension that involves ethical competence, decision-making skills, and understanding different stakeholders' viewpoints and how technology affects services. The present study suggests that care personnel have insights into these ethical aspects but that training, guidelines, and operative models to suport care professionals' ethical thinking and decision-making are lacking. This information can help health care organizations identify care personnel's training needs and requirements for a clear, uniform way in which to introduce technology. More research is needed to find out the state of existing ethical guidelines and operative models to understand how widely they are used and their usefulness from the care professionals' perspective.

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Conflict of interest statement

The authors declare that they have no conflict of interests. The granting institution had no impact on the results or preparation of the manuscript.

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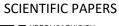
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Appendix 1.

The self-developed survey (Translated to English from Finnish).

1. Educational background

☐ Personal nurse / home nurse

☐ Nurse

☐ Nursing assistant

☐ Other, please specify.

2. Age

○ 18-24

○ 25-34

○ 35-44

○ 45-54

○ 55 or more

3. Work experience in years in this work area

○ 0-4

○ 5-9

○ 10-14

○ 15-19

○ 20 or more

4. What technology is used in your unit to support living at home?

☐ Safety phone, locating safety bracelet

☐ Medical robot / reminder

☐ Sensor technology e.g. door sensor, detection of falls

☐ Cooker guard

☐ Application

☐ Remote measuring

☐ Remote communication

☐ Catering machine

☐ Other, please specify.

5. What ethical principles guide your work?

_____

6. How do you feel about your ethical competence related to the introduction of technology that supports living at home?

○ Very good

○ Good

○ Quite good

○ Bad

○ Very bad

○ I cannot say

7. Who makes the choices and decisions on introducing technology?

_____

8. How does introducing technology affect other services for the customer?

_____

9. How does the customer's background (e.g. language, culture, financial situation, health) affect the introduction of technology and what ethical challenges do you think can be associated with this?

_____

10. What factors promote or hinder the successful introduction of technology?

_____

11. Who benefits from the introduction of technologies that support living at home?

_____

12. How is it ensured that the customer, family member and care personnel are able to use the technology?

_____

13. What feelings and thoughts does the adoption of technology inspire in you?

_____

14. Does your organisation provide training on the ethical aspects of adopting technology?

◯ Yes
◯ No

15. What kind of training? (Opens if previous answer was "Yes")

_____

16. Can you think of any personnel competence development needs related to the topic?

_____

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Appendix 2.

A sample of the content analysis (Translated to English from Finnish).

Simplistic expressions	Subcategories	Categories	Main categories
Need for the services might reduce	Reduced need for services	Change in the services	
The services might reduce The service might reduce	Reduced services		
Home visits might reduce Home visits might reduce Aims to reduce home visits Home visits reduce Home visits might reduce Home visits reduce Home visits reduce The need for home visits might reduce Technology effects the amount of home visits Reduced physical visits	Reduced home visits		Change Brought about by Technology
Remote contact Remote contacts Remote contacts	Remote contacts	Type of visit changes	
Remote monitoring of the client	Remote monitoring		
Become easier	Work becomes easier	Lightening of workload	
Support care personnels work	Support for the work		
Technology reduces care personnels workload Decreased workload The aim is to decrease the workload Work becomes lighter	Decreased workload		
Technology reduces the worry of care personnel Reduced worry of care personnel	Reduced worry		
Client benefits Client benefits Client benefits Technology increases the right care of the client Benefits for the client Support to elderly persons home Usefulness	Client benefits	Stakeholders who benefit from the introduction of technology	
Home care, if the home visits reduce Care personnel benefits Nurses benefit	Home-care unit benefits		
Family member benefits	Family member benefits		
Service provider benefits The company which provides services benefits The company profits	Service provider benefits		
Everyone benefits	Everyone benefits		
Society, if it brings savings Society benefits	Society benefits		
Independent living becomes possible Clients more independent living becomes possible	More independent living becomes possible	The effect on clienst life	
Ease of life Everyday life becomes easier	Making life easier		
Increased feeling of safety	Increased feeling of safety		
Technology increases clients safety Increased safety for the client Increased safety for the client	Increased safety		
Short client interaction Reduced social contacts	The effects on interaction		
Technology reduces family members work	Reduced work for family members	The effect on family members life	
Reduced worry of family members Technology reduces family members worry	Reduced worry of family members		
Family members responsibility	Family members responsibility		