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Finnish telehomecare workers' satisfaction with inclusion of telehomecare in older adults' home care and factors associated with it

Running title: Workers' satisfaction with telehomecare

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Abstract:

Background: Telehomecare in older adults' home care in Finland is mainly video-mediated check-up and reminder calls with home care clients. Home care workers have reported mixed attitudes and feelings towards utilisation of technologies and remote services in their work. The aim of this cross-sectional study was to investigate Finnish telehomecare workers' satisfaction with inclusion of telehomecare in older adults' home care. Another aim was to examine what factors are associated with this satisfaction.

Methods: The data was collected with an electronic quantitative email survey. Five Finnish older adults' home care organisations participated as the target organisations of the study. Two of the organisations were located in large cities, one in medium-sized provincial centre and two in rural municipalities. Three organisations provided telehomecare services with centralised service models and two with decentralised service models. In total, the organisations had 103 telehomecare workers to whom the survey was directed.

Results: The telehomecare workers were mostly satisfied with (55.8%) or felt neutral about (20.9%) the inclusion of telehomecare in older adults' home care. Satisfaction was strongly related to the workers' experience of telehomecare making their work easier, improved interaction and enhanced relationships of trust with clients as well as decreased workload. Application of telehomecare to overcome the workers' physical restrictions, and also their perceptions of being able to influence whether to start working in telehomecare, were strongly related to their satisfaction with inclusion of telehomecare in home care.

Conclusions: The results confirm that telehomecare job positions function well as relocated job positions in home care when workers have musculoskeletal problems or injuries. However, it is important that workers' willingness to work in telehomecare is also respected. From the telehomecare workers' perspective, good interaction and trustful relationships with clients are important factors that produce good care and increase satisfaction with telehomecare.

Keywords: Older adults, Homecare

What does this research add to existing knowledge in gerontology?

Population aging and shortage of labour challenge gerontological nursing care and especially home care. This study provides new information regarding development of new service models utilising technologies for home care organisations. The study discusses telehomecare workers' views related to telehomecare.

What are the implications of this new knowledge for nursing care with older people?

The results of this study suggest that most telehomecare workers are satisfied with the inclusion of telehomecare in older adults' home care. Telehomecare workers´ job satisfaction was strongly related to the workers' experience of telehomecare making their work easier, improved interaction and enhanced relationships of trust with clients as well as decreased workload.

How could the findings be used to influence policy or practice or research or education?

The number of older people is continuing to grow, and it is considered preferable that people can age in their home rather than having to be committed to institutional care. Therefore, new service models utilising technologies are being developed. Telehomecare offers the new opportunity to deliver home care to older people. In addition, telehomecare has a positive impact to the home care workers. The home care workers need training in the use of new technologies.

1 INTRODUCTION

The number of 75+ year olds has almost doubled and that of 85+ year olds tripled in 30 years. In 1992 and 2022 5.7% and 10.8%, respectively, of the Finnish population was over 75 years old (Statistics Finland 2023.) Older adults' care in Finland and in all Nordic countries has experienced changes during the last few decades (Kröger, 2019; Rostgaard et al., 2022). Traditional institutional care has been partly replaced by assisted living and, in general, long-term institutional care has been considerably reduced. The role of home care has increased since the 1980s. Home care today is targeted more strictly to those with the highest needs, to balance the decrease in the coverage of institutional care (Kröger, 2019). In 2020, there were approximately 208,000 home care clients in Finland, of whom 55% were regular and 43% were intensive home care clients, and 18% received three or more home care visits per day (Saukkonen et al., 2020). Most home care visits were visits by social and health care professionals at the client's home but 6% were carried out as appointment visits or via telephone or electronic connection.

Labour shortages are evident in the social and health care sector, and challenges regarding adequacy of personnel are highlighted especially in older adults' home care (Hetemaa et al., 2020; Alastalo et al., 2017; Kehusmaa & Alastalo, 2022). Care units frequently operate understaffed, and overtime is common (Hetemaa et al., 2020; Kehusmaa & Alastalo, 2022). Shortage of labour limits the availability of home care services (Kehusmaa & Alastalo, 2022). Utilising digitalisation and technologies is one of the key themes of the Quality recommendations to guarantee a good quality of life and improved services for older persons and are related especially to digital services, support of living at home and support of employees (STM, 2020). The most frequently used technologies in home care work in Finland are smartphones, desktop computers, email and patient and/or client information systems (Lampi & Sihto, 2022). Telecare is a new form of work in social and health care, and especially in home care in Finland (Heinonen et al., 2022). Telecare can be defined as *client care, guidance and support in matters related to health and wellbeing by utilising information networks and other technology* (Forsberg et al., 2014). Synonyms for telecare include remote care, telenursing and telehomecare.

Telehomecare work in older adults' home care is mainly video-mediated check-up and reminder calls with home care clients (Heinonen et al., 2022). Telehomecare encounters are most often arranged to ensure medical treatment and meals but the contents of encounters between organisations vary (Josefsson & Hammar, 2022). The most systematic and longstanding telehomecare services in Finland are being implemented in Helsinki where the city's Service Centre

has provided telehomecare services in cooperation with the city's Social and Health Services since 2014 (Heinonen et al., 2022). In Helsinki, telehomecare includes calls related to medications and meals, health monitoring, individual and group exercises, social activities, telemedicine and answering calls of clients and relatives. The biggest group of clients are people with memory disorders.

Remote service encounters in home care increased by as much as 44% from 2019 to 2021, but they still comprise only about 3% of all service encounters (Hetemaa et al., 2020). Although telehomecare services still have room for development they are already provided in all regions in Finland and in 47% of all home care operational units (Josefsson & Hammar, 2022). Reasons for organisations to include telehomecare as part of their older adults' services are generally related to having high expectations of online communication's potential to reduce costs and to improve the efficiency of care delivery, to improve quality of care and possibly seeking to become profiled as a technology leader in the field (Postema et al., 2013).

Successful inclusion of new technologies in healthcare services is a slow and complex process (Greenhalgh et al., 2004; May, 2004, Wouters, 2022). It requires user acceptance (Venkatesh & Davis, 2000) and support to adopt, implement, and integrate innovations into existing work processes (Greenhalgh et al., 2004; Gagnon et al., 2012). Readiness for using technologies is higher within care workers with first-hand experience with them than within those with no experience (Turja et al., 2020). Perceived usefulness is one of the most important factors associated with care workers' willingness to use technologies (Suwa et al., 2020). In Finland, attitudes and feelings towards the use of technologies and remote services in their work have been demonstrated to be mostly positive among occupational health professionals (Koivisto et al., 2019). However, contradictory results regarding home care workers' views of technologies (Lampi & Sihto, 2022) and telehomecare (Heinonen et al., 2022) have been reported. Positive experiences are related to improved workflow and efficiency of information transmission (Koivisto et al., 2019; Lampi & Sihto, 2022) as well as to the improvement of service availability (Heinonen et al., 2022; Koivisto et al., 2019) and the possibility of continuing a work career in home care when a musculoskeletal injury is sustained (Heinonen et al., 2022).

Changes in the job descriptions of professionals, due to utilisation of technology and remote services, are perceived as contradictory since they not only enrich the work but also fragment it (Koivisto et al., 2019). The lack of touch and physical contact, as well as limited opportunities to observe the clients' activities and home conditions, and to support clients in a tangible manner, have

been described as the main difference between traditional home care work and telehomecare (Heinonen et al., 2022). The reduction of face-to-face encounters and problems related to both professionals' and clients' use of technology are perceived as negative factors (Koivisto et al., 2019). Home care professionals have emphasised negative emotions such as frustration, uncertainty and anger related to technology (Heinonen et al., 2022). These emotions are mostly due to technologies not functioning properly, poor working conditions in home care and time pressure of employees.

In fact, workers' thoughts and feelings related to technologies are found to be influenced by several factors related to the technology itself, the individual background of the workers and organisational environment (Meissner et al., 2020). Healthcare professionals' attitudes and experiences affect their willingness and motivation to use technologies (Konttila et al., 2019). Wider introduction of digital services and technologies requires strengthening employee skills, changing working methods and technical support in the working community (STM, 2020; Konttila et al., 2019).

The most recent study (Heinonen et al., 2022) to examine telehomecare from the professionals' point of view used qualitative interviews. The data for this study were collected just before the Covid19 pandemic. The results showed that telehomecare had changed both the contents of care work and the skills needed in it. It was concluded that telehomecare complemented and diversified both home care work and service provision. However, since this study was conducted in only one home care organisation with very long experience with telehomecare and before the pandemic, it is important to further examine professionals' perceptions related to telehomecare.

The purpose of this quantitative study was to investigate Finnish telehomecare workers' satisfaction with the inclusion of telehomecare in older adults' home care. In addition, the purpose was to examine what factors are associated with this satisfaction. These factors are important when telehomecare is further implemented in older adults' home care, implementation processes are developed and when telehomecare job positions are marketed to social and health care professionals.

2 METHODS

2.1 Design

This cross-sectional study and the survey developed in it was designed based on the theoretical frameworks of Greenhalgh et al. (2004) and May (2006).

Greenhalgh et al. (2004) synthesised factors related to the spread and sustainability of innovations in health service organisations. Successful routinisation of an innovation in an organisation depends on adaptive and flexible organisational structure; top management support; the motivation, capacity, and competence of individual practitioners; early and widespread involvement of staff at all levels; effective communication across structural boundaries within the organisation; and adaptation of the innovation to the local context.

The normalisation process theory (May, 2006) is a model on how new technologies, techniques, working practices, and organisational interventions (named as complex interventions) become normalised in practice. It enables analysis of the conditions that are necessary to support the introduction of complex interventions. According to the model, four constructs influence the potential for the adoption of work practices and formation of new routines after the introduction of technology. First, interactional workability refers to interpersonal interaction and whether the introduction of technology changes the communication and interaction between people verbally and/or non-verbally. Second, relational integration refers to relationships of trust and whether the introduction of technology changes trust (confidence) in one or more of three ways; patients' trust in their health care, trust between professionals, and professionals' trust in patients' accounts of their symptoms. If the introduction of technology interferes with professional-patient interaction or undermines confidence, then it is an unlikely candidate for normalisation. Third, skill set workability refers to professionals' knowledge, skills, and experience in using the technology, whether the right people can use it and if the introduction of technology changes the division of tasks between professionals. Finally, contextual integration refers to the effects of technology introduction on the complexity of work processes and the workload experienced by healthcare professionals and, therefore, on how the implementation affects the organisation. To be an optimal candidate for normalisation, the technology must not disturb the division of tasks and practices of the service organisation. Also, it should not add complexity and workload as experienced by health care professionals.

2.2 Setting and participants

A total of five Finnish older adults' home care organisations agreed to participate as the target organisations of the study. Two of the organisations were located in large cities, one in a medium-

sized provincial centre and two in rural municipalities. All these organisations used telehomecare services as part of their older adults' home care.

Two service models are currently used to organise telehomecare services in older adults' home care organisations in Finland. A centralised service model means that all telehomecare calls are made from a single office for the whole operational home care region (e.g. municipality, city). In centralised service model, telehomecare workers do not usually carry out traditional home care visits but work 100% in telehomecare. A decentralised service model means that each regional home care unit within a larger home care region has its own telehomecare services. In decentralised service model, regional home care workers carry out both traditional home care visits and telehomecare calls.

Of the five home care organisations participating in this study, three had organised telehomecare with centralised service model. These organisations were located in larger municipalities and had introduced telehomecare services in 2016, 2017 and 2019. Two of these organisations had first started with decentralised service model but switched to centralised service model after 2–3 years. One organisation had started directly with centralised service model. The three participating home care organisations with centralised service model had operated with this model three years before the survey. Two participating organisations provided telehomecare services with decentralised service model. These organisations were located in smaller municipalities and had introduced telehomecare services in 2021 and 2022. The five participating home care organisations had a total of 103 telehomecare workers, of whom 36 worked with centralised and 67 with decentralised service model.

2.3 Data collection and analysis

The cross-sectional data was collected between April and September 2022 with an electronic quantitative survey. The survey was implemented with Webropol 3.0 Survey & Reporting tool and sent to home care managers who were asked to forward the questionnaire to home care workers. Two reminder emails were sent, one in May and one in August.

This study was part of a larger survey that was targeted, in addition to telehomecare workers also to traditional older adults' home care workers and managers to study their views on aspects related to telehomecare. Based on Greenhalgh et al. (2004) and May (2006), the survey developed within this study and directed to telehomecare workers included seven categories with nominal and ordinal

variables (table 1). The ordinal variables mainly used a 5-point Likert scale. In addition, in each question the respondents had the possibility to answer “I cannot say”. Nominal variables mainly had “yes”, “no” and “I cannot say” answer categories.

Statistical analyses were conducted using the IBM SPSS Statistics software version 15.0. The descriptive findings are presented as frequencies and relative frequencies. Kendall's tau-b correlation coefficients (two-tailed) were calculated between “Satisfaction with inclusion of telehomecare in home care” (exact question: “How satisfied are you with the inclusion of video-mediated telehomecare in home care?”) and other variables. Level of statistical significance was set at 5% ($p<0.05$). In addition, linear regression analysis with stepwise method was performed with “Satisfaction with inclusion of telehomecare” as the dependent variable (Settings: Statistics: Estimates and Model fit. Probability of F: entry 0.05 and removal 0.1.). Those respondents (n=4) that answered “I cannot say” to “Satisfaction with inclusion of telehomecare“ were removed from the analyses, thus the maximum number of respondents in correlations and linear regression analysis was 39 (n=39). “I cannot say” answers were also removed from independent ordinal variables. Nominal variables were recoded as dummy variables. Missing values were excluded pairwise both in correlations and in linear regression analysis.

2.4 Ethical considerations

The study followed the principles of Helsinki Declaration (2013) and General Data Protection Regulation GDPR (2016). Research permits were applied, and written permissions were acquired from all five participating home care organisations. The survey was carried out using an anonymous questionnaire and the name the home care organisation was not asked. Thus, the individual respondents could not be identified. The respondents were sent a cover letter explaining the purpose of the study, possible benefits to science and society, and an explanation of the voluntary nature of their participation. A data protection statement was attached to the cover letter.

3 RESULTS

In total, 43 telehomecare workers answered the survey. This was 41.7% of all telehomecare workers of the five Finnish home care organisations. The response rates of centralised and decentralised telehomecare service model organisations were 41.7% and 41.8%, respectively. All the respondents were women. Most of them were 41–50 years old with vocational upper secondary qualification and

over 10 years of work experience in home care (table 2). Over 65% of the respondents worked in an organisation that had decentralised telehomecare service model and provided telehomecare services at less than one-quarter of their total care work. 32.6% provided only telehomecare services without traditional home care visits. 58.1% had learned telehomecare work entirely during the Covid-19 pandemic (years 2020–2022) and 23.3% partly.

Telehomecare workers were mainly satisfied with (55.8%) or felt neutral (20.9%) about the inclusion of telehomecare services in home care (figure 1). However, 14.0% were either quite or very dissatisfied with the inclusion and 9.3% (n=4) did not state their view. All these four employees worked in an organisation with decentralised telehomecare service model where telehomecare consisted of less than one-quarter of their care work.

In total, 27 parameters had statistically significant correlations to satisfaction with inclusion of telehomecare in home care and 17 of these were statistically highly significant ($p<0.001$) (table 3). The strongest correlation ($r=0.723$, $p<0.001$) was related to telehomecare workers' experience of telehomecare making their work easier. Interaction and relationships of trust with clients, decision-making related to client care, many parameters related to workload and work wellbeing, and the possibility to influence whether to start working in telehomecare also correlated strongly ($p<0.001$) with satisfaction. Of factors related to support, sufficient time to learn telehomecare and support for interaction and communication were most significantly ($p<0.001$) related to satisfaction. The centralised telehomecare service model and a large proportion of telehomecare services of care work also correlated strongly ($p<0.001$) satisfaction. Telehomecare workers' background information (age, education level, work experience in home care) did not correlate statistically significantly with satisfaction.

In stepwise linear regression analysis, four independent variables that best explained the variance in telehomecare workers' satisfaction with inclusion of telehomecare in home care, and were therefore entered into the model, were 1) effects of telehomecare on making the work easier; 2) effects of telehomecare on relationships of trust with clients; 3) prevalence of slowness and malfunctions of digital technologies and 4) workers' use of telehomecare due to their physical restrictions (table 4). These four variables explained 84.7% of the variance in telehomecare workers satisfaction with inclusion of telehomecare in home care. Those telehomecare workers that were the most satisfied with the inclusion of telehomecare where the ones that felt that telehomecare had made their work easier and enhanced trustful relationships with their clients. Also, these workers felt that telehomecare was never or only rarely related to slowness or malfunctions of technologies that would cause them delays or interrupt their work. Finally, these workers stated that they worked in

telehomecare because physical restrictions meant they were not able to work in traditional home care. 53.3% (n=8) of telehomecare workers working in centralised service model organisations had applied telehomecare because of their physical restrictions.

4 DISCUSSION

The results of this study suggest that most Finnish telehomecare workers are satisfied with the inclusion of telehomecare in older adults' home care. Satisfaction was strongly related to the experience of telehomecare making workers' work easier, improved interaction and enhanced relationships of trust with clients, and decreased workload. In addition, those who felt they were able to influence whether to start working in telehomecare, had had enough time to learn telehomecare and felt that their supervisor was able to ease their workload were more satisfied with the inclusion. Centralised telehomecare service model and large proportion of telehomecare services of total care work were also positively related to satisfaction. Four factors that best explained the variance in telehomecare workers' satisfaction with inclusion of telehomecare in home care were effects of telehomecare on making worker's work easier, enhanced relationships of trust with clients, rare occasion of slowness and malfunctions of digital technologies and workers' use of telehomecare due to their physical restrictions.

Telehomecare workers' mainly positive attitude towards the inclusion of telehomecare in home care corresponds with the findings of Heinonen et al. (2022) and Saari et al. (2022). The results also support the findings by Osuji et al. (2020) on clinicians' perspectives on implementing video visits in home based palliative care. Workers' attitudes towards technology appear to be influenced by thoughts on how the use of technology affects their daily work (Meissner et al., 2020). Workers mostly reflect on their physical and mental wellbeing and on meeting their requirements in terms of efficiency and service quality, for example. In the current study, telehomecare workers' satisfaction with the inclusion of telehomecare in home care was associated with perceptions of facilitation of work, enhanced work wellbeing and decreased workload, sense of hurry and fast pace of work. Video visits have been reported to offer convenience and increased efficiency also to physicians working in palliative care and this has been suggested to be a value-enhancing factor (Osuji et al., 2020). Time pressure in telehomecare has been estimated to be lower than in traditional home care (Heinonen et al., 2020) which is confirmed by the current study.

Telehomecare changes both the contents of the care work and the skills needed in it. Client relationship, trust, verbal interaction, and guidance are emphasised in telehomecare more than in

traditional home care. (Heinonen et al., 2022.) These results are supported by the current study since interaction and trustful relationships with clients and decision-making related to client care were all positively and strongly correlated to workers' satisfaction with inclusion of telehomecare in home care. Effects of telehomecare on relationships of trust with client were highlighted in the current study thus supporting Heinonen et al. (2022) who reported that client relationships in telehomecare were mainly determined by trust. In concrete terms this means, for example, whether workers can trust that their clients have acted the way they say (Heinonen et al., 2020). Also Carlqvist et al. (2021) reported that value expressed by health care professionals in the use of telemonitoring in the care of chronically ill patients was conceptualised in dimensions of meaningfulness, building of relationships and safety and feelings of trust. These dimensions were mainly expressed in a positive light as health care professionals connected these to improvements in medical care, accessibility and continuity. Professionals favour video-communication over the chat discussions since it enables detection of patients' visible symptoms (Carlqvist et al., 2021). Face-to-face interaction, whether physical or by video, seems to be central in creating of trust.

In the context of long-term care, human contact and interaction are critical components that should be carefully considered to ensure quality of care (Mordoch et al., 2000). Nurses value good client interaction even at the expense of their own workload (Saari ym., 2022). Digital health solutions change professional-patient interaction and require new skills (Jarva et al., 2022). Although reduction of face-to-face encounters between health care professionals and clients has also been reported with the use of home care technologies (Lampi & Sihto, 2022) and remote services (Lie et al., 2019), the current study supports previous studies (Laukka et al., 2020, Carlqvist et al., 2021, Heinonen et al., 2022, Saari et al., 2022) that have reported improved client interaction in telecare services. Telehomecare workers have described that they get to meet their client more directly, focus and be present to the client better than in traditional home care, where doing other care duties at the same time requires their attention (Saari et al., 2022). Traditional home care work today is perceived as fast paced and some workers find their work ethically challenging (Saari et al., 2022). A home care worker makes an average of ten client visits during the workday (Väisänen et al., 2022) and the number of visits has increased substantially during the last ten years (Kröger et al., 2018). In terms of duration, one visit lasts on average 24 minutes but is affected by the client's functional capacity (Väisänen et al., 2022). Helping with everyday activities takes most of the time during the visit. Ensuring medical treatment and recording everything also take time. Many traditional home care workers feel that they usually have too much to do at work (Kröger et al., 2018). It may be that this increased pace at work together with clients that are in poorer health than

before (Kröger et al., 2018) reduce interaction during traditional home care visits. Telehomecare may offer a channel for interaction.

Health care professionals perceive that providing patient-centric care through digital channels is a crucial aspect in digital health competence (Jarva et al., 2022). Patient-centric care includes patients' willingness to use digital services as well as their digital capabilities to do so. Clients have given positive feedback on telehomecare encounters, interaction in them and sharing matters with the nurse (Birkhoff et al., 2021, Heinonen et al., 2022, Saari et al., 2022). It has been described that client satisfaction and the professional's experience that the contact is successful are significant resource factors for telehomecare workers (Heinonen et al., 2022). Similar results have been reported in palliative care (Osuji et al., 2019). Although client feedback was not examined in the current study it may have an effect on telehomecare workers' satisfaction with inclusion of telehomecare in older adults' home care.

It must be recognised that, contrary to some previous research (Konttila et al., 2019, Lampi & Sihto, 2021), telehomecare workers' own digital skills were not related to their satisfaction with inclusion of telehomecare in home care in the current study. This may be because the workers generally evaluated their digital skills to be good and thus not affecting their performance in telehomecare. Also, Heinonen et al. (2022) reported that taking up the technology itself and using the equipment turned out to be quite easy for the telehomecare workers. However, corresponding to previous research (Carlqvist et al., 2021; Jarva et al., 2022) clients' digital skills were related to telehomecare workers' satisfaction with the inclusion of telehomecare in home care in the current study. Patients' difficulties in using technologies have been reported as the most negative aspect that cause value loss and time-consuming burden to professionals (Carlqvist et al., 2021). Patients' willingness to use digital health services has been shown to be connected to their competence in using them (Jarva et al., 2022). Therefore, selection of clients and supporting their digital skills are crucial when digital health services, including telehomecare, are further expanded and developed.

Professionals can be relocated to telehomecare job positions due to their musculoskeletal problems or injuries (Heinonen et al., 2022). Half of the studied telehomecare workers were relocated to their positions in a study by Heinonen et al. (2022). The current study supports this since 53.3% of workers working in centralised service model organisations had applied telehomecare because of their physical restrictions. Employees in Heinonen et al. study (2022) felt that telehomecare work had made it possible for their careers to continue. Applying to telehomecare positions because of physical restrictions was positively correlated to satisfaction with inclusion of telehomecare in home care also in the current study and was one of the four factors in stepwise linear regression

analysis model that best explained the variance in this satisfaction. Therefore, this is an important factor to consider when telehomecare is marketed to future telehomecare employees. However, it must be considered that employees' voluntariness to use technologies also affects their technology acceptance (Venkatesh et al., 2000). It is important for employees to act in accordance with their own values, to perceive the changes as reasonable from their own point of view, and to be able to influence changes at work (Turja, 2019). In the current study, 60% and 7% of workers working in centralised and decentralised service model organisations, respectively, had applied telehomecare positions out of choice. Similarly, 80% and 14% of workers working in centralised and decentralised service model organisations, respectively, felt that they were able, either partly or fully, to influence whether to start working in telehomecare. This had an even stronger correlation ($r=0.672$, $p<0.001$) to satisfaction with the inclusion of telehomecare in home care than application of telehomecare due to physical restrictions ($r=0.537$, $p<0.001$). Therefore, home care workers' relocation to telehomecare should not be done against their own choice but employees should rather be heard in situations that require work modifications.

5 METHODOLOGICAL CONSIDERATIONS AND STUDY LIMITATIONS

There are a few methodological considerations and study limitations that need to be addressed.

First, the study had relatively small sample size (n=43). This is because telehomecare is still a relatively new service (Saukkonen et al., 2021; Hetamaa et al., 2022) and although it is already being implemented in almost half of all home care organisations in Finland (Josefsson & Hammar, 2022) the number of clients and therefore telehomecare job positions is still rather small. However, strengths of the study were that the sample included five organisations from different locations and with two different telehomecare service models. In addition, although the sample was relatively small the response rate (41.7%) was quite good for an email survey (Cook et al., 2000; Wu et al., 2022).

Second, it must be noted that it was not possible to document the differences between those telehomecare professionals who responded to the survey and those who did not. The questionnaire was quite long (8 pages, 37 questions, 15 minutes to complete) so it is possible that those telehomecare workers with the highest burden (e.g., workload) did not respond. In addition, the questionnaire was mainly purpose-designed for the current study and was not validated. The reasons for this were unavailability of validated questionnaire for the purpose, the theoretical frameworks used for the study (Greenhalgh et al., 2004; May 2006) and lack of previous quantitative studies. As

a result, the questionnaire had to include several aspects and thus many questions. Questions regarding digital skills and functioning of digital technology were taken from the “Quality of work life survey” (Statistics Finland, 2022).

Third, it is possible that the five participating home care organisations were at different stages of implementation and routinisation (Greenhalgh et al., 2004) of telehomecare services in their home care services. Two of the organisations that had decentralised telehomecare service model had started telehomecare 5–9 months or approximately one year before the survey. Due to this, the service processes in these organisations might not be structured yet (Greenhalgh et al., 2004) and adoption of new work practices in telehomecare might still be in progress (May, 2006). All three home care organisations with centralised service model had operated with this service model three years before the survey. It is possible that this difference can partly explain the result that centralised service model correlated positively to satisfaction with inclusion of telehomecare in home care.

Due to these limitations, more studies and studies with larger sample sizes are needed to confirm the findings of the present study.

6 CONCLUSIONS

This is the first quantitative study to investigate Finnish telehomecare workers’ satisfaction with the inclusion of telehomecare in older adults’ home care and factors associated with it. The results suggest that telehomecare workers are mostly satisfied with the inclusion of telehomecare in older adults’ home care. In accordance with previous qualitative studies and telecare research, satisfaction was strongly related to workers’ experience of telehomecare making their work easier, improved interaction and enhanced relationships of trust with clients as well as decreased workload. Application of telehomecare due to workers’ physical restrictions but also their perceptions that they had had a possibility to influence whether to start working in telehomecare were related to their satisfaction with inclusion of telehomecare in home care. The current study confirms that telecare can support interaction with clients and that relocating workers to telehomecare job positions due to their musculoskeletal problems or injuries functions well. However, it is important that workers’ will to work in telehomecare is also respected.

CONFLICT OF INTEREST

There is no conflict of interest.

AUTHOR CONTRIBUTIONS

All authors were responsible for the study design. MH-M designed and implemented the electronic survey questionnaire and MK, ST, SE and TM contributed their expertise. All authors participated in data collection. MH-M performed the data analyses. MH-M and MK drafted the manuscript and ST, SE and TM critically reviewed it and contributed their expertise. All authors approved the final version of the manuscript.

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REFERENCES

Alastalo, H., Vainio, S. & Kehusmaa, S. (2017). Kotihoidon asiakasmäärät kasvussa, henkilöstön määrän kasvu ei kaikissa maakunnissa seuraa perässä (The number of home care clients is increasing, the increase in the number of personnel is not keeping up in all regions). Finnish Institute for Health and Welfare. Tutkimuksesta tiiviisti 18. 2017. https://www.julkari.fi/handle/10024/135119

Birkhoff, S.D., McCulloh, N.J., Bald, K., Frankum, T., Sanchez, S.R. & Salvatore, A.L. (2021). Facilitators and challenges in the adoption of a virtual nurse visit in the home health setting. *Home Health Care Serv Quarterly*, **40**(2), 105–120. doi: 10.1080/01621424.2021.1906374.

Carlqvist, C., Hagerman, H., Fellesson, M., Ekstedt, M. & Hellström A. (2021). Health care professionals' experiences of how and eHealth application can function as a value-creating resource – a qualitative interv.iew study. *BMC Health Services Research*, 21,1203.

Cook, C., Heath, F. & Thompson, RL. (2000). A Meta-Analysis of Response Rates in Web- or Internet-Based Surveys. *Educational and Psychological Measurement*, 60, 821–836. doi: 10.1177/00131640021970934

European Parliament and Council of the European Union. (2026). General Data Protection Regulation GDPR. Official Journal of the European Union. 27.4.2016. L119, 4 May 2016;1–88. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2016:119:TOC

Forsberg, K., Intosalmi, H., Nordlund, M. & Suhonen, S. (2014). Ikäteknologiasanasto (Age technology vocabulary). KÄKÄTE-raportteja 3/2014 © KÄKÄTE-projekti, 2014 ISBN 978-951-806-213-7 (nid., Vanhustyön keskusliitto ry) ISBN 978-952-9594-56-6-0 (nid., Vanhus- ja lähimmäispalvelun liitto ry) ISBN 978-951-806-214-4 (PDF, Vanhustyön keskusliitto ry) ISBN 978-952-9594-62-7 (PDF, Vanhus- ja lähimmäispalvelun liitto ry)

Gagnon, M.P., Orruño, E., Asua, J., Abdeljelil, A.B. & Emparanza, J. (2012). Using a Modified Technology Acceptance Model to Evaluate Healthcare Professionals' Adoption of a New Telemonitoring System. *Telemedicine and E-Health*, **18**(1), 54–59.

Greenhalgh, T., Robert, G., MacFarlane, F., Bate, P. & Kyriakidou, O. (2004). Diffusion of Innovations in Service Organizations: Systematic Review and Recommendations. *Milbank quarterly*, **82**(4), 581–629. doi:10.1111/j.0887-378x.2004.00325.x

Heinonen, T., Lindfors, P. & Nygård, C-H. (2022). Etäkotihoitotyön sisältö ja kuormittavuus sekä mahdollisuudet työurien pidentäjänä (Content and workload of remote home care work and its possibilities to extend careers). *Gerontologia*, **36**(2), 128–142.

Hetemaa, T., Knape, N., Kokko, P., Leipälä, J., Ridanpää, H., Rissanen, P., Suomela, T., Syrjä, V. & Syrjänen, T. (2020). Sosiaali- ja terveyspalvelut Suomessa 2020 (Social and health services in Finland 2020). Finnish Institute for Health and Welfare. 6.4.2022. ISBN: 978-952-343-840-8 (internet). https://www.julkari.fi/handle/10024/144240

Jarva, E., Oikarinen, A., Andersson, J., Tuomikoski, A-M., Kääriäinen, M., Meriläinen, M., Mikkonen, K. (2022). Healthcare professionals' perceptions of digital health competence: A qualitative descriptive study. *Nursing Open*, 9, 1379–1393. doi: 10.1002/nop2.1184.

Josefsson, K. & Hammar, T. (2022). Kotihoidon etäpalveluissa on vielä kehittämisen varaa (Remote home care services still have room for development). Finnish Institute for Health and Welfare. Tutkimuksesta tiiviisti 22. 2022. https://www.julkari.fi/handle/10024/144174

Kehusmaa, S. & Alastalo, H. (2022). Vanhuspalvelujen työvoimapula kärjistyy kotihoidossa – neljännes yksiköistä tekee joka viikko töitä riittämättömällä henkilöstöllä ja ylityöt ovat yleisiä (Labour shortage in older adults' services is exacerbated in home care - every fourth unit works every week understaffed and overtime is common). Finnish Institute for Health and Welfare. Tutkimuksesta tiiviisti 4/22. https://www.julkari.fi/handle/10024/143733

Koivisto, T.A., Koroma, J. & Ruusuvuori, J. (2019). Teknologian hyödyntäminen ja etäpalvelut työterveyshuollossa - ammattilaisten näkökulma (Utilisation of technology and remote services in occupational health care - professionals' point of view). *Finnish Journal of eHealth and eWelfare*, **11**(3), 183–197.

Konttila, J., Siira, H., Kyngäs, H., Lahtinen, M., Elo, S., Kääriäinen, M., Kaakinen, P., Oikarinen, A., Yamakawa, M., Fukui, S., Utsumi, M., Higami, Y., Higuchi, A. & Mikkonen, K. (2019). Healthcare professionals' competence in digitalisation: A systematic review. *Journal of Clinical Nursing*, **28**(5-6), 745–761. doi: 10.1111/jocn.14710.

Kröger, T. (2019). Looking for the Easy Way Out: Demographic Panic and the Twists and Turns of Long-Term Care Policy in Finland. In Jing TK, Kuhnle S, Pan Y, Chen S. (eds.). Aging Welfare and Social Policy: China and the Nordic Countries in Comparative Perspective. Springer International Publishing. International Perspectives on Aging 20. 2019;91-104. doi: 10.1007/978-3-030-10895-3_6

Kröger, T., Van Aerschot, L. & Puthenparambil, J.M. (2018). Hoivatyö muutoksessa. Suomalainen vanhustyö pohjoismaisessa vertailussa (Changing care work. Finnish elderly care in Nordic

comparison). University of Jyväskylä. YFI Publications 6. 2018. https://jyx.jyu.fi/handle/123456789/57183

Lampi, A. & Sihto, T. (2022). Kotihoidon työntekijöiden teknologiaan liittyvät tunteet (Technology-related feelings of home care workers). *Työelämän tutkimus*, **20**(3)411–435. https://journal.fi/tyoelamantutkimus/article/view/114442/75299

Laukka, E., Huhtakangas, M., Heponiemi, T., Kujala, S., Kaihlanen, A-M., Gluschkoff, K. & Kanste, O. (2020). Health Care Professionals' Experiences of Patient-Professional Communication Over Patient Portals: Systematic Review of Qualitative Studies. *Journal of Medicine Internet Research*, **22**(12):e21623. doi: 10.2196/21623.

Lie, S.S., Karlsen, B., Graue, M. & Oftedal, B. (2019). The influence of an eHealth intervention for adults with type 2 diabetes on the patient-nurse relationship: a qualitative study. *Scandinavian Journal of Caring Science*, **33**(3), 741-749. doi: 10.1111/scs.12671.

May, C. (2006). A rational model for assessing and evaluating complex interventions in health care. BMC *Health Services Research*, 6, 86. doi:10.1186/1472-6963-6-86

Meissner, A., Trübswetter, A., Conti-Kufner, A. & Schmidtler, J. (2020). Friend or foe? Understanding assembly workers' acceptance of human-robot collaboration. *ACM Transactions on Human-Robotic Interaction*, **10**(1):Article 3. https://doi.org/10.1145/3399433

Mordoch, E., Osterreicher, A., Gusea, L., Roger, K. & Thompson, G. (2013). Use of social commitment robots in the care of elderly people with dementia: A literature review. *Maturitas*, *74*, 14–20. doi: 10.1016/j.maturitas.2012.10.015.

Osuji, T.A., Macias, M., McMullen, C., Haupt, E., Mittman, B., Mularski, R.A., Wang, S.E., Werch, H. & Nguyen, H.Q. (2020). Clinicians perspectives on implementing video visit in home-based palliative care. *Palliative medicine reports*, **1**(1),221–226.

Postema, T.R.F., Peeters, J.M. & Friele, R.D. (2012). Key factors influencing the implementation success of a home telecare application. *International Journal of Medical Informatics*, **81**(6),415–423.

Rostgaard, T., Jacobsen, F., Kröger, T. & Peterson, E. (2022). Revisiting the Nordic long-term care model for older people—still equal? *European Journal of Ageing*, 19, 201–210. doi: 10.1007/s10433-022-00703-4

Saari, E., Koivisto, T., Koskela, I., Känsälä, M., Rydman, V. & Turunen, J. (2022). Enemmän aikaa empatialle? Hoivatyön teknologiavälitteinen viestintä ja työhyvinvointi (More time for empathy? Technology-mediated communication in care work and wellbeing at work). Finnish Institute of Occupational Health. ISBN 978-952-391-022-5 (PDF). 2022. https://www.julkari.fi/handle/10024/145000

Saukkonen, S-M., Mölläri, K. & Puroharju, T. (2020). Kotihoito 2020. Yli puolella säännöllisen kotihoidon asiakkaista palvelujen käyttö on päivittäistä (Home care 2020. More than half of regular home care clients use the services on a daily basis). Finnish Institute for Health and Welfare. Tilastoraportti 27. 6.9.2021. https://www.julkari.fi/handle/10024/142999

Statistics Finland. 2022. Quality of work life survey. https://www.stat.fi/keruu/tolo/index_en.html

Statistics Finland. (2023). StatFin data bank stat.fi: Population structure: Population, Population according to age. Accessed 31 March 2023.

STM. Ministry of Social Affairs and Health and Association of Finnish Local and Regional Authorities. (2020). Quality recommendation to guarantee a good quality of life and improved services for older persons 2020–2023: The Aim is an Age-friendly Finland. 1.10.2020. VN/19419/2020, STM115:00/2020. ISBN PDF 978-952-00-5457-1. https://julkaisut.valtioneuvosto.fi/handle/10024/162595

Suwa, S., Tsujimura, M., Ide, H., Kodate, N., Ishimaru, M., Shimamura, A. & Yu W. (2020). Home-care Professionals' Ethical Perceptions of the Development and Use of Home-care Robots for Older Adults in Japan. *International Journal of Human-Computer interaction*, 1295-1303. https://doi.org/10.1080/10447318.2020.1736809

Turja, T. (2019). Accepting robots as assistants: A social, personal, and principled matter. Academic dissertation. Tampere University, Faculty of Social Sciences. Tampere University Dissertations 174. 2019. https://urn.fi/URN:ISBN:978-952-03-1351-7

Turja, T., Taipale, S., Kaakinen, M. & Oksanen, A. (2020). Care Workers' Readiness for Robotization: Identifying Psychological and Socio-Demographic Determinants. *International Journal of Social Robotics*, 12, 79–90.

Venkatesh, V. & Davis, F.D. (2000). A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, **46**(2), 186–204. http://dx.doi.org/10.1287/mnsc.46.2.186.11926

Väisänen, V., Pesonen, T., Corneliusson, L., Ruotsalainen, S., Sinervo, T. & Noro, A. (2022). Hoitoajan jakautuminen ikäihmisten palveluissa ja päivitetty RUG-luokitus: Aikamittaus-hankkeen loppuraportti (Distribution of treatment time in services for the elderly and the updated RUG classification: Final report of the Time Measurement project). Finnish Institute for Health and Welfare. National Institute for Health and Welfare (THL). Report 12/2022. 125 pages. Helsinki, Finland 2022. ISBN 978-952-343-970-2 (online publication). http://urn.fi/URN:ISBN:978-952-343-970-2

Wouters, E.J.M. (2022). Healthcare and technology. The multi-level perspective: theories, models, and frameworks. In Hirvonen H, Tammelin M, Hänninen R, Wouters EJM (eds.). Digital Transformations in Care for Older People: Critical Perspectives. London & New York: Routledge. 2022. doi: 10.4324/9781003155317-3

World Medical Association Declaration of Helsinki. (2013). Ethical principles for medical research involving human subjects. *JAMA*, **310**(20),2191.

Wu, M-J., Zhao, K., Fils-Aime, F. (2022). Response Rates of Online Surveys in Published Research: A Meta-analysis. *Computers in Human Behavior Reports*, 7. https://doi.org/10.1016/j.chbr.2022.100206