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**Preventive Home Visits Among Older People:
Risk assessment, self-rated health and experiences of healthy
ageing**

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Preventive Home Visits Among Older People – Risk Assessment, Self-rated Health and Experiences of Healthy Ageing

THESIS FOR DOCTORAL DEGREE (Ph.D.)

By

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POPULAR SCIENCE SUMMARY OF THE THESIS

The world population is living longer, which in turn means that many people will spend several more years of their life as an older person than people did before them. Many see a long life as something to strive for, and a long and healthy life is often a lifestyle goal. Many people spend these extra years in a good and eventful old age, but we are also aware of various challenges associated with old age. These challenges may arise from heart disease, lung disease or dementia and can lead to pain, dizziness and falls, reducing the likelihood of older people being able to live independently and do the things that they appreciate in life. Old age is also associated with loneliness and the loss of family and friends.

To meet older people's challenges, preventive home visits have been shown to be beneficial for some older people. The term "preventive" is used insofar as these visits (to the home) can prevent or delay age-related challenges. The goal of such visits is to support the person in maintaining their life at home, their interests and the activities that they are engaged in. Studies show that not all older people benefit from preventive home visits or have they that the visits were relevant to them. In this study, we take a closer look at the factors associated with older people's health; we also ask older people what they think is important in their lives and in ageing.

In order to investigate which factors may be associated with older people's health, individuals aged 75 and older were offered preventive home visits in three municipalities in Western Norway. During the visits, the nurses used a questionnaire on health, lifestyle and social networks. To examine their thoughts on ageing, 34 persons were interviewed in groups.

The results from the preventive home visits showed that an older person's main reason for declining is that they "felt too healthy". But of those who participated in the preventive home visits, some areas were detected that may have a negative impact on health. Among those visited, one-third use five or more medications (polypharmacy), over a quarter had a risk of cognitive impairment (impaired attention) and well over 10 percent were at risk of falls and/or malnutrition. Finally, one-fifth of those older persons living at home were at increased risk of illness. A factor strongly associated with the aforementioned was a poor self-rating for health. Self-rated health is a person's subjective perception of their health. Each person has their own way of rating their health, but research shows that elements of medical, social, economic, relational and emotional conditions are often included in this rating. As there appears to be an association between self-rated health and areas that may

have a negative impact on older people's lives, it was of interest to examine which factors were associated with self-rated health among those who participated in the preventive home visits. It appears that being limited by disease and having pain were associated with poor self-rated health, and internet use was associated with good self-rated health. The results from the interviews showed that the older people wanted life to continue as it was but that they knew changes were coming. Despite the changes, which were described as a threat, they enjoyed life and appreciated their independence. It was important for them to sustain networks and activities. The threat consisted partly of not being able to socialise and be useful and partly of becoming dependent, which was associated with illness and the use of healthcare services. Contact with the healthcare services was only an associated factor if something occurred with the person's health that had a negative impact on their health and life.

The study concludes that it is important to ask those who are living at home about falls, nutrition, polypharmacy and cognitive impairment as well as to have these identified by these persons. In the study, self-rated health had an association with several areas of an older person's life. Therefore, self-rated health is suggested as a starting point in preventive home visits for the purpose of identifying the factors that contribute to good or poor self-rated health. If these factors are known, it is possible to change the negative factors and maintain the positive factors. Social networks and activities are important in order for older persons to maintain a good life and age well. During preventive home visits it is therefore important to talk about social needs and whether the older person in question feels that they have a sufficient level of social activity. The interview participants said that they either thought about or wanted services from healthcare professionals as long as they were feeling healthy and that life was good. This could be a barrier to healthcare professionals coming to their home and discussing life and ageing. Therefore, as older people's appreciation of social arenas and contributing to society are important to having a good life and ageing well, healthcare services and other sectors should contribute to health promotion in social arenas.

ABSTRACT

Background: The worldwide population is ageing and life expectancy is increasing. This increase in age is associated with physiological and psychosocial challenges and changes that lead to decreased intrinsic capacity and functional ability. To meet these challenges, preventive home visits have been reported to help older people meet their needs with regard to age-related changes, the intention being to enable older people to live at home for as long as possible. Although preventive home visits may have a positive impact on the lives of older people, it is still necessary to gain more knowledge not only about approaches and content, so as to optimise preventive home visits, but also about how older people perceive the ageing process and their need for support from the healthcare services and the environment.

Aim: The aim of this thesis is to increase the level of knowledge about the content of preventive home visits to older people who are living at home and about how older people who live at home perceive the ageing process; the overall purpose is to contribute knowledge to help develop risk prevention and health-promotion activities within this population.

Methods: The setting is three municipalities in Western Norway, representing a small, a medium and a large municipality. Older persons aged 75 and older participated in preventive home visits performed by trained nurses using a questionnaire. The questionnaire included questions and tests on falls, nutrition, polypharmacy and cognitive impairment as well as questions regarding lifestyle, health and medical diagnoses, including medications. Descriptive and inferential statistics were applied (Studies I to III), including logistic regression (Study II) and linear blockwise regression (Study III). Study IV used focus group interviews of participants aged 65 and older from the medium and large municipalities. The data was analysed using qualitative content analysis.

Results: In Study I, 60% (n=166) of the invited persons accepted a preventive home visit invitation. The main reason for declining a visit was that the person was “feeling too healthy”. Thirty-six persons (21.7%) were identified as being at increased risk of developing illness. Study II showed that 34% were at risk of polypharmacy, 13% at risk of falls and 12% at risk of malnutrition. Of the 106 persons who completed the Mini-Cog test, 28% were at risk of cognitive impairment. Poor self-rated health was associated with increased risk of falls, malnutrition and polypharmacy as well as increased risk of developing illness. In Study III, the blockwise regression model showed that being limited by disease and had pain were negatively associated with self-rated health and that use of the internet was positively

associated with self-rated health. The model had a R^2 0.432. Being limited by disease was the variable that resulted in the largest change in the model (R^2 Change=0.297, p-value < 0.001). Study IV suggests that most old persons enjoy life and they want to continue enjoying life for as long as possible. It is important to sustain networks and feel useful. Unexpected changes were described as threats, and the need to use healthcare services was associated with illness and being dependent. The results are categorised according to: embracing life, dealing with challenges and considering the future.

Conclusion and implications: The findings from the overall study show that the focus areas of falls, nutrition, polypharmacy and cognitive impairment are relevant and should be assessed in preventive home visits for the purpose of risk identification. Self-rated health had associations with various risks and other factors related to everyday life. Therefore, self-rated health is suggested as starting point in preventive home visits for a personalised conversation regarding positive and negative factors in the older person's life. The findings from the focus interviews show that social networks and activities are important in order for older persons to maintain good quality of life and to age well. Therefore, it is suggested that preventive home visits are used to identify social needs and the ability to meet these needs. The findings also show that older persons did not include or wanted services from healthcare professionals as long they were feeling healthy. The older persons view their appreciation of social arenas and contributing to society as health promotion, and healthcare services and other sectors must contribute to health promotion in these areas.

LIST OF SCIENTIFIC PAPERS

- I. Cronfalk, B. S., Fjell, A., Carstens, N., Rosseland, L. M. K., Rongve, A., Rønnevik, D. H., Seiger, Å., Skaug, K., Vae Ugland, K. J., Hauge Wenersberg, M., & Boström, A. M. (2017). Health team for the elderly: a feasibility study for preventive home visits. *Primary Health Care Research & Development*, 18(3), 242–252.
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LIST OF ABBREVIATIONS

RCT Randomized controlled trials

ICT Information and communication technology

1 INTRODUCTION

Since my graduation from the nursing programme, my clinical experience has been related to medical and geriatric care in hospitals and municipalities. I gained my geriatric experience by working in a hospital geriatric ward, in nursing homes, in home-care services and on preventive home visits in a municipality. I was employed by the research project Health Team for the Elderly as part of Helsetorgmodellene, which will be presented in the thesis. My role in the project was firstly as a nurse contributing to the development of parts of the questionnaire used on preventive home visits and then collecting data during these visits. When Western Norway University of Applied Sciences announced a doctoral student position regarding preventive home visits developed by Helsetorgmodellene, I was naturally interested in applying so as to acquire a deeper understanding of preventive home visits.

The preventive home visits project provided me with an opportunity to work with both healthy older people and older people living at home who deal with various age-related challenges. This population seems independent and chose voluntarily to participate in a preventive home visit. My earlier experiences with older persons were notable for severe illness, complex conditions and terminal care in institutions; these conditions made the individuals dependent on care. The intention of the preventive home visits project was to focus on relevant areas related to the challenges of age and to delay or decrease the complexity of the older persons' health conditions and challenges of life. Although the subject matter and intentions of the preventive visits were professionally relevant and some of the older persons appreciated the visits, some of the older persons considered the visits irrelevant and were disturbed by them.

My intention in this doctoral project is to contribute to the knowledge of healthcare professionals and of developers of age-friendly environments with regard to what kind of preventive home visit content may be appropriate and relevant for older persons, as well as to improve awareness of what older persons consider to be important in their lives for healthy ageing.

2 BACKGROUND

2.1 AN AGEING POPULATION

Life expectancy of the world population is increasing due to effective methods of detecting disease, better treatment options and positive socioeconomic development (World Health Organization, 2015). In Europe, it is estimated that people over the age of 60 will make up more than 30% of the population in 2050. In Norway, this figure is somewhat lower, around 25% to 29%, and the number of people over the age of 60 is expected to be between 1.2 and 1.4 million in 2050 (Norwegian Institute of Public Health, 2018). The longevity in high-income countries can mostly be explained by the rising life expectancy among those over the age of 60 (Beard et al., 2016), and most deaths occur in people older than 70 (World Health Organization, 2015). In Norway, according to the latest statistical update in 2020, life expectancy is 84.7 years for women and 81.2 years for men (Statistics Norway, 2020), which is among the longest in the world (Norwegian Institute of Public Health, 2018).

The goal for increasing life expectancy is to have more good years of life (Beard et al., 2016). In gerontology, there are two hypotheses that describe the possible outcomes of a longer life: the compression hypothesis and the expansion hypothesis (Lee et al., 2020). According to the compression hypothesis, the population will have several years of good health and function, because the diseases will arise later and thus be compressed into the final years of life (Sierra et al., 2009). According to the expansion hypothesis, the population will live longer than before with illness and poor health, because more people will survive and grow old with diseases that previously caused their death (Olshansky et al., 1991). Increased longevity and an increased likelihood of surviving previously fatal conditions generate a greater need for healthcare services (Calderón-Larrañaga et al., 2017). In Norway, there has been a steady increase in users of community healthcare services. In 2019, there were 364,666 users of community healthcare services (home healthcare and nursing homes). Twenty-five percent of the users are aged 80 to 89, a percentage which is expected to increase further as a result of the ageing population (Ministry of Health and Care Services, 2019).

2.1.1 Normal ageing and its impact on life

Gerontology focuses on changes, contingency and diversity related to older age (Gilleard & Higgs, 2010). The life span is broken down into four ages, with old age being referred to as the third and fourth ages (Gilleard & Higgs, 2010). The third age includes the healthy and active “young-old”, aged 65 to 79. The fourth age includes the “old-old”, who are 80 years of age and older, and is associated with dependence, frailty and illness (Baltes & Smith, 2003; Higgs, 2018). It must be pointed out that there is great diversity in the health and ageing process, and thus also in levels of intrinsic capacity and functional ability. Intrinsic capacity is a concept that interests many researchers and is therefore the subject of much investigation. Intrinsic capacity is defined by Beard et al. (2019) as a combination of all of an individual’s mental and physical capacity, whereas functional ability is built on a person’s intrinsic capacity and also includes their capacity to do what they want. Older people over the age of 80 may have as high a level of functional ability as younger older people, and younger older people may have experienced a significant decline in functional ability (Baltes & Smith, 2003; Beard et al., 2016). Nevertheless, the body's reserves are halved and the risk of age-related disease increases more rapidly from the age of 80 and up (Jaul & Barron, 2017).

Increased age is associated with physiological and psychosocial changes that lead to declining physical and mental capacities and thereby decreased functional ability (Beard et al., 2016; Collard et al., 2012). Functional ability is defined in the World Health Organization’s (WHO’s) global strategy for ageing and health as “health-related attributes that enable people to be and to do what they have reason to value” (World Health Organization, 2017).

From a physiological perspective, ageing is the accumulation of molecular and cellular damage. With increasing age, the mechanisms of maintenance and repair are diminished, which consequently may lead to damage to organs (IS Rattan, 2014). Common age-related diseases include heart disease, stroke, diabetes, lung disease and dementia. Additionally, functional problems such as hearing and vision impairment, neck and back pain and declining muscle mass often occur with increased age (World Health Organization, 2015).

Physiological changes also lead to various clinical conditions that cannot be classified as disease, such as delirium, dizziness, syncope, urinary incontinence, falls and frailty. These conditions are referred to as geriatric syndromes (Beard et al., 2016; Inouye et al., 2007). The most prominent geriatric syndrome is frailty. Frailty is associated with declining reserve capacity and increased risk of functional decline, dependence, institutionalisation, hospitalisation and death (Fried et al., 2001; Morley et al., 2013; Rockwood & Mitnitski,

2011). The prevalence of frailty in older people living at home varies depending on the type of assessment. Studies using phenotype have identified a range of prevalence of frailty of between 4% and 17%. Studies using a comprehensive measurement report a prevalence of between 4% and 60% (Collard et al., 2012).

In addition to physiological changes, psychosocial changes also occur. Psychosocial changes in older age are often triggered by loss of relationships, impairment of physiological functions or clinical conditions. This includes changes in role or social position, such as retirement; loss of spouse, close friends or network; reduced autonomy; and reduced opportunity to live at home and perform other meaningful daily life activities (Bengtson & Settersten Jr, 2016; Dillaway & Byrnes, 2009). A consequence of these psychosocial changes is an increased risk of depression, loneliness, decreased quality of life and increased mortality (Holt-Lunstad et al., 2015). These changes may lead to an older person not being able to maintain life as it was before. However, for some individuals, losses and psychosocial changes may trigger development and contribute to new roles, viewpoints and social contexts and may lead to improved subjective well-being (Oh et al., 2014).

WHO have identified topics that should be addressed in order to delay or to some extent reverse the process of functional decline and frailty (World Health Organization, 2017). The main focus is on mobility loss, malnutrition, visual and hearing impairment, cognitive impairment, depressive symptoms, urinary incontinence and risk of falls (World Health Organization, 2017). Mobility impairment is caused by loss of muscle mass and strength, decreased flexibility and problems with balance (Altman et al., 2016). A common consequence of mobility impairment is falling. Studies report a prevalence of falls as high as 25% to 40% among people older than 70 who are living at home (Lavedán et al., 2018; Mota de Sousa et al., 2017). Falls also cause concern among relatives, both those in the same household or living elsewhere (Payette et al., 2016); falls lead to injuries (Mattig, 2020). Malnutrition among older who are living at home, which is reported as being between 3% and 30% (Cereda et al., 2016), is related to frailty (Verlaan et al., 2017) and has a negative impact on quality of life among older people who are living at home (Tek & Karaçil-Ermumcu, 2018). Depressive symptoms or sub-threshold depression is common in older persons: a study has identified that around 10% of those who are community-dwelling have these symptoms (Mohebbi et al., 2019). In Norway, 12% to 13% of older home-dwelling individuals were dispensed antidepressant medication in 2019 (National Institute of Public Health, 2019). The

issues identified are complex and interrelated; comprehensive assessments are therefore required to improve health.

2.1.2 Risk-assessment in older people

To accommodate age-related health challenges, it is recommended that assessments be carried out to identify individuals who are at risk and implement interventions to support people so that they can live independently at home (Stuck et al., 2015; World Health Organization, 2017). Risk may be perceived as synonymous with harm and can lead to people becoming dependent and isolated in an effort to avoid the various risks that may cause harm. Risk may also be seen as harm that may occur or as risk of something happening. This creates an opportunity to do something to protect the person against the potential risk and draws attention to the social mandate to protect vulnerable citizens and their right to be protected (Clarke et al., 2016).

In healthcare it is important to detect risks related to health and well-being so as to be able to proactively identify needs for support and services (Lette et al., 2017). Examples of risk assessments include identifying complex conditions in older persons with multiple comorbidities (Kojima et al., 2020), identifying frailty in primary care (Metzelthin et al., 2013) and multidimensional and comprehensive geriatric assessments (Pilotto et al., 2017). There are two approaches that are widely used to identify frailty. Frailty by phenotype is a physiological approach and which recognises loss of appetite, weakness (hand grip strength), slowness (time to walk 15 feet), exhaustion and low physical activity levels (Fried et al., 2001). Frailty of accumulated risks is a more comprehensive approach and involves the environment of the older person, self-rated health and quality of life (Jones et al., 2004). Comprehensive geriatric assessment is defined as a multidisciplinary diagnostic and treatment process that identifies risk for medical, psychosocial and functional limitations in a frail older person in order to develop a coordinated plan to maximise overall health with ageing (Deschodt et al., 2013; Parker et al., 2018). A comprehensive geriatric assessment usually includes validated tests of activities in daily life, depression, cognitive function, nutrition and social functioning (Stuck et al., 2015). Comprehensive geriatric assessment is the recommended approach for obtaining an overview of the complex factors and needs of an older person (Deschodt et al., 2013). WHO advocates the use of comprehensive geriatric assessment for tailoring interventions that an older person will experience as acceptable and appropriate (World Health Organization, 2017).

2.1.3 Preventive home visits

Preventive home visits are an intervention tailored to older people which has been described as a well-organised care pathway for accommodating the health challenges in the ageing population (Rechel et al., 2013). The intention of these visits is to improve or maintain the older person's opportunity to live a good and independent life, delay disability and functional decline and enable the older person to live at home for as long as possible (Liimatta et al., 2016; Rechel et al., 2013). Preventive home visits have the potential to restore the function and support the coping strategies of the individual and to facilitate the systems of the healthcare service for the ageing population (Elkan et al., 2001; Liimatta et al., 2019; Rechel et al., 2013). Preventive home visits are voluntary to receive and represent a category of home care services. Preventive home visits focus on maintaining independence and preventing/delaying the need for healthcare services, in contrast to regular home care services, which focus on treatment and rehabilitation (Mayo-Wilson et al., 2014).

Over the last three decades, numerous randomised controlled trial (RCT) studies on the effect of PVH have been performed. These have been summarised in several systematic reviews (Table 1). The first meta-analysis, conducted by Stuck et al. in 1993, included 28 RCT studies on preventive home visits using comprehensive geriatric assessment. The results show that preventive home visits using comprehensive geriatric assessment had a positive impact on being able to live at home longer (Stuck et al., 1993). Later research has shown that preventive home visits reduce the number of hospital admissions, prevent/delay admission to a nursing home, increase cost-effectiveness and quality of life, reduce mortality and improve physical and mental health outcomes (Elkan et al., 2001; Frese et al., 2012; Liimatta et al., 2016; Sahlén, 2009; Stuck et al., 2002; Zingmark et al., 2019). However, many systematic reviews show no clear evidence of effects such as reduced hospital admissions, reduced mortality or improvement in physical and mental health (Table 1). By 2009, the researchers who conducted these systematic reviews observed that the diversity of preventive home visit models made it difficult to conclude whether preventive home visits in general were effective or not (Fagerström, 2010; Gustafsson et al., 2009; Liebel et al., 2009). A comprehensive systematic review conducted by Mayo-Wilson et al. (2014) and including 64 trials concluded that it was not possible to identify effective preventive home visit models because of the heterogeneity of participants, interventions, outcomes and methods, but it did find a small positive effect with regard to physical function, hospital admissions, psychiatric illness and mortality.

Table 1. Summary of systematic reviews of effect of preventive home visits presented in chronological order

Author, year	Countries	Studies included	Setting	Inclusion criteria	Age	Recruitment	Follow-up	Type of assessment/intervention	Intervener	Effect
Stuck et al. (1993)		28	Hospital/municipality	Poor health	–	–	Yes, but frequency not specified	CGA	Intervention team	CGA positive for improving survival and function
van Haastregt et al. (2000)		15	Municipality	General population	65+	–	–	Multidimensional	–	No clear evidence of positive effect on age-related to ageing
Elkan et al. (2001)		15	Municipality	General population/recently discharged from hospital	65+	–	–	Health promotion, disease prevention	Nurses	Positive effect on mortality and admissions to nursing homes
Stuck et al. (2002)	England, France, Germany, Italy and Spain	18	Municipality	Living in the community	65+	GP practice or population list / insurance registers	Yes/no	Multidimensional/no multidimensional	Basically nurses	Positive on mortality, functional status and admissions to nursing homes if using CGA and follow up
Ploeg et al. (2005)		19	Municipality	Community dwelling	65+	Primary care /census list or health insurance list	≤ 24 – ≥ 36 months	Health and social assessment	Professionals/volunteers	Positive on mortality and continuing to live in the community
Markle-Reid et al. (2006)		12	Municipality	Community dwelling	65+	–	6–48 months/no	–	Nurses	Mixed results. Possible positive effect on health, functional status, mortality rates, hospital/nursing home admissions and costs
Bouman et al. (2008)		7		Poor health	75–82	–	≥ 12 months ≥4 visits/year	Multidimensional assessment	Nurses	No effect on mortality, health status, service use or costs
Beswick et al. (2008)		89	Municipality	General population/frail	65+	–	Yes/no	CGA/fall prevention/group education/community-based care after hospital discharge	–	Positive effect on mortality, falls and physical functioning. No effect on admissions to nursing homes
Huss et al. (2008)		21	Municipality	Community dwelling	Mean: 73–83	–	4 months to 4 years	Multidimensional	–	Positive effect on mortality and functional status
Gustafsson et al. (2009)	North America (USA and Canada) and Europe	14		Frail	Mean: 79	–	–	Multicomponent HPDP programme	Health professionals	HPDP was partially effective if the person is included in early stage of frailty. CGA recommended
Liebel et al. (2009)		10	Municipality	Older with disability	65+	–	Monthly / quarterly visits	Multidimensional	Trained nurses	Positive effect in 5 trials, 2 partly positive. Recommended CGA
Fagerström et al. (2009)		18	Municipality	–	–	–	Yes/no	Multidimensional/guidance	–	Mixed results on health. Recommend focus on

individual needs and assessments of risk factors and health resources

Author, year	Countries	Studies included	Setting	Inclusion criteria	Age	Recruitment	Follow-up	Type of assessment/ intervention	Intervener	Effect
Beswick et al. (2010)		110	Municipality	Community dwelling or discharge from hospital	Mean: 65	–	≤ 6 months	Multifactorial intervention	–	Positive effect on admissions to nursing homes and hospitals, falls and physical function
Tappenden et al. (2012)	–	11	Municipality	Vulnerable/ long-term medical or social needs at risk of admission to hospital/ residential or nursing care	71.9–83	–	4 per day for 4 weeks –12 months	Health promotion/ preventing falls/ screening /multidisciplinary team	Nurses/ trained nurses	Positive effect on mortality, varying effect on admissions to hospitals and nursing homes, falls, health status and patient satisfaction
Mayo-Wilson et al. (2014)	USA, UK, Canada	64	Municipality	High risk of institutionalisation /general population	65–99	Primary care provider / community and social service organisation / emergency rooms / health insurance registers / veterans' health organisations	3 – 60 months	Fall prevention/MGA/ exercise	Nurses/Trained nurses/ physiotherapists /social workers/ occupational therapists/ combination of professionals	No consistent effect on mortality or independent living. Impossible to identify effective programmes, but some programme may be effective
Tourigny et al. (2015)	North America, Europe, Asia, Australia	10 reviews of systematic reviews	Municipality	General population/ people said to be frail, vulnerable, in poor health or at risk	Mean:75	–	1 – 12 months	CGA/health education /information/problem identification and management	Mostly trained nurses/ nurses, but sometimes GP or geriatrician collaborated.	Small and conflicting results. Some evidence of positive effect on mortality if not too old. For functional ability, support MGA with clinical examination and follow-up
Liimatta et al. (2019)	–	19	Municipality	Frail, recent hospital discharge	70+	–	3 months to 10 years	Multidimensional/ geriatric management/ multiprofessional team/CGA	Mostly trained nurses/team of professionals	Some studies show it may decrease nursing home / hospital admissions. Some studies show positive effect on physical functioning, QOL and mortality.
Van der Elst et al. (2018)	–	25	Municipality	Frail	60+	–	2.5 – 36 months	Management/ Information /physical intervention/ psychosocial intervention	–	No sufficient evidence for protection against mortality, hospitalisation, health costs, falls or institutionalisation

In qualitative studies, older persons have expressed that they appreciate preventive home visits. They say that the visits make them feel safe in everyday life, seen and taken care of in the municipality and that they are somebody (Tøien et al., 2015; Tøien et al., 2014). Additionally, studies interviewing participants in preventive home visits about their experiences have also shown that these visits improved the older persons' coping ability (Sahlén, 2009), empowered them to initiate preventive actions and gave them a feeling of being in control of their own lives (Behm et al., 2013; Theander & Edberg, 2005). Factors contributing to older people feeling that they benefited from the visits were trust, a good patient–professional relationship and person-centred conversation (van Kempen et al., 2012). In addition, good professional communication skills, collaboration with the older individuals and a focus on their needs and interests were essential (Behm et al., 2013; Theander & Edberg, 2005; Tøien et al., 2015).

Participants in the preventive home visits

There is great diversity in the target population of different preventive home visit models, which range from models targeting the general population to studies that include only frail older individuals in poor health (Table 1). The models also differ in target age: ≥ 65 years of age (Corrieri et al., 2011), 75 years of age (Sherman et al., 2012) and 80+ years of age (Behm et al., 2016). Participants are recruited from primary care providers (Sahlen et al., 2006), emergency rooms (Elkan et al., 2001) and general population registers (Clegg et al., 2013) and through advertisements (Guralnik & Ferrucci, 2002). The great diversity in target populations may contribute to the variable outcomes of the preventive home visit models (Table 1). In 2015, Tourigny et al. published a review of ten systematic reviews from 2000–2011 that indicated positive outcomes of preventive home visits depending on the target population, assessment method and intensity. The studies that were included examined the effect of preventive home visits among the general older population and among older people said to be frail, vulnerable, in poor health or at risk. There was a tendency of preventive home visits being able to delay mortality for younger older people and to improve functional autonomy when comprehensive geriatric assessment was used (Tourigny et al., 2015).

Conduct and content of the preventive home visit

Preventive home visits were initially undertaken solely by volunteers with no professional qualifications (Carpenter & Demopoulos, 1990). Today, the visits are led by trained healthcare professionals, most commonly a trained nurse, but also by other healthcare professionals such as occupational therapists or physical therapists (Table 1). There are also

differences in terms of interaction between different healthcare professions, whether the assessment is performed by a multidisciplinary team and the composition of multidisciplinary team (Mayo-Wilson et al., 2014). Furthermore, the focus of preventive home visit models varies and includes reducing the risk of falls (Luck et al., 2013), reducing malnutrition (Westergren et al., 2014), addressing polypharmacy (Lagerin et al., 2014b), improving quality of life (Behm et al., 2014), becoming aware of mental health problems (Grundberg et al., 2016) and promoting exercise in order to maintain bodily function (Behm et al., 2016). This heterogeneity of preventive home visits makes it difficult to conclude whether the visits have a positive impact on an older person's life and health, but some common criteria of success have been identified. Preventive home visits that led to positive changes or improvements in the life of older persons were performed by professionals who had an education in geriatrics (Gustafsson et al., 2009; Liebel et al., 2009; Markle-Reid et al., 2006), included follow-up (Daniels et al., 2008; Liebel et al., 2009; Stuck et al., 2002) and included older people who were not overly frail (Bouman et al., 2008; Gustafsson et al., 2009; Stuck et al., 2002). Also, interventions tailored to the needs of the individual (Beswick et al., 2008; Daniels et al., 2008; Fagerström et al., 2009) and the use of comprehensive geriatric assessment were identified as success factors in preventive home visits (Frese et al., 2012; Stuck et al., 2002; Tourigny et al., 2015).

2.1.4 Appropriateness of health assessments and interventions in older people

Even if preventive home visits or other interventions are targeted at older persons in order to make them feel safe and empowered in everyday life, the interventions are not always appropriate for the target group (Marcus-Varwijk et al., 2016). Unfortunately, healthcare professionals often tend to act and understand the older person from their professional perspective and do not always take into account the older person's expectations, experience and opinions on ageing (Derksen et al., 2012; Marcus-Varwijk et al., 2016). This leads to discrepancies in perspective between the older person and the professional on health and what is important in life (Lette et al., 2017), thereby potentially leading to ineffective interventions (Beard et al., 2016; Derksen et al., 2012). A very significant discrepancy between older persons and professionals relates to the purpose of early detection initiatives, such as preventive home visits (Lette et al., 2017). Older persons may not pay attention to cognitive decline because they feel that it is beyond their control or is a taboo topic. On the other hand, healthcare professionals want to discuss cognitive decline because denial of the problem may indicate cognitive decline (Lette et al., 2017). (Lette et al., 2015) found in their study of older people living at home that older people felt that psychological and

social topics were private, whereas healthcare professionals paid more attention earlier to these topics in order to prevent social isolation (Lette et al., 2015). Furthermore, clinical health assessments do not have to agree with how an older person experiences their own health. A scoping review study found that there was little correlation between frailty assessments and participants' self-assessment of frailty (Archibald et al., 2020). Also, negative attitudes – such as stereotyping older people as frail, immobile, dependent and a burden on the family or society - may colour the interventions (Hickenbotham et al., 2012).

To develop sustainable and effective interventions, healthcare professionals must take the needs and preferences of older people into account (Gordon & Oliver, 2015; Lette et al., 2017; Marcus-Varwijk et al., 2016). Qualitative studies on preventive home visits have shown that the purpose of the visits may not be clear to older persons (Tøien et al., 2015; Tøien et al., 2014) and that the visits may not be of value (Behm et al., 2013). The older persons' reactions to recommendations made during a visit depended on whether they felt that the advice and recommendations were relevant and appropriate. Some of the older persons who participated in preventive home visits expressed needs and preferences that were not addressed in the intervention (van Haastregt et al., 2002).

There is also the question of whether preventive home visits should take a health promotion or a disease prevention approach. Studies show that interventions using both approaches have been useful and have led to positive outcomes for older persons (Behm et al., 2016; Behm et al., 2013; Lagerin et al., 2014a; Sherman et al., 2016), but this double approach was difficult for older persons to understand if it was not clearly formulated in the advance information (Tøien et al., 2014). It is therefore necessary to gain more knowledge of older persons' perspectives on ageing and their need for healthcare and social support in order to develop efficient preventive home visit models.

2.2 NORWEGIAN HEALTHCARE SYSTEMS

The Norwegian health and social care system is based on the Scandinavian welfare model, in which the whole population has the same right to welfare (Barth et al., 2014). The Norwegian health and social care system has two levels: primary and specialist care. The municipalities are responsible for primary care, which is the lowest level. This includes general practitioners, home care and long-term care. This municipality level is financed by the municipalities themselves and through governmental funding and incentives. Hospitals are responsible for specialist care and are financed by the Norwegian health authorities (Romøren et al., 2011).

On 1 January 2012, the Norwegian government implemented the Coordination Reform (White Paper No.47, 2008). The purpose of the reform was to provide effective and sustainable care transitions between the two levels of healthcare. Furthermore, a larger portion of healthcare services were to be delivered by the municipalities. The reform focused particularly on older and chronically ill persons, who, after the reform, were to receive care from the municipalities where this was an alternative to hospitalisation. The Coordination Reform pointed out that municipal services did not pay enough attention to limiting and preventing illness. The municipalities were therefore challenged to take care of prevention at the system level (White Paper No.47, 2008). The primary prevention goal is to achieve good health behaviour, be healthy and avoid illness and injury. The secondary goal is to prevent relapse and stay healthy, and the tertiary goal – to live with the problem and prevent it from getting worse (White Paper No.47, 2008). By developing systems that provide an overview of the state of health and factors that influence the development of good and poor health, it is possible to define the challenges that exist and initiate actions accordingly.

Norwegian legislation (the Law of Health - and care services (2011) states that the municipality intends, through the provision of health and care services, to promote health and prevent illness, injury and social problems. This is accomplished by, among other things, providing information, advice and guidance. Furthermore, it is stated in the Law of Public Health (2012) that the “municipality intends to promote the health, well-being, and good social and environmental conditions of the population, contribute to the prevention of mental and somatic illness, injury or suffering, contribute to equalising social health inequalities and contribute to protecting the population from factors that may adversely affect health”. The municipality is also given responsibility for maintaining an overview of the health status of its inhabitants and the positive and negative factors that may affect this (Law of Public Health, 2012).

2.2.1 Preventive home visits in Norway

Preventive home visits are legally required in Australia, Denmark, the United Kingdom and Japan (Stuck et al., 2002). They are not a legal requirement in Norway. However, in 2016, the government recommended that municipalities implement preventive home visits to meet their responsibility for preventive health (White Paper 1-2/2016, 2016).

Preventive home visits in Norway first occurred at the end of the 1990s and were conducted by healthcare professionals who were especially enthusiastic about developing these visits (Pettersen, 2005). A national survey conducted by Førland and Skumsnes (2014) identified

four focus areas of the preventive home visits: 1) assessment of functional decline, 2) prevention of injuries and accidents, 3) provision of health advice and information about services in the municipality and 4) resource-focused dialogue on health. They found that the age span of those visited ranged from 75 to 85 and that the visits were normally offered to persons without home care services. As a general procedure, the visits were offered only once, but some municipalities provided a follow-up visit if needed, and some had annual follow-up visits. The preventive home visits were conducted mostly by nurses but also by occupational therapists and physiotherapists (Førland & Skumsnes, 2014).

2.2.2 Helsetorgmodellen – a foundation for developing a preventive home visit model

In order to develop effective and sustainable care transition processes between the healthcare levels, the Norwegian government provided funding in 2010 for partnerships to facilitate these processes. Helsetorgmodellen was developed as a partnership in Western Norway between the three state-run hospitals, 19 municipalities and Western Norway University of Applied Sciences (formerly Stord Haugesund University College). The purpose of Helsetorgmodellen was to prevent the development and worsening of complex disorders, ensure satisfactory transitions between healthcare levels and conduct research on treatment and care for older persons (Vae et al., 2012). Within this partnership a project was established to support the collaboration, focusing on areas associated with care for older and chronically ill people.

One part of Helsetorgmodellen was the development and implementation of a model for preventive home visits. The preventive home visit model that was developed was called the Health Team for the Elderly. This preventive home visit model focused on nutrition, falls, polypharmacy and cognitive impairment. One of the special features of the model was the use of assessment tools that enable structured mapping. Such assessment in the form of structured mapping uses risk assessment tools that aim to “filter out” older people who are in the risk zone for developing illness and functional impairment.

2.3 THEORETICAL FRAMEWORK

In this section the theoretical frameworks used in the thesis will be presented. The frameworks are health and healthy ageing.

2.3.1 Health

According to the traditional biomedical understanding, health is the absence of illness and functional impairment (Huber et al., 2011; Jans-Beken et al., 2019) and individuals are perceived as healthy or ill. In 1946, the World Health Organization defined health from a

holistic approach as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (Huber et al., 2011). This is a broad definition which refers to physical and mental health as not existing alone but as being influenced by the individual and managed within a social context in order to maintain both good physical and mental health (World Health Organization, 2004). Physical health refers to processes in the body and how the healthy body handles and maintains physiological homeostasis. Physiological processes such as sleep or pain can be disturbed and cause physical limitations or deterioration of a subjectively experienced physical form (Huber et al., 2011; Jans-Beken et al., 2019). According to WHO, mental health is “a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community” (World Health Organization, 2004). Mental health is affected by individual factors and experiences, social interaction, societal structures and resources, and cultural values (Lahtinen et al., 1999; Lehtinen et al., 1997). Mental health represents a person’s ability to cope and recover from severe mental pressure and protect themselves from post-traumatic stress disorders and an ability to handle difficult situations. This ability to adapt to difficult situations increases a person’s subjective well-being, which is characterised by a sense of joy and contentment and meaning in life (Huber et al., 2011). Social health, also referred to as social well-being, appeals to a person’s capacity to be independent and participate in social activities, despite medical conditions. Social health is considered as a dynamic balance between opportunities and limitations that allows one to participate in social life and which changes throughout life (Huber et al., 2011). Social health is about feeling accepted by and belonging with others, and together with physical and mental well-being it constitutes the holistic concept of human health (Jans-Beken et al., 2019).

Self-rated health

Self-rated health is a person’s rating of their own health based on a single question: “How do you perceive your health?” It is the most used measurement of health status (Jylhä, 2009). This subjective perception of health is assumed to include an element influenced by physiological conditions and psychosocial factors in the environment (Jylhä, 2009; Meer et al., 2003). The main advantage of using the self-rated health question is its comprehensive nature, capturing elements of health that validated and more guided questions about health status cannot (Jylhä, 2009). Good self-rated health is an indicator of both well-being and quality of life (Ge et al., 2019), while poor self-rated health can indicate morbidity (Stenholm et al., 2016) and mortality (DeSalvo et al., 2006; Fernández-Ruiz et al., 2013).

Good self-rated health is associated with an increased probability of healthy ageing (Aunsmo & Holmen, 2017; Depp & Jeste, 2009).

2.3.2 Healthy ageing

Depending on the health approach taken, healthcare services will appear different.

According to a biomedical understanding, healthcare services are aimed at preventing or treating illness and are characterised by healthcare professionals who have knowledge of risk assessment, diagnosis and the right treatment. In a holistic approach, the healthcare services include the person's perspective and an emphasis on the person's surroundings as well as their physical symptoms. WHO argues for a holistic approach in the public health response to the ageing population (World Health Organization, 2015).

The holistic approach to healthy ageing seeks to optimise opportunities for good health, participation and enhancement of quality of life (World Health Organization, 2016). The goal of this strategy is to strengthen, maintain and develop the older person's functional ability, which generates well-being (World Health Organization, 2015). Assessment and the identification of risk factors, which can reduce negative impact on a person's health and behaviour and thus improve well-being, are considered as important targets for health promotion (World Health Organization, 2016). This is a comprehensive and holistic understanding of health promotion as "any activities that improve health status (Tones & Green, 2004). Beard et al. (2016) have developed a public health framework for healthy ageing that focuses on a person's intrinsic capacity and functional ability.

Intrinsic capacity is considered as the older person's physiological and psychosocial capacities. It concerns domains such as cognition, locomotion, vitality and sensory and psychological factors. Even if these domains are assessed separately, they must be considered as a dynamic interrelated environment in the living organism which taken together give a picture of the health status of the individual (Beard et al., 2016; Cesari et al., 2018). Functional ability is considered as the combination and interaction of intrinsic capacity and the surrounding environments. A person's functional ability and intrinsic capacity thereby constitute the total capacity of a person. The environment (i.e. assistive technologies, accessible public transport and activities) should be facilitated so that the older person can do the things that they value.

An individual's highest level of functional ability can be achieved in two ways: by building and maintaining intrinsic capacity or by giving a person with a given level of intrinsic capacity the opportunity to do things that matter. The population consists of three subpopulation groups: those with relatively high and stable capacity, those with decreasing

capacity and those with substantial losses of capacity. If the needs of these population subgroups are addressed, most older people will find their functional ability enhanced.

The holistic approach to healthy ageing promotes resilience as a concept to strengthen the older person’s ability to maintain or improve their functional ability in the face of adversity. Resilience comprises both a person’s individual intrinsic capacity to recover after a decline in functional ability and the environmental components that can mitigate deficits. This can be explained as the psychological traits or physiological reserves that lead to a positive outcome for a person after damage, given environmental resources such as social networks or access to healthcare and social care.

To achieve healthy ageing, WHO recommends that countries and communities align their healthcare systems and develop age-friendly environments. From a healthy ageing perspective, this means that healthcare systems should focus on building and maintaining functional ability and optimising trajectories for intrinsic capacity by way of initiatives that are person-centred and adapted to the individual’s level of capacity (Figure 1). A person-centred approach reflects the diversity of older people and is grounded in their individual perspective, experience, needs and preferences.

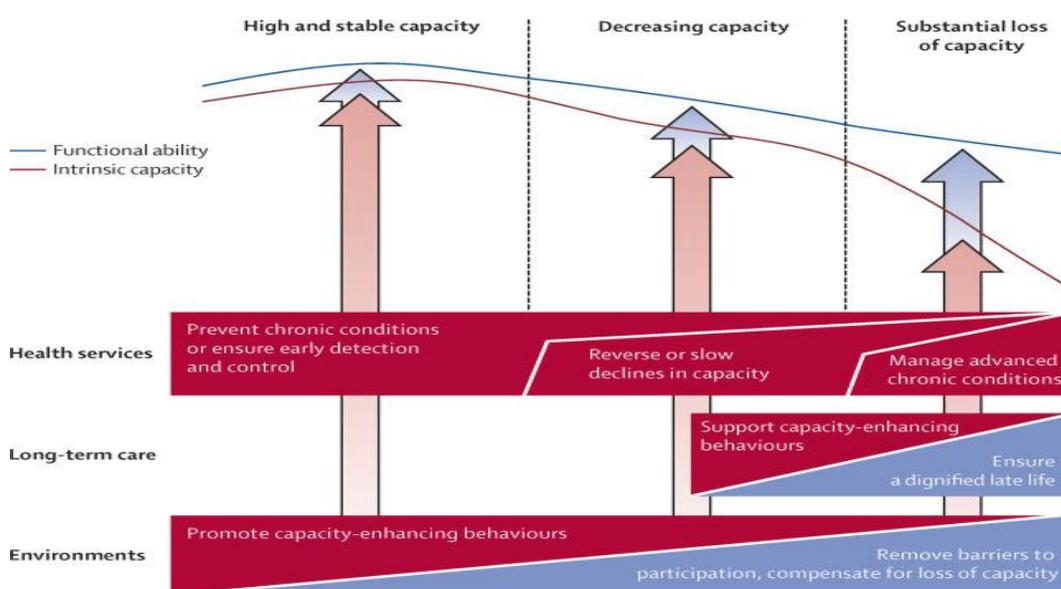


Figure 1. A public health framework for healthy ageing (Beard et al., 2016)

An aligned healthcare system involves several areas and intersector collaboration as well as the use of appropriate technologies for the purpose of helping older people to remain active, informed and independent. Governance is needed to implement successful healthcare services that are grounded in government commitment through policies, legislation, regulations and financing. Delivery of healthcare services includes healthcare workers collaborating with older people in order to meet their needs and expectations; services and interventions for older people should be located close to where they live. Where such services entail longer travelling distances, it is essential that inexpensive and easily accessible transport options are available in age-friendly environments. Age-friendly environments foster healthy ageing by supporting the building and maintenance of an individual's total capacity. Age-friendly environments may have different contexts, such as the home or community, as well as specific environmental factors, such as housing, transport, outdoor areas and social facilities. A person's intrinsic capacity is what they can do physically and mentally, and the goal of age-friendly environments is to strengthen their functional ability so that their total capacity enables them to do the things they value.

3 RATIONALE AND RESEARCH AIMS

The population is ageing worldwide and life expectancy is increasing. Ageing is associated with increased risk of morbidity, functional decline and frailty. Assessing risks and mapping the environment and social relations of older persons provides an opportunity to strengthen older persons' intrinsic capacity and functional ability. Preventive home visits aim to contribute to older persons' being supported in the management of their lives and having a good quality of life. Despite ambiguous results in respect of the effect of preventive home visits, they are widely implemented in many countries. There is ongoing discussion about the approach and essential content of preventive home visits. Additionally, it is important that healthcare professionals take into account the older person's perspective and are open to what the older person thinks are important matters or needs when developing preventive home visit models. Based on the research presented in the background section, there is a need for greater knowledge about the usability, feasibility and relevant content of preventive home visit models in order to develop general recommendations for increasing functional ability and intrinsic capacity. There is also a need for more knowledge about older persons' experience of healthy ageing and which health and social care interventions they think would contribute to their improved health.

3.1 OVERALL AND SPECIFIC AIMS

The aim of this thesis was to increase the level of knowledge about the content of preventive home visits among older people living at home and about how older people dwelling at home perceive the ageing process, with the overall purpose being to contribute knowledge for the development of risk-prevention and health-promotion activities within this population.

The thesis is based on the following four studies, whose aims are described below:

Study I

The aim of this study was to describe the development, utilization and feasibility of a model of preventive home visits in an urban and a rural municipality in Norway.

Study II

The aim of this study was to examine associations between five kinds of risks: risk of falls, malnutrition, polypharmacy, cognitive impairment, and risk of developing illness and factors related to lifestyle, health, and medical diagnoses among older people living at home.

Study III

The aim of this study was to examine associations between self-rated health and factors related to demographics, lifestyle, health conditions and medical diagnoses by older people participating in a preventive home visit program.

Study IV

The aim of this study was to investigate how old persons perceived their life to be, how they viewed the ageing process and their need of health care and societal support.

4 MATERIALS AND METHODS

4.1 STUDY DESIGN

This thesis used both quantitative and qualitative approaches to increase the level of knowledge about the content of preventive home visits among older people living at home and of older people's experience of growing old and ageing. Study I is a feasibility study whose descriptive explorative design described the phases of development, utilisation and feasibility of preventive home visits in two different settings. Studies II and III both used a cross-sectional study design and applied descriptive and inferential statistics, including regression models, to explore associated factors related to different kinds of risk and self-rated health. Study IV employed a qualitative approach and had an explorative design that used focus group interviews to describe older persons' experience of growing old and their views on ageing and how to manage the ageing process (see Table 2).

Table 2. Overview of the aim, design, participants and analysis

	Study I	Study II	Study III	Study IV
Aim/focus	To describe the development, utilization and feasibility of a model of preventive home visits	To examine associations between five kinds of risk and factors related to lifestyle, health, and medical diagnoses	To examine associations between self-rated health and factors related to demographics, lifestyle, health conditions and medical diagnoses	To investigate how old persons perceived their life to be, how they viewed the ageing process and their need of health care and societal support
Design	Descriptive explorative	Cross-sectional	Cross-sectional	Explorative qualitative
Participants	166 individuals from a large and a small municipality	166 individuals from a large and a small municipality	233 individuals from a large, a medium and a small municipality	34 individuals from a large and a medium municipality
Data collection	Nurses using a questionnaire while conducting a preventive home visit. Documentation from project work	Nurses using a questionnaire while conducting a preventive home visit	Nurses using a questionnaire while conducting a preventive home visit	Focus group interviews
Data analysis	Student's t-test, chi-square test and Cohen's κ	Student's t-test, chi-square test and logistic regression analysis	Student's t-test, chi-square test and linear blockwise regression analysis	Content analysis
Ethical approval	NSD* 26328 29153 REK** 2010-2076-3	NSD 26328 29153 REK 2010-2076-3	NSD 26328 29153 44970 REK 2010-2076-3	NSD 57506 REK 2015/28/1/REK vest

*Norwegian Social Science Data Service A/S NSD **Regional Ethics Committee

4.2 DEVELOPMENT OF THE PREVENTIVE HOME VISIT MODEL

The context of the project, development of the questionnaire used in preventive home visits and the dissemination and utilisation of the preventive home visit model is presented below.

4.2.1 Context

This research was conducted in the western part of Norway. When the study was started in 2010, the region had a population of 170,000 inhabitants in 19 municipalities whose populations ranged from 216 to 45,000 inhabitants. The region has four state-run hospitals, which are responsible for all specialist care, while the municipalities are responsible for the healthcare services and centres and home care and nursing homes for older people.

At the beginning of the project, the authorities in the 19 municipalities were invited to participate. Representatives from the large and the small municipalities were interested in participating from the beginning of the project. A medium-sized municipality was included a number of years later because the local authority became interested due to the results in the other two municipalities.

The municipalities varied in size. The largest municipality had approximately 45,000 inhabitants and 5,271 persons ≥ 65 years of age. The medium-sized municipality had 12,000 inhabitants and 1,731 persons ≥ 65 years of age, while the smallest municipality had 1,000 inhabitants and 162 persons ≥ 65 years of age. In this study the municipalities are referred to by their size: large, medium and small. Municipalities where the authorities actively agreed to test the preventive home visit model among older people were included. The organisation of the municipalities varied, with the two larger municipalities providing healthcare services such as healthcare centres, home care organisation, nursing homes, general practitioners (GPs) and offices for social services, while the smallest municipality had one GP and one nursing home. All three municipalities belong to the same local hospital, that had 253 beds and outpatient clinics.

4.2.2 The aim of the preventive home visit model

The aim of the preventive home visit model was to identify risks and thereby possibly prevent illness and/or functional decline early on among older people living at home. The objective was to contribute towards older people receiving advice and treatment at the right time and at the right level of the healthcare system.

A project group confirmed the project's approach to the relevant geriatric topic and research focus. During the development of the project, healthcare professionals (specialists in geriatrics, a dietician, a pharmacologist and a physiotherapist) from the hospital, one GP and three health team nurses from the municipalities, as well as senior researchers from

university college, all participated in the planning. The reference group provided support and supervision. (Figure 2). The project initially included an administrator placed at the office for social services. The health team nurses were specialised in geriatric nursing or primary healthcare. The local GP from the small municipality was the project leader.

The preventive home visit model included a team of professionals meeting once a week to follow the health team nurses home visits. The Health Team for the Elderly project included the GP/project leader, a senior geriatrician at the hospital, a pharmacist, a physiotherapist, an occupational therapist and a senior citizen. Preventive home visits have been described (Luck et al., 2013; Vass et al., 2007) as taking a multidisciplinary approach, which contributes competence and expertise to the overall preventive home visit assessment.

Project group

GP¹, specialist geriatrician², administrator², senior researcher³, senior researcher and head of R&D³

Reference group

GP¹, nursing home manager¹, municipality representative (2)¹, senior physician², specialist geriatrician², senior adviser (social affairs)², senior adviser (finances)², senior nurse², senior researchers (2)³, head of R&D³

Health Team for the Elderly (THE)

GP¹, RN ¹, senior citizen¹, senior physician and specialist geriatrician², senior adviser (social affairs)², RN², senior pharmacist², dietician², physiotherapist², occupational therapist²

¹ municipality ² hospital, ³ university college

Figure 2. Project organisation of the preventive home visit project

4.2.3 Questionnaire

The preventive home visits focused on four areas of interest: falls, nutrition, polypharmacy and cognitive impairment. All of these have been previously described in the literature as areas of risk with strong associations with older people's lives and general health (Ambrose

et al., 2013). Devons (2002) strongly recommends using multidisciplinary instruments for assessing different aspects of health and risk factors for illness in older people. A questionnaire inspired by Säätelä and Fagerström (2006) was revised and used by the health team nurses when they were conducting the visits. The questionnaire consisted of three parts: a demographic section, a health assessment and a risk assessment score. The purpose of the questionnaire was to map individual resources and challenges such as self-rated health, physical function and/or disability, illness, lifestyle and social networks. In addition to questions about prescribed drugs, there were also questions about the use of non-prescription drugs and complementary and alternative medicinal products (See Figure 3).

Demographic	Health assessment	Risk assessment score
Gender	Self-rated health	Declining health
Age	Perception of life	Loneliness/social factors
Education	Physical activities	Risk of falling/
Social status	Risk of falls	malnutrition/polypharmacy/cognitive
Family and friends	Nutritional status	impairment
Housing arrangement	Cognition	Declining sight/hearing
Social support	Various questions concerning health, illness and medication	

Figure 3: An overview of the questionnaire and risk assessment tool

For the focus areas risk of fall, malnutrition and cognitive impairment, BBS, MNA and Mini – Cog instruments were used. For risk of polypharmacy, the number of medications was used. A description of the other validated instruments is given below.

Demographic assessment

The **OSLO 3-Item Social Support Scale (OSLO 3-SSS)** is a validated instrument that assesses individual perceived presence or absence of social support and includes items addressing primary support, interest shown by others and the likelihood of obtaining practical help from neighbours (Meltzer, 2003) (Table 3).

Health assessment

The **Short Form 36 Health Survey Questionnaire (SF-36)** is a 36-item validated instrument that measures health in terms of functional status and well-being and provides an overall evaluation of health (Brazier et al., 1992). In the preventive home visit questionnaire, one question (**SF-1**) on self-rated health was used, because self-rated health is used as a screening tool for identifying persons at risk of disease and SF-1 is the most commonly used question (Garbarski, 2016) (Table 3).

The **Positive Life Orientation Scale (PLOS)** is an instrument used to measure the positive or negative life orientation of a person and provide a comprehensive indicator of optimism (Valvanne, 1992) (Table 3).

Table 3. Overview of items and possible responses for the included tests

Instrument	Questions or items	Possible responses	Cut-off/assessment
OSLO	How many people are you close enough to that you can count on them if you have big personal problems?	1 point: None 2 points: 1–2 persons 3 points: 3–5 persons 4 points: 6 persons or more	
	How much interest do people show in what you do?	1 point: No participation or interest 2 points: Little participation or interest 3 points: Unsure 4 points: Some participation and interest 5 points: Great participation and interest	
	How easy is it to get practical help from neighbours if you need it?	1 point: Very difficult 2 points: Difficult 3 points: Possible 4 points: Easy 5 points: Very easy	Little support 3–8 p. Some support 9–11 p. Much support 12–14 p.
SF-36	How do you rate your health?	5 points: Excellent 4 points: Very good 3 points: Good 2 points: Fair 1 point: Poor	
PLOS	Are you satisfied with your life?	Yes/No	
	Do you have zest for life?	Yes/No	
	Do you have plans for the future?	Yes/No	
	Do you feel needed?	Yes/No	
	Do you suffer from loneliness?	Seldom or never / Sometimes / Often or always	
	Are you depressed/sad?	Seldom or never / Sometimes / Often or always	Positive life orientation: Answered yes on all questions (first four questions) and seldom or never (last two questions)
BBS Items 3, 6 and 9	Sitting to standing	4 points: Able to stand without using hands and stabilise independently 3 points: Able to stand independently using hands 2 points: Able to stand using hands after several tries	

		1 point: Needs minimal aid to stand or to stabilise 0 points: Needs moderate or maximal assistance to stand	
	Sitting with back unsupported but feet supported on floor or on a stool	4 points: Able to sit safely and securely for 2 minutes 3 points: Able to sit for 2 minutes under supervision 2 points: Able to sit for 30 seconds 1 point: Able to sit for 10 seconds 0 points: Unable to sit without support for 10 seconds	
	Pick up object from the floor from a standing position	4 points: Able to pick up safely and easily 3 points: Able to pick up but needs supervision 2 points: Unable to pick up but reaches 2–5 cm from slipper and keeps balance independently 1 point: Unable to pick up and needs supervision while trying 0 points: Unable to try/needs assistance to keep from losing balance or falling	Risk of falls is ≤ 9 p.
MNA	Has food intake declined over the past 3 months due to loss of appetite, digestive problems, or chewing or swallowing difficulties?	0 points: Severe decrease in food intake 1 point: Moderate decrease in food intake 2 points: No decrease in food intake	
	Weight loss during the past 3 months?	0 points: Weight loss greater than 3 kg 1 point: Does not know 2 points: Weight loss between 1 kg and 3 kg 3 points: No weight loss	
	Mobility	0 points: Bed or chairbound 1 point: Able to get out of bed/chair but does not go out 2 points: Goes out	
	Has suffered psychological stress or acute disease in the past 3 months?	0 points: Severe dementia or depression 1 point: Mild dementia 2 points: No psychological problems	
	Body Mass Index (BMI)	0 points: BMI less than 19 1 point: BMI 19 to less than 21 2 points: BMI 21 to less than 23 3 points: BMI 23 or greater	Risk of malnutrition is ≤ 11 p.
Mini-Cog	Recalling the words “cheese”, “bicycle” and “book” and a clock test	1 point for every word s/he recalls 2 points for a correct clock test	Risk of cognitive impairment and examination is ≤ 3 p.

The **Bergs Balance Scale (BBS)** is a validated instrument that measures balance and risk of falls (Berg et al., 1992). The instrument has 14 subtests, including sitting, standing, reaching and turning. In the preventive home visit questionnaire, three subtests were used: 1, 6 and 9 (Table 3).

The **Mini Nutritional Assessment Short Form (MNA-SF)** is a validated subset of six questions or areas from the full Mini Nutritional Assessment (MNA) that have high sensitivity, specificity and correlation to the full MNA. The MNA-SF gives an indication of whether an older person is at risk of malnutrition (Kaiser et al., 2009) (Table 3).

The **Mini-Cog** is a validated instrument that detects cognitive impairment (Borson et al., 2003). The instrument includes three items on recalling words and clock drawing and consists of three parts. In the first part, three words are presented for the person, who then repeats the words. The second part consists of drawing hands on the face of a clock (time to be drawn on clock face: 10:10) (given time 10.10). The third part involves recalling the words presented in part 1 (Borson et al., 2003) (Table 3).

4.2.4 Description of demographic and other questions in the questionnaire

In respect of questions concerning demographic data, the questionnaire included several questions about age, gender, educational level and marital status. It also contained questions about living conditions, such as whether the person was living alone, whether they were renting their home or owned it and whether there was a need for house adaptations. Factors related to lifestyle were addressed by questions on external activities: having a mobile phone, using the internet, having a hobby, participating in a club, exercising, smoking and drinking alcohol. For the health assessment, questions were asked about the person's vision, hearing, limitations from illness, sleep problems, pain and medical diagnosis (see Figure 3).

4.2.5 Risk assessment score

While developing the questionnaire, a risk assessment tool was created by the project group. The aim of this tool was to summarise the assessments of the instruments and the person-centred conversation and to evaluate the risk of developing illness or functional decline. This risk assessment was conducted by the health team nurse after the preventive home visit. The assessment was based on the validated instruments and questions in the questionnaire and was based on 12 sub-scales; each sub-scale was scored from 0 to 5 points and the total score of the sub-scales was used as a total score classification on four levels. Thus, the older person was classified on four different levels indicating the degree of risk of developing illness (Table 4). Where a person was categorised as level 2-4, the person was evaluated at a Health Team for the Elderly meeting.

Table 4. The risk assessment tool: sub-scales, scores and cut-off for risk levels

Subscale	Score					
	0	1	2	3	4	5
Declining health						
Declining functional level						
Loneliness						
Risk of falling						
Recently moved						
Declining sight/hearing						
Loss of close one						
Spouse is chronically ill						
Recently discharged from hospital						
Mental or cognitive problems						
Polypharmacy						
BMI and nutrition						
Total score						
Score points 0 = no risk 1 = of no importance 2 = of some importance 3 = of importance 4 = of significant importance 5 = of paramount importance Risk assessment level 0–24 p = Level 1: no immediate risk of illness 25–36 p = Level 2: some risk of developing illness 37–48 p = Level 3: increased risk of developing illness 49–60 p = Level 4: high risk of developing illness						

4.2.6 Validation of the questionnaire and the risk assessment tool

A pilot study was conducted to test the questionnaire. The purpose of the pilot study was to identify whether the older persons felt the questionnaire was relevant. Ten older people from the large municipality completed the questionnaire during the visits from the health team nurse. After the visits, they were asked to contribute their opinions on the questions and tests. The health team nurses also gave feedback on using the questionnaire. The nurses gave feedback on the practical use of the questionnaire, such as lines to write on and how the order in the questionnaire contributed to a good flow of preventive home visits. Following the pilot

study, the project group and the health team nurses made revisions on the basis of recommendations from the older people and the health team nurses. The revisions addressed the order in which the questions appeared in the questionnaire. An inter-rater analysis was conducted to examine the inter-rater reliability of the health team nurses' risk assessment scores of the risk assessment tool.

4.2.7 Dissemination and utilisation of the preventive home visit model

In the first two municipalities, older people, GPs and politicians were invited to receive information about the preventive home visit model. Information meetings were also arranged, and the media were involved. The health team nurses and the project leader of the Health Team for the Elderly participated in the meetings, which provided information about preventive home visits and why the municipalities wanted to offer them. Specialists provided an introduction to the focus areas of the preventive home visit model. A nutritionist discussed nutrition in old age, a GP spoke about falls and cognitive impairment and a pharmacist spoke about polypharmacy.

In order to identify home dwellers who fulfilled the inclusion criteria and to administer the project, a project administrator was included in the Health Team for the Elderly. The target group was identified by the Norwegian population register. An information letter explaining the purpose of the preventive home visits, the focus areas, how to decline to participate and the voluntary nature of the participation was sent to the target group, inviting them to participate in the preventive home visit study. It was possible to receive a preventive home visit without participating in the research study. If a person did not decline the visit by calling the administrator within 14 days, the administrator would call that person to make an appointment for the visit. Each participant was sent a consent form and a letter with further information about the focus areas and the questions that would be asked on the preventive home visit, as well as information about, and a photo of, the health team nurses making the visits.

The visits were conducted by health team nurses, who were also in the Health Team for the Elderly. During the visit, the health team nurse would use the questionnaire discussed above to collect data on the older person's health and risks in respect of the four focus areas. Before leaving the person, the nurse would summarise the level of risk based on the risk assessment tool and give advice in accordance with the identified risks. If a higher level of risk was identified, the person was informed of this and told that the multidisciplinary team would discuss the assessment and make an evaluation and would also notify the GP in charge. The person was encouraged to contact the nurse after the visit if he or she wanted to add something

to their recorded response. They were all offered telephone numbers to allow them to contact the nurse after the visit.

In all cases, with the person's consent, their GP would receive a summary report of the preventive home visit from the health team nurse. Where persons were identified as at risk of developing illness (risk level ≥ 2), their GPs were also invited to the multidisciplinary meeting. This group met every week to evaluate older people who had been identified as being at higher risk. All written recommendations from the team meeting were sent to the GP of the older person in question.

4.3 SETTING AND PARTICIPANTS

Studies I and II included two municipalities: the large one and the small one. The third, medium-sized, municipality got involved several years later. Thus, Study III included participants from all three municipalities. Study IV included two municipalities.

The participants in studies I to IV were all persons aged 75 years and older. Inclusion criteria other than age were that the persons be living at home, regardless of whether they received home assistance from the municipalities, and able to speak, read, write and understand the Norwegian language. Excluded were persons who did not fulfil the inclusion criterion and those admitted to nursing homes. The choice of age range arose from previous studies that showed that the age of 77 was relevant to preventive home visits (Sherman et al., 2012; Vass et al., 2007), although recent research by Tøien et al., (2018) included older persons aged 80 or more. In Study IV, the age inclusion criterion was lowered to ≥ 65 years.

4.3.1 Studies I and II

In total, 259 persons were invited to participate. This included everyone who was 77 years of age living at home in the large municipality (n=177) and those 75 years of age and older in the small municipality (n=82). The reason for the extended age range in the small municipality was that the total number of inhabitants was less than 1,000. The group of older citizens was not comprehensive enough and therefore the age range was changed to 75 and older.

4.3.2 Study III

All persons 77 years of age in the large municipality (n=177) and the medium municipality (n=172) and all persons aged ≥ 75 (n=82) in the small municipality were invited to participate. Furthermore, we excluded persons older than 79 years of age from this study in order to have a more homogeneous sample. The inclusion criteria were being 75 to 79 years of age, living at home and being able to answer questions and understand written information

in Norwegian. The exclusion criteria were being > 79 years old, living in a nursing home and lacking the ability to communicate in Norwegian.

4.3.3 Study IV

Participants from the two largest municipalities were asked to participate in focus group discussions. Persons who were ≥ 65 years of age were recruited from a senior day centre and senior citizen university.

4.4 DATA COLLECTION

The data for Studies I to III in this thesis was mainly collected through the questionnaire developed for the preventive home visits (Figure 3). The health team nurses conducted the visits and collected the data in a standardised way. The older people's answers were documented by the nurses in the format set out in the interview guide. The data for Study IV was collected using focus group interviews, which are described in detail below. For all studies, written and verbal information about the study was provided and participation was voluntary. All participants signed a consent form.

4.4.1 Study I

Data was collected during the preventive home visits between March 2011 and May 2012. In Study I, the following data was extracted from the questionnaire: gender, age, municipality, time of conducting preventive home visits, risk assessment score.

Data and documents, such as notes from the administrator and minutes from various meetings during the process, were collected from the project group and the Health Team for the Elderly. Notes regarding the reasons why people declined to participate in the study were also collected by the project administrator at the centre for social services.

Twenty visits were conducted with people 77 years of age from the large municipality. All four health team nurses participated in the study. Two nurses attended each visit, at which one of the nurses conducted the visit using the questionnaire and acted as facilitator and the other nurse acted as moderator and was able to ask additional questions. The four health team nurses were paired up so that each of them made visits with the others, as well as being both moderator and facilitator. Following the visit, the two nurses independently assessed the older person's risks according to the risk assessment tool.

4.4.2 Study II

The data in Study II is from the same data collection as in Study I and is described above. The aim of Study II was to examine factors associated with different kinds of risk as assessed in the preventive home visit study. These risks are as follows: falls, malnutrition,

polypharmacy, cognitive impairment and development of illness. Twenty variables were chosen in order to examine associated risk. These variables were organised into four categories – demographic, lifestyle, health and medical diagnoses – based on the research literature (Lim et al., 2012; Stuck et al., 2015) (Table 5).

Table 5. Overview of variables extracted from the questionnaire in Study II

Risk	Risk of falls (BBS) Risk of malnutrition (MNA) Risk of polypharmacy Risk of cognitive impairment (Mini-Cog) Risk of developing illness (risk assessment tool)
Demographic	Age Gender Education Marital status
Lifestyle	Social support (OSLO-3 SSS) Exercise Smoking Alcohol External activities
Health	Vision Hearing Sleep problems Pain Feeling depressed (item from PLOS) Self-rated health (SF-1)
Medical diagnoses	Hypertension Hypercholesterolemia Eye disease Arthrosis Cancer

4.4.3 Study III

In Study III, the data from Study I and Study II was used. Study III also included data from the medium-sized municipality. The data collection in the medium-sized municipality was conducted by health team nurses in the same way as described in Study I and Study II. The data was collected between 2015 and 2018.

Following the first data collection in 2011–2012, some revisions were made to the questionnaire. The changes included sending some questions ahead of the visits instead of

the older persons being asked these questions at the time of the preventive home visits. These questions concerned gender, education, marital status, living conditions, having a mobile phone and using the internet, hobbies, social support and participation in organisations and voluntary work. Furthermore, the question “How would you describe your vision?” was replaced with a question about sensory impairment. This question was asked during the preventive home visit. The medium-sized municipality used the new questionnaire in the data collection.

The data was organised into the same categories as in Study II: demographic, lifestyle, health and medical diagnoses (see Table 6).

The variables were selected based on the research literature. COPD, heart failure, stroke and cancer were chosen because these are the most common causes of death in the Norwegian population aged ≥ 65 . Data about anxiety and depression was collected because these two diagnoses are often related to suicide among older people, and the prevalence of suicide in Norway is on the rise (Norwegian Institute of Public Health, 2018). Osteoporosis and arthritis relate to pain and reduced movement patterns that influence a person’s life (Langdahl et al., 2016). The information on having a mobile phone and using the internet was collected based on healthcare and society to a large extent basing services on digital tools in Norway.

Table 6. Overview of the variables extracted from the questionnaire in Study III

	Self-rated health
Demographic	Age 75–79 years Gender Education Municipality Living alone Residential Improvement in house
Lifestyle	Social support Exercise Smoking Use alcohol External activities Have mobile phone Use internet Have a hobby Participated in a club/ social organized activity
Health	Vision Hearing Sleep problems Life orientation Home care services Limited by disease
Medical diagnoses	Stroke Heart failure COPD Cancer Depression Anxiety Osteoporosis Arthrosis

4.4.4 Study IV

Study IV explored older people's experience of health as this relates to growing old and ageing, as well as their strategies for managing the ageing process. Implicit in this was the question of how older people manage age-related challenges that occur naturally and how they want to live their lives. Focus group discussions were chosen as the means for collecting data for Study IV. Group discussions are described in the literature as a strategy for involving the participants in a dynamic process where there is an opportunity to access and share experiences and understandings of specific topics (Polit & Beck, 2017). Each discussion was moderated by me and an additional moderator. In all, three moderators participated at various times in the focus group discussions.

I started each group discussion by providing information about guiding principles, such as the option of raising one's hand if a participant wanted to talk, and briefly providing information about the tape-recording procedure and that the discussions commenced when the tape recorder was turned on. Refreshments were offered before and after the interviews. The discussions lasted between 65 and 95 minutes.

Altogether, seven focus groups were assembled with three to six participants in each group. For the sake of flexibility, the participants could choose between different time schedules for the discussions. Participants in groups one, three and four were previously established groups as they attended the same activities together and expressed a desire to be in the same group. Three focus groups were conducted at the university college, three at the senior centre in the large municipality and one in the medium-sized municipality. The last interview took place at a private house.

A semi-structured interview guide was used for the discussions. Key questions posed are as follows: Can you please describe what good ageing is to you? Can you please describe what you do to manage the challenges that may occur? In what way can the healthcare services be of use to you for maintaining good health? These questions were followed by probing questions to encourage the participants to reflect and elaborate further upon their answers and thoughts.

4.5 DATA ANALYSIS

Studies I, II and III were quantitative studies and Study IV was a qualitative study. SPSS version 25 was used to conduct the statistical analyses in Studies I to III. The responses to the questionnaire took the form of information (e.g. kinds of medication or blood pressure) written by the health team nurse. In Studies I and II, a research assistant plotted all the information from the responses to the questions and tests in an SPSS file. In Study III, the

results were plotted by me and another research assistant. After all of the data was plotted, the responses to the questionnaires were cross-checked against the plotted data. All statistical analyses were conducted by me, the supervisors and a statistician and we did so independently of one another. Table 7 presents an overview of the statistical tests used in Studies I, II and III. Study IV was a qualitative study and used content analysis, which is described in detail at 5.7.4.

Table 7. Overview of the statistical methods used

Purpose of analysis	Statistical test	Study
Describe frequencies and distributions	Frequency (n), mean (m), percentage (%)	I, II, III
Assess difference between two independent groups. Used continuous variables	Student's t-test (<i>t</i>) Mann-Whitney U Fischer's Exact Test	I, II, III III II III
Assess difference between independent groups (mean). Used categorical variables	Chi-square test χ^2	I, II, III
Assess interrater reliability (interobserver agreement)	Cohen's κ	I
Assess multicollinearity between independent variables	Spearman rank-order test	III
Examine correlation between one independent variable and one dependent variable to predict probability of an event. Used screwed or binary dependent variable	Univariate logistic regression	II, III
Examine correlation between two or more independent variables and one dependent variable to predict probability of an event. Used screwed or binary dependent variable	Multivariate logistic regression	II
Examine correlation between two or more independent variables and one dependent variable to predict probability of an event. Used screwed or binary dependent variable	Logistic regression	II
Examine correlation between blocks including one or more independent variables and one dependent variable to predict probability of an event. Used continuous and normal distributed dependent variable	Linear blockwise regression	III

4.5.1 Study I

Descriptive statistical analyses were used for characteristics of the participants in the total sample. To assess the differences between the samples, the Student's t-test was used for continuous variables such as age, duration and risk of developing illness. The chi-square test was applied for categorical variables such as gender and municipality.

As part of the feasibility study, a second aim was to examine the feasibility of the questionnaire. Therefore, a review of the data set was conducted in order to identify responses missing from the questionnaire.

To test interrater reliability among the data collectors (the health team nurses) in their assessment of older persons' risk according to the risk assessment tool, Cohen's κ test was used.

The notes by the project administrator on the reasons for declining a preventive home visit were categorised by the reason for declining. Documentation from the project (Vae et al., 2012) and Health Team for the Elderly meetings was used to describe the process of developing and utilising the preventive home model.

4.5.2 Study II

This study examined factors associated with risks of falls, malnutrition, polypharmacy and cognitive impairment and the risk of developing illness (risk assessment tool – see x).

To analyse the differences in the sample between sub-groups, the Student's t-test and chi-square test were used. An example of the differences between these tests is the variable risk of malnutrition. The Student's t-test analyses whether there is a difference between two sub-groups in mean values, while the chi-square test identifies whether there is a difference in the proportion of persons identified as at no risk or at risk.

Logistic regression analysis was used to examine the associations between the different risks and factors related to demographic, lifestyle, health and medical diagnoses. Logistic regression analysis requires dichotomous dependent variables (Campbell et al., 2010). The dichotomisation followed the validated instruments' cut-off limit and was divided into "no risk" and "risk for" (see Table 8).

Table 8: An overview of dependent and independent variables used in Study II

Dependent variables	Cut-off/dichotomisation
Risk of falls (BBS)	Risk \leq 9 points
Risk of malnutrition (MNA)	Risk \leq 11 points
Risk of polypharmacy	Risk \geq 5 medications
Risk of cognitive impairment (Mini-Cog)	Risk \leq 3 points
Risk of developing illness (risk assessment tool)	Risk \geq 25 points
Independent variables	
Demographic	
Age	Continuous
Gender	Female/male
Education	College (trade school/high school/university) No college (folk high school/handicraft/trade school/7-year elementary school/middle school/secondary school/other)
Marital status	Partner (married/cohabitating) Single (alone/divorced/widowed)
Living alone	Dichotomous
Lifestyle	
Social support	Continuous
Exercise	Often (4–6 times a week/daily) Seldom (1–3 times a week/1–3 times a month/rare)
Smoking	Dichotomous
Use alcohol	Dichotomous
External activities	Often (several times a day/daily/4–6 times a week) Few (rare/1–3 times a week)
Health condition	
Vision	Good (excellent/good) Reduced (somewhat impaired/reduced/visually impaired)
Hearing	Good (excellent/good) Reduced (somewhat impaired/reduced/hearing impaired)
Sleep problems	Dichotomous
Pain	Dichotomous
Feeling depressed	Dichotomous (items from PLOS)
Medical diagnoses	
Heart failure, COPD, cancer, depression, anxiety, osteoporosis and arthrosis	Dichotomous

The screening question for the Mini-Cog test was “Do you find that your memory is impaired?” If the person replied yes, he/she was offered the opportunity to take the test. As a result, only 106 persons completed this specific test.

All independent variables were dichotomous or dichotomised and each response for the variable was given a value of 0 or 1. Social support was treated as continuous because it is assigned values (much support, some support, lack of support) and thus did not provide a logical cut-off point.

To develop a model for examining the associations between the different kinds of risk and the demographic, lifestyle, health and medical diagnoses, univariate logistic regression analysis was used. The model was adjusted for sex, age and education, and the criterion for including a variable was a p-value of < 0.1 in the unadjusted model. In the adjusted regression analyses of the risk of developing illness, the variables risk of falls, malnutrition, polypharmacy and cognitive impairment were also included, and in this model these variables were used as continuous data. The significance level in the adjusted model was set at p-value < 0.05 .

4.5.3 Study III

The aim of the study was to examine associations between self-rated health and factors related to demographics, lifestyle, health conditions and medical diagnoses by older people participating in a preventive home visit programme.

To assess the differences between good and poor self-rated health in the sample, the Student's t- test and the chi-square test were used. Fisher's Exact Test analyses were used on variables with fewer than five responses (stroke, health failure, COPD, cancer, depression, anxiety, osteoporosis and arthrosis).

Table 9. An overview of dependent and independent variables in Study III

Dependent variables	Cut-off/dichotomisation
Self-rated health	Dichotomous and continuous
Independent variables	
Demographic	
Age	Continuous
Gender	Dichotomous
Education	College (trade school/high school/university) No college (folk high school/handicraft/trade school/7-year elementary school/middle school/secondary school/other)
Marital status	Partner (married/cohabitating) Single (alone/divorced/widowed)
Living alone	Dichotomous
Residential	Dichotomous (private/hired)
Improvements in house	Dichotomous
Lifestyle	
Social support	Continuous
Exercise	Continuous
Smoking	Dichotomous
Use alcohol	Dichotomous
External activities	Continuous
Have mobile phone	Dichotomous
Use internet	Dichotomous
Have a hobby	Dichotomous
Participate in social organized activity	Continuous
Health condition	
Vision	Good (excellent/good) Reduced (somewhat impaired/reduced/visually impaired)
Hearing	Continuous
Sleep problems	Dichotomous
Pain	Dichotomous
Life orientation scale	Dichotomous
Home care services	Dichotomous
Limited by disease	Continuous
Medical diagnoses	
Heart failure, COPD, cancer, depression, anxiety, osteoporosis and arthrosis	Dichotomous

To explore the associations between the dependent variable of self-rated health and the independent variables, a linear blockwise regression analysis was applied. One criterion for conducting a linear blockwise regression analysis is a normally distributed dependent variable. Self-rated health had a normal distribution (skewness 0.25). By using blockwise regression analysis, this analysis allows the researchers to examine how much variance in the outcome each block explains in addition to the previous blocks.

There were many independent variables included in the study, some of which needed to be eliminated to develop a final model (Table 9). The selection of variables was conducted by using a univariate model for each independent variable and multivariable models including all of the independent variables within each of the following blocks: demographic, lifestyle, health conditions and medical diagnoses. Those variables with a p-value of ≤ 0.1 in one of the models were included in the final model, in addition to clinically interesting variables, social support and gender. The latter two variables are known as factors associated with self-rated health (Aunsmo & Holmen, 2017; Machón et al., 2016).

New blocks were defined for the final model and were included cumulatively in the model in the following order: limited by disease (single variable), lifestyle, demographic, health conditions and medical diagnoses. For each new block, we estimated improvement of explained variance by including it and using an ANOVA to test whether this improvement was significant. Multicollinearity between independent variables was tested using the Spearman rank-order test ($\rho \leq 0.85$) and the normality assumptions were assessed by a Q–Q plot.

4.5.4 Study IV

In Study IV, the focus was on the older persons' experience of ageing. Data from the focus group discussions was analysed using content analysis with a manifest inductive approach as described by Graneheim and Lundman (2012) and Graneheim, Lindgren and Lundman (2017).

Content analysis originates from the eighteenth century and was used to quantify quantitative data. It has been described as a research method for describing the manifest content of communication in a systematic, objective and quantitative manner (Berelson, 1952). Content analysis also refers to an analytic process commonly used in nursing research, as it is considered to be both flexible and pragmatic and therefore compatible with various types of data (Elo & Kyngäs, 2008; Hsieh & Shannon, 2005). According to Patton (2002), content analysis can be applied “to any qualitative data reduction or sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings” (p. 541) and this is supported by Krippendorff (2013). In Study IV, Graneheim and Lundman's (2004) principles for content analysis were used as described below.

The following principles were applied during the analysis:

- a) The interviews were listened to following the interviews.

- b) The interviews were transcribed and read through to obtain a first impression of the content of the texts.
- c) The texts were then read again to identify meaning units.
- d) The meaning units were abstracted into codes, i.e. condensed description close to the text (meaning units).
- e) The codes were then compared and sorted into sub-categories and three categories.
- f) The underlying meaning of the categories and sub-categories were merged into one overall theme (see Table 10).

Table 10. Study IV example of the analysis

Meaning unit	Sub-category	Category	Theme
"Indeed, I am great, because I am healthy and can participate in activities, I can travel, my financial situation is good, my home is centrally situated."	Health and identity	Embracing life	
"These things you normally postpone until the day comes, right? When the bomb goes off, then you need to deal with the situation as it is."	Life challenges	Dealing with challenges	So far so good...
"My fear is that I will become a burden and not an enrichment, and that I have to be very conscious that they should live their own lives and not think about how their mother and father are doing first."	Social support and healthcare services	Considering the future	

4.6 ETHICAL CONSIDERATIONS

The Helsinki Declaration states that "while the primary purpose of medical research is to generate new knowledge, this goal can never take precedence over the rights and interests of individual research subjects" (General Assembly of the World Medical Association, 2014). This statement means that participants should be included in a research study only if their rights and interest are respected. This can be expressed by four ethical principles: beneficence, nonmaleficence, autonomy and justice (Gillon, 2015). In respect of this research on preventive home visits, the research group has analysed and discussed the ethical consequences of the design of the included studies.

For example, in Studies I–III, screening instruments were used to assess the older persons. Screening has been criticised for using resources on healthy people, but it also identifies where there is need for the healthcare services (Clarke et al., 2016). As part of the

Coordination Reform in Norway, GPs in the municipalities are to have an overview of the population's health (White Paper No.47, 2008). Regardless of whether the studies used resources, it contributed to an overview of the health conditions of persons over the age of 77 years in the large municipality and ≥ 75 years of age in the small municipality.

In Studies I–III, data from the preventive home visits was used. During these visits, the participants were invited to answer several questions and participate in some tests. One of the tests was the Mini-Cog, which can give an indication of cognitive impairment. This could lead to conflict between the principles of beneficence and nonmaleficence. Regarding the principle of nonmaleficence, the test may trigger concern in the older person if their score is positive for cognitive impairment. The beneficence may be early detection of dementia or other conditions that can be treated or delayed. The participants in this preventive home visit study were able to call the visitor after the visit and ask questions or discuss the conditions that emerged during the visit.

Preventive home visits can reveal conditions in the home of the older person that may be harmful. One example of this is violence, whether physical, psychological or sexual (Feltner et al., 2018). According to the principles of beneficence and nonmaleficence, healthcare professionals should act to the best of their ability and be willing to respond and avoid patient suffering. As regards the principle of justice, priority should be given to those most in need.

Study IV was a qualitative focus group study. In research interviews, the ethical balance of power dynamics can be disturbed, as the researcher is in a dominant position. In the interviews, the researcher must consider whether any of the participants are experiencing negative stress and report their findings confidentially (Brinkmann & Kvale, 2015). By way of discussion, the authors of this study decided which quotations from the interviews should be included in order to ensure the anonymity of the participants.

All study participants were informed about the study orally and in writing and they signed a written consent form. In the consent form, the participants were informed that their participation was voluntary and that they could withdraw from the study at any time. The autonomy principle was thus adhered to. The participants were assured of full confidentiality. The data was anonymous and not distributed to other persons. As regards the principle of justice, the participants in all four studies may benefit from the new knowledge generated.

Research studies in Norway are required to obtain approval from regional committees for medical health research (REK). These studies were considered by REK to be non-disclosure for Studies I, II and III with project number 2010-2076-3 2015/28-1/REK vest. The Norwegian Social Science Data Service (NSD) has given its approval for all studies. The project numbers are 26328 (Study I), 29153 (Study II), 44970 (Study III) and 57506 (Study IV).

5 RESULTS

5.1 STUDY I

The aim of Study I was to describe the development, utilisation and feasibility of a model of preventive home visits in a large and a small municipality in Norway.

Description of the sample

A total of 259 persons were invited, 145 (60%) of whom agreed to participate, 87 (49%) of whom were in the large municipality and 58 (71%) of whom were in the small municipality. The twenty persons from the interrater reliability test were also included. In addition, two 78-year-old persons from the large municipality were also included. However, one person did not fully complete the questionnaire. In total, 166 persons participated, of whom 96 were women and 70 were men. There was no significance in the proportion of women and men participating in the two municipalities. The mean age of the participants differed between the two municipalities. In the large municipality, the mean age was 77.3, and the mean age in the small municipality was 81.4, which was expected and in line with the inclusion criteria.

The reason most people gave for declining to participate was that they were in good health and thought it unnecessary to take part. Others said that they had no wish to have contact with representatives from the municipality and a few were seriously ill.

The time spent conducting the preventive home visits varied, taking between 60 and 180 minutes, the mean time being 108 minutes (SD 20). There was a significant difference between the two municipalities in the time spent conducting the visits. In the large municipality (n=91), the mean time was 112 minutes (SD 20), whereas in the small municipality (n=58) the mean time was 102 minutes (SD 19). Of the 156 participants who were offered a second visit, 150 responded that they were interested.

Data missing data from the questionnaire

No missing data was identified for the demographic variables. In respect of the health assessment, data was missing for the variables of relationship, social network and the balance test (BBS). In total, 29 (17.5%) persons did not respond to the question “Do you feel safe in your municipality?” and 19 (11.4%) persons did not respond to the question “Are you looking forward to ageing?” Seven (4.2%) persons did not complete the BBS test.

Risk assessment of the sample

The risk assessment tool identified 36 persons who were at risk of developing illness (levels 2 and 3). No persons were identified as being at the highest level of risk for developing illness. The total risk assessment score was 15.7 (SD 7.1), with no significant differences between the two municipalities. The interrater reliability study of the risk assessment tool showed that the nurses' assessment was highly correlated. Eight of the twelve sub-scales had a Cohen's κ of ≥ 0.7 . See Table 11.

Table 11. Results of the interrater analysis of the 12 sub-scales in the risk assessment tool and risk assessment level

Sub-scales	Cohen's κ
Declining health	0.802
Declining functional level	0.776
Loneliness	0.285
Risk of falling	0.703
Recently moved	-
Declining sight/hearing	0.762
Loss of close one	0.519
Spouse is chronically ill	0.710
Recently discharged from hospital	0.318
Mental or cognitive problems	0.839
Polypharmacy	0.842
BMI and nutrition	0.727
Risk assessment level	0.912

5.2 STUDY II

The aim of Study II was to examine associations between five kinds of risks (falls, malnutrition, polypharmacy, cognitive impairment and development of illness) and factors related to lifestyle, health, and medical diagnoses among older people living at home

Description of the sample

The study's total sample size was 166. In the large municipality 108 persons participated and in the small municipality 58 persons participated. Most of the participants were women and the mean age of the total sample was 79. A large proportion of the sample had no college education, and about half were single. In this study, the sample was divided into two groups: risk of developing illness and no risk of developing illness. There were no significant differences regarding demographic variables between the group who were at risk of developing illness compared to those without this risk.

With regard to lifestyle, there was a significant difference in less social support and fewer social activities between those at risk of developing illness or those at no risk. Of the total sample, 55% reported pain, 35% reported poor health, 34% had sleep problems and 24% felt depressed. There were significant differences between the two groups in respect of state of health. Persons at risk of developing illness reported reduced hearing, feeling depressed and poor perceived health to a greater extent than did those without this risk. There were no significant differences between the groups as regards the five most common medical diagnoses.

Risk assessment

In total, 20 (13%) persons were identified as being at risk of falls. For the sample as a whole, the BBS mean value was 11.1. Twenty (12%) persons were identified as being at risk of malnutrition and, for the sample as a whole, the MNA mean value was 13.1. Polypharmacy (≥ 5 medications) was found in 57 (34%) persons. For the sample as a whole, the mean value was 3.9 medications. Among the 106 participants who completed the Mini-Cog test, 30 (28%) were identified as being at risk of cognitive impairment; the mean value was 3.8.

The two groups (risk of developing illness and no risk of developing illness) were compared in respect of all of these risks. There were significant differences between the two groups for these four variables, which all pointed in the same direction, i.e. that persons at risk of developing illness were at increased risk of falls, malnutrition, polypharmacy and cognitive impairment.

Factors associated with risk of falls, malnutrition, polypharmacy, cognitive impairment and risk of developing illness

Poor self-rated health had a highly significant association with increased risk of falls, malnutrition, polypharmacy and the risk of developing illness. The risks of falls, malnutrition

and cognitive impairment were associated with an increased risk of developing illness as well as with lack of social support, few external activities, sleep problems and feeling depressed.

The independent variables of no use of alcohol and not having hypercholesterolemia were associated with an increased risk of falls. Increased risk of polypharmacy was associated with the following independent variables: no use of alcohol, having pain, hypertension and hypercholesterolemia. None of the five medical diagnoses were associated with risk of developing illness (Table 12).

Table 12. Logistic regression models for variables significantly associated with risks of falls, malnutrition, polypharmacy, and developing illness, adjusted for gender, age and education

	Risk of falls			Risk of malnutrition			Risk of polypharmacy			Risk of developing illness				
	Exp (B)	95% CI for Exp (B)	P-value	Exp (B)	95% CI for Exp (B)	P-value	Exp (B)	95% CI for Exp (B)	P-value	Exp (B)	95% CI for Exp (B)	P-value		
Lifestyle		Lower	Upper		Lower	Upper		Lower	Upper		Lower	Upper		
Social support mean							1.214	1.010	1.459	0.039				
Seldom exercise														
Smoke														
Use of alcohol	0.263	0.082	0.847	0.025			0.383	0.183	0.802	0.011				
Few external activities														
							2.586	1.155	5.788	0.021				
Health														
Reduced vision														
Reduced hearing														
Sleep problems														
Pain							2.182	1.100	4.328	0.025	2.263	1.024	4.999	0.043
Feeling depressed														
Poor perceived health	9.255	2.849	30.071	<0.001	5.766	2.042	16.285	0.001	7.809	<0.001	3.743	1.699	8.244	<0.001
Medical diagnosis														
Hypertension							3.057	1.529	6.110	0.002				
Hypercholesterolemia	0.318	0.106	0.952	0.041			3.499	1.764	6.942	<0.001				
Eye disease														
Arthrosis														
Cancer														
Risks														
Falls											0.640	0.506	0.811	<0.001
Malnutrition											0.698	0.563	0.866	<0.001
Polypharmacy											1.222	1.041	1.434	0.014
Cognitive impairment											0.379	0.248	0.580	<0.001

5.3 STUDY III

The aim of study III was to examine associations between self-rated health and factors related to demographics, lifestyle, health conditions and medical diagnoses by older people participating in a preventive home visit program.

Description of sample

The total sample consisted of 233 participants (62% of the eligible population aged 75–79). Approximately half of the participants were women and the mean age for the sample as a whole was 77. The educational level of one-quarter of the total sample was college, and close to half were living alone. Almost all of the participants owned their own home, and about a quarter needed to do improvements in their house in order to continue to live at home.

A majority (163 or 70%) of the participants rated their health as good, choosing the answer options “excellent”, “very good” or “good” to self-rate their health. The mean value for self-rated health for the sample as a whole was 2.84 (SD 0.88). Among the participants who rated their health as good, 6% were at risk of malnutrition, 4% at risk of falls, 24% had polypharmacy and 26% were at risk of cognitive impairment (data not shown.)

There were no significant differences between the participants with good and poor self-rated health with regard to demographic and medical diagnoses. Participants in good health reported greater use of alcohol, the internet and their mobile phone and significantly less sleep problems. The participants who suffered from pain, had a negative life orientation, used home care service and were limited by disease nevertheless rated their health as good.

Factors associated with self-reported health

After the univariate and blockwise full model analyses, the variables ‘Education’, ‘Use alcohol’, ‘Have mobile phone’, ‘Use internet’, ‘Have a hobby’, ‘Hearing’, ‘Sleep problems’, ‘Pain’, ‘Negative life orientation’, ‘Home care service’, ‘Limited by disease’ and ‘Depression’ remained in the final model. ‘Gender’ and ‘Social support’ were added to the final model because of their clinical relevance.

In the final model, only limited by disease is the only variable that showed a significant association with self-rated health (B(CI)=0.37 (0.26, 0.48), $p < 0.001$) and explained alone 30% of its variance ($R^2=0.30$). Both the lifestyle block (R^2 change 0.07, $p=0.003$) and the health conditions block (R^2 change 0.05, $p=0.012$) contributed weakly but significantly to the model quality, while demographic and medical diagnoses did not. Even if not significant in respect of the marginal Bonferroni level, we observed within the two contributing blocks ‘Use internet’, B(CI)=0.25 (0.02, 0.47), $p=0.033$, and ‘Have a mobile

phone', B(CI)=0.32 (-0.01, 0.65), p=0.054 as well as 'Pain' B(CI)=0.25 (0.03, 0.47), p=0.023 with a coefficient in a similar range as 'Limited by disease' and a low p-value. See Table 13.

Table 13. The model summary of the blockwise regression analysis

	Final model		Model properties		
	B (95% CI)	p-value	R ²		
			value	change	p-value
Block 1: Single variable			0.30	-	< 0.001
Limited by disease	0.37 (0.26, 0.48)	< 0.001			
Block 2: Lifestyle			0.37	0.07	0.003
Social support	-0.00 (-0.04, 0.04)	0.835			
Use alcohol	-0.11 (0.32, 0.11)	0.332			
Have mobile phone	0.32 (-0.01, 0.65)	0.054			
Use internet	0.25 (0.02, 0.47)	0.033			
Have a hobby	-0.06 (-0.47, 0.35)	0.776			
Block 3: Demographic			0.37	0.07	0.003
Gender	0.02 (-0.21, 0.24)	0.891			
Education	0.12 (-0.13, 0.37)	0.334			
Block 4: Health conditions			0.42	0.05	0.012
Hearing	-0.03 (0.11, 0.18)	0.651			
Sleep problems	0.17 (-0.06, 0.40)	0.150			
Life orientation	-0.18 (0.04, 0.39)	0.100			
Pain	0.25 (0.03, 0.47)	0.023			
Home care services	0.21 (-0.06, 0.49)	0.125			
Block 5: Medical diagnoses			0.43	0.01	0.108
Depression	0.64 (-0.14, 1.43)	0.108			

5.4 STUDY IV

The aim of Study IV was to investigate how old persons perceived their life, the ageing process and their need for healthcare and societal support.

Description of the sample

In all, 34 persons between the ages of 69 and 93 (28 women and 6 men) accepted the invitation to participate in this study. All of the participants lived at home, four of whom had assisted home care services. All but six of the participants were living in the large municipality township (Table 14).

The findings were described in three categories: “Embracing life”, “Dealing with challenges” and “Considering the future” and a concluding theme “So far so good”. The main findings disclosed that overall, the participants, enjoyed life and in many instances wished it to continue life as it was. It was important to them to be able to maintain their personal relationships and social networks, facilitate their autonomy, and to withhold their integrity.

Table 14. Overview of the participants

Focus group	Total	Male	Female	Age	Municipality	Home care services
1	4		4	78 – 86	Large	1
2	3	1	2	69 – 86	Large	1
3	5		5	75 – 84	Large	
4	5	5		75 – 90	Large	1
5	6		6	73 – 93	Large	1
6	5		5	71 – 80	Large	
7	6		6	73 – 82	Medium	

Most of the participants perceived age as a matter of no great concern, mainly due to their not feeling old or perceiving themselves as old. They were in good health, felt healthy and found their life to be good. The findings also showed that good health was experienced as a sign to continue with life, to be able to do whatever one wants to do with little or no effort or restriction. As they felt they had a healthy and active life, they did not feel there was a negative association between life and the ageing process.

Even though the participants were generally in good health, they associated poor health with being dependent on the support of others for assistance, which they considered as a problem. Some of the participants spoke of experiences where older family members or friends been in need of support and care and their reflections that one day “something” might sooner or

later happen to them. This change was recognised as involving both physical and psychological challenges that could occur rapidly or gradually. Nevertheless, they agreed that it was something they had to face when it happened. The participants expressed colourful views of the healthcare services, pointing out that having a contact was not relevant until their health started to deteriorate. Interaction with the healthcare services was not part of how they perceived “a healthy life”.

The findings also showed that despite being retired from their employment, their professional lives still played an important role as this was still part of how they perceived their identity. Other aspects of their identity were described in their strategies for finding meaning in life. Some say they receive satisfaction from helping others through voluntary work and/or visiting lonely persons or persons in need of practical help and this kind of activity was very significant with regard to their concept of meaningful activity. The contact and interaction with others helped to facilitate positive feelings as well as helping them to reflect on their own responsibilities in their social life.

Social interactions with others created a sense of security and helped them to avoid feelings of loneliness. The findings showed the positive nature of social networks in so far as they helped them to maintain their interests of a social, physical and/or intellectual character. Being part of a network contributed to the sense of belonging. According to the participants, the activity centres provided an important platform for these activities. Living conditions and housing were also of social concern. Some of the participants suggested shared housing for older people as a way of gaining access to facilitates, support, social networks and activities. Others had opted to make changes to their home or had moved to convenient apartments.

The findings also showed that the participants were concerned about how the healthcare services functioned for older people. Their experiences varied, but they were predominately expressed as being negative. One reason for this is the participants’ own experiences of being exposed to inadequate or poor respect as older persons. Some of them explained this as being the result of a gap between the generations, and that the older generation in Norway was raised to be respectful and at hand and not to ask for much, whereas the healthcare services expected everyone to argue for their own rights. Another concern related to the staffing of home care services, which was described as unsettled and unstable as the staff work under pressure in terms of time spent at each person’s home. This insight or belief was given by some as a reason for moving to a nursing home rather than receiving care at home. Others wished to live at home for as long as possible, but only if they were guaranteed high-quality home care. The participants described their own needs for support and said that these mainly

related to physiotherapy, occupational therapy and help adjusting their homes according to their needs.

The findings showed that several participants used Information and Communication Technology (ICT) to get and seek information and to maintain contact with family and friends. However, some of them described a sense of anxiety concerning the increased use of ICT and argued that it might replace human contact and contribute to increased feelings of loneliness. A worrying aspect of the use of ICT was that the community might require all home dwellers to use it in order to be self-reliant.

The overall theme, *So far so good*, suggests that older persons from one western region in Norway want to pursue an independent life for as long as possible, but with the understanding that times will eventually change. To help them maintain important contacts and to seek information, this modern technology (ICT) was used even if some of the participants were reluctant, pointing out the possible risk of human relationships being replaced with technology, leading to feelings of loneliness in the older generation.

6 DISCUSSION

A discussion of the results and methodological considerations of the four studies is presented below.

6.1 DISCUSSION OF RESULTS

The main findings are that a proportion of the sample in the preventive home visits was identified as being at risk of developing illness. This was based on the assessment of four focus areas: malnutrition, falls, polypharmacy and cognitive decline. Poor self-rated health had a negative association with malnutrition, falls and polypharmacy. Factors associated with self-rated health were as follows: limited by disease, pain and use of the internet. Focus groups interviews with older persons living at home revealed that social factors had a positive impact on the older persons' lives, and that they wanted to live their lives as they were and continue to be independent. Below, these results are discussed in light of how a preventive home visit model can, by way of risk assessment and identification of barriers, contribute to maintaining the functional ability that enables a person to contribute and be part of the community. Also, the perspective of older home-dwelling persons on ageing and the role and relevance of preventive community healthcare services will be discussed.

6.1.1 Risk assessment

From the Healthy ageing concept it is good to get old. Nevertheless, it must be recognised that older people will experience a reduced capacity to fulfil the roles they have previously had in their lives. According to the healthy ageing theory, a decrease in intrinsic capacity is influenced by trajectories such as risk behaviours and age-related risks (Beard et al., 2016). In this preventive home visit model, there were four focal areas where risk assessments were performed: falls, malnutrition, polypharmacy and cognitive impairment. These are common risk factors among older people that can negatively affect their health (Hartholt et al., 2019; Little, 2018; Pinto et al., 2014). These risks also have a negative synergic effect on each other (Little, 2018; Pinto et al., 2014). In Study II, it was found that 13% of the older persons receiving a preventive home visit were at risk of falls, 12% were at risk of malnutrition, 34% had polypharmacy and 28% were at risk of cognitive impairment. The prevalences in Study II were similar to those of previous studies (Fonad et al., 2015) with regard to malnutrition (Westergren et al., 2015; Win et al., 2017) and polypharmacy (Machón et al., 2016). These risks have both physical and mental components and may have a negative impact on the individual's intrinsic capacity. By identifying risk at an early stage, persons with high capacity and good health may have a better chance of maintaining higher capacity.

Correspondingly, early risk detection in an individual with decreasing capacity may enable them to reverse or slow their declining capacity (Beard et al., 2016; Cesari et al., 2018). In Study II, 65% of the sample rated their health as good, even if several had identified risks. Of those persons that rated their health as good, 6% were at risk of malnutrition, 4% at risk of falls, 24% had polypharmacy and 26% were at risk of cognitive impairment (data not shown.) This indicates that all of the persons, even if they rated their health as good, could benefit from risk assessment, suggesting that assessment of falls, malnutrition, polypharmacy and cognitive impairment should be part of the content of preventive home visits.

Furthermore, in Study I, 21% of the individuals were identified as being at risk of developing illness, as assessed through the use of a risk assessment tool. In addition to the aforementioned four focal areas, the tool also assessed psychosocial factors, vitality, vision, hearing and pain. The assessment tool applied during the preventive home visits is comparable to the International Classification of Function, Disability and Health's five domains that are important to identify and assess in order to capture an individual's intrinsic capacity. These domains are cognition (i.e. memory), psychological (i.e. social interactions and depressive symptoms), sensory function (i.e. vision, hearing and pain), vitality (i.e. nutrition status, Body Mass Index, circulation) and locomotion (balance) assessment (Cesari et al., 2018; World Health Organization, 2007). This indicates that those older individuals identified by the risk assessment tool as being at risk of developing illness may have had decreasing intrinsic capacity. Factors associated with developing illness were feeling depressed, low level of social support, sleeping problems and poor perceived health (Study II), which are factors known to have a negative impact on health (Becker et al., 2017; Wang et al., 2018). Interestingly, there was no association between risk of developing illness and the lifestyle factors exercise and smoking. A possible explanation may be the relatively limited sample size, resulting in a small sample of smokers (16%). The group that seldom exercised in fact exercised three times per week or less, which means that the persons identified as seldom exercising may be relatively active. Nevertheless, to maintain high and stable capacity, exercise and abstaining from smoking are important and highly recommended behaviours (Abe et al., 2020).

6.1.2 Identification of barriers

Functional ability is defined by WHO as the combination and interaction of intrinsic capacity with the environment a person inhabits (Cesari et al., 2018; World Health Organization, 2015). An older person's level of functional ability determines whether they are able to do the things they value. Functional ability is considered as a complementary factor in the older

person achieving healthy ageing (Beard et al., 2016). It is therefore of interest to examine factors associated with conditions that may have a negative impact on an older person's functional ability to do the things they value. Study II examines factors associated with different kinds of risk. The main finding was that poor self-rated health was associated with risk of falls, malnutrition, polypharmacy and development of illness. Self-rated health is a comprehensive assessment tool. It takes a holistic approach to assess subjective factors related to an individual's medical, socioeconomic, relational and emotional status (Jylhä, 2009; Waller et al., 2016). Since poor self-rated health in Study II was shown to be associated with several risks (falls, malnutrition and polypharmacy), Study III explored factors associated with self-rated health more extensively. The variable of being limited by disease was highly associated with poor self-rated health. In addition, pain was also negatively associated with poor self-rated health. Others have also found that pain is associated with poor self-rated health among older people living at home (Chireh & D'Arcy, 2018). Pain is also viewed as a limitation that negatively affects everyday life (Larsson et al., 2017). The variable of being limited by disease captures not only functional limitation but also the person's experience of being restricted and affected in everyday life from perspectives other than physical function. Findings from Study IV show that the older persons emphasised wanting to live their life as it was, that they appreciated being physically and mentally active and that age- and disease-related limitations were a potential threat in their lives. Another interview study has had similar findings in respect of the older persons feeling restricted by their diseases as they had an impact on what kinds of activities they could participate in and they felt isolated and lonely (Eckerblad et al., 2015). It is interesting to note that having a medical diagnosis was not associated with self-rated health. Older persons' focus on health has more to do with how to maintain everyday life and what hinders them in doing what they want than with medical diagnoses (Galenkamp et al., 2012; Nosraty et al., 2019).

The older persons who felt limited by disease may also suffer from several symptoms that it is possible to act upon. In Study III, 45% of the sample had pain and 29% had sleep problems. Other common symptoms in frail older home-dwellers include dry mouth, numbness and lack of energy, which may have an impact on their self-rated health (Eckerblad et al., 2015) and lead to limitations in life. The older persons' health literacy could have an influence on these limitations and thus also on their ability to manage challenges related to disease or age-related conditions (Dufour et al., 2019; Geboers et al., 2016). Health literacy is related to a person's competence and capacity to obtain, interpret, understand and use basic health information and services to enhance health (Sørensen et al., 2012). Since 2016, health literacy has been considered as a determinant of health (Duplaga, 2020). A low level of health

literacy is more common among the older population than the younger population (Chesser et al., 2016) and is associated with lower quality of life (Panagioti et al., 2018). Being limited by disease could be a consequence of the older person not being able to handle the challenges on their own or not utilising external resources. An optimal trajectory is for intrinsic capacity to remain high until the end of life. What is more likely, however, is a sequence of events that causes a fall in intrinsic capacity, which in turn may lead to recovery or a further decline in intrinsic capacity (World Health Organization, 2016). Focusing on the older person's health literacy may encourage better coping with chronic diseases and conditions (Dufour et al., 2019; Mackey et al., 2016), regardless of the degree of capacity of the older person. Hence, increasing health literacy may interrupt the trajectory of intrinsic capacity and thereby prevent or delay pre-frailty or frailty (Elliot et al., 2018). Health literacy is increasingly given emphasis and there are many research projects around the world which seek to increase awareness among healthcare professionals of the importance of health literacy (Organizational Health Literacy 2019). The important role of health literacy in the management of challenges suggests that it should be taken into account when performing preventive home visits. Increasing the individual's health literacy may improve their functional ability and increase the likelihood of the older person being able to participate in the community.

6.1.3 The importance of being a part of the community

The findings from Study IV show that older persons expressed that their health was good was an indicator of a good old age and of not feeling old and enabled them to live the life they wanted and valued. These findings are supported by Nivestam, Petersson, et al. (2020), who show that feeling valuable and participating in social activities are associated with good self-rated health. A person can maintain or increase their functional ability if they are in an age-friendly environment. Age-friendly environments are being designed to enable older people to retain their autonomy and health and offer activities that enable them to retain their identity and interests. Housing, access to information, communication and technology (ICT) and social networks are essential elements of age-friendly environments (World Health Organization, 2016). In Study IV, the participants expressed that having a social network and participating in activities were important for facilitating a feeling of security, reduced loneliness and maintaining good health. For many of the participants, a sense of belonging with other people was vital. "Belonging" was described in several ways by the participants: as feeling included and useful in the community, as having an activity to do, as meaning something to others and being engaged in volunteer work. All of these activities provided life

with structure. This is comparable to having a purpose in life that bolsters psychological growth and which is associated with a reduced risk of adverse outcomes (Cohen et al., 2016). The importance of social networks and activities was also pronounced in Study II, where the results indicated that there is a lack of social support and few external activities were associated with a risk of falls, malnutrition, cognitive impairment and development of illness. These findings are in line with previous research where social factors have been associated with survival among older persons (Rizzuto & Fratiglioni, 2014; Sakurai et al., 2019). Also, loneliness, which can be a consequence of a lack of social support and few external activities, has been identified as a strong predictor of a higher risk of mortality among older adults (Teguo et al., 2016).

Preventive home visits are offered to older people living at home. The reasoning for this can be found in the health economics policy in Norway, and many other western countries, in recent decades. The rationale behind the political goal – that everyone should live in their own home for as long as possible – is that everyone wants to continue to live at home (Daatland et al., 2012). However, in Study IV, the participants expressed that they wanted shared housing with the opportunity to participate in activities and be social, have someone to share meals with and thus avoid loneliness. Research shows that many older people, even at an advanced age, want to leave their residence and move to an apartment or care apartment with good facilities that can contribute to their social life and security (Munkejord et al., 2018; Perry, 2014). The assumption that all older people want to continue to be home-dwelling is a critical factor in preventive home visits and other interventions designed to contribute to older people staying at home for as long as possible. The one-sided focus on keeping older people at home may appear fragmented in contrast to a holistic approach. Home dwelling may lead to isolation and loneliness, and in many cases older people with decreased functional ability who are living at home need assistance to fulfil their social desires and to participate in the activities that they appreciate. In Study IV, the participants expressed that being dependent meant that an individual needed help to maintain their social life and the opportunity to participate in activities with others.

In Study IV, some of the participants said that the increasing use of ICT discriminated against them and excluded them from the community as they were not ICT users. Others expressed that ICT was important for maintaining contact with family and friends and having access to information. In Study III, use of the internet was positively associated with good self-rated health. This is in agreement with a previous study in which internet use was identified as an important tool for older persons to have contact with others and to perform health-related

tasks, which was shown to be associated with better self-rated health (Choi & DiNitto, 2013). Healthcare services use digitalisation to inform and communicate with older persons for the purpose of offering more effective services (Cumming et al., 2016; Pang et al., 2015). The findings of studies III and IV indicate that it is essential to ask, and also inform and motivate about the use of digital tools during preventive home visits. Increasing use of internet among older adults can improve access to health information and management of health (Arcury et al., 2018; Delello & McWhorter, 2017), but practice is essential. In the ICT world, the continuous development of both software and hardware, force people to learn new things to be able to make use of the technology. This may be challenging for older people, especially as increasing age is associated with lower understanding of ICT tools and use of ICT (Olsson et al., 2019), and is referred as digital health literacy (Dunn & Hazzard, 2019). Digital health literacy is an extension of health literacy, but in the context of use of technology. It means that use of technology in purpose to navigating in the healthcare system, communications with healthcare providers and make favourable shared health decisions, technological competence and skill should be build (Dunn & Hazzard, 2019). A study showed that four two-hours sessions improved the ICT skills of older people and led to changes in health-related attitudes and behaviours (Xie, 2011). A challenge in using digitalisation in communication is the digital exclusion of older people (Olsson et al., 2019). This has become particularly relevant during the Covid-19 pandemic, both because part of the follow-up by the health service is performed digitally and because social isolation among older persons who do not use ICT becomes even more marked (Seifert et al., 2020).

6.1.4 The older person's perspective on healthcare services

Maintaining functional ability consists in part of having access to targeted healthcare services when needed. This means that the services meet the needs of the older persons, which is in agreement with their perception of life. The results of Study I show that the main reason for declining a preventive home visit was that the older person felt that they were in good health. This finding is supported by the findings in Study IV, where the participants did not place emphasis on services from the municipality or healthcare services when they were healthy. Study IV also found that the older persons live their life as it comes, although there was recognition that some kind of age-related changes would most likely occur. Until “something” happened, they wanted to live independently and face any potential problems and challenges as they occurred. This finding is similar to that in Lette et al. (2017), who found that older people tend to respect initiatives by healthcare professionals only if their circumstances are changing, whereas professionals like to raise awareness of potential

problems or risks at retirement age. Lette et al. (2017) also found that older persons found it impossible to imagine the challenges that the future might bring (Lette et al., 2017). One of the basic principles for supporting the individual's ability to be resilient is autonomy. The participants in Study IV emphasised that being able to live the life they wanted and be social and independent was important in order for them to retain their autonomy and integrity. A qualitative interview study found that if information about or an invitation to potential participants in prevention models refers to ageing, the older persons are ambivalent to participate (Patzelt et al., 2016). Focusing on age in an invitation may lead to thoughts about being in a phase of life associated with events that may affect their life and health negatively. In Study IV, the participants did not include the healthcare services in their lives as these were associated only with disease or dependence. This was also found in a study by Marcus-Varwijk et al. (2016), where older people felt no need or wish to talk about healthy living with healthcare professionals and wanted to be self-sufficient and find solutions themselves (Marcus-Varwijk et al., 2016).

Some people felt that being labelled as at risk was a threat to their integrity and autonomy, because it was associated with surveillance, restriction of freedom and alterations to social and physical environments (Patzelt et al., 2016). From this perspective there is a tension between the professionals wanting to avoid harm and the older persons' wishing to retain their autonomy (Clarke et al., 2016). In Study II, 64% of the participants took the Mini-Cog test, which is an instrument to detect cognitive impairment. The test has a screening question: Do you find that your memory is impaired? It is possible that some people may have avoided answering "yes", even if this was the case, in fear of the possible consequences. Some older people may view cognitive impairment as something private, uncontrollable and taboo, whereas healthcare professionals want to detect cognitive decline as early as possible (Lette et al., 2017). Awareness and early diagnosis of cognitive decline can have a positive effect on older people's autonomy, as this enables them to be involved in the planning of their future care (van den Dungen et al., 2014). Early detection of cognitive impairment depends on how healthcare professionals communicate and motivate a person during preventive home visits. Trust and information, in order to achieve goal-concordant communication, are essential to a diagnosis of great importance in one's life and health (Sanders et al., 2018).

In the present studies (I, III and III), there is data from municipalities of different sizes. In the smallest municipality, the promotion of the study was influenced to a greater extent by the informal involvement of professionals. These persons were well known in the municipality among the older persons, had been healthcare providers to the population for many years and

were the providers of the preventive home visits. Some of the participants in the small municipality may therefore have felt obligated to participate. This is supported by the greater response rate in the small municipality. Another possibility is that they felt more informed about, consulted with and involved in the project because they could talk about the project with professionals they knew, and they felt that this project is “for me”. From a public health point of view, information, consultation and involvement are important principles for getting older people engaged in interventions (Rémillard-Boilard et al., 2017). This highlights the importance of the engagement of the older population and the involvement of their perspective. Such involvement may be easier in small communities.

6.1.5 Support of healthy ageing

The maintenance or restoration of intrinsic capacity and functional ability for the purpose of achieving healthy ageing is conditioned by several factors and is also influenced by older people themselves and by their environment. In this thesis, several factors with an impact on intrinsic capacity and functional ability have been shown to be associated with poor self-rated health. This suggests that the subjective evaluation self-rated health may be able to serve as a foundation for further elaboration of the elements of self-rated health (medical, socioeconomic, relational and emotional) by way of dialogue focusing on the individual’s perception and situation.

Person-centred care aims to bring out the person’s perception and opinion of a situation, and it is essential in dealing with the diversity among older persons and to enhance individual healthy ageing. The purpose is to make changes or create initiatives around the older person that contribute to maintaining or restoring functional ability (Brummel-Smith et al., 2016). From a healthy ageing perspective, the restoration of functional ability is considered as resilience. In person-centred care, it is possible to capture the underlying causes of poor self-rated health, thereby making it possible to have dialogue on the changes that could address the challenges within an individual’s premises, with the aim of avoiding dependence and maintaining autonomy (Marcus-Varwijk et al., 2019). If a person rates themselves as being in good health, it may be helpful for the older person to discuss how to maintain the factors that contribute to good health. In addition, collaborative dialogue between the individual and the healthcare professionals may improve the older person’s health literacy and enable them to manage and use health information (De Wit et al., 2018). According to Beard et al. (2016), it is important for persons with declining capacity to manage the underlining causes of declines in capacity and thereby increase the possibility of building up their capacity and doing the things they value.

As regards the focus areas – fall, malnutrition, polypharmacy and cognitive impairment – it seem appropriate to assess these during the preventive home visits (Study II). Focusing on these areas is also in line with WHO's guidelines for managing declines in intrinsic capacity and producing a synergistic effect on the intrinsic capacity and functional abilities of the older person (World Health Organization, 2017). In addition, WHO's Integrated Care for Older People guidelines also recommend focusing on symptoms of depression (World Health Organization, 2017). In the preventive home visit model presented in this thesis, depressive symptoms were assessed using the Positive Life Orientation Scale, which is a dichotomised assessment tool (Study I). Depression and depressive symptoms are increasing in Norway (Norwegian Institute of Public Health, 2018), so future studies should use instruments or questions that are based on continuous scales that can assess depressive symptoms to a greater extent (Streiner et al., 2015). The WHO guidelines also emphasise the assessment of vision impairment. In Studies II and III, there was no association between reduced vision and the different kinds of risk and self-rated health. This may be explained by good financial systems and that several older people also have good financial resources, which enables the treatment of e.g. cataracts and good assistive aids.

In this preventive home visit model everyone who was 77 years of age was included, regardless of whether the participant were receiving healthcare services. Chronological age is not the best criterion for preventive home visits, as it is not necessarily an indicator for functional decline (Beard et al., 2016; Fabbri et al., 2015). The participants in the project expressed that they felt preventive home visits or other preventive initiatives were irrelevant if they felt healthy (Studies I and IV). An alternative strategy may be to explore the situation of the individual by way of screening questions, such as self-rated health, and thereafter to adapt the strategy for further individual follow-up.

The preventive home visit model offered only one visit. Follow-up visits are recommended in order to maintain intrinsic capacity and functional ability and to delay or reduce the likelihood of admission into nursing home (Beard et al., 2016; Luker et al., 2019). However, follow up visits may depend on the purpose of the preventive home visits. Some visits were meant to provide information about services in the municipalities and other relevant offers and activities; here an age-specific inclusion seems reasonable. The medium-sized municipality in this project annually holds a public information meeting to which it invites all 75-year-old inhabitants. The meeting programme consists of information about the municipality's services and activities for older people. This is in accordance with the findings of Study IV, where the participants expressed a need for information on services.

Furthermore, social factors are important for healthy ageing (Study IV). This suggests that it is essential to identify social support, networks and interests during preventive home visits. The purpose of this is to recognise the obstacle(s) to the person's social life and facilitate an increased social life, if so desired. Findings from Studies III and IV show that a rich social life, social support, activities and use of ICT had a positive impact on the older persons' lives. These factors may also contribute to health promotion at a societal level and the development of an age-friendly society (Nivestam, Westergren, et al., 2020). Age-friendly environments are a cross-sectorial collaboration between official and private sectors and are influenced by government agencies and thus subject to requirements, political regulations and financial allocation, which affects offers and facilities adapted to the older persons (Warth, 2016). It is therefore important to attain a common understanding of the function and value of age-friendly environments (Davern et al., 2020; World Health Organization, 2020). The third sector, including non-profit organisations, foundations and voluntary work, is of great importance when it comes to the social challenges faced by the ageing population. The facilitation of voluntary work and volunteer organisations contributes to positive effects for both those who need social support and those who are involved in the voluntary work (Addicott, 2017). Volunteers and patient organisations are considered to be important in people better managing challenges with chronic disease or other life challenges, because their efforts are thought to be more customised (Adsul et al., 2017).

6.2 METHODOLOGICAL CONSIDERATIONS

This PhD project consists of four studies. Both quantitative and qualitative data collection methods were used to answer the overall aim of this thesis. Each methodological approach has its strengths and limitations that influence the results. This section discusses the internal and external validity of the quantitative studies and the trustworthiness of the qualitative study.

6.2.1 The validity of the quantitative studies

Internal validity relates to the validity of the results for the sample and how the data has been measured. External validity relates to whether the results can be transferred to the general population and to other situations.

6.2.2 Study design

In studies I to III, a cross-sectional study design was used. This study design is appropriate for describing the status of phenomena at a particular point in time (Campbell et al., 2010; Polit & Beck, 2017). As the aims of studies II and III were to explore associations between dependent variables (risks and self-rated health) and independent variables, data was

collected on demographics, health conditions, lifestyles and medical diagnoses. A limitation of the cross-sectional study design is that it cannot evaluate effects or examine the direction of associations (Kesmodel, 2018). As a consequence, in studies II and III the results of the regression analyses show only associations between the dependent variables (risks and self-rated health) and the selected variables and not the direction, e.g. whether malnutrition was caused by poor self-rated health or the opposite. To examine the direction of an association or examine the effect of an intervention, a longitudinal study design would have been more appropriate, but such a study design is more resource- and time-consuming, and it was therefore not possible to use such a design for this project. The advantage of a cross-sectional study design is that it is suitable for examining the prevalence of disease or behaviours in a population (Sedgwick, 2014). Part of the aim of this project was to identify factors that had associations with older people's health and life, and thereby identify factors that may contribute to an increased level of knowledge about the lives of older people, even if the causal relationships are unknown.

6.2.3 Setting and sample

All 19 municipalities were invited to participate in the project, but only three accepted the invitation. This number represents a small sample of the total numbers of municipalities as regards representativity. However, these three municipalities had characteristics that represent the area of the 19 municipalities: urban (large-sized), rural (medium-sized) and small rural (small-sized) and are non-neighbourhood.

In Studies I and II, the participants were recruited from the large and small municipalities. In total, 166 persons accepted the invitation (response rate of 60%). In Study III, the medium-sized municipality was also included, and for that reason the total sample size increased to 233 persons (response rate of 62%). This sample size may still be regarded as small, which challenges the external validity, but more than 60% of the eligible population participated, which is acceptable in order for a cross-sectional study to generalise (Polit & Beck, 2008). Many of the results of the study, such as those related to falls, malnutrition, polypharmacy and cognitive impairment, are comparable with other studies, which strengthens the validity.

6.2.4 Data collection: instruments and data collection procedures

A weakness in Study I was the lack of spokespersons representing the older population in the project and the reference group. This may have had an impact on the number of participants in the study, particularly in the large-sized municipality (49% of eligible in the large vs 71% in the small municipality). The relatively high response rate in the small

municipality may relate to formal and informal relationships and the knowledge the healthcare professionals had of the population, which is discussed in the results discussion.

A strength of Studies I, II and III is the use of several validated tests, such as the BBS, MNA, Mini-Cog and SF-1. The SF-1 was used in both Studies II and III. The Berg Balance Scale (BBS) was used in a short form (items 1, 6 and 9). This may reduce the validity of the instruments, and persons at risk of falls may not be detected because the instrument was not used a whole. The BBS scale in its entirety is extensive, as well as time-consuming to use. The chosen items (1,6 and 9), which include sitting from standing, sitting with the back unsupported but feet supported on the floor or on a stool and picking an object up from the floor from a standing position, are representative of the activities of older people living at home.

The risk assessment tool (risk of developing illness) builds on 12 comprehensive areas in an older person's health. After the risk assessment tool was developed, WHO published recommendations for improving older persons' chances of ageing healthily (World Health Organization, 2015, 2017). The 12 areas in the risk assessment tool are both comparable with and partly equal to the recommendations by WHO. It must be strongly emphasised that the instrument has not been psychometrically evaluated. The cut-off for both sub-scales and risk levels were set by an experienced geriatrician based on clinical experience.

In Study III, when the medium-sized municipality was included, part of the data collection procedure was changed. Instead of the nurses collecting all the data by using the interview guide during the visit, some of the questions were sent by post in advance to the older person so that they could answer those questions themselves. These questions related to demographic data and the OSLO-3 SSS (social support). One disadvantage of self-reporting was that if the persons did not understand the questions, their answers were based on a misunderstanding (Polit & Beck, 2017). The questions in the OSLO-3 SSS are concrete and easy and the older person had the opportunity to ask the nurse who performed the visits about the self-reported questionnaire and thereby reduce the risk of misinterpreting the questions.

6.2.5 Data analysis

A strength of the studies I -III was that little data was missing from the data set. There was some data missing for the variables vision (39%) and limited by disease (15%) (Study III). An explanation for the data missing for limited by disease may be that the persons had no limitations and the questions were irrelevant. In Study III, the results showed that the selected medical diagnoses were not associated with the different kinds of risk or with self-

rated health. In this case, if a person with missing data gave the variable limited by disease a rating of “not at all”, this strengthens the association with self-rated health. Those participants with no reported medical diagnoses were thus excluded from the question “Does the disease affect you in everyday life?” With regard to vision, in the medium-sized municipality, which was included several years after the other two municipalities (Study III), the response options to the question about vision were changed from the responses possible for “How do you describe your vision?” to those for the Downton fall risk index. A possible explanation for the data missing from the Downton fall risk index may be that the question before it related to balance problems and falls, and Downton may have seemed irrelevant if the older persons had given answers that do not indicate a risk of falling. By missing data, especially where this was missing not at random (MNAR) (Leurent et al., 2018) as is the case here, the calculation basis is smaller and the confidence interval wider, which weakens internal validity and thereby external validity (Campbell et al., 2010).

Due to the small sample sizes in Studies II and III, it was not possible to include all of the independent variables in the regression models. There is a restriction on the number of variables that can be included. A rule of thumb is that 20 respondents constitute an adequate sample size for each independent variable (Ogundimu et al., 2016). In Study II, there was a limit to how many independent variables could be included in the analysis and therefore in this study univariate analyses were used as the first step in identifying independent variables with a stronger/significant association with the dependent variable. A weakness is that even if a variable is not significant in univariate analysis, it may still have a significant association in the multivariate regression model.

To examine the associations between the dependent and independent variables, in Study II logistic regression was used because the dependent variables were skewed. In logistic regression analysis, only a dichotomous dependent variable is used (Campbell et al., 2010). A weakness of using a dichotomised dependent variable is that information about the score level was lost. An accurate score could have provided information about whether the association with the independent variable was low or high within the risk area score. Most of the independent variables were dichotomised also because of the variable measurement level (ordinal). However, some variables, such as the variable for exercise, was dichotomised as “often” (daily/4–6 times a week) and “seldom” (1–3 times a week/1–3 times a month/rarely). The external activities variable was divided into “often” (several times a day, daily, 4–6 times a week) “few” (rare, 1–3 times a week) and were more differentiated than as presented in Study II. The responses few external activities and

“seldom” for exercise were used in respect of a large range of activities that were valuable to know about, because these factors have a known positive impact on health (ref).

Furthermore, a weakness in Study II is that variables included in the risk assessment tool (the dependent variables) were also included as independent variables. These variables were the risk of malnutrition, falls, polypharmacy and cognitive decline, as well as social support and self-rated health. If a variable is included among both the independent and dependent variables, it is natural to identify significant associations between the variables. The risk assessment tool is an instrument that should capture factors that have been assessed during preventive home visits, so these significant associations may indicate that the instrument has captured this. A strength of the risk assessment tool is the interrater reliability test, which shows a high correlation between the nurses’ assessments of risk levels (Study I).

In Study III, linear regression analysis was used. By using linear blockwise regression, multivariate regression of each block was performed. This provides greater insight into some of the factors that have an impact on each other. This is a stepwise selection of variables in small sample sizes, which reduces the number of erroneously excluded or included variables in the final model (Olden & Jackson, 2000).

6.2.6 Trustworthiness of the qualitative study

The focus in Study IV was on older persons’ views of how older persons perceived their life, the ageing process and the need for healthcare and societal support.

Qualitative research often poses the question of how to establish trust or confidence in the results, which refers to all parts of the study, so that others feel safe in acting upon them (Lincoln & Guba, 1985). Graneheim et al. (2004) propose that at the heart of trustworthiness is the author’s responsibility for how the research process and the results are described. The author’s accuracy in reporting the whole research process is described as helping the reader to judge the study’s trustworthiness. Graneheim et al. (2017) suggest that the concept of trustworthiness as it pertains to content analysis has its place within the hermeneutic paradigm and as such should be judged as suggested by Lincoln and Guba (1985). Lincoln and Guba’s (1985) suggestion that trustworthiness relates to credibility, dependability and transferability will be discussed below.

6.2.7 Credibility

The concept of credibility refers to the process of conducting a study so as to enhance trust in its interpretations and findings and also relates to the decisions on the focus of the study, its context, its participants and the gathering of data (Graneheim & Lundman, 2004;

Lincoln & Guba, 1985; Polit & Beck, 2017). As this study focused on old persons' experience of ageing, focus groups were chosen for the purpose of data collection (Krueger, 2014). Focus groups were used so as to facilitate a varied and dynamic discussion among the older persons and so that they could share their experiences of growing old. Focus group discussions have been described as a helpful way of accumulating meaning and understanding that can be added to already existing knowledge. In the present study, the purpose was to gain a deeper understanding of the concept of growing old by adding "why" and "how" questions (Morgan, 1997; Patton, 2015; Polit & Beck, 2017).

Another group interview method that could have been considered for this study is nominal group methodology. This technique is described by Allen et al. (2004) as being predominately suited to research using purposeful sampling and data collection from different sources such as patients, relatives and staff. This method is described as being highly controlled by a moderator and difficult for dominant participants to control. The method also requires extensive organisation and is considered time-consuming for participants (McMillan et al., 2014; Williams et al., 2006). The structure of nominal group technique includes various phases such as repeated surveys and the development of instruments or questionnaires to gain information regarding the participant's views, thoughts and ideas for discussion within the group. Another option was individual interviews. This, however, was not considered, as the aim of the study was to investigate how old persons viewed ageing in general and their own specific, illuminating feelings and opinions about growing old. The characteristics of focus group discussions are described by Morgan (1997) as the explicit use of the group interaction to gain data and insight into what would be less accessible without the group interaction.

Study IV was intended to supplement Studies I to III by voicing older persons' experiences of different aspects of ageing. Following discussions with supervisors, older persons (Studies I to III) and healthcare professionals' purpose and focus for Study IV emerged. An interview guide was created on the basis of research literature that covered the study objectives. To validate the questions in the questionnaire, the interview guide was tested by three academically employed nurses with long clinical experience and qualitative research experience. In future studies, persons from the target group should also validate the questions.

The participants in this study were selected from two municipalities by way of an exploratory design and purposeful convenience sampling. The older persons from previously established groups at the municipalities' activity centres were approached. In all, 34 persons agreed to participate. The inclusion criteria were that the individuals be retired

and residing in their own home and that they understand Norwegian. The exclusion criterion was cognitive impairment that affected their ability to understand the purpose of the questions. These criteria were important in respect of enabling a discussion about experiences of ageing and everybody understanding the questions.

Convenience sampling in qualitative studies has been criticised by Patton (2015), as he suggests that the researcher consciously directs and selects participants who are available for the study and that this might affect data. However, Malterud (2012) and Polit and Beck (2017) suggest that there are advantages to using convenience sampling, as participants who are willing to share their experiences participate, which enriches the data material (Polit & Beck, 2017). Study IV sought to investigate older persons' experience of and views on ageing and the need for healthcare and support. The data collection occurred in two specific municipalities and activity venues for older persons, suggesting that purposeful convenience sampling was appropriate for Study IV. The findings suggest that the importance to the participants of being in a social context may be explained by the fact that they were recruited from social settings and already positively disposed towards the activities.

There were 34 participants older than 65 years of age in Study IV. In qualitative research, sample size is guided by the richness of the data collected rather than numbers of participants; the aim is not to generalise the results (Patton, 2015; Polit & Beck, 2017). The data collected in Study IV was rich and offered broad information about the participants' experience of ageing (Malterud et al., 2016), which confirms that the size of the sample was satisfactory for the purposes of the study.

In all, seven focus groups were established. The group members were homogenous, because they have experience of old age in common, which was fundamental to stimulating discussion (Krueger, 2014). The heterogeneity in age of the groups can be seen as a strength of the study as most likely it contributed to the diverse discussions and reflections among the participants as to how they perceived the ageing process (Krueger, 2014; Morgan & Bottorff, 2010). The number of participants in the groups varied between three and seven; for focus groups the suggested number of participants is between five and twelve (Polit & Beck, 2017). Having few participants in a group is described as limiting the dynamic process during discussions. A limitation of Study IV is the small number of men participating as compared to women. However, this may reflect that the ageing population in Norway, as in other developed countries (Kontis et al., 2017), is dominated by women as

they have a longer life expectancy than men. In Norway, life expectancy is 84 years for women and 80 years for men (Statistics Norway, 2020).

A manifest approach means that the categories and theme are characterised by concrete and phenomenological analysis levels (Graneheim et al., 2017). Nevertheless, there is always some degree of interpretation in the analysis process; the researcher's preunderstanding affects the result of the analysis and thus requires a balancing act from researchers (Graneheim & Lundman, 2004). As a result of my clinical background, nursing perspective and education in health communication, my preunderstanding is that healthcare services often do not act or inform patients or users in an appropriate way that meets their prerequisites. This preunderstanding has been reinforced by new knowledge that I acquired by reading the research literature on interventions regarding older persons, as well as by the results of Studies I to III with regard to older persons being too healthy in order to participate in preventive home visits and the subjective impact of poor self-rated health and the variable of being limited by disease. My preunderstanding was a strength in gaining a deeper understanding of the participants' understanding of and views on ageing and their needs with regard to the fulfilment of their prerequisites. My preunderstanding may also be a limitation, as it may steer my interpretation and findings may remain undiscovered.

An inductive analysis approach is characterised by a search for patterns that can be sorted into categories (Krippendorff, 2013; Patton, 2015). These categories should then be judged by their internal homogeneity and external heterogeneity (Patton, 2015). Internal homogeneity relates to the data belonging to the categories in a meaningful way. As an example of internal homogeneity, the category "dealing with challenges" includes data relating to "feel the age", "something will happen", "take initiative in social relationships" and "adapting to change". External heterogeneity is concerned with the differences between categories, which means that there is not large overlap or unassignable data items.

6.2.8 Dependability and confirmability

Dependability relates to instability and whether data changes, as well as decisions made during the analysis process. The consistency of data and a study's findings are understood as confirmability (Graneheim & Lundman, 2004; Lincoln & Guba, 1985). I had had no experience with focus groups interviews and therefore after each interview I had a debriefing with the experienced moderator regarding the moderating of the focus groups, which should strengthen the dependability.

A strength was that I was involved in all parts of the study: design, recruitment, data collection, the analysis process and understanding the study as a whole. The data was

collected in the period from 12 February to 12 March 2018. To strengthen dependability, the same interview guide was used in each interview. For each question the moderator solicited every participant to speak, which is important for data quality (Krueger, 2014). The participants were encouraged to tell their version of their experience, even though the statements were very similar to each other (Morgan & Bottorff, 2010). According to Polit and Beck (2014), every single statement enriches the data material. It was also important to emphasise that even though it was a group, it was the individual's voice and thoughts that counted, not what "the group" thought (Morgan & Bottorff, 2010; Polit & Beck, 2017). After each question was answered, the researcher made a summary of what had been said and the participants could make corrections. Polit (2014) labelled this as member checking; it should occur in situ and thus strengthen the trustworthiness of the study and its informative power (Malterud et al., 2016).

An underlying assumption of the analysis is that a text can be read from several perspectives and it is not necessary for it to possess only one meaning (Krippendorff, 2013). To strengthen confirmability, the analysis was conducted by myself first. Then the categorised data was discussed and evaluated with my supervisors in an effort to achieve internal homogeneity and external heterogeneity. Agreement on data included involved meaning units, condensations and abstractions being discussed with my supervisors. The process of analysis evolving from meaning units to categories was illustrated in a table and representative quotes from the text that describe the categories were presented.

6.2.9 Transferability

Transferability refers to how the findings of the study can be transferred to other groups and settings. Transferability differs from generalisability in that it is the readers who judge whether the findings are transferable (Graneheim & Lundman, 2004). To make this judgement, the researchers openly present the necessary information on the context, sample and analysis process. In Study IV, the context and the sample were well described, as were the analysis process and the quotations from participants. Older persons' experience of healthy ageing and their opinion on healthcare services are of worldwide concern and are a focus area for WHO, me and the supervisor suggest that the findings are relevant to the development of the environment for the ageing and to healthcare intervention for older persons.

7 CONCLUSIONS AND IMPLICATIONS FOR PRACTICE

Findings from the overall study support the relevance of the focus areas in the WHO guidelines (falls, nutrition, polypharmacy and cognitive impairment) to risk assessments in preventive home visits. Self-rated health was associated with risk of falls, malnutrition, polypharmacy and being limited by disease and use of the internet. Therefore, self-rated health is suggested as the starting point in a personalised conversation on the positive and negative factors in an older person's life. By focusing on self-rated health, these focus areas support the management of the limitations experienced as a result of disease and the challenges in everyday life, which may strengthen the older person's functional ability and their opportunity to age healthily. The findings from the focus group interviews showed that social networks and activities are important for older persons to be able to maintain a good life and age well. Therefore, it is suggested that social needs and the ability to meet these needs are identified during preventive home visits.

8 FUTURE RESEARCH

The results of this work suggest that older persons who rate their health as poor should be offered a preventive home visit. Therefore, future research should examine the use of self-rated health, perhaps as an initial digital screening question, to identify who should be offered preventive home visits. Furthermore, persons who rate their health as poor may be more likely to find preventive home visits to be relevant. From a financial perspective, the better targeting of individuals for preventive home visits would also be more resource-efficient. .

Health literacy is a health determinant that may have an impact on the outcome of preventive home visits. Future studies should focus on older persons' health literacy and digital health literacy and on the healthcare professionals' communications skills, the purpose being to enable older people to understand and use information in ways that reduce limitations in life and promote and maintain good health.

With regard to WHO's guidelines for integrated care for older people, these include the detection of depressive symptoms for the purpose of improving intrinsic capacity and functional ability. Future research on preventive home visits should include a greater focus on depressive symptoms than in the preventive home visit model of this project.

Social arenas are important for older persons as older people can use them to seek out health information that they consider to be relevant to them. Studies should explore the opinions and learning outcomes of meetings in such social arenas.

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