Patient safety and feeling of safety when telecare is used among home-dwelling older adults. A qualitative study.

by

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Summary

In English

Background

The use of telecare technologies is regarded as an important measure in meeting future healthcare challenges, and is a major focus area both in Norway and internationally. With the help of telecare, older individuals with chronic illnesses and impaired functioning shall better master their illness and everyday life and be able to live at home for as long as possible. Home-dwelling older adults are an important target - and user group. An important intention for the implementation and use of telecare technologies is to contribute to increased patient safety and feeling of safety. However, there is a lack of research concerning patient safety and feeling of safety when telecare is used among older adults in a municipal context.

Aim

The overarching aim of this thesis was to contribute to more insight and knowledge regarding patient safety and feeling of safety when telecare is used among home-dwelling older adults, by exploring the perceptions and experiences of homecare professionals, managers, and older telecare users.

Methodology

This qualitative study has an exploratory, inductive design. A total of 29 participants from a total of ten Norwegian municipalities participated in the study. The participants had practical and/or administrative experience within a total of 12 different telecare devices. Data were collected using focus groups and individual interviews. All data were

analyzed using qualitative content analysis. The collected data formed the basis for three research papers (Paper I, II, and III).

Findings

Paper I presents the findings from focus group interviews with in total 10 homecare professionals (nine registered nurses and one occupational therapist). The research question was: *How do homecare professionals perceive safety in relation to older adults' use of telecare?* The analysis identified two themes that illustrate the participants' perceptions. The first theme, *A protection against injury and insecurity,* was based on the two categories Preventing harm and Feeling safe. The second theme, *Involves challenges that could lead to harm,* was based on the two categories Technological limitation and Difficulties managing and understanding the technology. The findings show that the participants perceived that the use of telecare protects older adults against injury and insecurity by preventing harm and giving them a feeling of safety. However, they also perceived that the use of telecare involves challenges that could lead to harm, related to technological limitations and difficulties managing and understanding the technology.

Paper II presents the findings from focus group interviews with in total 20 participants, including ten homecare professionals (nine registered nurses and one occupational therapist), and ten managers (eight health and care managers and two telecare project group managers). The research question was: *What do managers and homecare professionals perceive as important for safe and secure use of telecare for older adults in community homecare services?* The analysis identified three categories that refer to the participants' perceptions: *Sufficient knowledge, Close follow-up,* and *Meet the needs of the users.* The findings show that the participants considered it important that both healthcare personnel and service users receive essential information and training about the telecare technologies in use. Furthermore, it was deemed vital that both the technology and its use are closely followed up

and that the solutions offered complies with the service users' individual desires, needs, and resources. The participants also referred to the significance of increased attention to early initiatives and the use of telecare in a preventative perspective.

Paper III present the findings from individual interviews with nine older telecare users (seven service users and two spouses). The research question was: *How do older adults experience safety when using a telecare at home?* The analysis identified one theme that illustrates the participants' experiences: *Feeling free and protected from danger.* The theme was based on the three categories Being protected against harm, Trusting and managing the device, and Becoming more independent. The findings show that the participants experienced an increased feeling of safety by using their mobile safety alarm with GPS or electronic medicine dispenser. This was linked to a sense of being protected from physical harm, and finding their device reliable and easy to use and understand. Moreover, the findings reveal that the increased feeling of safety was significant in that the participants could maintain their daily activities and live more independently at home.

Conclusions

This thesis has demonstrated how both technological, individual, and organizational conditions have importance for patient safety and feeling of safety in telecare use. The thesis has revealed how patient safety and feelings of safety are promoted by functionalities related to the telecare devices. The enhanced feeling of safety from using telecare devices has significance to that home-dwelling older adults can maintain their activities and live more independently at home. Thus, this thesis provides insight and knowledge on what feeling of safety from using telecare devices mean for older adults who use the technologies in their everyday lives.

The findings of this thesis suggests that telecare can be a significant tool to prevent injury among home-dwelling older adults, and allow them to feel safer and live more independently at home. However, this thesis has revealed how patient safety and feelings of safety are challenged by technological inadequacies and limitations, and difficulties for some older users to understand and manage telecare functionalities. Thus, this thesis provides important insight and knowledge regarding technological vulnerabilities.

This thesis has further revealed how patient safety and feelings of safety are promoted by organizational conditions in terms of telecare routines, drills, and targeted training. Furthermore, the thesis has emphasized the importance of ensuring that telecare solutions fit the users' individual needs and prerequisites. Moreover, the thesis has highlighted homecare professional's crucial role and function by facilitating patient safety and feelings of safety when telecare is used among home-dwelling older adults.

In Norwegian

Bruk av velferdsteknologi (VT) anses som et viktig tiltak i møtet med framtidige utfordringer innen helsetjenesten, og er et stort satsingsområde både i Norge og internasjonalt. Ved hjelp av velferdsteknologi skal eldre personer med kronisk sykdom og nedsatt funksjonsevne bli bedre i stand til å kunne mestre sin sykdom og hverdag, og kunne bo hjemme så lenge som mulig. Hjemmeboende eldre er en viktig mål - og brukergruppe. En viktig intensjon for implementering og bruk av velferdsteknologiske løsninger er å øke pasientsikkerheten og følelsen av trygghet. Det er imidlertid mangel på forskning vedrørende pasientsikkerhet og følelse av trygghet når velferdsteknologi benyttes blant hjemmeboende eldre i en kommunal kontekst.

Mål
Det overordnede målet med denne avhandlingen var å bidra til mer innsikt og kunnskap vedrørende pasientsikkerhet og følelse av trygghet når velferdsteknologi benyttes blant hjemmeboende eldre, ved å utforske opplevelsene og erfaringene til helsepersonell, ledere og eldre VT-brukere.

Metode
Denne kvalitative studien har et eksplorativt, induktivt design. Totalt 29 deltagere fra til sammen ti norske kommuner deltok i studien. Alle deltagerne hadde praktisk og/eller administrativ erfaring med til sammen 12 ulike velferdsteknologiske løsninger. Data ble samlet inn ved bruk av fokusgrupper og individuelle intervju. Alle data ble analysert ved hjelp av kvalitativ innholdsanalyse. De innsamlede dataene dannet grunnlag for tre forskningsartikler (Artikkel I, II & III).

Funn

Artikkel I presenterer funnene fra to fokusgruppeintervju med totalt 10 helsepersonell (ni sykepleiere og én ergoterapeut). Forskningsspørsmålet var som følger: *Hvordan oppfatter helsepersonell trygghet relatert til bruk av velferdsteknologi blant hjemmeboende eldre?* Analysen identifiserte to tema som illustrerer deltagernes oppfatninger. Det første temaet, *En beskyttelse mot skade og utrygghet*, var basert på de to kategoriene Forebygging av skade og Følelse av trygghet. Det andre temaet, *Involverer utfordringer som kan føre til skade*, var basert på de to kategoriene Teknologiske begrensninger og Vanskeligheter med å håndtere og forstå teknologien. Funnene viser at deltakerne opplevde at bruk av velferdsteknologi beskytter hjemmeboende eldre mot skade og gir dem følelse av trygghet. De opplevde imidlertid at bruk av velferdsteknologi innebærer utfordringer som kan medføre skade, relatert til teknologiske begrensninger og vanskeligheter med å håndtere og forstå teknologien.

Artikkel II presenterer funnene fra fire fokusgruppeintervju med totalt 20 deltagere, inkludert 10 helsepersonell (ni sykepleiere og én ergoterapeut) og 10 ledere (8 helse- og omsorgsledere og 2 prosjektledere for VT). Forskningsspørsmålet var som følger: *Hva opplever ledere og helsepersonell som viktig for trygg og sikker bruk av velferdsteknologi for eldre i hjemmebasert helse- og omsorgstjeneste?* Analysen identifiserte tre kategorier som refererer til deltagernes opplevelser: *Nødvendig kunnskap*, *Tett oppfølging* og *Ivareta brukernes behov*. Funnene viser at deltakerne opplevde det som viktig at både helsepersonell og brukere får nødvendig informasjon og opplæring om velferdsteknologien som benyttes. Det ble videre ansett som avgjørende at både teknologi og bruken av den følges tett opp, og at løsningene som tilbys er i samsvar med brukernes individuelle ønsker, behov og ressurser. Deltagerne viste også til betydningen av å øke oppmerksomheten mot tidlig innsats og bruk av velferdsteknologi i et forebyggende perspektiv.

Artikkel III presenterer funnene fra ni individuelle intervju med eldre VT-brukere (syv tjeneste-brukere og to ektefeller). Forsknings-spørsmålet var som følger: *Hvordan erfarer eldre trygghet når de benytter velferdsteknologi hjemme?* Analysen identifiserte ett tema som illustrerer deltagernes erfaringer: *Å føle seg fri og beskyttet mot fare.* Temaet var basert på de tre kategoriene Å være beskyttet mot skade, Stole på og administrere enheten, og Bli mer selvstendig. Funnene viser at deltakerne opplevde økt følelse av trygghet ved å bruke sin mobile sikkerhetsalarm med GPS eller elektronisk medisindispenser. Dette var knyttet til en følelse av å være beskyttet mot fysisk skade, og finne sin enhet pålitelig og enkel å bruke og forstå. Videre viser funnene at den økte følelsen av trygghet hadde betydning for at deltagerne kunne opprettholde daglige aktiviteter og leve mer selvstendig hjemme.

Konklusjon

Denne avhandlingen har demonstrert hvordan både teknologiske, individuelle og organisatoriske forhold har betydning for sikkerhet og trygghet ved bruk av velferdsteknologi. Avhandlingen har vist hvordan pasientsikkerhet og følelse av trygghet fremmes av forhold knyttet til de velfersteknologiske løsningene. Den økte følelsen av trygghet ved å bruke velferdsteknologi har betydning for at hjemmeboende eldre kan opprettholde sine aktiviteter og leve mer selvstendig hjemme. Dermed gir denne avhandlingen innsikt og kunnskap om hva følelsen av sikkerhet ved bruk av velferdsteknologi betyr for hjemmeboende eldre som bruker teknologiene i sin hverdag.

Funnene i avhandlingen antyder at velferdsteknologi kan være et viktig teknologisk hjelpemiddel til å forebygge skade blant hjemmeboende eldre, og legge til rette for at de kan oppleve følelse av trygghet og leve mer selvstendig hjemme. Avhandlingen har imidlertid vist hvordan pasientsikkerhet og følelse av trygghet utfordres av teknologiske mangler og begrensninger, og vanskeligheter for noen eldre brukere å

forstå og benytte teknologiene. Dermed gir denne avhandlingen viktig innsikt og kunnskap vedrørende teknologiske sårbarheter.

Avhandlingen viser videre hvordan pasientsikkerhet og følelse av trygghet fremmes av organisatoriske forhold i form av rutiner, øvelser og opplæring. Videre har avhandlingen understreket viktigheten av å sikre at de velferdsteknologiske løsningene passer til brukernes individuelle behov og forutsetninger. Videre har den fremhevet helsepersonells viktige rolle og funksjon ved å legge til rette for pasientsikkerhet og trygghet når velferdsteknologi brukes blant hjemmeboende eldre.

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PART 1

1 Introduction

Due to longer life expectancies and better health, the population of elderly people around the world is predicted to increase rapidly in the coming years (Beard & Bloom, 2015; Christensen et al., 2009). With higher life expectancies, the number of people with chronic diseases and dementia diagnoses is also projected to rise (WHO, 2015). Simultaneously, a shortage of qualified healthcare personnel is identified as a major future challenge, both worldwide (WHO, 2016) and in Norway (Ministry of Health and Care Services, 2006). Consequently, healthcare will face a gap between a greater demand for healthcare services and limited resources. Norwegian policymakers point out that the expected growth in healthcare demands must be solved in the municipalities and encourages them to increase their efforts regarding preventive and early healthcare initiatives (Ministry of Health and Care Services, 2009).

The use of telecare technologies in the field of healthcare is identified as a significant part of the solution. Telecare technologies have the potential to assist home-dwelling older adults with chronic illness and impaired functioning to better manage their everyday situation and health and extend the time they are able to live at home (Barrett et al., 2014; Giordano et al., 2011; Kusk, 2011; Milligan et al., 2011). Today, there is considerable international interest in the potential of using technology-enabled services to support people facing long-term challenges to both their physical and mental health (Carretero, 2009). During this study, searches for relevant literature in international electronic databases were carried out continuously. To our knowledge, however, very little attention has been devoted to qualitative research with the explicit aim of exploring patient safety and feeling of safety when telecare is used among home-dwelling older adults in a municipal context. To bridge this knowledge gap, this qualitative thesis focuses on patient safety and

feeling of safety when telecare is used among home-dwelling older adults, based on the perceptions and experiences of homecare professionals, managers and older telecare users.

This thesis comprises two main parts. Part 1 consists of seven chapters. Chapter 1 clarifies central key concepts, describes the contextual background, and presents relevant previous research in the field. The chapter also introduces the overarching aim and research questions of the thesis. Chapter 2 presents the study's central theoretical frameworks and approaches. Chapter 3 presents the philosophical and scientific foundation, followed by a description of the overall research design and strategy, data collection methods and analytical approach. In addition, research ethics and research quality (trustworthiness) are addressed. Chapter 4 provides a brief presentation of the main findings (Papers I, II and III). In Chapter 5, the main findings are discussed in relation to theory and previous research. The chapter also reflects on the methodological approaches taken and choices made. Chapter 6 presents a summarized conclusion, followed by implications for healthcare and further research. In Chapter 7, a list of references is presented. Part 2 includes the three research papers (Papers I, II and III), and the appendices.

1.1 Key concepts in this thesis

1.1.1 Telecare

Telecare is explained as 'the use of information, communication, and monitoring technologies that allow healthcare professionals to remotely evaluate health status, provide educational interventions, or deliver health and social care to patients in their homes' (Solli et al., 2012, p. 2802). In the literature, however, other terms are also utilised to describe technologies used in the context of healthcare. This has led to a variety of related concept, such as 'telehealth' (vital health data sent between patients and clinicians) (Stowe & Harding, 2010), 'telemedicine' (the exchange of valid health information for diagnosis and treatment) (WHO, 2009), and 'e-Health' (a collective term that includes the use of information and communications technology (ICT) in the health sector) (Directorate of Health, 2012). In this thesis, the term telecare[1] is used because it embraces both the assistance to the end-user individual resident in the home, and the telecare services delivered by homecare providers (Stowe & Harding, 2010). An illustration is shown in Figure 1.

Both internationally and nationally, telecare is a growing field attracting large ongoing investment. The use of telecare in a healthcare context is today a considerable area of focus in many Western countries (Milligan et al., 2011; WHO, 2019). Despite the rapid development and increasing use, digital telecare devices and services are a new arena for many healthcare providers (Barret et al., 2014). In several policy documents, the Norwegian authorities emphasize an urgent need for more research on telecare, especially when used in a municipal context (Directorate of Health, 2012; Ministry of Health and Care Services, 2013). Thus, there

[1] The Norwegian term 'velferdsteknologi' ['welfare technology'] (NOU, 2011), an originally Danish term mainly used in Scandinavia, is used, among others, in Paper II (in Norwegian), interview guides and formal letters.

is a need for more qualitative research regarding telecare used in a resident, municipal context.

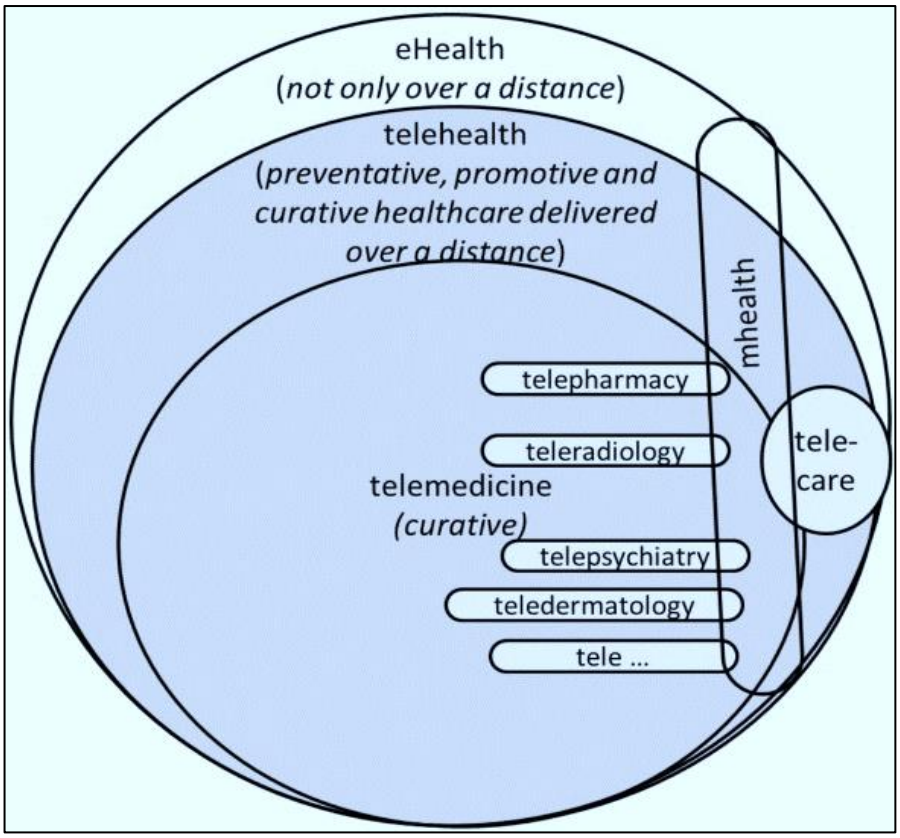

Figure 1: Van Dyk (2014).

1.1.2 Home-dwelling older adults

This thesis addresses telecare used by older adults[2] who use the technologies in their own homes. Older adults are an important target user group of telecare (Directorate of Health, 2021). *Older people* usually refer to people who have reached the general age of retirement (WHO, 2004). In Norway, the national retirement age is 67 years (Birkeland et al., 1999). *The home* is important to many older adults (Haak et al., 2007), and many older adults want to remain living in their own homes (Ahlqvist et al., 2016). Increased focus on the context of home is important as the population is ageing, and it is desirable from a socio-economic perspective that older people can continue living at home (Ministry of Health and Care Services, 2018). The home is also the central arena for the delivery and use of telecare services to older adults as many of the telecare activities and trials conducted so far have been directed towards use in the home (Directorate of Health, 2021).

Feeling safe at home is central to many older adults (Lang et al., 2008; Silverglow et al., 2020), and for many of them, home represents a place where they feel safe (Mahler et al., 2014; Wiles et al., 2012). Nevertheless, the home is also a common place for accidents to occur (Ohm et al., 2019). Norwegian public statistics reveal that more than one in three accidents treated in Norwegian hospitals occurred in private homes (Norwegian Institute of Public Health, 2018). Although many of today's elderly enjoy good health (Texmon, 2013; Vos et al., 2015), age-related biological changes also lead to increased vulnerability to developing impaired vision or hearing, poor balance and reduced muscle tone (Bravell, 2011). Many older adults also have a high incidence of multiple diseases (Sørbøe & Vetvik, 2009). Globally, dementia is a leading cause of death, disability and dependency among older people and is recognised as a public health priority (WHO, 2017). Dementia is

[2] In Papers I & II, older telecare users are referred to as 'patients' by homecare professionals and managers, in accordance with the Patient and User Rights Act of 1999, §1–3a).

an umbrella term for a group of brain diseases characterised by cognitive impairment, memory difficulties, decreased ability to function in daily life and impaired language function (Brækhus et al., 2005). It is estimated that approximately 100,000 people live with dementia in Norway today, and the number is expected to more than double by 2050 (Gjøra et al., 2020). The risk of being injured and hurt rises with age, and older people with impaired functioning are at particular risk (Ohm et al., 2019; Ramm, 2012). Falls are a main cause of injury among elderly persons (Olsen et al., 2017; WHO, 2018), and injuries resulting from falls involve suffering and reduced quality of life (Bailey et al., 2011; da Cruz et al., 2017; Olsen et al., 2017). The risk of perishing in fire also increases with age, and older adults living alone are at particular risk (DSB, 2021). Older adults are also at risk of drug-related problems (Cresswell el al., 2007), with adverse events related to self-medication practices among the elderly presenting a prevalent challenge (Locquet et al., 2017). In addition to the physical and emotional burden for the individual, accidents and adverse events in older adults constitute a burden for family members and have significant societal cost (Olsen et al., 2017). Fear of being exposed to physical harm related to the physical environment is an important reason why older adults may feel insecure at home (Lang et al. 2008).

The current thesis addresses older adults who live and uses telecare technologies at home. During the last few years, a growing body of literature has revealed the benefits of telecare use for home-dwelling older adults. Previous qualitative studies have shown that older adults experience increased independence by using telecare interventions (Bowes & McColgan, 2012; Karlsen et al., 2019; McCaig et al., 2012). Another qualitative study has found that older adults perceive it as a significant benefit that the technology supports their activities (Mitzner et al., 2010). Furthermore, studies have shown that using the global positioning system (GPS) (Grut et al., 2017; Øderud et al., 2015) and

sensor technology (Olsson et al, 2018) increases the independence of people with cognitive decline.

Previous research has further focused on conditions that impact on decisions to adopt and accept telecare technologies. One review has shown that ease of use strongly influences older adults' telecare acceptance (Chen & Chan, 2011). A qualitative study focusing on older adults' perceptions of home telehealth services has demonstrated that perceived usefulness is an important influencing factor in the intention to use telecare (Cimperman et al., 2013). Another qualitative study reveals that the information and support older adults receive in using their devices positively influences their acceptance and use of telecare (Hamblin, 2017). However, a systematic review concludes that lack of telecare training is a barrier to the adoption of telecare and acceptance of telecare (Scott Kruse et al., 2018). A qualitative systematic review has found that lack of telecare understanding can hamper correct use of telecare among older adults (Karlsen et al., 2017). Both a recently published systematic review (Leonardsen et al., 2020) and a qualitative study (Olsson et al, 2018) reveal that technical problems led to frustrations and negative user experiences. Moreover, both a qualitative (Cook et al., 2016) and a mixed methods study (Radhakrishnan et al., 2012) have shown that limited usability and a lack of trust and confidence in the equipment are barriers to the use and adoption of healthcare technologies. A qualitative study has also revealed that purposeful telecare training creates confidence and changes attitudes among healthcare professionals (Guise & Wiig, 2017).

1.1.3 Patient safety and feeling safe

Safety[3] (in this thesis used for the Norwegian term 'sikkerhet') refers to the prevention of unintended adverse events (Vinje, 2006). *Patient safety* (in this thesis used for the Norwegian term 'pasientsikkerhet') is defined by Vincent (2010, p. 329) as "the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of healthcare". As a healthcare discipline, patient safety emerged with the evolving complexity of healthcare and is seen both as a subset and attribute of healthcare quality (Mitchell, 2008; Saunes et al., 2010). Patient safety aims to achieve a trustworthy system of healthcare delivery by minimising the incidence and impact of adverse events associated with healthcare (Emanuel et al., 2008). Within the patient safety perspective, attention is drawn towards the system where errors and injuries occur, underpinned by an understanding that the underlying causes of adverse events are found, and hence can be solved, within the system (Emanuel et al., 2008; Saunes et al., 2010). Patient safety is recognised as a high priority in many countries (Emanuel et al., 2008; Vincent, 2010). Patient safety and improving the quality of health services is a major focus area in Norway, where the overall goal is to offer safe healthcare services through systematic quality improvement, better patient safety and fewer adverse events (Ministry of Health and Care Services, 2012). Municipalities have a legal obligation to work systematically with quality improvement and patient safety, according to the Norwegian Municipal Health and Care Services Act (2011). Norwegian policy documents also emphasize a need for more knowledge regarding patient safety in the municipal setting (Ministry of Health and Care Services, 2012). The safety literature in the context of home care is also poorly addressed (Lang et al., 2008). However, most current

[3] The Norwegian word 'sikkerhet' can also be translated as *security*. In the safety literature, however, security is understood as the protection against adverse events as a result of intentional and planned acts (e.g., criminal activities). However, safety can be seen as a 'hypernym' (overarching term) covering *all* kinds of adverse events, regardless of whether they are unintended or intended (Vinje, 2006).

research on patient safety has been undertaken in a hospital setting rather than a primary healthcare context, which is where most care is delivered (WHO, 2017).

To *feel* safe[4] (in this thesis used for the Norwegian term 'trygghet'), refers, however, to an emotional condition, defined by Wills (2014, p. 2233) as 'a feeling of being protected from external threats, risk, or dangers'. Feeling safe can be seen both as a human phenomenon and an individual experience (Segesten, 1994). According to Sandler (1960), to feel safe is a natural part of our human existence that we often take for granted as a background to our everyday lives. To feel safe is also considered a primary, human need (Maslow, 1943).

In this thesis, the term (patient) safety is understood and used for the avoidance and prevention of accidents, errors, and other adverse events that have potential harmful consequences for home-dwelling older adults. The concept of patient safety does not include people's experiences of feeling safe (Silverglow et al., 2020). In this thesis, the term of feeling safe is understood and used to denote the emotional aspect, related to a sense or feeling of being protected from injury and harm. To gain a comprehensive understanding, both the terms patient safety and feeling safe are used in the overall aim, information and content letters to study participants, and the interview guides for Paper I & II.

[4] Occasionally, this thesis also uses related terms such as 'sense of security'.

1.2 The Norwegian, municipal telecare context

The Norwegian healthcare system is built on the overall principle of equal access to healthcare services for all inhabitants (Ministry of Health and Care Services, 1999). At the national level, the Norwegian Ministry of Health and Care Services oversees the regulation and supervision of all healthcare services provided in Norway (Ringard et al., 2014). The Norwegian healthcare system is organised into two main parts: specialist (secondary) care and municipal/community (primary) care. While the responsibility for specialist healthcare lies with the state (and is administered by four regional health authorities), each municipality is responsible for offering and providing primary healthcare services to its own inhabitants (Ringard et al., 2014). As of January 1, 2020, there are 356 municipalities in Norway (Norwegian Government, 2021).

The Norwegian commitment to telecare was mainly introduced through the official Norwegian report NOU 2011, *Innovation in the Care Services*, which recommended an enlarged investment in the implementation and use of telecare applications within primary healthcare. Several policy documents (e.g., the Ministry of Health and Care Services, 2013, 2015 and 2018) support these recommendations. In 2013, a national programme for the implementation and use of telecare services, the 'Nasjonal velferdsteknologi – program' (NVP), was established. The programme, which is a cooperation between the Directorate of Health, the Norwegian Association of Local and Regional Authorities (KS), and the Directorate of eHealth, is still a driving force in the implementation, cooperation, and exchange of experiences between municipalities in the field of telecare. The first NVP programme, which lasted from 2014 to 2016, had 31 municipalities participating (Directorate of Health, 2021). Since the start of the NVP programme, several Norwegian municipalities have tested and implemented a range of different telecare devices and solutions with diverse functionality and purposes. Telecare devices, such as mobile

safety alarms, electronic medicine dispensers and bed and fall sensors, send out alerts and alarms to homecare services. Other technologies, such as digital video cameras and web portals, provide the capability for homecare services to have remote supervision of and conversations with telecare service users (end users) living at home. Some of the users of mobile safety alarms have their relatives or other nominated persons receive the alarm alerts instead of, or in addition to, homecare services. A few technologies, such as light sensors and smart home technologies, are used without assistance from homecare providers (Directorate of Health, 2021).

This thesis addresses telecare used in a municipal context. In Norway, each municipality has the responsibility for the provision and follow-up of telecare devices and services to its inhabitants. For telecare used in the home*,* municipal homecare services have a central role. *Homecare* is the collective term for municipal care services that are received by people who do not live in institutions but in their own homes or care homes (Abrahamsen & Svalund, 2005). The care provided ranges from care for individuals with complex needs to care for people who only need help occasionally with relatively simple tasks (Genet et al., 2011). A *homecare professional*, such as a registered nurse (RN) or occupational therapist (OT), is explained as the provision of healthcare services to individuals in the home with the goal of meeting their individual healthcare needs (WHO, 2013). Homecare professionals and managers, in different positions and levels, have essential roles and possess extensive experience concerning the telecare services provided to home-dwelling older adults in the municipalities (also see 4.3). To our knowledge, however, there is a relatively small body of literature regarding safety in telecare use based on the perceptions and experiences of homecare professionals, particularly healthcare managers.

The Norwegian field of telecare is linked to several legal regulations. The Municipal Health and Care Services Act (2011) comprises

regulations concerning the municipalities' healthcare responsibilities and obligations. According to §3–1, municipal healthcare services are obligated to provide 'necessary' healthcare to patients/users. Another general rule, according to the Patient and User Rights Act (1999) §3–1 and §3–2, is that patients/users are entitled to participate in the implementation of their healthcare, and to receive the information that is necessary to obtain an insight into the content of that healthcare. Another general rule, according to the Patient and User Rights Act (1999) §4–1, is that healthcare may only be provided with the patient's consent. In terms of telecare, a more recent regulation in §4–6a states that healthcare services may, however, make decisions regarding the use of notification and localisation technologies to adult patients/users who are not competent to give consent if the use of the device is, among others, seen as necessary to prevent or limit the risk of harm to the patient/user and in the best interests of the patient/user.

1.3 Patient safety and feeling safe in telecare use

As mentioned above, harm and injuries among older adults have a range of adverse outcomes, both for the individuals involved and society in general. Thus, a highly significant intention of the implementation and use of telecare technologies is to contribute to increased patient safety and feeling of safety (Kusk, 2011; Nakrem, 2017; Schulz et al., 2015). When this Ph.D. study started in 2016, very few qualitative studies had been published regarding telecare use in general and safety in telecare use in particular. During the last few years, however, the amount of research has increased. In a qualitative study conducted by Rantanen et al. (2017), telecare is found to promote medication adherence for elderly homecare patients. Previous qualitative studies have further revealed that telecare increases the feeling of safety in older adults (Berge, 2017; Karlsen et al., 2017) and people diagnosed with dementia (Grut et al., 2017; Øderud et al., 2015). In a quantitative study conducted by Frennert and Baudin (2019), telecare is found more reliable and safer than humans

with regards to supervision and reminders. Another systematic literature review and meta-analysis concludes that assistive technology items improve the patient safety of home-dwelling people with dementia by reducing the danger of falls risk, accidents and risky behaviour (Brims and Oliver, 2019). An increased sense of safety is further found as significant for the successful adoption of telecare services among older adults (Cimperman et al., 2013; van Hoof et al., 2011).

However, numerous systematic literature reviews recognise a dearth of research regarding patient safety associated with telecare use and practice in the home (e.g., Black et al., 2011; Guise et al., 2014; McLean et al., 2013). In particular, there is a need for more literature regarding the impact of technology on patient safety risk and that clarifies the circumstances under which the technology can become unsafe (Guise et al., 2014). Vincent (2010) indicates that the use of technology in healthcare constitutes vulnerabilities for the occurrence of errors and mistakes. According to WHO (2019), the implementation of technologies in healthcare is characterised by a rollout without a sufficient evidence base regarding benefits and harm. A recent study also reveals that many older people experience a lack of digital competence (Bjønness et al., 2021). To our knowledge, however, there is a lack of research concerning patient safety and feeling of safety when telecare is used among older adults in a municipal context. The relationships between patient safety and feeling safe in telecare use is not fully understood, and poorly addressed in the current literature. Thus, to ensure that telecare technologies promote patient safety and feeling of safety as intended, there is a need for more knowledge. Obtaining the perceptions and experiences of homecare professionals, managers, and older telecare users can provide increased understanding and knowledge.

1.4 Aims and research questions

The overarching aim of this thesis was to contribute to more insight and knowledge regarding patient safety and feeling of safety when telecare is used among home-dwelling older adults, by exploring the perceptions and experiences of homecare professionals, managers, and older telecare users.

The overarching research question is as follows:

What are homecare professionals', managers', and older telecare users' perceptions and experiences regarding patient safety and feeling of safety when telecare is used among *home-dwelling older adults?*

The thesis comprises three research papers (Paper I, II, and III) which help to answer the overarching research question. To answer the overall research question, three specific objectives and research questions were formulated:

Paper I

To explore homecare professionals' perceptions of safety related to the use of telecare by older adults.

The research question was:

How do homecare professionals perceive safety in relation to older adults' use of telecare?

Paper II

To explore what managers and homecare professionals perceive as important for safe and secure use of telecare for older adults in community homecare services.

The research question was:

What do managers and homecare professionals perceive as important for safe and secure use of telecare for older adults in community homecare services?

Paper III

To explore older adults' safety experiences when using telecare at home.

The research question was:

How do older adults experience safety when using telecare at home?

2 Theoretical frameworks and approaches

This chapter present the central theoretical frameworks and approaches used in this thesis to illuminate and improve our understanding of the empirical findings. This overview concerns theory regarding safety from a systemic perspective, and theory regarding the emotional aspects of feeling safe. The theoretical approaches are also briefly introduced in the research papers (Paper I, II and III).

2.1 System models for safety

Using theoretical patient safety approaches is appropriate for helping to increase our understanding of the organizational mechanisms behind adverse events in healthcare systems (Aase & Rosness, 2015). The findings of this thesis are discussed in the light of two safety models and frameworks: the "Swiss cheese" model of defence, and the Systems Engineering Initiative for Patient Safety (SEIPS) model of work system and patient safety. Both models have widespread acceptance within healthcare research and practice (Carayon et al., 2014; Pronovost et al., 2009; Reason, 2013; Wooldridge et al., 2017). In this thesis, the models are used with the assumption that municipal homecare services are the 'system' providing telecare services to home-dwelling older adults. In this thesis, both models are used to provide an integrated understanding of the findings.

2.1.1 The 'Swiss cheese' model of defence

According to Vincent (2010), accidents, serious injury, loss of life and other adverse events can be prevented by using technical and organisational defences (barriers). A system that lacks sufficient barriers can easily be exposed to accidents. Safety barriers are defined as 'physical or non-physical means planned to prevent, control, or mitigate undesired events or accidents' (Sklet, 2006, p. 494). The function of barriers is to stand between hazards and potential losses and thus prevent adverse events (Vincent, 2010). Reason (1997) uses the terms "soft" and "hard" defences, where technical devices and alarms are examples of hard defences, and legislation, procedures, routines, training and drills are examples of soft defences. Humans are considered as both a hard and soft defence (Rosness et al., 2002).

In the 'Swiss cheese' model (Figure 2) introduced by James Reason (Reason, 1997), the defences (barriers) are illustrated as *slices of cheese.* In an ideal world, the defensive layers would be intact and protective, allowing no penetration by possible accident trajectories. In reality, however, each layer has weaknesses and vulnerabilities caused by active failures and latent conditions, which cause the barriers to deteriorate. In the model, these weaknesses and vulnerabilities are illustrated as *holes* in the cheese slices. Active failures encompass the unsafe acts committed by people in direct contact with the patient or system (for example, healthcare personnel), and they have a direct but usually short-lived effect. Examples of active failures are slips, lapses, fumbles, mistakes and procedural violations. Latent conditions include the inevitable and contributing factors present in all systems, which arise in the organizational and managerial sphere from decisions made by designers, procedure writers and top-level management. Latent conditions are often harder to identify than the active failures since they can lie dormant for a long time. Examples of latent conditions are time pressure, inexperience, inadequate equipment and training, lack of policies and

procedures, inexperience, untrustworthy alarms and deficiencies in design and construction. Barriers will usually catch such errors and conditions if they occur individually. Occasionally, however, the holes align, and an adverse outcome occurs. An accident trajectory that passes through the holes is illustrated as a *red error* in the model. The 'Swiss cheese' model emphasizes the importance of so-called 'defences in depth', where weaknesses in one barrier should not lead to an accident because another barrier will intervene (Reason 1997; 2000; 2013).

In this thesis, the 'Swiss cheese' model is applied to help improve our understanding of how various technological, organizational, and human conditions can either pose a threat towards or prove a benefit to the safety safety of home-dwelling older adults when using telecare.

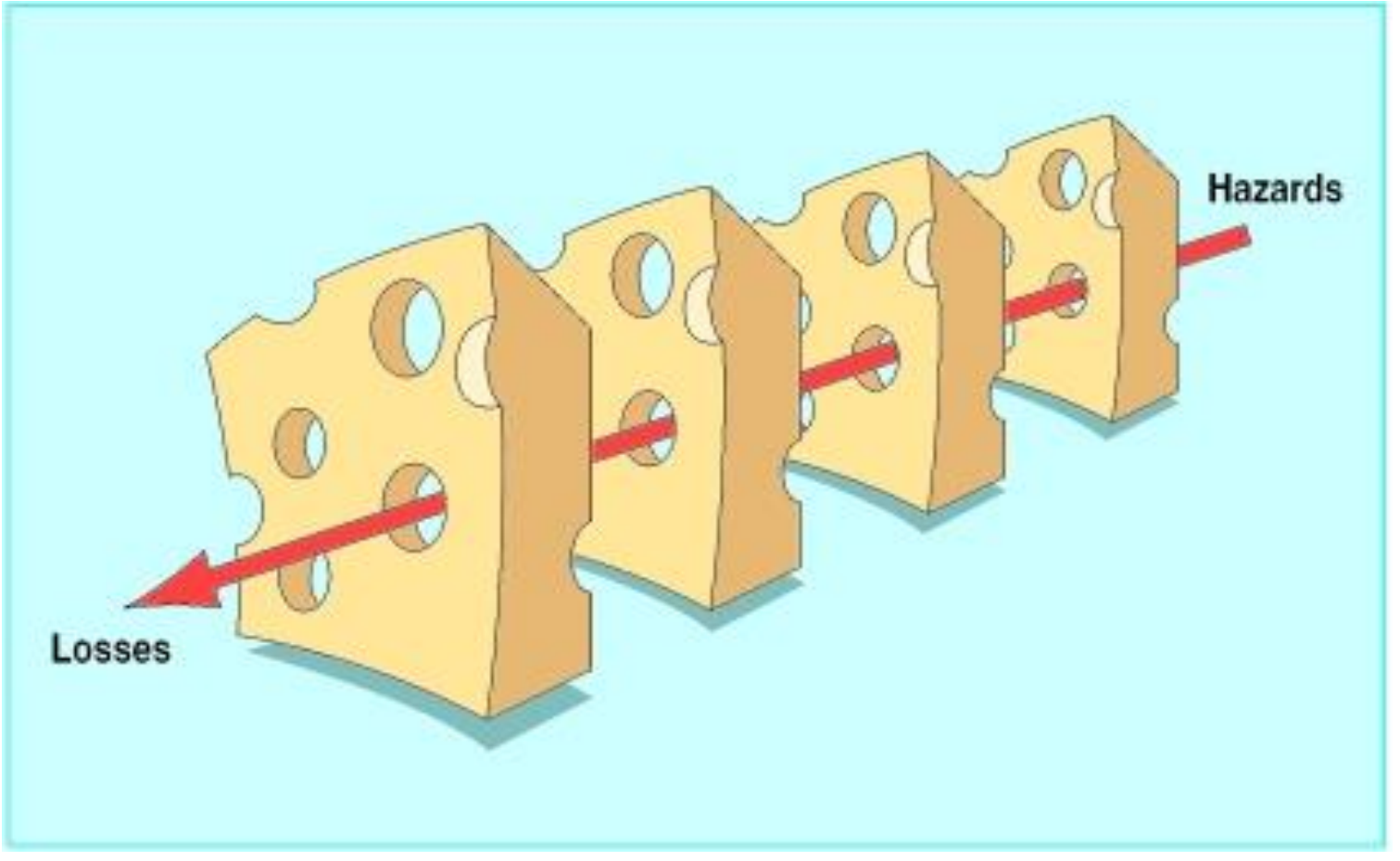

Figure 2: Safety barriers as shown in the 'Swiss cheese' model (Reason, 2000).

2.1.2 The SEIPS model of work system and patient safety

The Systems Engineering Initiative for Patient Safety (SEIPS) model of work systems and patient safety (Figure 3), introduced by Pascale Carayon and her colleagues (Carayon et al., 2006[5]) is a patient safety and human factor framework. The model was initially an extension of the structure, processes and outcomes model of care developed by Donabedian (1978). Human factor theory (also known as ergonomics) is defined as 'a scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data, and methods to design systems that optimise human well-being and overall performance' (International Ergonomics Association, 2021). Applying human factor principles, tools and methods in healthcare is highlighted as a means to better understand safety risks and improve the quality and patient safety of healthcare (Carayon et al., 2014; Gurses et al., 2012).

According to Vincent, safety emerges from the interactions between different components of a system. The SEIPS model focuses on five interacting elements of a *work system* (where care is provided): person, organizational conditions, tasks, physical environment and technology and tools. A *person* can, for example, be a patient or a healthcare provider, with their individual physical and psychological characteristics, skills, knowledge, motivation and needs. *Organizational conditions* include teamwork, coordination, collaboration and communication, organizational and patient safety culture, work schedules, social relationships, and management style. *Tasks* includes a variety of actions, job content, utilisation of skills and job demands (such as workload or time pressure). *Physical environment* includes noise,

[5] The extended second version of the model, SEIPS 2.0, by Holden et al. (2013) is not used in this thesis because the first version was found to emphasize patient safety outcomes to a larger degree.

light, temperature and workstations at the workplace or in the patients' homes. Lastly, *technology and tools* includes various health information technologies and medical devices. The interactions of these elements can affect clinical *processes* (how care is provided), resulting in positive or negative outcomes for patients (quality of care and patient safety) and for the organization/employee. This thesis concerns outcomes for patient safety. The feedback loops in the model are an important feature, representing the opportunities for improving (redesigning) the work system (Carayon et al., 2006; 2014). The SEIPS model is dynamic, where changes to any aspect of the work system will either negatively or positively affect the clinical processes and outcomes (Carayon et al., 2006).

In this thesis, the SEIPS framework is applied because it captures the complexity of municipal homecare, and incorporates relevant elements in the provision and use of telecare devices and services in municipal homecare. Using this model can help increase our understanding of how these elements, individually and in combination, can support or hinder the safety of home-dwelling older adults when using telecare.

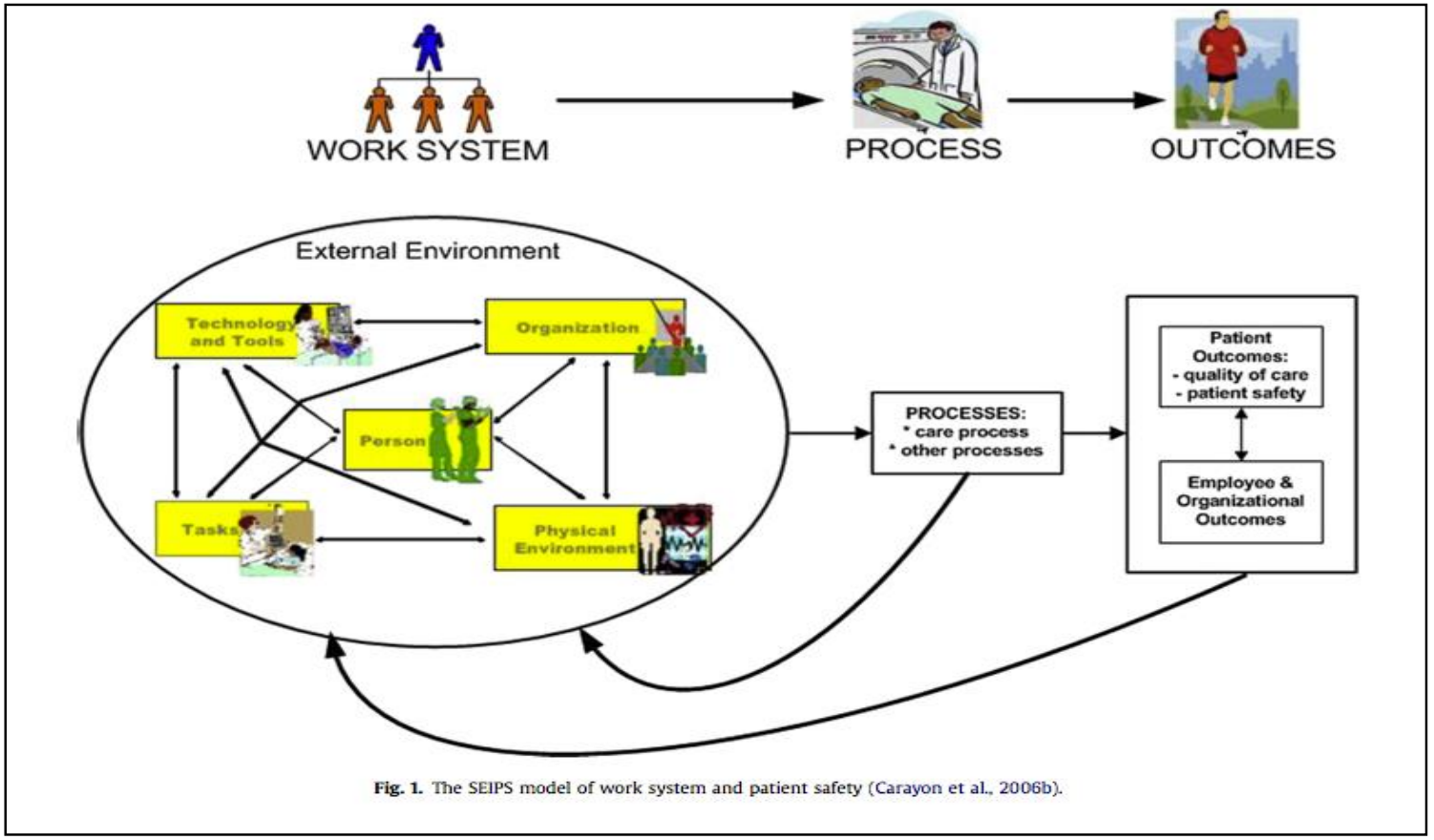

Fig. 1. The SEIPS model of work system and patient safety (Carayon et al., 2006b).

Figure 3: The SEIPS model of work system and patient safety (Carayon et al., 2006).

2.2 Feeling safe

The Swedish nurse Kerstin Segesten bases her theory (1994) on the findings from her phenomenological study, aiming to understand what the phenomenon of feeling safe ('trygghet') means to people from their own perspective. Based on her findings, Segesten divides the feeling of safety ('trygghetskänslan') into two main dimensions that together constitute the individual's holistic experience of feeling safe: internal (basic) and external (situation-related) safety. Internal safety is linked to a positive and safe childhood or religious belief and is related to self-confidence and self-esteem. Segesten refers to how Erikson (1902–1994), inspired by Freud's (1856–1939) childhood development theory, describes how the first years of human life are vital for establishing a 'basic trust'. External safety is linked to the current and actual situation and the individual's perception and experience of it. Segesten further divides the external dimension into six sub-dimensions: material, environmental, knowledge and control, relationship, trust in others and pseudo-safety. *Material* safety is related to having a residence, job and accessible hospitals and insurance. *Environmental* safety is mentioned in terms of animals, nature, music, the ocean and the hospital setting. *Knowledge and control* are about knowing 'how things are', 'what applies' and 'what to expect' in different situations, and what the different roles and requirements are. *Relationships* is linked to having a social network, warm and close relationships, friends and family and having 'someone available'. This dimension is further associated with relationships where one feels respected, the experience of physical intimacy (e.g. holding someone's hand), not being lonely, having caring relationships and to the calm, warmth and kindness given by other humans. *Trust in others* is linked to situations we cannot control. In such situations, it is important that help is available, giving a feeling of being 'in safe hands'. Lastly, *pseudo-safety* is linked to a symbolic safety. This dimension is also associated with the desire of healthcare professionals

to appear warm and safe, protecting the patient from unpleasant situations (Segesten, 1994).

In this thesis, Segesten's theory can help improve our understanding of what the feeling of safety means for older adults when using telecare technologies at home.

3 Methodology

This chapter presents the philosophical and scientific foundation of this thesis, followed by a description of the overall research design and strategy. Then, the data collection methods and the analytical approaches are described. Lastly, this chapter addresses research ethics and research quality (trustworthiness).

3.1 Foundation of philosophy of science

In all scientific research, the overall theoretical frameworks of understanding stem from questions of both ontological (how reality appears) and epistemological (theory of knowledge) nature (Jakobsen, 2015). Social research is usually conducted on the basis of theoretical and methodological research traditions, which Blaikie (2010) refers to as "paradigms." A paradigm represents a "worldview" that defines the nature of the world, and the individuals in it (Lincoln & Guba, 1985). Which paradigm the researcher chooses is important both for the methodological choices made to obtain the knowledge, and for the knowledge that emerges from the research (Malterud, 2011). This doctoral thesis is positioned within the humanistic science tradition. While the natural sciences tradition seeks to explain natural phenomena and causes, the humanistic tradition seeks to understand human phenomena and actions. The humanistic scientific tradition considers man as a subject, as a thinking, feeling, acting and communicating being and a bearer of meaning (Collins, 2014). Phenomenology and hermeneutics are central to the humanistic science tradition. The starting point for the phenomenological approach is the subjective perspective and lived experiences, founded on an understanding that one and the same phenomenon is experienced individually based on each person's own background, interests and understanding. The purpose of phenomenological research is to understand and describe social phenomena from the participants' own perspectives (Flick, 2014; Kvale

& Brinkmann, 2015). Within the hermeneutic approach, interpretation and understanding are central elements, where the purpose of hermeneutic interpretation is to achieve a valid and general understanding of the meaning of a text, discourse, or human action (Flick, 2014; Kvale & Brinkmann, 2015). In this thesis, the phenomenological approach sought to understand the participants' subjective experiences, while the participants' perceptions and experiences were the basis for our hermeneutic interpretation.

3.2 Research design and strategy

A *research design* is the plan for the research study (Blaikie, 2010). In qualitative research, however, decisions of how to obtain and collect the data often emerge as the study unfolds (Polit & Beck, 2017). This thesis has an exploratory research design. Exploratory research is considered necessary when exploring new fields and where there is little current knowledge about the investigated topic (Blaikie, 2010; Polit & Beck, 2017). When starting on this PhD study in 2016, the implementation of telecare was at an early stage. Very few studies had been conducted and published regarding the use of telecare among older adults in a municipal context.

A *research strategy* provides a logic or set of procedures for answering the research question (Blaikie, 2010). This thesis has an inductive research strategy. The inductive research strategy is associated with social studies, where the aim is to "establish limited generalizations about the distribution of, and patterns of association amongst, observed or measured characteristics of individuals and social phenomena" (Blaikie, 2010, p. 83).

3.3 Data collection methods

A method is a process for collecting empirical data and, thus, a tool for providing a description of reality (Jakobsen, 2015). In all research, the method should be adapted to the purpose of the study, which includes choosing the method that is considered best suited to answer the research questions (Malterud, 2011). Based on the overall research question, a qualitative approach was chosen. Qualitative methods aim to explore the meaning of social and cultural phenomena, as experienced by those involved (Malterud, 2011). Qualitative methods are particularly appropriate for illuminating people's experiences and social lives, in which the researcher is interested in the individual's own perspectives and narratives about the world and wants to understand how people think, feel, act, learn, and evolve (Brinkmann & Tangaard, 2015).

In this thesis, homecare professionals, managers, and older telecare users were chosen as sources of empirical knowledge because they all, in different ways, possess significant everyday experiences with telecare use. Homecare professionals are, as frontline healthcare workers, in daily direct contact with the users and are engaged in a range of different practical and administrative telecare processes. Managers possess important practical and administrative experience and knowledge related to, among other things, overall decision-making, implementation, allocation, and legislation. It was also considered important to hear the voices and lived experiences of older telecare users. Including end users' perspectives in healthcare research is important in order to meet quality requirements and practice relevance (Kjelsaas, 2020). Including end-users is also a highly recommended and encouraged both nationally (for example, by the Research Council of Norway and Omsorg 2020) and internationally (for example, by Horizon 2020, the European Science Foundation, and WHO).

To capture the perspectives of the homecare professionals and the managers, focus group interviews were used. A focus group is a qualitative research technique that collects data through group interaction on a topic determined by the researcher (Morgan, 1996). Focus groups are particularly suited to produce knowledge of the participants' experiences, attitudes, or points of view in an environment where many people interact (Malterud, 2012). Focus groups are also appropriate to elucidate the norms of group practice (Halkier, 2010) and achieve knowledge about agreements or disagreements in a group (Krueger & Casey, 2015). To capture the perspectives of the older telecare users, individual face-to-face interviews were used. Individual interviews are particularly suitable to obtain access to the meaning people attribute to their experiences and social world when topics about daily life are to be understood from the individuals' perspectives (Kvale & Brinkman, 2015; Miller & Glassner, 2016).

To address the overall aims and research questions, three sub-studies with homecare professionals (sub-study A), managers (sub-study B), and older telecare users (sub-study C) were conducted. An overview is shown in Figure 4.

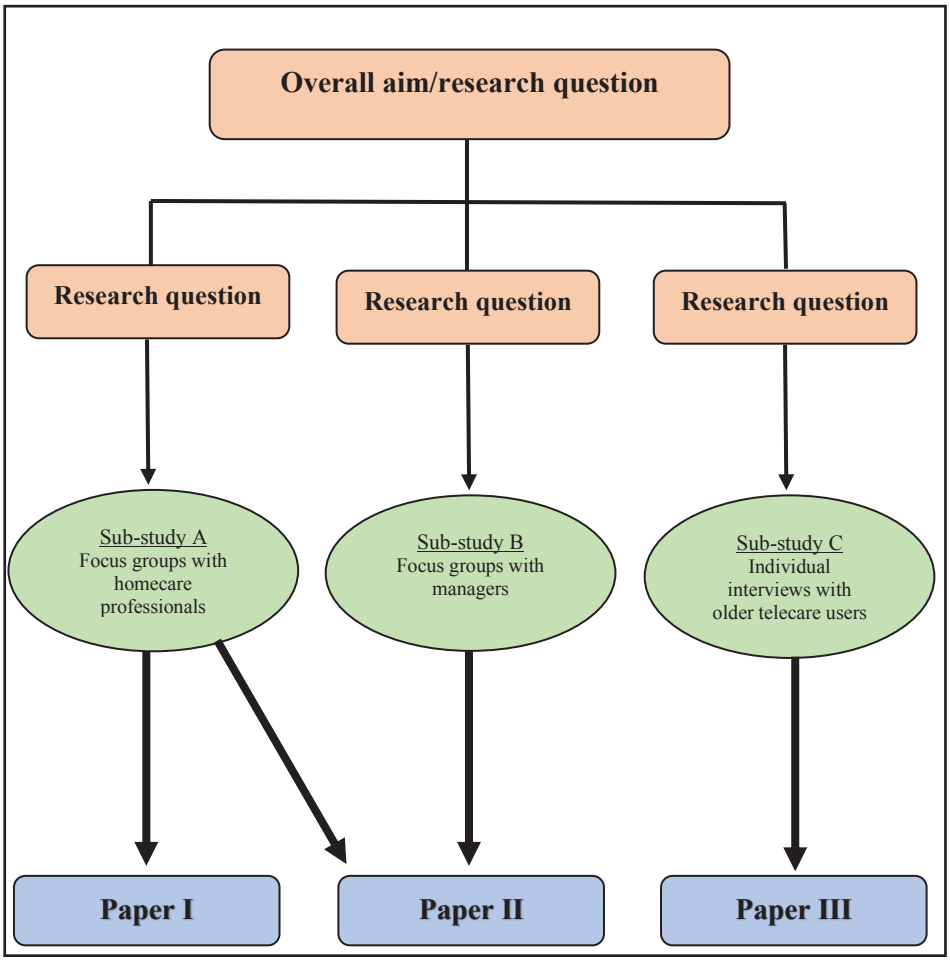

Figure 4: Overview of the sub-studies.

In each sub-study, a semi-structured interview guide was utilized. The interview guides are enclosed in Part 2. The interview guides were formulated with the intention of ensuring that the topic of interest was covered and discussed by the participants. However, they were also formulated with the intention of ensuring that the participants could freely share their experiences and perceptions. Semi-structured interviews are widely used in qualitative research interviews and usually include a set of predetermined open-ended questions but allow other questions to emerge from the dialogue between the interviewer and interview participant(s) (DiCicco-Bloom & Crabtree, 2006). Hence, using semi-structured interview guides allows the interviewer to be open to the interviewee's individual way of talking about the topic of interest (Flick, 2014).

3.3.1 Focus groups with homecare professionals (Sub-study A)

Recruitment

Two municipalities in Western Norway were selected as the base for recruiting participants. The municipalities were selected because they, at the time of recruitment, had participated in the 2013 NVP program and had implemented several newer digital telecare technologies as part of their healthcare services. One of the municipalities was large, while the other was had medium-sized populations. However, it was the wide telecare experience, not the size of the municipalities that had an impact on the selection of these municipalities.

The recruitment of participants aimed to ensure a sample with the best possible potential to illuminate the topic of interest (Malterud, 2011). In the first step of the recruitment process, this thesis's first author (TBJ) contacted the health and care management in both municipalities, asking

permission to carry out the study. Both municipalities were positive, and a contact person in each municipality was assigned. Both contact people, one department manager and one municipal telecare department employee, knew the municipal telecare field and the personnel/ homecare services with telecare experiences very well. The inclusion criteria for participation were a minimum of six months' work experience with telecare devices used by older adults (patients) who receive community care services at home. To archive rich and varied data material and to shed light on the research question from a variety of aspects (Maltrud, 2011), it was desirable to include both registered nurses and occupational therapists with experience with various telecare technologies in the sample. The contact people contacted homecare professionals who met the inclusion criteria, asking if they were willing to participate in the study.

Participants

The final sample comprised in total ten homecare professionals, including nine registered nurses and one occupational therapist. The participants were employed in a total of six homecare service units in the two municipalities. The participants had between 6–32 months' practical work experience with a total of ten different home-based telecare devices. Most of the technologies with which the participants had experience were implemented based on the 2013 NVP program.

Table 1 shows an overview of the participants, including the telecare devices that they had experience with.

	Participants	Employed	Telecare devices
Focus group 1	Registered nurse	Municipality 1	-Web portal (tablet) -Mobile safety alarm -Electronic medicine dispenser -Digital camera -Light sensor -Door exit sensor -Bed sensor -Smoke detector -Fall sensor -Ambient control technology ("Smart home")
	Registered nurse	Municipality 1	
	Registered nurse	Municipality 1	
	Registered nurse	Municipality 1	
	Occupational therapist	Municipality 1	
Focus group 2	Registered nurse	Municipality 2	
	Registered nurse	Municipality 2	
	Registered nurse	Municipality 2	
	Registered nurse	Municipality 2	
	Registered nurse	Municipality 2	

Table 1: Overview of the participants (homecare professionals) *(n=10)*

Preparation and conduct

Two focus groups were carried out between June and December 2017. Before the focus groups, the first author (TBJ) contacted the participants who had agreed to participate to arrange the date and time for the interview. The participants participated in the group in the municipality where they worked. In the first group, one occupational therapist and four registered nurses from five different homecare service units participated. None of the participants in this group previously knew each other. In the second group, five registered nurses from the same homecare service unit participated, and all the participants, therefore, knew each other beforehand. The focus group interviews took place in bright meeting rooms, which facilitated a good environment for conversation and discussion between the participants. The first author (TBJ) served as moderator in both group interviews, while the co-authors (ALH and MS) served as co-moderators in one group each, observing

the dynamics and social interaction between the group members (Krueger & Casey, 2015). The participants were encouraged to freely share their experiences, viewpoints, and perceptions. During the interviews, the moderators listened carefully to the participants' responses and added supplementary open-ended questions when necessary. The moderators also ensured that all the participants were included in the discussions. Both focus groups had a positive and open atmosphere, and all the participants contributed greatly to the discussions. In the group where the participants did not know each other beforehand, the discussions and sharing of experiences appeared to be of great interest to the other group participants. Each of the focus group interviews lasted approximately one to one and a half hours. The focus group interviews were audio recorded and transcribed shortly after they were conducted.

3.3.2 Focus groups with managers (Sub-study B)

Recruitment

Two inter-municipal telecare project groups, geographically located in two different parts of Western Norway, were selected as the base for recruiting participants. The group consists of managers in leading positions who are employed in geographically close municipalities that collaborate on different municipal telecare projects.

The recruitment of participants aimed to ensure a sample with the best possible potential to illuminate the topic of interest (Malterud, 2011). In the first step of the recruitment process, the first author (TBJ) contacted the project group manager in each of the groups, asking if they were interested in participating in the study. Both were positive. Both managers assisted the first author (TBJ) in the recruitment process by contacting and asking managers in their respective telecare project group who met the inclusion criteria if they were willing to participate

in the study. The inclusion criteria for participating were a minimum of six months' work experience with the introduction of telecare used by home-dwelling older adults in the context of community homecare. It was desirable to include participants with experience of various telecare technologies in the sample to archive rich and varied data material and to shed light on the research question from a variety of aspects (Maltrud, 2011). Thus, there were no limitations concerning the participants' academic background or occupational title/position.

Participants

The final sample comprised in total ten participants, including eight health and care managers, and the two project group managers. The participants had different academic backgrounds and occupational titles. They all held middle to upper management positions within community nursing and care, telecare, and IT. The health and care managers were employed in eight small to large municipalities that had implemented and/or had specific plans to implement various telecare technologies. While some of the participants held senior positions without direct contact with the end users, other participants also had positions and experience with implementation processes in close contact with both homecare services and end users. The participants had administrative experience with a total of four different home-based telecare devices. Some of the participants also had experience with the practical use from the implementation processes. In addition, some of the participants had experience in two technologies used by health professionals in the participants' homes, such as electronic door locks (e-locks) for main entrance doors and portable electronic patient record tablets.

Table 2 shows an overview of the participants, including the telecare devices that they had experience with.

	Participants	Employed	Telecare devices
Focus group 1	Telecare project group manager	Inter-municipal telecare project group 1	-Web portal (tablet) -Mobile safety alarm -Electronic medicine dispenser -Digital camera -Electronic door locks -Portable electronic patient record tablets
	Health and care manager	Municipality 1	
	Health and care manager	Municipality 2	
	Health and care manager	Municipality 3	
	Health and care manager	Municipality 4	
	Health and care manager	Municipality 5	
Focus group 2	Telecare project group manager	Inter-municipal telecare project group 2	
	Health and care manager	Municipality 6	
	Health and care manager	Municipality 7	
	Health and care manager	Municipality 8	

Table 2: Overview of the participants (managers) *(n=10)*

Preparation and conduct

Two focus groups were carried out in two municipalities between August 2017 and April 2018. Before the focus groups, the first author (TBJ) contacted the participants who had agreed to participate concerning the place, date, and time for the interviews. Each focus group consisted exclusively of representatives from each of the inter-municipal groups and, thus, knew each other beforehand. In the first group, one telecare project group manager and five health and care managers from five

municipalities participated. In the second group, one telecare project group manager and three health and care managers from three municipalities participated. Both focus group interviews took place in suitable and bright meeting rooms, which offered good facilitation for conversation and discussion. In both groups, the first author (TBJ) served as the main moderator, while one of the two co-authors (ALH) served as co-moderator in the first group. The moderators encouraged the participants to freely share their experiences and perceptions and ensured that all the participants were included in the discussions. Supplementary open-ended questions were also asked when necessary. The moderators observed the dynamics and social interaction between the members of the groups (Krueger & Casey, 2015). Both focus group sessions had a positive atmosphere, where the participants were willing to share their experiences and showed respect and interest for each other's views and perceptions. Because the participants in both groups knew each other already, the discussions were characterized by honesty and openness, and all the participants contributed to the discussions. Each of the focus groups lasted about one to one a half hours. The focus group interviews were audio recorded and transcribed shortly afterward.

3.3.3 Individual interviews with older telecare users (Sub-study C)

Recruitment

The recruitment of participants aimed to ensure a sample with the best possible potential to illuminate the topic of interest (Malterud, 2011). For this study, participants were recruited from one large municipality in Western Norway, which started the implementation of mobile safety alarms in 2015–2016 and electronic medicine dispensers in 2017–2018. In the first step of the recruitment process, the first author (TBJ) contacted the health and care management in the municipality, asking for permission to carry out the study. The municipality responded

positively. The recruitment process was aided by an employee from the community telecare department, and by healthcare personnel from community homecare services. They contacted and asked home-dwelling older telecare users who met the inclusion criteria if they were willing to participate in the study. The inclusion criteria for participating were aged 67 years or older, living in their own home, with a minimum of six months' experience of using either a mobile safety alarm with GPS or an electronic medicine dispenser at home. Exclusion criteria were participants without consent competence or who had been diagnosed with dementia. Older adults who met the inclusion criteria were asked to participate in an interview, either with an employee from the community telecare department or personnel from community homecare services. Seven accepted the invitation. Before the interviews started, two of the service users with mobile safety alarms asked if their spouse could participate in the interview. The two spouses were included in the final sample because they have a valid role in the telecare use by the service user and contributed valuable experiences from their own perspectives. Both spouses were familiar with the alarm and were registered as the first contact on their spouses' alarm's emergency contact list.

Participants

The final sample comprised nine participants, including seven service users (aged 76–91 years), and two spouses (aged 65 and 84 years). The sample included both women and men. Of the total sample, five participants had a mobile safety alarm with GPS, and four had an electronic medicine dispenser. None of the participants used more than one of the devices. Participants used the same brand of either a safety alarm or medicine dispenser. Except for the two married couples, the participants were widows/widowers and lived alone, and had minimal or no telecare or health-related assistance from community homecare services. They had received information about their telecare device either through the local newspaper, local community homecare service, the

Norwegian Labor and Welfare Administration (NAV), or from their regular general practitioner. The users with mobile safety alarms stated that they had acquired the device due to their health and medical conditions (epilepsy, atrial fibrillation, fall risk/unsteadiness, vision impairment, and mobility difficulties in extremities after a stroke). The users with medicine dispensers reported that they had acquired the device because they had started to experience difficulties in administering their medication themselves and/or were often outdoors.

Table 3 shows an overview of the participants, including the telecare devices that they had experience with.

Participants (service user/spouse)	**Telecare device**
Woman	Mobile safety alarm
Man	Mobile safety alarm
Woman (spouse)	
Woman	Mobile safety alarm
Man (spouse)	
Woman	E-medicine dispenser
Man	E-medicine dispenser
Woman	E-medicine dispenser
Man	E-medicine dispenser

Table 3: Overview of the participants (older telecare users) *(n=9)*

Preparation and conduct

Seven individual face-to-face interviews were carried out in the participants' private homes. The interviews took place between June 2017 and May 2019, due to the implementation of the technologies at different times. Before the interviews, the first author (TBJ) contacted the participants who had agreed to participate concerning the date and time for the interview. The first author (TBJ) conducted all the interviews. The two married couples were interviewed together. The interviews had a relaxed, open atmosphere. Each interview lasted approximately 45–60 minutes and was audio recorded in agreement with the participants.

The data collected from the three sub-studies formed the basis for three research papers: Paper I, II, and III. An overview of the papers, including the participants/sample which the papers were based on, data collection methods, and the analytical approach, is presented in Table 4. The research papers are attached in full in Part 2.

	Paper I	**Paper II**	**Paper III**
Participants/ sample	Homecare professionals (n=10) including * • 9 registered nurses • 1 occupational therapist	Homecare professionals (n=10) including * • 9 registered nurses • 1 occupational therapist Managers (n=10) including • 8 health and care managers • 2 telecare project-group managers	Older telecare users (n=9) including: • 7 service users • 2 spouses
Data collection method	2 focus groups	4 focus groups	7 individual interviews
Analysis	Qualitative content analysis	Qualitative content analysis	Qualitative content analysis

* Sub-study A

Table 4: Overview of the research papers.

3.4 Data analysis

Analysis of qualitative data includes a systematic organization and synthesis of the data material (Polit & Beck, 2017). The analysis process aims to build a bridge between the raw data and the results by organizing, interpreting, and summarizing the data material (Malterud, 2011). In this thesis, qualitative content analysis as described by Graneheim and Lundman (2004) and Graneheim et al. (2017) was utilized to analyze the collected and transcribed data material from all three sub-studies. Qualitative content analysis is a method for analyzing qualitative data (Graneheim et al., 2017) and is considered an appropriate method for capturing and interpreting the meaning of the participants' experiences (Flick, 2014). Qualitative content analysis is explained as a systematic approach for classifying and identifying themes or patterns in the data (Hsieh & Shannon, 2005). Content analysis was deemed suitable because it offers a high degree of flexibility and several choices of use. Moreover, the qualitative content analysis also offers opportunities to analyze both the manifest and latent content and stresses variation by focusing on similarities and differences in the text (Graneheim et al., 2017). It was also seen as advantageous that the analysis method can fit various research questions.

In accordance with the descriptions by Graneheim and Lundman (2004) and Graneheim et al. (2017), our analysis comprised both descriptions of the manifest content of the text (close to the text) as well as interpretations of the latent content of the text (distant from the text but still close to the participants' lived experiences) (Graneheim et al., 2017). Also in accordance with the authors' descriptions, the manifest content is expressed as categories, while the latent content is expressed as themes. The categories can refer to the phenomenological approach, while the identification of themes can refer to hermeneutic interpretation (Graneheim et al., 2017). Both the manifest and latent content require interpretation, but the interpretations may vary in depth and level of abstraction (Graneheim & Lundman, 2004; Graneheim et al., 2017).

The analysis process in this thesis can also be described as a hermeneutic spiral, where a better understanding of the whole is achieved by interpreting parts of the interview(s), and a better understanding of the parts is achieved in light of the whole, and finally all, interview(s). The 'hermeneutic spiral' refers to this exchange between the whole and the parts, and between our pre-understanding and experiences, where the understanding of the parts is understood and interpreted from the whole, and the whole is understood and interpreted from the parts. As a spiral, we can then overcome our prejudices and achieve a deeper understanding (Thurèn, 2009).

In accordance with Graneheim and Lundman's (2004) definitions and descriptions, our data analysis included the following steps:

1. All three authors openly read through all the transcribed data material (unit of analysis) several times to obtain a sense of the whole (Graneheim and Lundman, 2004).
2. Then, we searched for meaning units in the text, which we found relevant to answer the research questions. A *meaning unit* consists of words, sentences, or paragraphs containing aspects related to each other through the literature and context (Graneheim and Lundman, 2004). When analyzing the focus group interviews with the homecare professionals for Paper I, the meaning units that we found that answered the aim of Paper II were set aside and saved. By reading the entire text several times during the analysis process, we also included meaning units that were not identified initially.
3. The identified meaning units were condensed while we strived to preserve their main content. *Condensation* is a process that makes the text shorter and more manageable while preserving the central content (Graneheim and Lundman, 2004).
4. The condensed meaning units were further abstracted and labeled with a code. A *code* is a label on a condensed meaning unit that describes its content (Graneheim and Lundman, 2004).

5. The various codes were compared, based on their similarities and differences, and sorted into categories. A *category* refers mainly to the descriptive level of content, and can be seen as an expression of the manifest content of a text (Graneheim and Lundman, 2004).
6. For Paper I and III, we found that the data allowed further interpretation, and themes were formulated. A *theme* refers to the thread of the underlying meaning through condensed meaning units, codes and categories, and can be seen as an expression of the latent content of a text (Graneheim and Lundman, 2004).

When analyzing the data, all the authors (TBJ, MS, and ALH) participated in the whole process. The identification of meaning units and coding was, however, mainly done by the first author (TBJ), in close collaboration with the other authors. The data for Paper I (homecare professionals) and Paper III (older adults) were analyzed separately. The data for paper II, which included healthcare professionals and managers, were analyzed together.

3.4.1 Pre-understanding

Pre-understanding refers to the opinions and perceptions that we already have about a phenomenon, which can characterize our way of seeing reality in both everyday life and in scientific research (Thurèn, 2009). Our pre-understanding consists of experiences, hypotheses, professional perspectives, and the frame of theoretical references that we have at the beginning of the research project (Malterud, 2011). Gadamer (2004) notes that everyone has a pre-understanding of a phenomenon which they bring to various meetings and situations or when approaching a text. According to Gadamer, our pre-understanding is an important prerequisite for gaining increased understanding. As scientific researchers, however, our pre-understanding can also have an impact both on what questions we ask the participants and how we interpret our collected data material (Malterud, 2011). Therefore, it is important that

we, as researchers, are open and aware of our pre-understanding throughout the entire inquiry process. Both the first author (TBJ), the first author's main supervisor (ALH), and the co-supervisor (MS) are registered nurses with clinical work experience in healthcare. In addition, the first author holds a master's degree in societal safety and also has previous work experience in health, environment, and safety (HSE), which has provided the first author with basic theoretical knowledge and an interest in safety and safety issues. Altogether, these conditions may have affected the authors' pre-understanding. Nevertheless, when starting on this thesis, the authors had only limited prior knowledge and no previous clinical experience with newer digital telecare devices (including the devices this thesis's participants had experiences of). However, through working on this thesis, we have gained knowledge, which may have possibly influenced our interpretation of the collected data material. Therefore, we had to be aware of how our pre-understanding could influence our meetings with the study participants, as well as the interpretation of the data. However, we also see that our prior clinical experiences as nurses provided us a better understanding of homecare services as an organization, and about who could give us the best information on the topic of interest.

3.5 Research ethics

According to Kvale and Brinkmann (2015), ethical aspects should be considered throughout the whole research process. This study was pre-approved by the Norwegian Social Science Data Service (NSD) (project number 48429). Throughout the work, ethical concerns have constantly been considered and conducted in accordance with Norwegian legislation and requirements, notably the Guidelines for Research Ethics in the Social Sciences, Law, and the Humanities (NESH, 2015) and the Declaration of Helsinki (WMA, 2013). Prior to the interviews, the participants received written and oral information, and informed consent was obtained. The ethical approval from NSD and the information- and

consent letters are enclosed in Part 2. The participants' confidentiality has been ensured by the anonymization of the data. Hence, a more detailed description of the participants' age, municipality of residence, workplace, and work title is omitted to avoid identification.

3.6 Research quality (trustworthiness)

The purpose of scientific research is to produce valid and trustworthy knowledge of reality (Jakobsen, 2015). Like quantitative studies, qualitative studies must be judged according to their scientific quality (Malterud, 2011). According to Graneheim and Lundman (2004; 2017), research findings should be as trustworthy as possible, and every research study must be evaluated in relation to the procedure used to generate the findings. To achieve trustworthiness in this qualitative study, the quality concepts of credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985) were applied.

3.6.1 Credibility

Credibility refers to the confidence in the truth of the research findings (Polit & Beck, 2017). To establish credibility in this thesis, participants who possessed an exclusive everyday experience and knowledge of the topic were recruited. Prior to the interviews, the authors emphasized to the participants that they should feel free to honestly share their options, views, experiences, and perceptions. The authors, therefore, believe that the data shared by the participants during the interviews represent their true thoughts and personal experiences. Moreover, the participants were asked follow-up questions during the interviews, to ensure that we had understood them correctly. Furthermore, the whole research team (TBJ, ALH, and MS) served as authors on all the research papers in this thesis. ALH or MS have also served as co-moderators in three of four focus groups. This has given us a valuable opportunity to discuss our observations of the interaction between the participants and what the participants shared in the groups (Krueger & Casey, 2015). We consider

that this strengthens the study's credibility. The whole research team also participated and collaborated in all the analysis processes, including reflecting upon and discussing categories and themes until an agreement was reached. Except for two focus group interviews, all the interviews were transcribed by the first author. Furthermore, representative quotations from the participants were presented in all the papers. This allows the reader to judge the findings and interpretations. The tape recorder used during the interviews was new and of good quality, and it was easy to hear and understand what the participants said on the recordings.

3.6.2 Transferability

Transferability refers to the degree to which research results can be applied to another context (Bitsch, 2005). In this thesis, context, recruitment, data collection, and the data analysis process have been carefully described. Furthermore, by including participants with experience of telecare in use in Norwegian municipalities, we believe that our findings can be transferred and applied to other healthcare contexts or settings. In this study, the participants were recruited from ten municipalities, which may facilitate transferability.

3.6.3 Dependability

Dependability refers to the consistency and stability of findings over time (Bitsch, 2005). In this thesis, the research team contributed to all the included research papers. Moreover, consistency has been achieved in that I, as a Ph.D. student and author of this thesis, had the overall responsibility for and overview of the research design and the execution and coordination of the data collection. I also served as the main moderator in all the focus groups and conducted all the individual interviews. This has contributed to consistency throughout the research process. Although I was a new researcher when starting this thesis, the research quality of this thesis has been ensured by the fact that ALH and

MS hold high academic positions as professors and have several years of research experience. Furthermore, consistency has been obtained by using the same interview guide for all the participants within each sub-study. Nevertheless, terms were explained and formulated to ensure that each participant understood the questions. The moderators also followed up the participants' responses and asked follow-up questions when necessary.

3.6.4 Confirmability

Confirmability concerns the findings' neutrality and objectivity (Polit & Beck, 2017). None of the research team had previously met or were familiar with the interview participants or had any commercial interests in the telecare devices. According to Kvale and Brinkman (2015), qualitative research is a social exchange of knowledge, where knowledge is produced through interaction between the researcher and the participant(s). However, this interaction can also influence the quality of the knowledge obtained (Kvale & Brinkman, 2015; Malterud, 2011). Prior to the interviews, we emphasized to the participants that we did not have any affiliation with either their local homecare services or telecare suppliers, and that the study was subject to strict confidentiality. Although the researcher can never be an invisible part of a qualitative interview (Malterud, 2011), we tried as much as possible to stay in the background so that the participants could speak freely without interruption. We also emphasized listening attentively and meeting the participants' experiences with respect, interest, and an open attitude. We also strived to be aware of our pre-understanding when performing the interviews and analyzing our data as objectively as possible. We believe that this has helped to ensure confirmability.

4 Summary of the main findings

This chapter presents the main findings in the three research papers (Paper I, II, and III).

4.1 Paper I

This paper presents the findings from focus group interviews with homecare professionals (sub-study A). The analysis identified two themes. The first theme, *A protection against injury and insecurity*, was based on the two categories Preventing harm and Feeling safe. The second theme, *Involves challenges that could lead to harm*, was based on the two categories Technological limitations, and Difficulties managing and understanding the technology.

The findings show that the participants perceived that the use of telecare protects older adults against injury and insecurity by preventing harm and giving them a feeling of safety. However, they also perceived that the use of telecare involves challenges that could lead to harm to older adults related to technological limitations and difficulties managing and understanding the technology.

4.2 Paper II

This paper presents the findings from focus group interviews with homecare professionals (sub-study A) and managers (sub-study B) and is therefore based on two interview guides. The analysis identified three categories: *Sufficient knowledge*, *Close follow-up*, and *Meet the needs of the users*.

The findings show that the participants considered it important that both healthcare professionals and service users receive essential information and training about the telecare technologies in use. Furthermore, it was

deemed vital that both the technology and its use are closely followed up, and that the solutions offered complies with the service users' individual desires, needs, and resources. The participants also referred to the significance of increased attention to early initiatives and the use of telecare in a preventative perspective.

4.3 Paper III

This paper presents the findings from individual interviews with older telecare users (service users and spouses) (sub-study C). The analysis identified one theme: *Feeling free and protected from danger.* The theme was derived from three categories: Being protected from harm, Trusting and managing the device, and Becoming more independent.

The findings show that the participants experienced an increased feeling of safety by using their mobile safety alarm with GPS or electronic medicine dispenser. This was linked to a sense of being protected from physical harm, and finding their device reliable and easy to use and understand. Moreover, the findings revealed that the increased feeling of safety was significant in that the participants could maintain their daily activities and live more independently at home.

5 Discussion

The overall aim of this thesis was to contribute to more insight and knowledge regarding patient safety and feeling of safety when telecare is used among home-dwelling older adults. In this thesis, the perceptions and experiences of homecare professionals, managers, and older telecare users are explored. In the first part of this chapter, the main findings (as laid out in the three research papers) were discussed in light of previous research and theoretical approaches. Based on the findings, this section addresses key conditions of importance for patient safety and feeling of safety when telecare is used among home-dwelling older adults in a municipal, homecare context. The structure is guided by relevant elements in accordance with the SEIPS model (Carayon et al., 2006) and the 'Swiss cheese' model (Reason, 1997). In the last part of this chapter, methodological approaches and choices taken in this thesis, including their strengths and limitations, are elaborated.

5.1 Key conditions of importance for patient safety and their feelings of safety when telecare is used among home-dwelling older adults

5.1.1 Functionalities related to the telecare devices

'Technology and tools' is an important element in the SEIPS model (Carayon et al., 2006) concerning the functionality and useability of technologies such as telecare devices. The findings of this thesis demonstrate how technological conditions have importance for patient safety and feeling of safety when using telecare (Paper I, II, and III). The findings highlight how notifications/alarms and tracking functions related to the telecare devices themselves promotes patient safety and feeling of safety by averting, preventing, and limiting the consequences

of accidents, errors, and adverse events among older adults (Paper I, II and III). In the 'Swiss cheese' model, Reason (1997; 2000) shows how such alarms and alerts can act as "hard" barriers, preventing errors, accidents and other adverse events from occurring. Previous research has also shown that telecare could potentially promote older adults feeling of safety (Karlsen et al., 2018; Berge, 2017). The findings of this thesis particularly highlight the harm-prevention functions of digital telecare devices, such as mobile GPS safety alarms, for people with impaired physical and cognitive functioning (Paper I & II). Many people with dementia face difficulties finding their way home due to problems with memory and orientation (Brækhus et al., 2005). This may increase the risk for adverse events, and it is often critical that they are found quickly. For family members, not knowing where their spouse or parent is can cause great concern, and search operations are often demanding in terms of physical resources and emotional stress for the people involved. Thygesen (2011) posits that offering a GPS to people with dementia can help reduce or avoid other, often controversial, efforts, such as locking doors. However, to use localization technologies for people with dementia, as for the use of all types of telecare devices, it is vital that the decisions are legally founded and based on comprehensive ethical considerations regarding the technology's potential, how it would affect the end-user, and alternatives (Hofmann, 2019; Nakrem, 2017; Thygesen, 2011).

Moreover, the thesis findings reveal how patient safety and feeling of safety are promoted when the devices are simple to use (Paper I, II, & III). Telecare devices have a simple design are crucial for correct and proper use among older adults. Additionally, a simple design can make the devices more applicable for people with physical and cognitive needs and challenges. It can also benefit homecare personnel and family members using telecare. Prior research has shown that technologies perceived as user-friendly support older adults' telecare acceptance and adoption (Cimperman et al., 2013; Chen & Chan, 2011). In contrast,

limited usability and a lack of trust in the equipment are identified as barriers to telecare use and adoption (Cook et al., 2016; Radhakrishnan et al., 2012). Thus, to ensure that the devices fit the needs of the users, as well as help to create an acceptance and desire to use the solutions, telecare designers should include and involve end-users in the process (Directorate of Health, 2012). Henriksen (et al., 2008) also states that to ensure patient safety, new technologies should be designed with the end-user in mind, and human strengths and limitations must be considered. Berge (2017) refers that if telecare is correctly adjusted to users' needs and abilities, they will also feel safer. However, older adults are different in terms of technological interest and experience. They also have different life situations and states of health. What they define as user-friendly can depend on their everyday life, digital competencies and interests, and personal preferences. Thus, the choice of telecare solution for use older adults should always be seen in the context of their individual and unique desires and needs. Nevertheless, it is important to have in mind that although a telecare user may struggle to use a device at the beginning, they might better understand and use the devices with practice, training, and support.

However, the findings of this thesis reveal how patient safety and feeling of safety are challenged by technological inadequacies and limitations related to the devices themselves and networks. The findings also point to the complexities and vulnerabilities in telecare use in the municipalities in general, where the use of several new telecare units will fit in with established networks and local ICT systems (Paper I & II). The current findings provide significant insight and knowledge of vulnerabilities regarding the technologies and can be considered as a substantial finding by filling an important and recognized knowledge gap (Guise et al., 2014). Such inadequate equipment is referred to by Reason (1997; 2000) as latent conditions. In his 'Swiss cheese' theory, Reason shows how such latent conditions can create holes or weaknesses in the defense layers (barriers), so errors, accidents and other adverse events

occur more easily. Clearly, poor and insufficient technology can adversely influence patient safety and feeling of safety by that the devices do not work as intended. Moreover, and as findings of this thesis also emphasize (Paper I & II), it could create a "false sense of security" if the technology used does not work adequately, as well as make homecare professionals unmotivated and the telecare users stressed, anxious, and unwilling to keep their device. Technical problems also lead to frustration and stress for older users (Leonardsen et al., 2020; Olsson et al., 2018). Nevertheless, is important to remember that, although many of today's telecare solutions can be described as "immature," the telecare field is rapidly evolving.

Poor mental and physical health are widely recognized as risk factors for the loss of independence (Escourrou et al., 2017). The findings of this thesis reveal how the enhanced feeling of safety from using telecare devices is significant for home-dwelling older adults, so they can maintain their activities and live more independently (Paper I & III). In line with these findings, previous research has shown that older adults' independence increased when using telecare interventions (Karlsen et al., 2019; Bowes & McColgan, 2013; McCaig et al., 2012). Controlling everyday situations and maintaining a social life is highlighted as important for having a good old age (Hansen & Daatland, 2016; Hillcoat-Nallétamby, 2014). Segesten (1994) notes that being in contact with other people and mastering one's everyday life is important to feel safe. Older adults living independently in their homes for as long as possible is also a national goal (Ministry of Health and Care Services, 2018). Nevertheless, this goal can stand in contrast with individual desires and needs. Providing care "at distance" by using telecare can involve changes in how healthcare services are traditionally provided (Oudshoorn, 2012). Today, there is a debate and fear that "cold technology" will replace traditional "face-to face" contact and warm relationships and interactions between healthcare personnel and users, which touches on the fundamental questions of care (Jøranson & Lausund, 2019; Nakrem;

2017; Thygesen, 2011). For some older adults, homecare service visits may be embraced in addition to the medical/practical assistance, an important social function. As such, using a telecare device (e.g., a camera or a medicine dispenser) instead of receiving in-person visits may constitute the loss of a "bright spot" in everyday life. According to Segesten (1994), the presence of healthcare personnel also has vital importance for patients' feeling of safety. Segesten (1994) notes that injury, acute illness, or loss of bodily functions can cause a "disturbance" in everyday life, resulting in insecurity and a lack of control. In such situations, according to Segesten (1994), in order for older adults to feel safe, they should "have someone available," be able to receive help from an "expert," and be in "safe hands".

5.1.2 Older telecare user characteristics and the role of homecare professionals

The 'person' is a vital element in the SEIPS model (Carayon et al., 2006), concerning their physical and psychological characteristics, motivations, and needs. In the SEIPS model, the individual, such as a patient receiving care, is placed in the center of the work system (Carayon et al., 2006). The findings of this thesis demonstrate how end-user characteristics are important for patient safety and feeling of safety in telecare use (Paper I, II, and III). The findings reveal how patient safety and feeling of safety are challenged by difficulties for some older telecare users to understand and manage device functions. In his 'Swiss cheese' theory, Reason (1997; 2000) shows how human errors create holes or weaknesses in the defense layers (barriers), so errors, accidents and other adverse events could more easily occur. A vital finding is that managing and understanding the devices seems as particularly problematic for users with dementia, especially when using technologies with active functions, such as lights, connected communication, or pre-recorded voice messengers (Paper I). Lack of understanding of the telecare functionalities can adversely affect patient safety and feeling of safety

by that the devices are incorrectly used. Previous research has also revealed that a lack of technological understanding among older adults can hamper the correct use of telecare (Karlsen et al., 2017). Illness, impaired cognitive and physical health, and limited technological experiences are also factors that may further challenge technological understanding in older adults. Thus, and as the findings of this thesis also emphasize (Paper I & II), telecare decisions must consider older adults' capabilities, skills, and resources.

In the SEIPS model (Carayon et al., 2006), 'tasks' refer to healthcare personnel tasks in the organization. Ensuring safe healthcare services by reducing the likelihood of errors and adverse events is an important part of healthcare personnel's curative and harm prevention function (Health Personnel Act, 1999). Vincent (2010) notes that humans are a key resource in achieving patient safety, and that the human ability to anticipate and respond is crucial for achieving safer healthcare. The findings of this thesis emphasize how homecare professionals play a crucial role in promoting patient safety and feeling of safety when telecare is used among home-dwelling older adults. For example, findings reveal how homecare professionals consider and identify the user's needs, provide information and telecare training to end-users and involved family members, and follow-up on patients' technology use at home (Paper I, II & III). Nevertheless, using telecare technologies (e.g., medication dispensers and digital cameras) as a substitute for in-person homecare visits can have potentially negative safety implications due to the limited opportunities to clinically observe the users' health condition, medication-related side effects, and risk situations in the home. Thus, the findings suggest that the presence of healthcare personnel is critical for ensuring patient safety and their feeling of safety when telecare is used among home-dwelling older adults.

5.1.3 Organizational conditions

In the SEIPS model, 'organization' include, among others, organizational procedures, routines, and guidelines (Carayon et al., 2006). The findings of this thesis demonstrate how organizational conditions are important for patient safety and feeling of safety in telecare use (Paper I, II, and III). In the 'Swiss cheese' model, Reason (1997; 2000) shows how procedures, routines, training, and drills can act as "soft" barriers, preventing accidents and adverse advents from occurring. The findings highlight how patient safety can be increased with homecare service personnel having clarified roles, and how implementing telecare training, drills, and routines help both homecare personnel and older adults use the devices correctly (Paper I & II). Using guidelines and procedures is an important part of the quality work for healthcare personnel and can contribute to safer healthcare services (Stubberud, 2018).

In particular, the findings of this thesis emphasize the importance of providing sufficient information and telecare training both to all involved homecare personnel, as well as the older telecare users and relevant family members (Paper I, II, & III). Having adequate telecare skills can ensure that older adults use the device correctly. Segesten (1994) notes that having knowledge and being informed about own situation and health is a prerequisite for feeling safe. Previous research also shows that adequate information on how to use the devices promotes older adults' telecare acceptance and use (Hamblin, 2017). In contrast, a lack of training is identified as a barrier to the adoption and acceptance of telecare among older adults (Scott Kruse et al., 2018). As findings of this thesis also emphasize (Paper I & II), that homecare personnel have sufficient telecare knowledge can, in turn, ensure that correct information and training are provided to the home-dwelling users, and ensure that they receive technology that fits their needs. Tailored telecare training also creates confidence and changes attitudes among healthcare professionals (Guise & Wiig, 2017). Nevertheless, to ensure safe telecare

use, there needs to be an agreement between the homecare personnel's competence and the required tasks. In light of a constant development of new technologies, it is valid that this competence is continuously developed. However, when offering telecare training to end-user's and/or involved family members, homecare personnel must ensure that the training is adapted to their individual prerequisites and needs. Moreover, to avoid an unrealistic view of the device's potential and a "false sense of security", the users should also be informed in advance of potential limitations regarding the use of their device.

In sum, the findings show how technological, individual, and organizational conditions are significant for patient safety in telecare use. This is in line with the system approach, which consider patient safety as an outcome of the interaction of different elements in a system (Carayon et al., 2006, 2014; Reason, 1997, 2000). Carayon et al. (2006; 2014) refer that all elements must be optimally designed to ensure maximum patient safety. In terms of telecare, although an end-user has received adequate training, the safety will not be optimal if the telecare device or the network system does not work, or if homecare personnel does not respond to a triggered alarm. Thus, to optimize patient safety when telecare is used among home-dwelling older adults, both technological, human, and organizational conditions should be taken into considerations.

5.2 Methodological considerations

The findings of this thesis must be considered in light of the methodological choices taken. Based on the overall aim and research questions, a qualitative approach was chosen. A desire to illuminate and bring out the voices from individuals with everyday experience was crucial for choosing this methodological direction. Focus groups with homecare professionals and managers (Paper I and II) were chosen as the data collection method because the group interaction between the

participants was expected to facilitate valuable discussions and draw out the participants' experiences, attitudes, and points of view (Krueger & Casey, 2015; Malterud, 2012; Morgan, 1996). Individual face-to-face interviews with the older telecare users in their respective homes (Paper III) were chosen as the data collection method because this was considered to be the best approach to facilitate a personal and natural conversation. We assumed that individual interviews in their own homes would be the most convenient option for the participants due to their potential health, hearing/vision, and mobility issues. However, it is possible that telephone interviews instead would have led to a larger sample and made recruitment easier.

The findings of this thesis must be viewed in light of methodological strengths and limitations. Potential limitations can be linked to the recruitment process. In the sub-study with the older telecare users, the inclusion age of 67 years was set in order to include both older and younger elderly people in the sample. However, it is possible that also including even younger adults would have offered a greater breadth of experiences. Moreover, it might also be a limitation that it was the contact people who selected, approached, and asked the participants if they were willing to participate in this study. Nevertheless, this ensured that confidentiality was upheld and that only participants with relevant telecare experiences were included.

Another potential limitation is that the findings are based on the perspectives of a limited group of participants. However, this qualitative thesis does not aim to generalize but to provide rich descriptions of individual and subjective experiences (Polit & Beck, 2010). Malterud et al. (2016) argue that in qualitative studies, a less extensive sample is needed if the participants hold characteristics that are highly specific for the study aim. Malterud et al. (2016) refer that a study with strong and clear communication between researcher and participants requires fewer participants to offer sufficient information power, than a study with

ambiguous or unfocused dialogues. By including the perspectives of homecare professionals, managers, and older telecare users, the thesis sheds light on the topic of interest from different perspectives. The findings are based on perceptions and experiences from a total of 29 participants, all with extensive telecare experience. Moreover, it can be considered a strength that the participants had practical and/or administrative experience with a total of 12 different telecare devices used in Norwegian municipalities. Moreover, the participants were recruited from ten different municipalities. Homecare professionals were recruited from two municipalities, which, at the time the sub-studies were carried out, were two large pioneer municipalities ("resource municipalities") in the field of Norwegian telecare.

Potential limitations can also be linked to the conduct of the focus group interviews. In focus groups, the composition of the groups has significance for the knowledge produced (Malterud, 2012). Bloor et al. (2001) recommend that focus groups should not be too homogeneous because of the risk of a lack of interaction of interest, nor too heterogeneous because of the risk of conflict or too much agreement. In this study, the focus groups with the homecare professionals and the managers were conducted separately. This was mainly because of practical concerns for the participants, as the municipalities where they were working were geographically separate. Krueger and Casey (2015) argue that the size of a focus group should be small enough for everyone to have the opportunity to share insight and perceptions, and recommend to include five to eight people. In this study, each focus group consisted of between three and six participants. This size was found to facilitate open and honest discussion and the sharing of experiences.

6 Conclusions

This thesis has contributed to more insight and knowledge regarding patient safety and feeling of safety when telecare is used among home-dwelling older adults. This has been achieved by exploring the perceptions and experiences of homecare professionals, managers, and older telecare users.

This thesis has demonstrated how both technological, individual, and organizational conditions have importance for patient safety and feeling of safety in telecare use. The thesis has revealed how patient safety and feeling of safety are promoted by functionalities related to the telecare devices. The enhanced feeling of safety from using telecare devices has significance to that home-dwelling older adults can maintain their activities and live more independently at home. Thus, this thesis provides insight and knowledge on what feeling of safety from using telecare devices mean for older adults who use the technologies in their everyday lives.

The findings of this thesis suggests that telecare can be a significant tool to prevent injury among home-dwelling older adults, and allow them to feel safer and live more independently at home. However, the thesis has revealed how patient safety and feelings of safety are challenged by technological inadequacies and limitations, and difficulties for some older users to understand and manage telecare functionalities. Thus, this thesis provides important insight and knowledge regarding technological vulnerabilities.

This thesis has further revealed how patient safety and feelings of safety are promoted by organizational conditions in terms of telecare routines, drills, and targeted training. Furthermore, the thesis has emphasized the importance of ensuring that telecare solutions fit the users' individual

needs and prerequisites. Moreover, the thesis has highlighted homecare professional's crucial role and function by facilitating patient safety and feelings of safety when telecare is used among home-dwelling older adults.

6.1 Implications for clinical practice

The findings of this thesis have several implications for decision-makers/managers, educators, telecare designers, healthcare personnel, telecare users and their family members, and other key people involved in the implementation and use of telecare in primary and municipal healthcare settings. Based on the findings, the following implications are recommended:

- In telecare use, the focus should be on the user's individual requirements and prerequisites. Such knowledge could be obtained through face-to-face conversations, observations, or mapping forms, and should be done early in the process. Family members, GP's, telecare suppliers, and user representatives can contribute valuable information, and could be included as vital resources.

- There should be increased focus on the development of robust, reliable, and user-friendly telecare solutions and systems. Older adults' requirements and needs should also be heard and included in the development of new telecare devices.

- It is essential that homecare services facilitate and ensure telecare training regarding the technologies in use, both to all involved homecare personnel, as well as home-dwelling users and their family members. Furthermore, homecare services should ensure that routines are established, and facilitate practical drills for homecare personnel. Homecare services should also make it possible for healthcare professionals to follow up on the technologies in use. The information and training offered to the end-user's and/or their family

members should be based on their individual prerequisites and needs.

- Homecare services should acknowledge the crucial role and function of homecare professionals in promoting patient safety and feeling of safety in telecare use.

- There is a need for increased awareness of potential vulnerabilities in telecare use. Thus, risk and vulnerability assessments should be conducted and followed-up. Prior and during telecare use, devices should also be frequently tested. Such tests should be realistic, and take place under the local and specific conditions which they are to function.

- There is a need for particular awareness when telecare is used by people with dementia and other cognitive impairments.

6.2 Implications for further research

The findings of this thesis have several implications for further research. Based on the findings, the following implications are recommended:

- This study included a few spouses' perceptions and experiences. However, to meet the safety needs of family members, more research is needed regarding spouses/cohabitants' roles and experiences. In addition, future research should explore the role and experiences of adult children.

- This thesis findings clearly suggest increased attention on organizational conditions, such as telecare training. To ensure safe use, there is a need for more research on what training and competence is needed. There is also a need for more research on the role and responsibility of homecare personnel in the provision of ensuring patient safety and feeling of safety in telecare use.

- This qualitative thesis has explored participants' perceptions and experiences. Future research should also focus on the efficiency of municipal telecare interventions to avoid and prevent harm among older adults in residential settings.

- Future research should focus on safety when telecare is used by people with dementia and other cognitive impairments. To also meet the safety needs of their family members, more research should focus on the roles and experiences of spouses / cohabitants, and children.

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PART 2

List of Papers

Paper I

Johannessen, T. B., Storm, M., & Holm, AL. (2019). Safety for older adults using telecare: Perceptions of homecare professionals. *Nursing Open, 6,* 1254–1261.

Paper II

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Paper III

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RESEARCH ARTICLE

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Safety for older adults using telecare: Perceptions of homecare professionals

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Abstract

Aim: The aim of this study was to explore homecare professionals' perceptions of safety related to the use of telecare by older adults.

Design: An exploratory qualitative design was employed.

Methods: Two focus group interviews with ten female homecare professionals (nine Registered Nurses and one occupational therapist) were carried out between June–December 2017. The participants were recruited from six community homecare services in two Norwegian municipalities. Data were analysed using qualitative content analysis.

Results: The participants perceived that the use of telecare protects older adults against injury and insecurity by preventing harm and giving them a feeling of safety. However, they also stated that the use of telecare involves challenges that could lead to harm to older adults due to technological limitations and difficulties managing and understanding the technology. Although telecare can enhance safety, it is necessary to develop reliable technology and adapt it to the user's abilities, skills and resources.

KEYWORDS
homecare professionals, homecare services, older adults, safety, telecare

1 | INTRODUCTION

Use of telecare technology has the potential to maintain and enhance older adults' independence and quality of life, reduce hospital and care home admissions and enable them to remain in their own homes for a longer time (Botsis, Demiris, Pedersen, & Hartvigsen, 2008; Milligan, Roberts, & Mort, 2011). Telecare has also been identified as an important tool for addressing predicted future challenges caused by the larger proportion of older people in the population and the worldwide workforce shortage (European Commission, 2010). Telecare is the use of information, communication and monitoring technologies that allow healthcare professionals to remotely evaluate health status, provide educational interventions or deliver health and social care to patients in their homes (Solli, Bjørk, Hvalvik, & Hellesø, 2012: p. 2802). By enabling healthcare professionals to provide care at a distance to patients' homes, telecare represents a significant shift in the way that care services are provided (Oudshoorn, 2012).

During the last decade, several developed countries have begun to implement telecare through different local and national initiatives (Milligan et al., 2011). In Norway, an overarching national strategy is to integrate telecare in the community health and care services by 2020 (Ministry of Health & Care Services, 2013). As a result, a national programme for the development and implementation of telecare was established to facilitate co-operation and exchange of experiences between municipalities that use and integrate telecare as a part of the community health and care service. Since the start of the programme in 2013, several Norwegian municipalities have

participated in various implementation projects covering a range of home-based telecare technologies such as localization technology (GPS), electronic medicine dispensers, digital camera supervision and web-based portals for people with various chronic diseases (Directorate of Health, 2019). In most cases, the telecare device is managed by the patients themselves or with the help of their family carers. However, homecare professionals in the community homecare service follow-up telecare use among older adults as well as the alerts received from, for example mobile safety alarms, fall alarms and electronic medicine dispensers. Homecare professionals also have remote conversations with older adults using web portals, in addition to supervising them remotely by means of digital cameras. Hence, homecare professionals must be considered an important source of empirical knowledge about telecare use among older adults.

More advanced age is associated with a greater risk of injury and harm. According to the World Health Organization (WHO), the major burdens of disability and death arise from age-related losses of hearing, sight and movement by the age of 60 years. Higher age also implies an increased risk of many health disorders such as chronic respiratory conditions and dementia (WHO, 2015). People aged over 60 years are also at greater risk of falls (WHO, 2018) and medication errors (Barber et al., 2009; Fialová & Onder, 2009). Hence, ensuring the safety of patients is a major area of concern for those delivering healthcare worldwide (WHO, 2017), where the use of technology in healthcare is considered to have a positive impact on patient safety by reducing the risk of human error (Ball, Weaver, & Abbott, 2003). Ensuring the safety of older adults who live at home is also a highly important aim in the effort to implement telecare in community health and care services in Norway (NOU, 2011; Ministry of Health & Care Services, 2013). Patient safety is defined as the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of health care (Vincent, 2010: p. 32). Most previous research on patient safety has been conducted in a hospital setting and not in a primary healthcare context where most care is delivered (WHO, 2017). The use of telecare in homecare is an expanding research area (Lindberg, Nilsson, Zotterman, Siv Söderberg, & Skär, 2013). There is also an extensive global interest in exploiting the potential of digital technologies to enhance the quality and safety of health care (Black et al., 2011). However, a previous review of health technologies and their impact on the quality and safety of healthcare delivery identified a large gap between the postulated and empirically demonstrated benefits (Black et al., 2011). Furthermore, another review performed to identify patient safety risks associated with telecare use in homecare identified a need for more research to avoid or minimize potential harm to patients (Guise, Anderson, & Wiig, 2014). Qualitative research concerning safety in telecare use has addressed specific telecare interventions such as safety alarms (Melander-Wikman, Fältholmand, & Gard, 2008; Melkas, 2010), fall detectors and bed occupancy sensors (Horton, 2008) and smoke detectors (Doughty & Orton, 2014). Other studies have been performed to describe safety experiences of telecare use from the perspectives of persons with dementia and their family carers (Riikonen, Mäkelä, & Perälä, 2010; Olsson, Engström, Skovdahl, & Lampic,2012 2012). Studies have also found that home healthcare nurses who delivered health services through virtual visits evaluated the virtual visit technology positively (Husebø & Storm, 2014). Moreover, in a study performed by Barrett (2017) aimed at understanding how teleconsultation has an impact on the role of nurses, it was reported that nurses have different types of presence (operational, clinical, technical and social) during teleconsultation to support patient care. The degree of presence depends on specific characteristics of video-mediated communication. However, few qualitative studies have addressed the safety of older adults who use telecare from the perspective of homecare professionals. More knowledge can lead to increased focus on aspects that may be of importance for the safety of older adults who use telecare at home.

1.1 | Aim

The aim of this study was to explore homecare professionals' perceptions of safety related to the use of telecare by older adults. The research question was as follows: How do homecare professionals perceive safety in relation to older adults' use of telecare?

2 | METHOD

2.1 | Study design

An explorative qualitative research design (Polit & Beck, 2012) was used to obtain the participants' perceptions. A qualitative design is concerned with producing discursive descriptions and exploring social actors' meanings and interpretations (Blaikie, 2010: p. 204). Data were collected by means of two focus groups, which is a qualitative research technique that enables the collection of data through group interaction on a topic determined by the researcher (Morgan, 1996).

2.2 | Sample

The recruitment aimed to ensure a sample with the greatest amount of insight to illuminate the presented topic (Krueger & Casey, 2015). To be included in the study, the participants had to have a minimum of six months' work experience with telecare devices used by older adults who receive community care in their own homes. Homecare professionals who met the inclusion criteria were asked to participate by a municipal contact person (one department manager and one Telecare department employee) in each of the municipalities.

The sample comprised of ten female homecare professionals recruited from two Norwegian municipalities (one large and one medium-sized). Both municipalities were participating in the national programme for the development and implementation of telecare (Directorate of Health, 2019) and over the previous few years had implemented a range of different home-based telecare devices for older adults living at home. The participants in focus group A consisted of four Registered Nurses (RNs) and one occupational

TABLE 1 Overview and description of the telecare devices

Focus group/ municipality	Telecare device	Description
A	Web portal	Web-based portal for remote communication between homecare professionals and patients with chronic obstructive pulmonary disease (COPD). Also possibilities for video conversations
A	Ambient control technology	Ambient control technology for doors, light, heat, door phone, windows, curtains and sun shielding in patients' homes
A + B	Mobile safety alarm	GSM-based, wearable alarm for outdoor use with emergency button, loudspeaker and Global Positioning System (GPS) for localizing patients
A + B	Electronic medicine dispenser	Electronic medicine dispenser with medication reminder. If the medication is not released from the dispenser in a given time, the dispenser automatically locks and alerts homecare professionals
A + B	Digital camera	Digital camera for remote supervision of patients living at home. Mostly in use at night. Takes "snapshots" at an arranged time
A + B	Light sensor	Motion sensor for switching lights on/off
A + B	Door exit sensor	Automatically alerts homecare professionals if patients open the door. Available with a voice messenger
B	Bed sensor	Automatically alerts homecare professionals if the patient does not return to bed in a pre-determined time
B	Smoke detector	Automatically alerts homecare professionals if smoke develops in the home
B	Fall sensor	Wearable. Automatically alerts homecare professionals if patients fall at home. The patient can also press an emergency button

therapist (OT) recruited from five different homecare services using different telecare devices. The participants in focus group B comprised of five Registered Nurses (RNs) recruited from one homecare service. The participants had between 6–32 months of work experience with ten different telecare devices, presently or previously in use by older adults in the two municipalities. The telecare devices are presented in Table 1.

2.3 | Data collection

The focus groups interviews were carried out between June–December 2017. The interviews took place in meeting rooms in the municipality where the participants had their respective workplaces. The first author (TBJ) served as moderator in both focus group interviews, while the co-authors (MS and ALH) each acted as co-moderator in one group, observing the dynamics and social interaction between group members (Morgan, 1996). Both focus group interviews were based on a semi-structured interview guide including the following request; "Can you please discuss how the use of telecare ensures safety for older adults?" The group discussion comprised both descriptions of the telecare devices and a sharing of perceptions and experiences of the topic. All the participants contributed to the discussions and were encouraged by the moderators to freely share their perceptions. The moderators added in-depth supplementary open-ended questions when necessary. Each focus group interview lasted approximately 1–1.5 hr. Both interviews were audio recorded and transcribed verbatim shortly after they had been conducted.

2.4 | Analysis

A qualitative content analysis as described by Graneheim and Lundman (2004) was conducted. Qualitative content analysis is described as a systematic approach for classifying and identifying themes or patterns in the data (Hsieh & Shannon, 2005). All three authors participated in the entire analysis process. In the first step, the authors carefully read through the transcribed material several times to gain a sense of the whole. In the second step, the authors searched for meaning units in the text. In the third step, the identified meaning units were condensed while preserving their main content. In the fourth step, the condensed meaning units were labelled with a code. In the fifth step, the codes were sorted into categories based on their similarities and differences. Finally, the categories were abstracted into two themes on a descriptive level (Graneheim, Lindgren, & Lundman, 2017). The three authors discussed the themes and categories until consensus was achieved.

2.5 | Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki (WMA, 2013). The study was pre-approved by the Norwegian Social Science Data Service (project number 48429). Prior of the focus group interviews, the participants were provided with both written and oral information about the study and written informed consent was obtained. The participants' confidentiality was ensured by anonymization and the confidential handling of the data. A more detailed description of the participants' workplace is omitted to avoid identification.

3 | RESULTS

The analysis resulted in two descriptive themes. An overview of categories and sub-categories is presented in Table 2. In the following, the results will be presented with selected representative quotations to illuminate the participants' perceptions and the analysis process.

TABLE 2 Themes and categories

Themes	Categories
A protection against injury and insecurity	Preventing harm
	Feeling safe
Involves challenges that could lead to harm	Technological limitations
	Difficulties managing and understanding the technology

3.1 | A protection against injury and insecurity

This theme illuminates that the participants believed that telecare can protect older adults against injury and insecurity. The theme is based on two categories: *Preventing harm* and *Feeling safe*.

3.1.1 | Preventing harm

The participants perceived that telecare prevents harm to older adults. For example, they related that they had several call-outs due to the occurrence of smoke at service users' homes that are equipped with smoke detectors. One participant stated:

> We see that it has averted situations. We've had a real proper fire and it was the smoke detector that first alerted us. (Nurse 6)

Furthermore, the participants mentioned that the GPS in the mobile safety alarm had been used successfully several times to localize missing persons with dementia. According to one participant, in other municipalities older adults with dementia died outdoors because they were unable to find their way home. A participant revealed that before the use of mobile safety alarms, homecare personnel often had to search outdoors for patients. A participant said:

> Although they do not the press the emergency button we can see where they are if we do not find them at home in the evening. (Nurse 7)

The participants stated that the main purpose of the web portal is preventing the exacerbation of COPD, thus avoiding hospital admissions. According to the participants, the use of a video conversation provides an important opportunity for clinical observation of COPD status. As one of the participants expressed:

> You observe a lot when you are talking to them face to face, even if it is through the net. (Nurse 2)

It was also agreed that using electronic medicine dispensers prevents harm to older adults. However, it was emphasized that in most cases medicine dispensers are not suitable for persons with dementia. According to the participants, the dispenser ensures the correct dose at the right time by reminding the patient when to take the medication and remotely alerting homecare professionals if the medication is not released from the dispenser in a given time. The medicine dispenser was also perceived to prevent patients from taking too much medication as it automatically locks if the dose is not released. A participant stated:

> It is very safe that way. There are few medication errors with that dispenser. (Nurse 1)

3.1.2 | Feeling safe

The participants found that telecare promotes an increased feeling of safety among older adults. The mobile safety alarm was especially highlighted as increasing the sense of safety for persons with dementia. As one participant commented:

> They feel safe when they have GPS and can find their way home. Because there have been episodes when they did not return home after going out. (Nurse 7)

The participants also revealed that they often receive feedback that the service users feel safer with the safety alarm as they can receive help outdoors when necessary. As one of the participants related:

> A couple we visit were very happy to be picked up because they had gone further than they could really cope with health wise and could not find their way home again. (Nurse 7)

Another participant revealed:

> A woman I care for is very happy that she can use the mobile safety alarm because it makes her feel more secure. She does not think it is so nice to go outside alone, but at the same time she wants to have the freedom to go whenever she wants. (Nurse 4)

The participants also perceived that service users with COPD felt safer having contact with homecare professionals through the web portal. One stated:

> I think that patients feel a lot safer by signing up on the web portal. And even if the line breaks, we'll call them on the phone (Nurse 3)

Another explained:

> I have the impression that it makes them feel safe and that they like it when we phone and have time to chat with them because they can tell us how they feel and talk a little. (Nurse 2)

3.2 | Involves challenges that could lead to harm

This theme demonstrates that the participants were of the opinion that telecare involves challenges that could lead to harm to older adults. The theme is based on two categories: *Technological limitations* and *Managing and understanding the technology*.

3.2.1 | Technological limitations

The participants perceived that limitations in the technology could lead to harm to older adults. For example, a participant reported that she had experienced that one of the digital cameras placed in a patient's home did not work for a whole weekend due to poor mobile network coverage in the area. Another participant related:

> We have a camera that goes on and off all the time, even though the plugs are in and all. (Nurse 5)

Furthermore, the participants reported that they often experienced an unstable Internet connection when holding video conversations with service users suffering from COPD, where the net often breaks up, stops and vibrates. According to the participants, this stresses the service users. As one of the participants stated:

> They become stressed. They are overjoyed to get through and be in touch and then the connection breaks down and you have to do it all over again. It is bad for the COPD patients we are working for. (Nurse 2)

The participants emphasized that when Internet problems occur, homecare professionals always phone the service users instead. However, a participant underlined that a telephone conversation does not provide an opportunity for clinical observation:

> We do not get that: 'Yes, you make an effort when you breathe,' 'What is the skin colour like?' If they are in poor shape you do not get the visual impression of how they are (Nurse 3)

The participants also revealed that even though GPS generally picks up the exact location of lost and missing adults, the GPS positioning disappears if the patient is in an area covered by trees, in a building or in a car. As a participant explained:

> When they are driving a car example, they are locked in and the GPS signals will not be picked up. And if they go into a building or are in a place with lots of trees their position disappears. So, there are some limitations with the usability of that device. (Nurse 4)

Another perceived safety challenge was related to the use of fall sensors. A participant elaborated that the alarm sometimes does not trigger if the older adult collapses without a sudden movement, while on the other hand it can easily go off due to a strong movement. Moreover, if the patient remains lying on the floor or begins to move after falling, the alarm stops beeping. According to the participants, a consequence of these issues is that some service users often stop using the alarm and put it away. A participant described the problem as follows:

> It's so sensitive that it often goes off and they become annoyed and put it away because it is so easy to activate. Then they are not safe. (Nurse 8)

However, the participants emphasized that the development of personal fall sensor technology is complex due to the many different ways of falling. Hence, not many fall sensors have been employed in recent years.

3.2.2 | Difficulties managing and understanding the technology

The participants found that difficulties managing and understanding the technology could lead to harm to older adults. According to the participants, many persons diagnosed with dementia have great difficulty relating to, managing and understanding the functions of the mobile safety alarm. As one participant explained:

> The patients with dementia are not always able to handle the functions of the mobile safety alarm. They do not manage to push the emergency button and speak into it themselves or understand its functions. (Nurse 9)

The participants also reported that when they dial the patients on the alarm and it automatically connects, some of those suffering from dementia do not understand where the voice is coming from. A participant described:

> On one occasion there was a lady who had wandered off. She eventually ended up at the Emergency Department where they pressed the emergency button and got in touch with us. So that user group is always a challenge. (Nurse 4)

Another perceived safety challenge was related to the use of ambient controlling technology of, for example doors, lights and curtains. According to the participant, while healthy service users had no problem mastering the technology, those with dementia found it more difficult to manage and understand:

> It didn't go very well because this technology is supposed to be used more actively and it may not work smoothly when it is hard to learn new things. (Occupational therapist)

In addition, persons with dementia found sensors difficult to manage and understand. The participants revealed that the pre-recorded voice messenger on the door exit sensor often made some of them confused and anxious. One participant described it as follows:

> Yes, that voice sensor when you go out of the door: 'Now it is night. Go to bed,' If the voice comes from a stranger, they often become anxious. If it is a familiar voice, they also become anxious: 'Huh, wasn't it my daughter?' And every time you go in or out of the door, there's someone talking to you, so we took it away. (Nurse 9)

The light sensors were also found to cause difficulties for persons with dementia. As a participant explained:

> Some didn't understand what happened and why the light went on. Most patients are used to turning the light on and off and when it was the opposite, they found it difficult to relate to. Many patients spent a long time sitting still on the toilet and then suddenly it went completely dark. (Nurse 4)

The participants also mentioned that some of the service users turned off the door exit sensor themselves because they did not want to bother the homecare personnel. Additionally, they experienced that some disconnect their telecare devices due to their habit of unplugging all electrical devices in the evening. The participants revealed that if several telecare devices are connected, this will disconnect not only the sensors but also the alarms. Moreover, it occasionally occurs that the service users turn off the alarms themselves. A participant stated:

> We had a lady who had a direct connection to the Fire Department, but if the fire alarm went off, she just took a broom and beat the alarm off. (Nurse 9)

4 | DISCUSSION

This study aimed to explore homecare professionals' perceptions of safety related to the use of telecare by older adults. The first theme reveals that the participants perceived that the use of telecare protects older adults against injury and insecurity. In particular, the use of mobile safety alarms and video conversations promoted a feeling of security among service users. Electronic medicine dispensers, mobile safety alarms and the web portal were also highlighted as technologies that prevented harm and injury to older adults. These findings are supported by several previous studies. For example, a study performed by Melander-Wikman et al. (2008) found that an increased feeling of safety was a significant reason for using mobile safety alarms among older adults. Furthermore, a study conducted by Melkas (2010) noted that safety alarms have a positive impact on perceived health due to improved safety. Other studies have shown that the use of various types of telecare technology can have a positive impact on the safety of people with dementia and their family carers (Gibson, Dickinson, Brittain, & Robinson, 2015; Olsson et al., 2012; Riikonen et al., 2010). Safety barriers can be explained as "physical or non-physical means planned to prevent, control or mitigate undesired events or accidents" (Sklet, 2006:496). According to Reason (1997, 2000), people create different barriers (defences) to prevent accidents from occurring, which can be either "soft" (e.g., procedures and training) or "hard" (e.g., technical devices and alarms). Reason (1997) demonstrates that the purpose of these barriers is to stand between the hazard and the potential losses (e.g., people), thus preventing an adverse event, or reducing its consequences. The concept of safety barriers can be applied to illuminate how telecare can be understood as a physical barrier to prevent or reduce the consequences of adverse events that may cause harm to older adults. Consequently, the use of telecare can reduce older adults' need for hospital admission, residential care or other public care services and enable them to live for a longer time in their own homes. Additionally, it may empower them to undertake more physical and social activities outside of the home, thus enhancing their quality of life. Hence, an possible implication for the homecare services is that telecare can be a significant tool for enhancing patient safety and addressing the safety needs of older adults.

The second theme reveals that the participants perceived that the use of telecare involves challenges that could lead to harm to older adults. The participants perceived limitations in the technology related to the use of mobile safety alarms, the web portal, digital cameras and fall alarms. Perceived difficulties in managing and understanding the technology were especially associated with the fact that many older adults either did not understand or were incapable of managing the functions of the mobile safety alarm, the ambient controlling technology and the sensor devices. A central finding was that managing and understanding the technology was especially problematic for older adults with dementia. These findings are in line with several previous studies. For example, a review performed by Bharucha et al. (2009) on the use of technology in dementia care found that much still remains to be done to design technologies that are functional and acceptable for users with dementia. Furthermore, a previous study demonstrated that people with dementia accepted telecare devices more readily if they were easy to use (Riikonen et al., 2010). Studies have also shown that telecare technology can play an important role in health care if the devices are adapted to users' needs (Hoonakker, Khunlertkit, Tattersall, Keevil, & Smith, 2012). Unreliable technology and difficulty understanding its functions may lead to harm to older adults in several ways. For instance, inability to understand the functions of a mobile safety alarm may result in the user failing to call for help in the case of an emergency. Studies also report that limitations associated with the technology, such as technical failure, can inhibit the uptake and adoption of the technology by nurses (Barrett, 2017). Moreover, if older adults repeatedly find the technology unreliable or difficult to

understand, they may develop a negative attitude towards the telecare device and not bother using it. We should also bear in mind that inadequate technology may lead to a false sense of security, not only for the users but also for their relatives and homecare personnel. It is therefore vital that the technology can meet the users' safety expectations. According to Sklet (2006), a successful barrier function should have a direct and significant effect on the occurrence and/or consequences of an adverse event or accident. However, Reason (1997) shows that an adverse event can occur due to weaknesses in the defences caused by active failures (e.g., unsafe acts by personnel) and latent conditions (e.g., poor design, inadequate tools). This perspective can be used to illuminate the vulnerability of telecare because safety is dependent on the technology working properly, being used correctly and suitably designed for the users. Hence, a potential implication for ensuring the safety of older adults who use telecare might be to promote and facilitate the development of robust and reliable information and communications technology (ICT) systems and telecare technology. Furthermore, it may also be of importance to bear in mind that although the devices themselves might appear to have simple functions, some older adults may nevertheless experience challenges and difficulties using them. It is therefore necessary that telecare use by older adults is closely followed up by the homecare services and that the telecare solutions offered are adapted to each user's individual abilities, skills and resources.

4.1 | Study limitations

This study has several potential limitations. Firstly, the focus group participants had relevant work experience with the ten telecare devices that had been implemented in the two municipalities. However, it is likely that participants who only had experience of a smaller number of telecare devices would have led to a deeper discussion about each of the devices. Another possible limitation is related to the composition of the focus groups. In the group that consisted of participants who did not know each other, some participants may have been reluctant to share all their thoughts and perceptions, while in the other group where the participants were colleagues, it is possible that they expressed more consensus than would have been the case with strangers. Moreover, although telecare is a new research area for the authors, it is possible that our pre-understanding (Gadamer, 2004) as healthcare researchers and Registered Nurses may have influenced the analysis process.

5 | CONCLUSION

The participants perceived that the use of telecare protects older adults against injury and insecurity by preventing harm and giving them a feeling of safety. However, they also stated that the use of telecare involves challenges that could lead to harm to older adults due to technological limitations and difficulties managing and understanding the technology. The study indicates that telecare can be a significant tool for enhancing patient safety and addressing the safety needs of older adults. To ensure the safety of older adults who use telecare, the study underlines the need for the development of robust and reliable information and communications technology (ICT) systems and telecare technology. Furthermore, it is necessary that telecare use by older adults is closely followed up by the homecare services and that the telecare solutions offered are adapted to each user's individual abilities, skills and resources.

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CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest in this study.

AUTHOR CONTRIBUTIONS

The study design was developed by TBJ and ALH. All authors contributed to the data collection and analysis. The manuscript was drafted by TBJ, while ALH and MS contributed to the preparation and revision of the manuscript. All authors read and approved the final version of the manuscript.

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Trygg og sikker bruk av velferdsteknologi i hjemmebasert helse- og omsorgstjeneste

Safe and secure use of telecare for older adults in homecare services

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Sammendrag
Hensikten med studien var å utforske hva ledere og helsepersonell opplever som viktig for trygg og sikker bruk av velferdsteknologi for eldre i hjemmebasert helse- og omsorgstjeneste. Studien har et eksplorativt, kvalitativt design. Det ble gjennomført fire fokusgrupper med tilsammen 20 deltagere: ti ledere fra åtte kommuner og ti helsepersonell fra to kommuner. Dataene ble analysert ved hjelp av kvalitativ innholdsanalyse. Resultatene viser at deltakerne opplevde det som viktig at både helsepersonell og brukere får nødvendig informasjon og opplæring om velferdsteknologien som benyttes. Det ble videre ansett som avgjørende at både teknologi og bruken av den følges tett opp, og at løsningene som tilbys er i samsvar med brukernes individuelle ønsker, behov og ressurser. Deltagerne viste også til betydningen av å øke oppmerksomheten mot tidlig innsats og bruk av velferdsteknologi i et forebyggende perspektiv.

Nøkkelord
Velferdsteknologi, trygghet, sikkerhet, hjemmebasert helse- og omsorgstjeneste

Abstract
The purpose of the study was to explore what managers and health care professionals perceive as important for safe and secure use of telecare for older adults in community health- and care services. The study incorporates an explorative, qualitative design. Four focus groups were conducted with a total of 20 participants: ten managers from eight municipalities, and ten health care professionals from two municipalities. Data were analysed using qualitative content analysis. The results show that the participants considered it as important that health care professionals and service users receive essential information and training related to the technology in use. Furthermore, it was deemed vital that both the technology and its use are closely followed up, and that the devices being offered meet the service users' individual needs. The participants also referred to the significance of increased attention to early initiatives and use of telecare in a preventative perspective.

Keywords
Telecare, safety, security, homecare services

Innledning

I løpet av de kommende årene er det forventet at samfunnet vil stå overfor utfordringer med å imøtekomme innbyggernes behov for helse- og omsorgstjenester. Lengre levealder i befolkningen er ventet å øke antallet eldre betydelig (Folkehelseinstituttet, 2018). Knapphet på kvalifisert helsefaglig personell er også identifisert som et stort fremtidig problem (Helse- og omsorgsdepartementet, 2006). For å imøtekomme disse utfordringene, sikre god kvalitet og legge til rette for at hjemmeboende eldre best mulig kan mestre sin hverdag, er det behov for å forenkle og forbedre de kommunale helse- og omsorgstjenestene. Samhandlings-reformen peker på at den forventede veksten i behov i helsetjenesten primært bør løses i kommunene, og helse- og omsorgstjenestene oppfordres til fokus på helhetlig tenkning, forebygging og tidlig innsats (Helse- og omsorgsdepartmentet, 2009). Den offentlige utredningen NOU 2011:11 *Innovasjon i omsorg* anbefaler derfor økt satsing på bruk av velferdsteknologi i de kommunale helse- og omsorgstjenestene. Velferdsteknologi (VT) er beskrevet som teknologisk assistanse som skal bidra til økt trygghet, sikkerhet, mobilitet, aktivitet og sosial deltagelse. Velferdsteknologi skal gi brukeren større selvstendighet og livskvalitet, og gjøre det mulig å kunne bo lenger i eget hjem (NOU, 2011; Helse- og omsorgsdepartementet, 2013).

Ifølge Meld. St. 29 (2012–2013) *Morgendagens omsorg* er det et nasjonalt, overordnet mål at velferdsteknologi skal være en integrert del av de kommunale helse- omsorgstjenestene innen utgangen av 2020 (Helse- og omsorgsdepartementet, 2013). For å bidra til dette ble Nasjonalt velferdsteknologiprogram (NVP) etablert i 2013 på oppdrag fra Helse- og omsorgsdepartementet. Det nasjonale programmet, som er et samarbeid mellom KS, Direktoratet for e-helse og Helsedirektoratet, har som formål å legge til rette for at flere kommuner tar i bruk og integrerer trygghetsskapende velferdsteknologiske hjelpemidler som en del av den kommunale helse- og omsorgstjenesten. Fra programmets start har flere kommuner prøvd ut ulike velferdsteknologiske løsninger som varslings- og lokaliseringsteknologi, fallsensorer, elektronisk medisineringsstøtte, digitalt tilsyn, elektroniske dørlåser og medisinsk avstandsoppfølging (Helsedirektoratet, 2019). I løpet av de senere årene har også flere stortingsmeldinger som *Fremtidens primærhelsetjeneste – nærhet og helhet* og kvalitetsreformen for eldre, *Leve hele livet*, støttet opp under satsingen på bruk av velferdsteknologi i kommunal helse- og omsorgstjeneste (Helse- og omsorgs-departementet, 2015; Helse- og omsorgsdepartementet, 2018a). Den norske satsingen på velferdsteknologi er også nært knyttet til kommunenes plikt til å forebygge, behandle og tilrettelegge for mestring av sykdom, skade, lidelse og nedsatt funksjonsevne etter helse- og omsorgstjenesteloven.

Flere studier basert på perspektiver fra helsepersonell (Johannessen, Storm & Holm, 2019; Radhakrishnan, Jacelon & Roche, 2012) og brukerne selv (Berge, 2017; Eriksson, Lindstrøm, & Ekenberg, 2011; Karlsen, Ludvigsen & Moe et al, 2017) viser at bruk av velferdsteknologi gir økt opplevelse av trygghet og sikkerhet. En nylig publisert studie viser imidlertid til at begrensninger ved teknologien og vanskeligheter med å benytte og forstå de teknologiske løsningene oppleves som utfordrende for de eldre brukernes sikkerhet (Johannessen et al., 2019). Selv om det er en stor global interesse for å forbedre pasientsikkerheten i helsevesenet (Vincent, 2010) finnes det imidlertid lite forskning vedrørende organisatoriske forhold som kan utgjøre risiko for pasienter ved bruk av velferdsteknologi innen hjemmebaserte tjenester (Guise, Anderson & Wiig (2014). Arbeidet med pasientsikkerhet innebærer å forhindre, forebygge og begrense uønskede hendelser som følge av prosesser i helsetjenesten (Vincent, 2010). Helse- og omsorgstjenestene har som overordnet mål å tilby tjenester som er trygge og sikre, med færre uønskede hendelser og pasientskader (Helse- og

omsorgsdepartementet, 2018b). Kommunale helse- og omsorgstjenester har videre et lovfestet ansvar for å arbeide systematisk med å forbedre kvaliteten og pasientsikkerheten etter helse- og omsorgstjenesteloven og forskrift om ledelse og kvalitetsforbedring i helse- og omsorgstjenesten. For å legge til rette for og forbedre trygghet og sikkerhet for hjemmeboende eldre som benytter velferdsteknologi, kan helse- og omsorgstjenesten ha nytte av mer kunnskap om hvilke behov, forhold og tiltak som oppleves som viktig for å fremme trygg og sikker bruk av velferdsteknologi. Erfaringer og perspektiver fra ledere og helsepersonell som arbeider med velferdsteknologi i kommunene kan gi mer spesifikk kunnskap. Hensikten med studien var å beskrive hva ledere og helsepersonell opplever som viktig for trygg og sikker bruk av velferdsteknologi for eldre i hjemmebasert helse- og omsorgstjeneste.

Metode

Studien har et eksplorativt, kvalitativt forskningsdesign (Polit & Beck, 2012). Bruk av kvalitativ metode gir muligheter for å utforske menneskelige egenskaper som erfaringer, tanker, forventninger, motiver og holdninger (Malterud, 2011). Data ble samlet inn ved bruk av fokusgrupper. Fokusgruppe er en kvalitativ metode der man bruker gruppeintervjuer til å utvikle data om et tema, og hvor samspillet mellom deltagerne er sentralt (Malterud, 2012).

Rekruttering og utvalg

Det ble gjort en strategisk rekruttering av deltagere som ble ansett å ha best mulig forutsetninger for å belyse problemstillingen (Malterud, 2012). Det ble rekruttert både ledere og helsepersonell fra kommunal helse- og omsorgstjeneste for å inkludere erfaringer fra både innføringsprosesser og praktisk bruk av teknologiene ute i tjenesten. Inklusjonskriteriene var minst seks måneders arbeidserfaring med praktisk bruk og/eller innføring av velferdsteknologiske løsninger som benyttes av eldre i den hjemmebaserte helse- og omsorgstjenesten. Ledere ble rekruttert via to interkommunale prosjektgrupper som består av nærliggende kommuner som samarbeider om ulike prosjekter innen velferdsteknologi. Helsepersonell ble rekruttert fra to kommuner (én mellomstor og én stor) som begge har deltatt i NVP. Lederne ble rekruttert med hjelp fra to prosjektgruppeledere, mens helsepersonell ble rekruttert med hjelp fra en avdelingsleder fra en hjemmebasert tjeneste og en ansatt fra en kommunal velferdsteknologiavdeling. Tre av disse deltok også selv i fokusgruppene.

Utvalget besto av fire fokusgrupper med til sammen 20 deltagere fra ti kommuner. Fokusgruppe 1 og 2 besto av to prosjektgruppeledere og åtte helse- og omsorgsledere fra åtte små til store kommuner. Helse- og omsorgslederne hadde ulike stillinger innenfor pleie og omsorg, administrasjon og IT, med et rådgivende og faglig ansvar med innføring og implementering av velferdsteknologi i egen kommune. Fokusgruppe 3 og 4 besto av ni sykepleiere og én ergoterapeut, ansatt i seks hjemmebaserte helse- og omsorgsenheter i de to kommunene. Tabell 1 viser en oversikt over deltagerne i fokusgruppene. De velferdsteknologiske løsningene som deltagerne hadde erfaring med, er presentert i tabell 2.

Tabell 1 Deltagerne i fokusgruppene

Gruppe	Stilling	Antall	Fra kommunal sektor/etat	Fra antall kommuner
1	Helse- og omsorgslederne	5	Pleie og omsorg / adm. / IT	5
	Prosjektgruppeleder	1	Prosjektgruppe VT	
2	Helse- og omsorgslederne	3	Pleie og omsorg / adm. / IT	3
	Prosjektgruppeleder	1	Prosjektgruppe VT	
3	Sykepleiere	4	Hjemmebaserte tjenester	1
	Ergoterapeut	1	Ergoterapi	
4	Sykepleiere	5	Hjemmebaserte tjenester	1
Totalt		20		10

Tabell 2 Velferdsteknologiske løsninger

Velferdsteknologi
Elektronisk medisineringsstøtte (dispenser) Mobil trygghetsalarm m/GPS Portabel elektronisk pasientjournal Elektronisk dørlåser Smarthusteknologi Sensorer for fall, lys, røyk og dør Medisinsk avstandsoppfølging (nettbrett/videokommunikasjon) Digitalt tilsyn (kamera)

Datainnsamling

Fokusgruppene ble gjennomført i fire kommuner i perioden juni 2017 til april 2018. Alle gruppene ble avholdt i lyse og egnede lokaler som la gode rammer for samtale og diskusjon. Artikkelens førsteforfatter var hoved-moderator i alle gruppene, mens en av medforfatterne var med-moderator i gruppe 1, 2 og 3. I fokusgruppe 4 var vi enige om å kun benytte hoved-moderator på grunn av få deltagere. Under samtalene la vi vekt på å inkludere alle deltagerne i diskusjonene. Vi anvendte en semistrukturert intervjuguide for å sikre at studiens tema ble dekket. Intervjuguiden var likevel utformet slik at deltagerne kunne snakke friest mulig om emnet. Spørsmål i intervjuguiden var: *1) Hvilke forhold og tiltak opplever dere bidrar til å fremme trygghet og sikkerhet for brukere av velferdsteknologi? 2) Hva opplever dere som ledere og helsepersonell som viktige behov og forutsetninger?3) På hvilken måte kan helse- og omsorgstjenesten best mulig legge til rette for trygg og sikker bruk av velferdsteknologi?* Hvert av fokusgruppeintervjuene varte i cirka 1 til 1,5 time.

Analyse

Fokusgruppeintervjuene ble tatt opp på lydbånd og transkribert kort tid etter at de ble avholdt. Vi gjennomførte en kvalitativ innholdsanalyse som beskrevet av Graneheim & Lundman (2004). Først i analyseprosessen leste vi det transkriberte materialet nøye igjennom flere ganger for å få en forståelse av helheten. Deretter ble meningsenheter i teksten identifisert. Meningsenheter er ord, meninger eller stykker av en tekst som hører sammen gjennom sitt innhold og sammenheng. Teksten i meningsenhetene ble deretter fortettet samtidig som vi sikret at det sentrale innholdet ble bevart. Vi ga de kondenserte meningsenhetene en kode som kortfattet beskrev innholdet. Kodene ble så sortert på bak-

grunn av likheter og ulikheter, og videre abstrahert via underkategorier til kategorier med beslektede innhold. Kategorier representerer det synlige, åpenbare innholdet på et beskrivende nivå.

Forskningsetiske hensyn

Studien er forhåndsgodkjent av Norsk senter for forskningsdata (NSD) med prosjektnummer 48429. Prosjektet ble også på forhånd meldt inn til Regional komité for medisinsk og helsefaglig forskningsetikk (REK) som svarte at studien kunne gjennomføres uten deres godkjenning (ref.nr.: 2016/310). Før studien fikk samtlige deltagere både skriftlig og muntlig informasjon om studien og deres rettigheter til å trekke seg. Vi innhentet også skriftlig informert samtykke fra alle deltagerne i forkant av fokusgruppeintervjuene. Videre er deltagernes personlige identitet gjennom tittel og arbeidsplass anonymisert.

Resultat

Analysen identifiserte tre kategorier som gjenspeiler hva deltagerne opplever som viktig for trygg og sikker bruk av velferdsteknologi: *Nødvendig kunnskap*, *Tett oppfølging* og *Ivareta brukernes behov*. Kategorier og underkategorier er vist i tabell 3. Resultatene vil i det følgende bli presentert med utvalgte sitater fra deltagerne.

Tabell 3 Kategorier og underkategorier

Kategorier	Underkategorier
Nødvendig kunnskap	Utveksle erfaringer
	Opplæring av helsepersonell
	Opplæring av brukere
Tett oppfølging	Følge rutiner
	Tilgjengelige leverandører
	Avklare roller og ansvar
Ivareta brukernes behov	Kartlegge behov
	Tidlig innsats

Nødvendig kunnskap

Utveksle erfaringer

Flere av lederne fortalte at de opplever å få støtte, drahjelp og oversikt over hva som skjer innenfor velferdsteknologifeltet ved å delta i interkommunale velferdsteknologiprosjekter. De trakk frem at slike samarbeidsprosjekter kan ha særlig stor betydning for små kommuner. De opplevede at samarbeid og utveksling av erfaringer med andre kommuner har gitt dem viktig kunnskap som er til nytte i egen kommune. Følgende sitat illustrerer dette:

> Deres historie er en del av grunnlaget for at vi får det til. For vi fikk jo deres erfaringer nøye beskrevet. Det har jo hjulpet andre tenker jeg. (Leder)

Opplæring av helsepersonell

Deltagerne anså det som avgjørende at helsepersonell får nødvendig opplæring om de velferdsteknologiske løsningene som benyttes. Det ble her understreket betydningen av at helse-

personell har kunnskap om de ulike velferdsteknologiske løsningene på markedet, slik at de kan komme med forslag som samsvarer med behovet til den enkelte bruker. De vurderte det imidlertid som en utfordring at det ofte er få personer i hver enkelt kommune som benytter de ulike teknologiene, da det kan føre til at kunnskapen forvitrer fort. Det ble også antydet at brukerne kan bli skeptiske og negative hvis de opplever at ansatte har lite kunnskap. En deltager uttrykte det slik:

> Når det blir mye plunder for de ansatte, så smitter det jo over på brukerne òg. De har gjerne vært litt skeptiske til teknologien i utgangspunktet, og så får de noe som de ser de ansatte stresser med og ikke får til, og det ikke fungerer for dem heller, så vil jo det skape en negativ forbruker. (Leder)

For å sikre at brukerne får rett informasjon, ble det også vurdert som viktig at helsepersonell har kunnskap om hvordan de velferdsteknologiske løsningene fungerer. En deltager formulerte dette slik:

> Det er viktig at de som går rundt og informerer om teknologien, vet hvordan teknologien fungerer og hvordan en formidler bruken av den, fordi at hvis en er småskeptisk selv, så tror jeg man legger det fram på en måte som gjør at det er skumlere enn det er. (Helsepersonell)

Flere av lederne kunne fortelle at deres kommune satser mye på å lære opp ansatte, og at mange ansatte har deltatt i workshops, tatt kurset «Velferdsteknologiens ABC» eller videreutdannet seg innen velferdsteknologi. Helsepersonell var enige om at de generelt får god opplæring både fra leverandører og internt på arbeidsplassen. De viste imidlertid til et behov for større kompetanse i bruk av PC og velferdsteknologiske løsninger, fordi de opplever at en del ansatte, særlig de eldste, sliter med å bruke og administrere løsningene via PC. De pekte i denne forbindelse på at arbeidsplassene må bli enda bedre på å lære opp også ansatte i små stillinger, ufaglærte og vikarer. Sitatet nedenfor er et eksempel på dette:

> Så har vi disse sårbare helligdagene, og da kommer gjerne ufaglærte som ikke har fått opplæring. Og det er kanskje da det skjer også, sant. Jeg tenker at vi kan bli bedre på å få ut god informasjon til alle som jobber. For den dagen det er noe med teknologien, så er det ikke sikkert du er der. Da er det kanskje ei som ikke har peiling. (Helsepersonell)

En deltager fortalte at fordi en del prosjekter har feilet, har noen ansatte blitt skeptiske til nye velferdsteknologiprosjekter. De har derfor valgt å ta opplæringen mer gradvis, slik at de ansatte kan henge med fra begynnelsen. Deltagerne har også god erfaring med å bruke «ildsjelene» på arbeidsplassen til å lære opp ansatte som er skeptiske. En uttrykte dette slik:

> Det er jo alltid noen som kanskje er litt motstandere av dette nye. Så hos oss har vi vært heldige og hatt mange ildsjeler som har klart å dra det i gang ganske godt i begynnelsen, og så smitter det også litt over på de andre. Så du trenger de ildsjelene som lager litt blest og dysser ned angsten. (Helsepersonell)

Opplæring av brukere

Deltagerne anså det også som vesentlig at brukerne får nok informasjon om og opplæring i de velferdsteknologiske løsningene de anvender. Flere helsepersonell fortalte at de ofte må gjenta informasjon de har gitt tidligere, særlig til personer med demens. En sa det slik:

> De får jo informasjon sånn egentlig kontinuerlig hva det er for noe. Noen husker det jo fra gang til gang da, mens for andre så er det ganske nytt for dem hver gang hva den faktisk er for noe, men de reagerer positivt på det. (Helsepersonell)

Det var også betraktet som hensiktsmessig å komme tidlig inn med teknologi til personer med begynnende demens, slik at de kan få informasjon, kunnskap og praktisk erfaring så tidlig som mulig i sykdomsforløpet. En deltager formulerte dette slik:

> Det handler jo om dette med å komme tidlig inn. Altså klarer vi å komme inn tidlig med teknologien, så varer den funksjonen mye lenger. Kommer en inn for sent, så kan en jo ikke sette i gang med de tiltakene. (Helsepersonell)

Oppsummert oppleves det som viktig å utveksle erfaringer, og at både helsepersonell og brukere får nødvendig informasjon og opplæring om teknologien som benyttes.

Tett oppfølging

Følge rutiner

Deltagerne opplevde det også som avgjørende at de velferdsteknologiske løsningene følges tett opp av helsepersonell gjennom bruk av rutiner. En formulerte dette slik:

> Det er jo veldig mange rutiner som er byggeklosser rundt hjelpemidlet, så hvis de faller ifra, så funker jo ikke hjelpemidlet heller. Så det er jo et sårbart system, egentlig, som må følges tett opp, for ellers blir det farlig egentlig, for det blir en falsk trygghet til slutt for både den ene og den andre. Hvis mottakerapparatet ikke fungerer, så hjelper jo ikke teknologien et fnugg, for å si det rett ut. (Helsepersonell)

Flere av deltagerne fra hjemmebaserte tjenester kunne fortelle at de har faste rutiner for å sjekke trygghetsalarmer hos brukere etter tordenvær, og hos brukere som har vært lenge bortreist. Videre har de rutiner på å skru av og på fallalarmer, og påser at mobile trygghetsalarmer settes på lading etter bruk. Selv om dette står på arbeidslistene, blir dette likevel glemt iblant. Dette betegnet deltagere som «sårbarheter» som kan gi falsk trygghet. En formulerte det slik:

> Og dørsensoren er jo sårbart med det at vi er jo mennesker, folk som jobber. Og det ser vi jo litt nå i overgangen, at folk ikke er vante med det, så de glemmer å sette på dørsensoren. Så når vi kommer om morgenen, så er den ikke på, så da er det jo falsk trygghet. (Helsepersonell)

De kunne videre fortelle at de ofte må påse at brukere med kognitiv svikt og demens som benytter mobil trygghetsalarm, har denne med seg når de går ut. De poengterte at også dette kan gi falsk trygghet fordi helsepersonellet ikke alltid er til stede når brukeren går ut. En deltager formulerte dette slik:

> Men det er jo på en måte ikke noen ordentlig sikring, for vi er jo ikke der hele tiden … Det blir jo litt falsk trygghet. (Helsepersonell)

I denne forbindelse understreket en deltager at teknologien skal være i tillegg til, og ikke i erstatning for, trygg og forsvarlig helsehjelp. Hun sa det slik:

> Det er viktig å huske at teknologien ikke skal være en erstatning og det som gir sikker og forsvarlig helsehjelp, for vi kan ikke stole på teknologien godt nok til det. Det skal være et supplement for også å øke sikkerheten. Så er det jo faktisk vi mennesker som til syvende og sist må følge opp. (Helsepersonell)

Det ble også ansett som viktig å øve på rutiner og bruk av teknologien for å være forberedt og holde kunnskapen ved like. En deltager sa det slik vedrørende bruk av mobil trygghetsalarm:

> Per i dag så har vi hatt veldig få leteaksjoner, så det vi har funnet ut, er at vi må ha beredskapsøvelser slik at alle vet hvordan de skal bruke det. For når du bruker det lite, er jeg redd for at folk ikke vet hvordan de skal gjøre det når de faktisk må agere raskt. (Helsepersonell)

Tilgjengelige leverandører

Flere deltagere opplevde at de enkelte leverandørene følger godt opp teknologien som er anskaffet og benyttes i hjemmetjenestene, men understreket at dette imidlertid kan variere. En helse- og omsorgsleder som hadde benyttet to ulike leverandører samtidig, fortalte om sin erfaring. Hun betraktet leverandørenes oppfølging som en forutsetning for å lykkes:

> Vi kjørte to teknologier ganske likt, og vi så stor forskjell på leverandørene. Fra den ene leverandøren fikk vi nøye gjennomgang og anbefalinger og alt klart. Og vi så at når gjorde det som ble anbefalt, så lykkes vi. (Leder)

Deltagerne understreket også verdien av at leverandørene er tilgjengelige og raske til å reparere eventuelle feil ute hos brukerne. For eksempel uttrykte en deltager dette slik:

> For det skjer jo ofte feil … Da må du ha noen til å komme inn og fikse på det, og det skjønner ikke alltid disse leverandørene, de skjønner ikke at de må være på pletten da, for dette er faktisk en bruker som må ha dette i orden, for han er helt avhengig av det. (Helsepersonell)

Avklare roller og ansvar

Flere viste til at bruk av velferdsteknologi i mange tilfeller innebærer nye og endrede arbeidsoppgaver. For at helsepersonell kan følge opp bruk av velferdsteknologi på en god måte, ble det pekt på betydningen av å tidlig avklare hvilken rolle og ansvar den enkelte ansatte skal ha. En leder fortalte om sine erfaringer med dette:

> Vi ga ut de mobile trygghetsalarmene slik som vi gjør med analoge alarmer, og tenker at det må jo være på samme måten. Og så oppdager man jo; Oi sann, de må huske å ta den med.., Oi sann, den må lades, hvem gjør det? Og hvem skal rykke ut hvis de drar til nabokommunen og har behov for hjelp? Så det dukket opp det ene spørsmålet etter det andre som vi så vi ikke hadde tatt helt høyde for. Så vi har virkelig lært hvor viktig det er å avklare til detalj hvem som gjør hva til hvilket tidspunkt, det der med rolleavklaring på alle nivåer. (Leder)

I fokusgruppene diskuterte deltagerne om de tekniske varslene og alarmene som kommer inn til tjenesten, bør gå direkte til personalet eller til et responssenter**.** Deltagerne presiserte at dette er et spørsmål som hver enkelt kommune må ta stilling til selv. Det var enighet om at arbeidsmengden til de ansatte ute i tjenesten må tas i betraktning når dette avgjøres, fordi at mange hjemmebaserte tjenester allerede har nådd et smertepunkt for hvor mange oppdrag de klarer å håndtere. Én sa det slik:

> Slik jeg hører fra mange kommuner, er det såpass tett program for de som er i hjemmesykepleien, det er bare på grensen til at de håndterer trygghetsalarm, og hvordan skal de da kunne ta varsler fra medisindispensere, fra dørsensorer, følge opp GPS- sporing, en fallalarm … Hvis du skal i tillegg skal følge opp varsler på blodtrykk og puls, respirasjon … Hvordan skal du rekke det når du allerede er så presset på tid med de andre oppdragene du allerede har? (Leder)

Oppsummert anses det som avgjørende at de teknologiske løsningene og bruken av den følges tett opp ved hjelp av rutiner, tilgjengelige leverandører og tidlig avklaring av roller og ansvar for oppfølgingen.

Ivareta brukernes behov

Kartlegge behov

Deltagerne diskuterte også betydningen av at velferdsteknologien som tilbys, er i samsvar med brukernes individuelle behov. De erfarte at de ved tidlig å kartlegge brukernes ønsker, utfordringer og ressurser, får et godt bilde over hvilken type velferdsteknologisk løsning som passer til den enkelte bruker. Ifølge deltagerne bør kartleggingen være basert på dialog med brukerne og innspill fra helsepersonell som kjenner dem godt. De vurderte det også som hensiktsmessig å ha dialog med pårørende, særlig når man vurderer teknologi til brukere med demens. De regnet det også som verdifullt å være i dialog med brukerne, fordi brukere og helsepersonell kan oppfatte brukernes behov ulikt. En deltager formulerte dette slik:

> Vi kan sitte med våre tankesett i forhold til hva som er viktig for oss, som vi tror og tenker at det må vi jo ta vare på i forhold til brukeren. Og så har de jo kanskje et helt annet syn selv. «Nei, hvis jeg kan gå ut og hive brødsmuler på det fuglebrettet, så har jeg masse verdi i livet mitt». Kontra det å sitte på dagsenter og ha det sosialt. Altså vi er jo så ulike som mennesker. (Leder)

En deltager trakk også frem at det er lett å la seg begeistre fordi det er så mange spennende løsninger i dag. Deltagerne understreket betydningen av at teknologien som kommunen anskaffer, passer til kommunens andre systemer. Sitatet nedenfor kan illustrere dette:

> Jeg tror ikke det nytter at det er en som sitter på rådhuset og liksom kan dele ut det som trengs rundt omkring. Det må komme fram gjennom et behov. Hver for seg kan det være gode produkter, men det kan passe veldig dårlig inn i porteføljen av IKT systemer og sikkerhet og den typen ting, så det kan fort bli sånn IT-avdelingens mareritt det med velferdsteknologi, hvis en ikke har en hånd på rattet i forhold til den grunnleggende infrastrukturen til systemene. (Leder)

Tidlig innsats

Deltagere viste til at det primært er personer med klare og definerte behov som i dag får innvilget kommunale helse- og omsorgstjenester. For at bruk av teknologi i enda større grad skal bidra til å forebygge skade og uønskede hendelser, mente flere deltagere at brukere med «potensielle» behov i større grad bør få tildelt velferdsteknologi. En formulerte dette slik:

> Det er helt avgjørende å komme inn tidlig nok. Og det har vært en av de utfordringene vi har sett når vi har jobbet med dette her. Fordi mange de er liksom der, at, ja, men det er ikke et behov for det nå, og så over natta så begynner det å brenne, og da er det for sent. (Helsepersonell)

Det ble ansett som særlig hensiktsmessig å tidlig introdusere teknologi til personer med begynnende demens. I tillegg til at teknologi kan forhindre uønskede hendelser, mener deltagerne at det kan gjøre brukerne mer selvstendige og gi dem et mer aktivt liv. En leder uttrykte dette slik:

> Jeg tenker når det gjelder bruk av mobil trygghetsalarm til personer med demens, at hvis vi kommer inn for sent, så er vinduet i ferd med å lukkes for mange, fordi de er ikke lenger trygg i trafikken. Sånn at de kan komme seg ut og være aktive mennesker i de årene de har foran seg. Det er jo der vi ønsker å komme på banen. Men det er nye tjenester som vi ikke er vant til å gi, engang. (Leder)

Oppsummert oppleves det som betydningsfullt at de teknologiske løsningene som tilbys brukerne, er i samsvar med deres individuelle behov. Deltagerne viste også til betydningen av tidlig tildeling av velferdsteknologi i et forebyggende perspektiv.

Diskusjon

Resultatene viser at deltagerne i denne studien opplevde det som viktig at både helsepersonell og brukere får nødvendig informasjon og opplæring om velferdsteknologien som benyttes. I tillegg ble det ansett som avgjørende at teknologien og bruken følges tett opp, og at teknologien som tilbys er i samsvar med brukernes ønsker, behov og ressurser. Deltagerne viste også til betydningen av å øke oppmerksomheten mot tidlig innsats og bruk av velferdsteknologi i et forebyggende perspektiv.

At helsepersonell har god kunnskap og ferdigheter om de velferdsteknologiske løsningene har stor betydning ved innføring og bruk av velferdsteknologi (Giordano, Clark & Goodwin, 2011). Flere tidligere studier viser at mangelfull opplæring er en betydelig barriere for implementering og aksept av velferdsteknologiske løsninger (Radhakrishnan, 2012; Brewster, Mountain & Wessels et al., 2014; Scott Kruse, Karem & Shifflett et al., 2018). Videre kan hensiktsmessig opplæring skape selvtillit og endre helsepersonell sine holdninger til teknologien (Guise & Wiig, 2017). Riktig og tilstrekkelig kompetanse blant helsepersonell er også identifisert som en viktig forutsetning for å oppnå god pasientsikkerhet (Norsk Sykepleierforbund, 2012; Guise et al., 2014). Funn i denne studien viser at god kunnskap blant helsepersonell oppleves som viktig for å sikre at brukerne får rett informasjon, kompetent opplæring, og at løsningene som tilbys er i samsvar med brukernes behov. Opplæring av brukerne kan i tillegg øke brukernes trygghet og forhindre skade på pasienter som følge av feilbruk. Å sikre nødvendig opplæring er en lovpålagt oppgave etter pasient- og brukerettighetsloven, og innebærer at pasienter og brukere får tilstrekkelig og tilpasset informasjon for å kunne ivareta sine egne interesser. Det er derfor avgjørende at den opplæringen som gis, tilpasses den enkelte bruker. Å introdusere velferdsteknologi på en måte som støtter pasientenes innflytelse over sin situasjon, kan redusere utfordringer ved innføring av velferdsteknologi (Nakrem, Pettersen & Kleiven, 2018). Å sikre alle ansatte nødvendig opplæring kan imidlertid være ressurskrevende og kostbart for mange helse- og omsorgstjenester. Forhold som varierende individuelle behov, stadig utvikling av løsninger og hyppig utskifting av personell, kan videre utfordre helsetjenestens arbeid med å gi tilstrekkelig opplæring til alle ansatte.

Å ha tilgjengelig leverandører og faste rutiner på teknologien hjemme hos brukerne er nødvendig for å sikre at teknologien fungerer optimalt. Funn i denne studien viser at helsepersonell har flere faste rutiner på teknologibruken hjemme hos brukerne, som for eksempel å sette på, lade og sjekke at alarmene virker. Det ble betegnet som «sårbart» at ansatte av og til glemmer å lade eller å skru på alarmene, og heller ikke alltid kan være til stede og passe på at brukere tar med seg alarmen ut. Dette kan gi falsk trygghet. Lav kompetanse blant helsepersonell og store avstander mellom brukere og leverandører er imidlertid forhold som kan utfordre brukernes behov for rask og kompetent bistand når teknologien ikke virker. Dette kan føre til utrygge situasjoner både for brukere og helsepersonell.

Plikten til å tilby helse- og omsorgstjenester som er tilpasset den enkeltes behov, er fastsatt i helse -og omsorgstjenesteloven. En systematisk kunnskapsoppsummering viser at eldre har en lavere mestringstro, høyere angst for og mer problemer enn yngre mennesker med å lære seg å ta i bruk teknologi (Chen & Chan, 2011). Forskning viser imidlertid at eldre oftere aksepterer og benytter teknologier som er enkle å forstå og som oppleves som trygge, nyttige og brukervennlige (Chen & Chan, 2011; Cook, Randhawa & Sharp et al., 2016). Som funn i denne studien viser til, opplevdes det som viktig at løsningene som tildeles er i samsvar med brukernes ønsker, behov og ressurser. Ved å tilrettelegge for samarbeid mellom bruker, helsepersonell og pårørende, kan helse- og omsorgstjenesten få verdifull kunnskap som kan sikre at brukerne blir tildelt løsninger de selv ønsker, og som de

har forutsetningene for å forstå og benytte på rett måte. Dette kan spille en viktig rolle for trygg og sikker bruk av velferdsteknologi. For å kunne komme med nyttige forslag til brukeren, trenger ansatte imidlertid kjennskap til de ulike velferdsteknologiske løsningene som finnes på markedet. Opplæring og samarbeid med andre faggrupper med ekspertise på velferdsteknologi, for eksempel ergoterapeuter og IT-personell, kan være nyttig.

Resultatene i denne studien kan gi viktig kunnskap som kan bidra i arbeidet med å legge til rette for trygg og sikker bruk når velferdsteknologi benyttes i hjemmebasert helse- og omsorgstjeneste. Ifølge Vincent (2010) er sikkerhet ikke en iboende egenskap, men et resultat av et samspill mellom ulike komponenter i et komplekst system. Dette samspillet kan illustreres ved hjelp av SEIPS (System Engineering Initiative for Patient Safety) – modellen (Carayon, Schoofs Hundt & Karsh et al., 2006). Denne modellen viser hvordan fem komponenter innenfor et arbeidssystem; person, oppgave, teknologi/verktøy, fysisk miljø og organisatoriske forhold, samhandler og gjensidig påvirker hverandre, og resulterer i ulike utfall for pasientsikkerhet. Bruk av velferdsteknologi kan medføre endringer og utfordre mange av de mer tradisjonelle arbeidsoppgavene, funksjonene og rollene i den kommunale helse- og omsorgstjenesten. Dette kan innbefatte praktisk bruk, nye administrative rutiner, dokumentasjon, oppfølging av alarmer og tekniske varsler samt oppfølging av brukers helsetilstand via kamera, nettbrett og video. Som Carayon (et al., 2006) påpeker, må alle komponentene i systemet være optimale for høy sikkerhet for pasientene. Ved bruk av velferdsteknologi kan forhold som feilbruk, dårlig fungerende teknologi, mangelfull opplæring, menneskelig svikt, manglende oppfølging eller nedsatt evne til å forstå informasjonen påvirke pasientsikkerheten negativt. For å legge til rette for trygg bruk av velferdsteknologiske løsninger, innebærer dette at helse- og omsorgstjenesten må se på arbeidssystemet som en samhandlende helhet av ulike forhold som kan ha betydning for trygg og sikker bruk av velferdsteknologi.

Metodiske betraktninger

Denne studiens troverdighet er ivaretatt i henhold til kriteriene anvendt av Lincoln & Guba (1985). En studies *gyldighet* refererer til «sannheten» av funnene. Både datainnsamlingen og analysen er utført i nært samarbeid og konsensus med alle forfatterne, som også har lest den transkriberte teksten flere ganger. Studien presenterer også direkte sitater fra deltagerne.

En begrensing ved studien er at den har relativt få deltagere. Utvalget besto imidlertid av deltagere med god kjennskap til og bred praktisk og administrativ erfaring med en rekke ulike velferdsteknologiske løsninger som benyttes i mange norske kommuner. Studiens gyldighet kan også begrenses av at forskeren har en for fremtredende rolle (Malterud, 2011). I fokusgruppene ble det lagt vekt på at deltagerne fikk snakke fritt og uten avbrudd, og at hoved-moderator og med-moderator lyttet og viste interesse og forståelse for det som kom frem i samtalene. Videre er studiens *overførbarhet,* som omhandler hvorvidt en studies funn kan anvendes i andre sammenhenger, forsterket gjennom beskrivelse av kontekst, datainnsamling, analyse og funn (Graneheim & Lundman, 2004; Graneheim, Lindgren & Lundman, 2017). Studiens gyldighet er også styrket ved at en eller flere av studiens forfattere deltok i alle fokusgruppe-intervjuene.

Konklusjon

Resultatene viser betydningen av at både brukere og helsepersonell får nødvendig informasjon og opplæring om de velferdsteknologiske løsningene. Resultatene viser også at helsepersonell har en viktig forebyggende rolle gjennom å undervise og følge opp teknologibruk.

Studien peker på nødvendigheten av å sette av nok tid og ressurser på nødvendige opplæringstiltak og på å sikre god oppfølging av teknologien ute hos brukerne.

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Paper III

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Appendices

Appendix 1 – Interview guide (homecare professionals)

INTERVJUGUIDE
FOKUSGRUPPE

- HELSEPERSONELL –

Innledende opplysninger/spørsmål

- Navn, alder, arbeidserfaring (nåværende/tidligere)
- Hvor lenge har dere hatt arbeidserfaring med velferdsteknologi?
- På hvilken måte har velferdsteknologi kommet inn i deres arbeidshverdag?

Hovedspørsmål

- På hvilken måte opplever og erfarer dere at bruk av velferdsteknologi bidrar til trygghet for hjemmeboende eldre?
- Hvilke forhold og tiltak opplever dere bidrar til å fremme trygghet og sikkerhet for brukere av velferdsteknologi?
- Hva opplever dere som helsepersonell som viktige behov og forutsetninger?
- På hvilken måte kan helse og omsorgstjenesten best mulig legge til rette for trygg og sikker bruk av velferdsteknologi?

Andre stikkord

- Kunnskap, informasjon og opplæring
- Medvirkning og innflytelse
- Personvern
- Utfordringer

Appendix 2 - Interview guide (managers)

INTERVJUGUIDE
FOKUSGRUPPE

- LEDERE/ FAGANSVARLIGE –

Innledende opplysninger/spørsmål

- Navn, alder, arbeidserfaring (nåværende/tidligere)
- Hvor lenge har dere hatt arbeidserfaring med velferdsteknologi?
- På hvilken måte har velferdsteknologi kommet inn i deres arbeidshverdag?

Hovedspørsmål

- Hvilke forhold og tiltak opplever dere bidrar til å fremme trygghet og sikkerhet for brukere av velferdsteknologi?
- Hva opplever dere som ledere som viktige behov og forutsetninger?
- På hvilken måte kan helse og omsorgstjenesten best mulig legge til rette for trygg og sikker bruk av velferdsteknologi?

Oppfølgingsspørsmål

- På hvilke måte vektlegger kommunene trygghet og sikkerhet for hjemmeboende eldre ved planlegging og implementering av velferdsteknologi?
- På hvilken måte tenker dere trygghet og sikkerhet best kan ivaretas ved planlegging og implementering av velferdsteknologi?
- Har dere noen tanker om utfordringer som gjelder trygghet og sikkerhet ved bruk og implementering av velferdsteknologi?
- Hvordan vil dere beskrive den opplæring og informasjon som gis til helsepersonell og hjemmeboende eldre ved implementering av velferdsteknologi i kommunene?

Appendix 3 - Interview guide (older telecare users)

INTERVJUGUIDE
INDIVIDUELLE INTERVU

- ELDRE BRUKERE –

Innledende spørsmål

- Navn, alder, sivil status og hjemmesituasjon
- Mottar du helsetjenester fra kommunen? I så fall hvilke, og hvor ofte?
- Hvor lenge har du hatt erfaring med dette velferdsteknologiske hjelpemiddelet?
- Hvordan opplevede du trygghet hjemme før og etter du begynte å bruke dette hjelpemiddelet?
- Hvordan fikk du informasjon om å søke?
- Hva var bakgrunnen for at du søkte?

Hovedspørsmål

- Kan du fortelle om hvordan du opplever trygghet når du bruker dette hjelpemiddelet?

Oppfølgingsspørsmål

- Erfarer du at hjelpemiddelet er nyttig for deg i din hverdag, og i så fall på hvilken måte?
- Opplever du at den er til å stole på?
- Har du erfart noen tekniske problemer?
- Er det spesielle forhold med hjelpemiddelet som gjør at du føler deg særlig trygg eller utrygg?
- Hvordan vil du beskrive den informasjon og opplæringen du fikk om hjelpemiddelet, og hvordan opplevde du den?
- Har du noen meninger angående eventuelle forbedringer?

Appendix 4 - Information- and consent letter (homecare professionals)

FORESPØRSEL OM DELTAKELSE I FORSKNINGSPROSJEKT

FOKUSGRUPPE MED HELSEPERSONELL

Dette er en forespørsel om deltagelse i en doktorgradsstudie som omhandler trygghet og sikkerhet ved bruk av velferdsteknologi for hjemmeboende eldre. Du er valgt ut som informant på bakgrunn av din erfaring med dette temaet.

Nedenfor vil jeg beskrive hensikten med studien og hvordan dine opplysninger oppbevares og brukes i forskningen.

HVA ER BAKGRUNN OG FORMÅL MED STUDIEN?

Bruk av velferdsteknologi i eldreomsorgen er et satsingsområde både nasjonalt og internasjonalt. En viktig hensikt til bruk og innføring av velferdsteknologi er å bidra til at eldre opplever trygghet og sikkerhet i hjemmet. Doktorgradsprosjektets overordnede formål er å frembringe mer erfaring, oppfatninger og meninger omkring bruk av trygghetsskapende velferdsteknologi for hjemmeboende eldre og vil omfatte tre delstudier:
eldre hjemmeboende brukere, helsepersonell og helseledelse/ fagansvarlige for velferdsteknologi i helse- og sosialsektoren i kommunene. Deltakerne i studiene vil bli rekruttert fra flere ulike kommuner på Vestlandet.

HVA INNEBÆRER DELTAGELSE I DENNE STUDIEN?

Denne henvendelsen gjelder forespørsel om deltagelse i fokusgruppe for helsepersonell med erfaring med bruk av velferdsteknologi. Deltagerne i fokusgruppen vil bestå av helsepersonell med ulik erfaring innen bruk av velferdsteknologi for hjemmeboende eldre.

Metoden for å samle data vil i denne studien foregå gjennom fokusgruppe, som er en kvalitativ metode hvor mennesker samles, diskuterer og fokuserer på et gitt tema. Tema for dette fokusgruppeintervjuet vil baseres på oppfatninger, meninger og refleksjoner omkring trygghet og sikkerhet ved bruk av velferdsteknologi blant hjemmeboende eldre.
Intervjuet ledes av en moderator (prosjektleder) som har til oppgave å presentere møtets tema og styre diskusjonen. Samtalen tas opp på bånd og det vil også gjøres noen skriftlige notater underveis. Fokusgruppe- intervjuet vil ha en varighet på ca. 1-1 1/2 time og vil foregå på et egnet grupperom.

PERSONVERN OG TAUSHETSPLIKT

Alle personopplysninger som innhentes vil bli behandlet konfidensielt og strengt fortrolig. Alle opplysninger vil bli behandlet uten navn og fødselsnummer eller andre identifiserende opplysninger. Kun en kode vil knytte deg til dine opplysninger gjennom en navneliste som vil lagres adskilt fra øvrige data. Det vil heller ikke være mulig å identifisere deg i resultatene av studiene når disse publiseres.

FRIVILLIGHET

Det er frivillig å delta i studien. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Du kan når som helst trekke ditt samtykke uten å måtte oppgi noen grunn. Du kan også be om å få slettet innsamlede opplysninger, med mindre opplysningene allerede er brukt i vitenskapelige publikasjoner.

Dersom du vil delta men ønsker å trekke deg eller har spørsmål til prosjektet, kan du når som helst ta kontakt med prosjektansvarlig på telefon eller e-mail.

HVA SKJER MED INFORMASJONEN OM DEG?

Informasjonen som registreres skal kun brukes slik som beskrevet i hensikten med studien. Du har rett til innsyn i hvilke opplysninger som er registrert om deg og rett til å få korrigert eventuelle feil i de opplysningene som er registrert. Prosjektleder har ansvar for den daglige driften av forskningsprosjektet og at opplysninger om deg blir behandlet på en sikker måte. Studiene skal etter planen avsluttes 31.07.2019. Opptakene og lagrede personopplysninger vil da bli slettet og makulert.

GODKJENNING

Prosjektet er godkjent av Norsk senter for forskningsdata, NSD (prosjektnummer 48429).

Prosjektansvarlig: Torunn Beate Johannessen, stipendiat ved avd. for helsefag, Høgskulen på Vestlandet (HVL).
Telefon 971 82 827 e-mail: torunn.johannessen@hvl.no

Hovedveileder: Anne- Lise Holm, professor ved avd. for helsefag, Høgskulen på Vestlandet (HVL).
Telefon 52 702763, e-mail: anne.lise.holm@hvl.no

Biveileder: Marianne Storm, professor ved institutt for helsefag, Universitetet i Stavanger (UiS).
Telefon 51 83 4158 e-mail: marianne.storm@uis.no

Finansiering: Høgskulen på Vestlandet (HVL)

Universitetet i Stavanger

Høgskulen på Vestlandet

SAMTYKKE TIL DELTAGELSE I FORSKNINGPROSJEKT

Jeg har mottatt og forstått informasjonen om studien, og er villig til å delta

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Sted/ dato

Signatur deltager

Navn deltager (blokkbokstaver)

Appendix 5 - Information- and consent letter (managers)

INFORMASJON OG FORESPØRSEL OM DELTAKELSE I FORSKNINGSPROSJEKT

FOKUSGRUPPE MED LEDERE/FAGANSVARLIGE

Dette er en forespørsel om deltagelse i en doktorgradsstudie som omhandler trygghet og sikkerhet ved bruk av velferdsteknologi for hjemmeboende eldre. Du er valgt ut som informant på bakgrunn av din erfaring med dette temaet.

Nedenfor vil jeg beskrive hensikten med studien og hvordan dine opplysninger oppbevares og brukes i forskningen.

HVA ER BAKGRUNN OG FORMÅL MED STUDIEN?

Bruk av velferdsteknologi i eldreomsorgen er et satsingsområde både nasjonalt og internasjonalt. En viktig hensikt til bruk og innføring av velferdsteknologi er å bidra til at eldre opplever trygghet og sikkerhet i hjemmet. Doktorgradsprosjektets overordnede formål er å frembringe mer erfaring, oppfatninger og meninger omkring trygghet og sikkerhet ved bruk av velferdsteknologi for hjemmeboende eldre og vil omfatte tre delstudier:
eldre hjemmeboende brukere, helsepersonell og ledelse/ fagansvarlige for velferdsteknologi i kommunene. Deltakerne i studiene vil bli rekruttert fra ulike kommuner på Vestlandet.

HVA INNEBÆRER DELTAGELSE I DENNE STUDIEN?

Denne henvendelsen gjelder forespørsel om deltagelse i fokusgruppe for ledere/ fagansvarlige/rådgivere innen implementering av velferdsteknologi. Tema for vedrørende trygghet og sikkerhet ved bruk og implementering av velferdsteknologi for hjemmeboende eldre i kommunen. Deltagerne i fokusgruppen vil bestå av ledere, koordinatorer, fagansvarlige og rådgivere med ulik erfaring og bakgrunn innen feltet.

Metoden for å samle data vil i denne studien foregå gjennom fokusgruppe, som er en kvalitativ metode hvor mennesker samles, diskuterer og fokuserer på et gitt tema. Tema for dette fokusgruppeintervjuet vil baseres på oppfatninger, meninger og refleksjoner omkring trygghet og sikkerhet ved bruk og implementering av velferdsteknologi i kommunen. Intervjuet ledes av en moderator (prosjektleder) som har til oppgave å presentere møtets tema og styre diskusjonen. Samtalen tas opp på bånd og det vil også gjøres noen skriftlige notater underveis. Fokusgruppe- intervjuet vil ha en varighet på ca. 1. time og vil foregå på et egnet grupperom.

PERSONVERN OG TAUSHETSPLIKT

Alle personopplysninger som innhentes vil bli behandlet konfidensielt og strengt fortrolig. Alle opplysninger vil bli behandlet uten navn og fødselsnummer eller andre identifiserende opplysninger. Kun en kode vil knytte deg til dine opplysninger gjennom en navneliste som vil lagres adskilt fra øvrige data. Det vil heller ikke være mulig å identifisere deg i resultatene av studiene når disse publiseres.

FRIVILLIGHET

Det er frivillig å delta i studien. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Du kan når som helst trekke ditt samtykke uten å måtte oppgi noen grunn. Du kan også be om å få slettet innsamlede opplysninger, med mindre opplysningene allerede er brukt i vitenskapelige publikasjoner. Dersom du vil delta men ønsker å trekke deg eller har spørsmål til prosjektet, kan du når som helst ta kontakt med prosjektansvarlig på telefon eller e-mail.

HVA SKJER MED INFORMASJONEN OM DEG?

Informasjonen som registreres skal kun brukes slik som beskrevet i hensikten med studien. Du har rett til innsyn i hvilke opplysninger som er registrert om deg og rett til å få korrigert eventuelle feil i de opplysningene som er registrert. Prosjektleder har ansvar for den daglige driften av forskningsprosjektet og at opplysninger om deg blir behandlet på en sikker måte. Studiene skal etter planen avsluttes 31.07.2019. Opptakene og lagrede personopplysninger vil da bli slettet og makulert.

GODKJENNING

Prosjektet er godkjent av Norsk senter for forskningsdata, NSD (prosjektnummer 48429).

Prosjektansvarlig: Torunn Beate Johannessen, stipendiat ved avd. for helsefag, Høgskulen på Vestlandet (HVL), avdeling Haugesund.
Telefon 971 82 827 e-mail: torunn.johannessen@hvl.no

Hovedveileder: Anne- Lise Holm, professor ved avd. for helsefag, Høgskulen på Vestlandet (HVL).
Telefon 52 702763, e-mail: anne.lise.holm@hvl.no

Biveileder: Marianne Storm, professor ved institutt for helsefag, Universitetet i Stavanger (UiS).
Telefon 51 834158 e-mail: marianne.storm@uis.no

Finansiering: Høgskulen på Vestlandet (HVL)

SAMTYKKE TIL DELTAGELSE I FORSKNINGPROSJEKT

Jeg har mottatt og forstått informasjonen om studien, og er villig til å delta

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Sted/ dato

Signatur deltager

Navn deltager (blokkbokstaver)

Appendix 6 - Information- and consent letter (older telecare users)

INFORMASJON OG FORESPØRSEL OM DELTAKELSE I FORSKNINGSPROSJEKT

ELDRE BRUKERE

Jeg heter Torunn Beate Johannessen, jeg er sykepleier og ansatt som doktorgradsstipendiat ved Høgskulen på Vestlandet (HVL), avdeling Haugesund.

I forbindelse med min doktorgradsstudie skal jeg gjøre en studie som handler om trygghet og sikkerhet ved bruk av teknologiske hjelpemidler (velferdsteknologi) for hjemmeboende eldre. Siden du har erfaring med bruk av slike hjelpemidler, håper jeg at du har lyst å delta i dette studiet.

Nedenfor vil jeg beskrive hensikten med studien og hvordan dine opplysninger oppbevares og brukes i forskningen.

HVA ER BAKGRUNN OG FORMÅL MED STUDIEN?

Bruk av velferdsteknologi i eldreomsorgen er et satsingsområde både nasjonalt og internasjonalt. En viktig hensikt til bruk og innføring av velferdsteknologi er å bidra til at eldre opplever trygghet og sikkerhet i hjemmet. Doktorgradsprosjektets formål er derfor å frembringe mer erfaring, oppfatninger og meninger omkring bruk av trygghetsskapende velferdsteknologi både fra eldre, helsepersonell og fra ledere.

HVA INNEBÆRER DELTAGELSE I DENNE STUDIEN?

Denne henvendelsen gjelder forespørsel om deltagelse gjennom et intervju. Intervjuet vil handle om dine erfaringer og opplevelser vedrørende trygghet og sikkerhet ved bruk av velferdsteknologi i hjemmet.

Intervjuet vil foregå hjemme hos deg og vil ha en varighet på ca. 30 min- 1 time. Om du heller ønsker at intervjuet skal foregår et annet egnet sted kan dette ordnes. Samtalen tas opp på bånd og det vil også gjøres noen skriftlige notater underveis.

PERSONVERN OG TAUSHETSPLIKT

Alle personopplysninger som innhentes og registreres vil bli behandlet konfidensielt og strengt fortrolig. Alle opplysninger vil bli behandlet uten navn og fødselsnummer eller andre identifiserende opplysninger. Kun en kode vil knytte deg til dine opplysninger gjennom en navneliste som vil lagres adskilt fra øvrige data. Det vil heller ikke være mulig å identifisere deg i resultatene av studiene når disse publiseres.

FRIVILLIGHET

Det er frivillig å delta i studien. Dersom du ønsker å delta, undertegner du samtykkeerklæringen på siste side. Du kan når som helst trekke ditt samtykke uten å måtte oppgi noen grunn. Du kan også be om å få slettet innsamlede opplysninger, med mindre opplysningene allerede er brukt i vitenskapelige publikasjoner. Dersom du er pasient/ bruker og ikke vil delta i studien eller velger å trekke deg underveis, vil dette ikke får innvirkning på ditt forhold til behandlere eller andre.

Dersom du vil delta men ønsker å trekke deg eller har spørsmål til studien, kan du når som helst ta kontakt med prosjektansvarlig på telefon eller e-mail.

HVA SKJER MED INFORMASJONEN OM DEG?

Informasjonen som registreres skal kun brukes slik som beskrevet i hensikten med studien. Du har rett til innsyn i hvilke opplysninger som er registrert om deg og rett til å få korrigert eventuelle feil i de opplysningene som er registrert. Prosjektleder har ansvar for den daglige driften av forskningsprosjektet og at opplysninger om deg blir behandlet på en sikker måte. Studien skal etter planen avsluttes 31.07.2019. Opptakene og lagrede personopplysninger vil da bli slettet og makulert.

GODKJENNING

Prosjektet er godkjent av Norsk senter for forskningsdata, NSD (prosjektnummer 48429).

Prosjektansvarlig: Torunn Beate Johannessen, stipendiat ved avd. for helsefag, Høgskulen på Vestlandet (HVL).
Telefon 971 82 827 e-mail: torunn.johannessen@hvl.no

Hovedveileder: Anne- Lise Holm, professor ved avd. for helsefag, Høgskulen på Vestlandet (HVL).
Telefon 52 702763, e-mail: anne.lise.holm@hvl.no

Biveileder: Marianne Storm, professor ved institutt for helsefag, Universitetet i Stavanger (UiS).
Telefon 51 83 4158 e-mail: marianne.storm@uis.no

Finansiering: Høgskulen på Vestlandet (HVL)

SAMTYKKE TIL DELTAGELSE I FORSKNINGPROSJEKT

Jeg har mottatt og forstått informasjonen om studien, og er villig til å delta

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Sted/ dato

Signatur deltager

Navn deltager (blokkbokstaver)

Appendix 7 - Ethical approval

Torunn Beate Johannessen
Avdeling for helsefag Høgskolen Stord/Haugesund
Postboks 1064
5407 STORD

Vår dato: 13.05.2016 Vår ref: 48429 / 3 / AH Deres dato: Deres ref:

TILBAKEMELDING PÅ MELDING OM BEHANDLING AV PERSONOPPLYSNINGER

Vi viser til melding om behandling av personopplysninger, mottatt 21.04.2016. Meldingen gjelder prosjektet:

48429	*Safety Perceptions Of Assistive Technology For Elderly Persons Living At Home*
Behandlingsansvarlig	*Høgskolen Stord/Haugesund, ved institusjonens øverste leder*
Daglig ansvarlig	*Torunn Beate Johannessen*

Personvernombudet har vurdert prosjektet, og finner at behandlingen av personopplysninger vil være regulert av § 7-27 i personopplysningsforskriften. Personvernombudet tilrår at prosjektet gjennomføres.

Personvernombudets tilråding forutsetter at prosjektet gjennomføres i tråd med opplysningene gitt i meldeskjemaet, korrespondanse med ombudet, ombudets kommentarer samt personopplysningsloven og helseregisterloven med forskrifter. Behandlingen av personopplysninger kan settes i gang.

Det gjøres oppmerksom på at det skal gis ny melding dersom behandlingen endres i forhold til de opplysninger som ligger til grunn for personvernombudets vurdering. Endringsmeldinger gis via et eget skjema, http://www.nsd.uib.no/personvern/meldeplikt/skjema.html. Det skal også gis melding etter tre år dersom prosjektet fortsatt pågår. Meldinger skal skje skriftlig til ombudet.

Personvernombudet har lagt ut opplysninger om prosjektet i en offentlig database, http://pvo.nsd.no/prosjekt.

Personvernombudet vil ved prosjektets avslutning, 31.07.2019, rette en henvendelse angående status for behandlingen av personopplysninger.

Vennlig hilsen

Vigdis Namtvedt Kvalheim

Åsne Halskau

Kontaktperson: Åsne Halskau tlf: 55 58 21 88
Vedlegg: Prosjektvurdering

Dokumentet er elektronisk produsert og godkjent ved NSDs rutiner for elektronisk godkjenning.

Personvernombudet for forskning

Prosjektvurdering - Kommentar

Prosjektnr: 48429

Formålet med studien er å få mer kunnskap om opplevelse av trygghet og sikkerhet ved bruk av velferdsteknologi for hjemmeboende eldre. Utvalget består av pasienter/brukere, helseledere og helseansatte. Personvernombudet legger til grunn at taushetsplikten ikke er til hinder for førstegangskontakt og rekruttering.

Utvalget informeres skriftlig og muntlig om prosjektet og samtykker til deltakelse. Informasjonsskrivene er godt utformet.

Vi anbefaler imidlertid at de ansatte innen helsesektoren som skal intervjues rutinemessig minnes om at de har taushetsplikt ovenfor forsker og således ikke kan omtale pasienter på en identifiserende måte.

Personvernombudet tar høyde for at det vil kunne behandles sensitive personopplysninger om helseforhold under intervjuene med brukere/pasienter.

Personvernombudet legger til grunn at forsker etterfølger Høgskolen Stord/Haugesund sine interne rutiner for datasikkerhet.

Forventet prosjektslutt er 31.07.2019. Ifølge prosjektmeldingen skal innsamlede opplysninger da anonymiseres. Anonymisering innebærer å bearbeide datamaterialet slik at ingen enkeltpersoner kan gjenkjennes. Det gjøres ved å:
- slette direkte personopplysninger (som navn/koblingsnøkkel)
- slette/omskrive indirekte personopplysninger (identifiserende sammenstilling av bakgrunnsopplysninger som f.eks. bosted/arbeidssted, alder og kjønn)
- slette digitale lyd-/bilde- og videoopptak