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Paper 2	Vestøl I., Debesay, J., Pajalic, Z., Bergland, A. The importance of a good therapeutic alliance in promoting exercise motivation in a group of older Norwegians in the subacute phase of hip fracture; a qualitative study. BMC Geriatrics 20 118 (2020). Doi: https://doi.org/10.1186/s12877-020-01518-7
Paper 3	Vestøl, I., Debesay, J., Bergland, A. Mobility—A Bridge to Sense of Coherence in Everyday Life: Older Patients' Experiences of Participation in an Exercise Program During the First 3 Weeks After Hip Fracture Surgery. Qualitative Health Research 2021. 31(10), 1823-1832 Doi: https://doi.org/10.1177%2F10497323211008848
Paper 4	Vestøl, I., Debesay, J., Bergland, A. The journey of recovery after hip-fracture surgery: older people's experiences of recovery through rehabilitation services involving physical activity. Disability and Rehabilitation 2021 Jun 12;1-11 Doi: https://doi.org/10.1080/09638288.2021.1936659

List of abbreviations

ADL Activities of Daily Living
APA Adapted physical activity
AS Anxiety Symptoms
BCT Behaviour Change Technique
BCTT Behaviour Change Technique Taxonomy
GRR General Resistance Resources
GP General Practitioner
IADL Instrumental Activities of Daily Living
HIFE High-Intensity Functional Exercise Program
HRQoL Health Related Quality of Life
MCS-36 Mental component summary, 36 items
MSK Musculoskeletal
MTEI Mid-Term Exercise Intervention (3-4 months)
NCD Non-Communicable Disease
NSD Norwegian Centre for Research Data
OEP Otago Exercise Program
PCS-36 Physical component summary, 36-item
PA Physical Activity
PADL Personal Activities of Daily Living
PRE Progressive Resistance Exercise
PRT Progressive Resistance strength Training
RCT Randomized Controlled Trial
REC Regional Ethics Committee
SA South Asian
SF12 Short Form Health Survey, 12 -items
SF20 Short Form Health Survey, 20 -items
SF36 Short Form Health Survey, 36 -items
SOC Sense of Coherence
SPPB Short Physical Performance Battery
STC Systematic Text Condensation
WHO World Health Organization

List of tables and figure

Definitions of central concepts

Concept	**Definition**
Ageing in place	To remain living at home in the community, with some level of independence (1, p. 133).
Active ageing	The process of optimising opportunities for health, participation, and security in order to enhance the quality of life as people age (2, p. 12).
Balance	The ability to stay upright and steady when stationary and during movement (3, p. 4).
Concept	1: Something conceived in the mind: Thought, notion. 2: An abstract or generic idea generalised from particular instances the basic concepts of psychology the concept of gravity (4).
Coping/to cope	To deal with problems and difficult situations and try to come up with solutions ▪ The trial has been difficult, but I'm learning to *cope*. — often + *with* ▪ You'll just have to *cope with* the situation. ▪ The book is about *coping with* stress. ▪ He says he can no longer *cope with* the demands of the job (4).

Chronic Disease	According to the World Health Organization (5, p. 15), "across the spectrum of non-communicable and communicable diseases, all chronic conditions can be characterised by long duration (of at least three months), waxing and waning symptoms, and often-slow progressions."
Exercise	A subcategory of physical activity that is planned, structured, and repetitive (6, p. 1337).
Experience	An experience refers to a practical contact with and observation of facts as well as an event or occurrence, which leaves an impression on someone (7).
Fall	An unexpected event where the participant comes to rest on the ground, floor, or lower level (8, p. 1).
Fear of falling	Enduring concern about falling which leads to an avoidance of activities even though the individual remains capable of performing them (9).
Frailty	A state of vulnerability to poor resolution of homoeostasis after a stressor event and a consequence of the cumulative decline in many physiological systems during a lifetime (10, p. 752).
Functional mobility	Individuals' ability to move around safely and effectively in their environment; perform basic ambulation; walk for leisure; perform everyday tasks; and participate in work, leisure, and exercise activities (11, p. 1508).
Generalised resistance resources	Any characteristic of the person, the group, or the environment capable of facilitating effective tension management (12, p. 29).
Health care	Efforts made to maintain or restore physical, mental, or emotional well-being, especially by trained and licensed professionals –usually hyphenated when used attributively (health-care professionals) (4). Health care is a single, standalone service (13).
Health-related quality of life	The value assigned to the duration of life modified by the impairments, functional state, perceptions, and social opportunities that are influenced by disease, injury, treatment, or policy (14, p. 1384).
Intervention	Purposeful action by an agent to create change (15, p. 467).
Lifeworld	The world is directly and subjectively experienced in everyday life, as distinguished from the objective physical world of the sciences (16).
Mobility	The ability to independently and safely move from one place to another (17). Mobility activities include transfers (e.g., rising from a chair or getting into bed), walking, or other types of recreational activities, such as dancing or sports (18).
Multicomponent physical activity	Important to improve physical function and decrease the risk of falls or injury from a fall and can be done at home or in a structured group setting. Many studied interventions combine all types of exercise (aerobic, muscle strengthening, and balance training) into a session, which has been shown to be effective (19, p. vii).
Motivation	The forces that initiate, direct, and sustain behaviour (20)

Multimorbidity	The simultaneous occurrence of two or more chronic diseases or medical conditions in the same person (21, p. 223).
Muscular strength	A health related component of physical fitness that relates to the amount of external force that a muscle can exert (22, p. 129).
Older people	Old age cannot be universally defined; however, in most high-income countries, older people are defined as 65+ years (23). Around two-thirds of persons aged 65 years and above are affected by one or several chronic diseases (24).
Phenomenon	To show itself (25) (from Greek)
Physical activity	Bodily movement generated by skeletal muscles that result in energy expenditure (6, p. 1337).
Physical function	The capacity of an individual to carry out physical activities related to daily living (6, p. 1337).
Recovery	A deeply personal, unique process of changing one's attitudes, values, feelings, goals, skills, and/or roles (26, p. 15) or a way of living a satisfying, hopeful and contributing life even with the limitations caused by illness (27, 28).
Sedentary behaviour	Any waking behaviour characterised by an energy expenditure ≤ 1.5 metabolic equivalents, such as sitting, reclining, or lying down (19, p. vii).
Sense of coherence	A global orientation that expresses the extent to which one has a pervasive, enduring though dynamic, feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected (29, p.123).
Stress	A sudden and non-controllable event (29).
Term	A word or expression that has a precise meaning in some uses or is peculiar to a science, art, profession, or subject legal terms expression of a specified kind described in glowing terms (4).
Therapeutic alliance/working alliance	The strong collaborative relationship in the interpersonal processes between a person receiving therapy and another person providing it (30, p. 252).

1. INTRODUCTION

The topic of this Ph.D. project is older people's experiences regarding the impact and meaning of performing physical activity, including exercises as part of an intervention or a health service provided by the municipality during different stages of their recovery processes. The Ph.D. project embraces three different samples of older people, experiencing physical activity or exercise from either a group exercise program, a one-on-one exercise program, or as part of regular rehabilitation services. The project's participants' disabilities or health conditions restricted their freedom concerning safe mobility and had ramifications on their physical functioning and independence in everyday life. Due to the severity of their conditions, they were all considered to need health care services from their respective municipalities. Most of the participants (40 out of a total of 47 participants) in this Ph.D. project had experienced a hip fracture (samples 2 and 3), which is why this thesis will specifically focus on the stated condition.

Physical activity is defined in the literature as "a bodily movement produced by skeletal muscles that result in energy expenditure" (6, p. 1337). Physical function is a strong measure of biological age and a biomarker for health and quality of life in older people (31-34) and in this regard, a broad multidimensional concept referring to an individual's ability to perform daily living activities (6, p. 1337). An important aspect of the physical activity in this project is that it was initiated, supported, and instructed by health personnel, mostly comprising physical therapists, from the municipalities, and to a large degree planned, structured and repetitive. In this thesis, the term "physical activity" will be used in the overall framing of the project to include all participants' individual experiences including "exercise". Physical activity, in the context of this study, can be considered a treatment provided by the community as a service mandated by the government provide to older people living in the community (35, 36). From a public health perspective, physical activity is deemed crucial to maintaining good health, mobility, and independence across all age groups (19, 37). On the other hand, inactivity represents the fourth-highest risk factor of mortality worldwide (38). Health can further be considered a process of human growth and development and is related to how individuals deal with the stresses in their contexts. This is in line with Aron Antonovsky's salutogenic perspective (39, 40) which served as a conceptual framework in papers 1 and 3 and will be further elaborated in chapter 3 together with the frameworks of the therapeutic alliance by Edward Bordin (30) as well as the conceptual recovery framework inspired by Leamy et al. (28) used in papers 2 and 4, respectively.

Although older adults may stay healthier longer nowadays (41, 42), increasing age is associated with an increased risk of chronic disease, a decline in physical function, and hospitalisation (43-45). Hip fractures are the most common injury in elderly patients (46) with severe consequences for the patients' physical function and quality of life. Hospitalization due to hip fracture is frequent in old age and hip fractures in the elderly are a major source of morbidity and mortality because nearly half of the patients do not return to their previous physical functional level and up to 30% of patients die within the first year following hip surgery; furthermore, the financial burden on health systems is high (47). In addition to several personal consequences, hip fractures suffered by an older person can have grave implications for health care and society. By 2050, the global number of hip fractures is expected to be between 7.3 and 21.3 million, resulting in treatment costs of nearly 131.5 billion US dollars (48). The physical function and quality of life after hip fracture are significantly reduced, and people with hip fracture often have poor physical functional recovery (49, 50).

"Ageing in place" is an important focus for ageing-related policies, programmes, and research, including this Ph.D. study. It is defined as "remaining living at home in the community, with some level of independence" (1, p. 133). The possibility of remaining in their own homes for as long as possible during ageing has been considered the most favourable living condition by policymakers, healthcare providers, and many older persons themselves (51, 52). In Norway as well as internationally, greater emphasis has been placed on primary healthcare services to handle health challenges for older adults. Aging in place, staying physically independent, and maintaining a good quality of life are important goals of clinical health care, public health, as well as economic imperatives (53). Being able to live at home as long as possible is a policy goal and is also perceived as a right (54, 55).

Physical activity and exercise are essential in reducing frailty (56), maintaining independence, reducing the number of falls which represent 90 % of all causes for hip fractures (57), and allowing older people to live their lives well (58-60). Rehabilitation after hip fractures assumes significance and includes components such as functional training and physical activity, as well as assessments to address depression (61) and undernutrition (62). Persons who stay sedentary after experiencing a hip fracture have an increased risk for a new fracture and for further physical functional decline (63).

As the topic of this project concerns older people's lived experiences based on interviews, it employs a qualitative design inspired by a phenomenological approach (64, 65) in paper 1 and the phenomenological hermeneutical approach by Ricoeur's (66) in papers 2-4. A phenomenological view of life and a hermeneutic interpretation makes it possible to illuminate the meaning people ascribe to their lived experiences, thereby gaining knowledge and understanding of the phenomena in focus (66). The methodology is based on in-depth interviews with older people with experiences from different physical activity sites. Participants from the first sample were home-dwelling older people aged ≥ 80 who had attended a long-term group exercise program arranged by the municipality as a low-threshold initiative for people in need of health care services. The second sample (≥ 65 years of age) received a one-on-one evidence-based exercise program "High-Intensity Functional Exercise (HIFE) Program" (67, 68) within the first three weeks after hip fracture surgery, during a short-term rehabilitation stay at a nursing home and were all considered fit to return to their respective homes after rehabilitation. The third sample of participants were home dwellers who had experienced a hip fracture surgery within the previous eight months and received rehabilitation services involving physical activity from their respective home municipalities.

The overall aim of this Ph.D. project was to explore and describe community-living older adults' experiences with physical activity as part of their recovery, by participation in two different exercise interventions and in ordinary rehabilitation services with a special focus on older people who had experienced a hip fracture. The first sub-aim was to describe the experiences of older people's motivation for participating in and adhering to a group-based exercise intervention in a local community setting (paper 1). The second sub-aim was to explore how older people who had participated in an evidence-based exercise intervention after hip fracture surgery describe their relationship with their therapists and how this relationship might have contributed to their motivation to execute their exercise regime (paper 2). The third sub-aim was to explore the reflections and thoughts of older people following their participation in the evidence-based High-Intensity Functional Exercise Program (HIFE) during the first three weeks of rehabilitation after hip fracture surgery (paper 3). We sought information about the impact of the program concerning the participants' mobility, their own resources for managing the situations they confronted in their everyday lives, and their views on whether the mobility challenges were worth their investment and commitment. Lastly, the fourth sub-aim was to explore and describe the experiences of recovery among community-

living older people receiving rehabilitation services involving physical activity during the first eight months following hip-fracture surgery (paper 4).

An overall goal of this Ph.D. project and in these four papers was to contribute to new research-based knowledge on enhancing the quality of health care services that could inform policy, clinical practice, and research on how to better address older home-dwelling people's needs and perspectives in interventions, services, or programs where physical activity or exercise is involved.

2. BACKGROUND

In this chapter, the background and larger context of the study will be presented. As stated in the previous chapter, this Ph.D. project concerns older people who were considered to need health care services and/or interventions from the community involving physical activity due to their health condition. In the following, sections presenting the complexity of ageing (2.1), hip fractures: Incident, risk factors, and consequences (2.2), physical activity and related terms (2.3), contextual background, and policies (2.4) will be addressed. Finally, I will give an overview of existing knowledge within the field in "State of the art" (2.5) and present the knowledge gap, rationale, and aim of the overall Ph.D. project (2.6). Although this project started in 2017, the following section will include literature published up to this date to include updated knowledge in the area under discussion.

2.1 The complexity of ageing

In this section, the development of the ageing population, hopefully of importance with respect to understanding the experiences of the included participants across the four papers, will be presented along with an overview of physical, psychological, and social changes in old age.

The world population of older adults from the age of 60 years was 962 million in 2017 (53) and this number is increasing due to an increase in life expectancy (69). Our participants were 65 years or older. In Norway, the number of older people aged 65 and above will increase by 100% by 2075, from 940 000 in 2020, whereas the number of people aged 80 and above is expected to rise from 230 000 in 2020 to more than 720 000 in 2060 (70). The proportion of the population of working age, compared to the elderly, will decline within this period, with huge consequences on the national economy (70). Population ageing poses questions of an ethical and political nature on many levels regarding older adults' rights and best interests. When such an approach is adopted, old age may bring social problems that require a deliberate intervention from the communities to resolve, eliminate or even alleviate them (71). Public spending on health and social care due to the increased survival expectancy into old age, is seen as a threat to the economic stability worldwide in the 21st century (24).

Old age cannot be universally defined; however, older people are defined as those aged 65 years and above in most high-income countries (23), which is why the inclusion criterion

regarding age was from 65 years and above in this thesis. Ageing in later life is both a collective and a personal experience and is not only a matter of chronology or biological changes, but also a process between the body, self, and society which is both complex and dynamic (72). Chronological age has limitations as a precise marker of the process of ageing due to the unique and complex experiences attached to both ageing and old age. Additionally, categories such as social class, gender, and race are known to affect ageing and old age all across the life course (73). Further, an individual can have a "biological age", based on age-related functional and biological changes to predict the ageing rate (74, 75); a "social age", referring to the person's "roles and habits as regards other members of the society of which he/she is a part." (76, p. 239); and "psychological age", which is based on the "behavioural capacities (e.g. memory, feelings) of individuals to adapt to the demanded changes"(76, p. 240).

The individual processes of ageing are multi-dimensional and concerns changes on the physical, psychological, and social level (77, 78) and are further characterised by an individual course occurring at different times in life and in different ways (71). Even though many older adults are in good health, the risk of functional disability and disease increases with age (43, 44, 79). This concept of social ageing refers to a person's changing roles and relationships with friends, family as well as participation in society (80), and emphasizing expectations and institutional constraints defining the way people work and live as they age. From the point where people retire from work, the number of roles decreases and the changes in roles may happen more suddenly (81), for instance, if one experiences an injury like a hip fracture and becomes dependent on others, as was the case for participants in papers 2, 3 and 4. Due to the decreased number of roles, the roles older people have left, become very important to maintain. The term "role-reversals" describes what happens for example when older people more and more depend on care from their own children (81). This loss of independence may also affect older people's quality of life (82). The four included papers in this project disclosed a loss of independence among the participants.

Ageing occurs in all living species and the biological processes from ageing are associated with the normal physiological process of ageing of cells, organs, and systems (71), thus contributing to an increased risk of disability (79). Some of the changes associated with ageing stem from pathologies and two-third of persons aged 65 and above are affected by one or more chronic diseases (24). Other changes are attributed to the excessive use or disuse of life resources (lifestyle, organization of collective life), and around 15-20 % of seniors over

75 years of age experience acute and chronic health problems that make them frail and dependent (79). The degeneration of bone structures is a natural part of the ageing process (83) and may lead to osteoporosis, which represents a substantial risk for fractures (79). In addition, the ageing process and many neurological diseases can impact balance and gait (79). As stated before in this section, the individual processes of ageing are multi-dimensional and concerns changes on the physical, psychological and social level (77, 78) which might represent important risk factors for hip fracture which are briefly presented in section, 2.2.

2.2 Hip fractures: Incident, risk factors, and consequences

As stated in the introduction, most of the participants in this project (40 of the total 47) had experienced a hip fracture within the last eight months before inclusion in the project. In papers 2, 3, and 4, the participants were older adults who had experienced a hip fracture, which is a common term for all fractures in the proximal part of the femur (84) and is the most common injury in elderly patients (46). In the following section, the presentation will include incidence, mortality, costs, risk factors as well as some individual consequences regarding hip fractures.

Worldwide estimates of hip fracture numbers by 2050 are between 7.3 and 21.3 million (85) although the variability in hip fracture incidences around the world is large, with the highest rates generally being observed in northern Europa, central Europa, and the Caucasus (86). Epidemiological studies show the rate of hip fracture increases with age (87) and regarding gender specificity in incidents, a US study shows a shift in trend by stating that the number of hip fractures among men is expected to increase by more than 50% by 2030 (88) while the numbers among women will decrease by 3.5 %.

Norway, along with the neighbouring countries Sweden and Denmark, exhibits the highest rates of osteoporotic fractures (89), with an incidence of 82 per 10.000 for women and 39 per 10.000 for men (90). Regional differences have also been observed, with higher incidents in the south than in the northern parts of Norway (91). Oslo, the country's capital city, reports the highest incidence rates of hip fractures that have ever been reported (92). In Norway, hip fracture rates have declined the past years (93), but the forecasted aging of the population might increase the absolute number of fractures (94). The reason for these high rates in the Nordic countries remains unclear, though genetic and environmental factors are thought to

play an important role (95). Hip fractures are the most serious fall-related fractures with a mortality rate of approximately 30% during the first-year post-fracture (47, 94). However, a small reduction in worldwide mortality rates at one year after a hip fracture has been shown in a recent systematic review (96), which together with an expected increase in hip-fracture incidents (96), will consequently increase the number of people living in the recovery phase after a hip fracture. Hip fractures are further associated with high financial costs (47) and the global treatment cost will be approximately $131.5 billion US dollars by 2050 (85).

A hip fracture suffered by an older person can have severe personal consequences. In addition, the quality of life and physical function after hip fracture are significantly reduced (85, 97). People experiencing hip fractures are often vulnerable and fragile (98) and inactivity during hospitalisation may contribute to functional decline, thereby signifying a major health risk to frail, elderly patients (99, 100). However, patients are discharged from the hospital "quicker and sicker", often with complex conditions and comorbidities (101). Patients who are not able to be discharged from the hospital directly to home may require a short-term nursing home placement in the municipality. The trend of low physical activity has further been found to continue from hospitalisation into the activity among community-dwelling people with hip fractures during the first year after surgery (99). Further, older people experiencing a hip fracture, often have poor functional recovery after rehabilitation and more than half do not regain pre-fracture levels of mobility in the first year after fracture (49), with only half of those able to walk outdoors before their fracture being able to do so afterwards (50). The reduced mobility and hospitalization may, in turn, cause severe decline regarding muscle mass, muscle strength, and consequently, their physical function (102), leading to reduced independence (103) with increased need of assistance and support in daily tasks (104). Furthermore, these patients are at high risk of increased fear of falling and post-operative pain through reduced mobility and loss of independence (98). According to a systematic review from 2014, the most important risk factor of hip fractures is having experienced previous falls, in addition to reduced balance, diminished strength, fear of falling, and decreased cognitive function (105). In addition to the physical frailty (98, 106) hip-fracture patients experience considerable deterioration in health-related quality of life (HRQoL) (107), especially in self-care and daily activities (108).

2.3 Physical activity and related terms

In this section, some issues concerning physical activity in old age are presented since this is the highlighted topic across all papers of this Ph.D. project. Initially, physical activity and related terms, important for the overall understanding of this study are outlined. In subsection 2.3.1, the health benefits and recommendations on physical activity in older life are briefly described. Finally, the benefits of physical activity after hip fractures will be given special attention in 2.3.2.

The broad definition of physical activity mentioned in chapter 1 encompasses a lot of other related terms or understandings important for achieving the aim of this Ph.D. project. Like the concept of exercise, which is already presented and described as a subcategory of physical activity (6), physical function, which is also an important concept relating to physical activity, is defined as "the capacity of an individual to carry out physical activities of daily living"(6, p. 1337). Physical function is further a strong measure of biological age and a biomarker for quality of life and health in older individuals (31-34).

Concepts representing the opposite physical activity are physical inactivity or sedentary behaviour, which is defined as "any waking behaviour characterised by an energy expenditure ≤ 1.5 metabolic equivalents, such as sitting, reclining or lying down" (19, p. vii).

Several definitions regarding physical activity, exercise, and inactivity are given in the publication titled *WHO Guidelines on physical activity and sedentary behaviour* (19, p. vii). Among them is a definition of the term 'multicomponent physical activity'. This kind of physical activity addresses the needs of older people and is elucidated to be "important to improve physical function and decrease the risk of falls or injury from a fall and can be done at home or in a structured group setting. Many studied interventions combine all types of exercise (aerobic, muscle strengthening, and balance training) into a session, and this has been shown to be effective. An example of a multicomponent physical activity programme could include walking (aerobic activity), lifting weights (muscle strengthening), and incorporates balance training. Examples of balance training can include walking backwards or sideways or standing on one foot while doing an upper-body muscle-strengthening activity, such as bicep curls. Dancing also combines aerobic and balance components (19). This extended description of physical activity embraces different physical activity- interventions in all papers of this study. Another related concept to physical activity is mobility or functional mobility, which refers to an individual's ability to move around safely and effectively in their environment,

perform basic ambulation, walk for leisure, perform everyday tasks, and participate in work, leisure, and exercise activities (11). Satariano et al. (11) further defined optimal mobility, as relative ease and freedom of movement in all of its forms, central to healthy aging. In paper 3 of this project, the aim was to describe the impact of a certain exercise program concerning the participants' mobility.

2.3.1 Health benefits and recommendations on physical activity

Due to biological changes from ageing, morbidity, and loss of functions, health-promoting and disease-preventing interventions (24), like maintaining physical function are public health imperatives positively associated with lower rates of morbidity and mortality in older adults. The health benefits of physical activity are well established and include a lower risk of cardiovascular disease, hypertension, diabetes, and breast and colon cancer. Additionally, physical activity has positive effects on mental health, delays the onset of dementia, and can help the maintenance of a healthy weight (109). The benefits of physical activity especially those related to older people's health are multiple and further include the improvement of mental and physical capacities, thus reducing risks and preventing diseases, and improving social outcomes (23).

Physical activity and exercise can further be effective in enhancing and maintaining the functional capacities of both frail and non-frail older adults (110), and in reducing the risk of major mobility disabilities among frail populations (111). Interventions aimed at increasing physical activity have also been shown to be effective and maybe most effective in more severe cases of frailty (111, 112).

Safe and independent mobility is an important factor for maintaining the quality of life and independence in old age (82) and has further strong attachments to participation and quality of life. Safe mobility could be attributed to the ability to walk without a high risk of falling. Walking is an activity with deep roots in most people's history, shown to have existential characteristics for old people (113, 114).

Although older people have much to gain from physical activity, the population health estimates fail to elicit these benefits for this age group (53). Physical inactivity is found to be the leading risk factor for overweight, obesity, non-communicable diseases (NCDs), and chronic conditions (53).

On the background of the well-established benefits of physical activity (109), WHO have presented age-specific recommendations on physical activity (19) where recommendations for

older people aged 65 and above include at least moderate-intensity aerobic physical activity of 150-300 minutes duration or at least 75-150 minutes of vigorous-intensity aerobic physical activity throughout the week. Furthermore, these recommendations include muscle-strengthening activities at moderate or higher intensity levels involving large muscle groups at twice a week, at least. These suggestions are applicable for all adults from 18 years of age, but an additional recommendation is added for the oldest group namely to include varied multicomponent physical activity emphasizing strength and functional balance and training at moderate or higher intensity levels, on at least three days a week to increase functional capacity and to prevent falls (19, 115). In addition, a piece of advice to limit the time spent on being sedentary is recommended for all age groups (19). The updated recommendations are based on a documented trend going the wrong way in Western high-income countries with an increase of insufficient physical activity and thereby an increased risk for non-communicable diseases and poorer mental health and quality of life on the individual level all across the grown-up population (109).

Further research regarding the health benefits of physical activity in older people will be outlined in section 2.5.1.

2.3.2 Benefits of physical activity after hip fractures

Evidence suggests that exercise plays a crucial role in improving physical function and enhancing the quality of life following a hip fracture (116) as well as in avoiding further reduced physical function in the early phase after hospital discharge (117). Furthermore, exercise improves fracture healing and subsequent pain relief over time, increases muscle strength and coordination, and consistently improves mobility, functional status, and quality of life (118).

Therefore, it is important to start these exercises as early as possible and follow the highly recommendations of early postoperative mobilization after hip fractures (119, 120) with the aim to minimise complications postoperative and to improve physical outcomes towards the pre-fracture level of physical function after hip fracture, HRQoL and to decrease pain (121). Exercise interventions and physical rehabilitation is often continued after hospital discharge in community-based rehabilitation units, such as short-term nursing home placements or as home-based exercise programs (98).

The existing literature is in-conclusive as to which exercise intervention contributes to the best achievable physical function, HRQoL, and pain after hip fracture (122, 123). In a

systematic review by Diong et al. (118), evidence was found for a positive effect of exercise interventions, including progressive strength training for improving mobility after a hip fracture. The systematic review by Auais et al. (98) reported that extended exercise interventions could improve physical function after hip fracture. However, single studies have investigated the effects of exercise on physical function, HRQoL, and pain after hip fracture included in the Cochrane review by Handoll et al. (123). For example, Tsauo et al. (124) reported that patients who received home-based physiotherapy (including exercises for muscle strengthening, range of motion, balance, and functional training) up to three months post-surgery, regained their physical function and HRQoL sooner than the control group (instructed to practice the exercise program given at bedside before discharge) (124, 125). Research on benefits regarding physical activity after hip fractures will be further highlighted in section 2.5.2.

2.4 Contextual background and policies

The physical activity that the participants in this Ph.D. project took part in was instructed by municipality employed health professionals who were either in a low-threshold group exercise program (paper 1), in a one-on-one exercise intervention (papers 2 and 3), or in regular rehabilitative health care services, including physical activity (paper 4); all of them were funded and organised within the framework of the Norwegian municipality health care services. Against this backdrop, an orientation of the overall Norwegian health care system will be given in subsection 2.4.1, followed by a presentation of the legislation concerning rehabilitation (2.4.2). In subsection 2.4.3, the contextual focus on physical activity in older life will be outlined, focusing on governmental publications concerning this issue. As Norwegian policy in the field partly has developed with impact from international frameworks or concepts (2, 126), the framework of "active ageing" and the "ageing in place" concept will be briefly presented in 2.4.4 and 2.4.5 respectively, to underline the interplay between international and national policies in the field.

2.4.1 The Norwegian Health Care system

The context framing this Ph.D. project across all the four papers included is the Norwegian health care system with the rights of the citizens on one hand (36) and the duties of the community required by law on the other (35). The particular regulations regarding older people's situation when they need public help after experiencing a drop in physical function,

specifically involve rehabilitation services legislation (127) which are elaborated in section 2.4.2 and the public health care act (128) as well as national strategies and guidelines following up on these (129-132). Norwegian health care policy for older people complies with international policy frameworks of Active ageing (2, 133) and emphasis on Ageing in place (23).

The Norwegian healthcare service is organised into two main sectors: primary healthcare services, including long-term and short-term nursing homes, and specialist healthcare services, including hospitals (134). Municipalities are responsible for the primary health and social care of their citizens (134, 135). In Norway, hospitals are responsible for specialist care and in this context, the participants in papers 2-4 had fresh experiences from this sector after their hip fracture surgery. Some hospitals in Norway are private, but most of them are owned by the Government and managed by four regional health authorities with a steering group and a chief executive officer (135).

A local democratically elected council is responsible for funding and prioritising municipal health services (135). Primary care is administered by the municipalities and includes general practitioners, home care services, nursing homes, and intermediate care (135). Municipalities are obliged by law to have employed certain professional workers such as general practitioners, nurses, physical therapists, occupational therapists, and psychologists (35). The number of practitioners in each professional group is decided by the municipalities' assessments concerning the assistance need of the citizens. In Norway, municipalities differ a lot when it comes to population size and geography (136), which impacts the organization and staffing of the health care services. The services or interventions involving physical activity the participants in this project experienced were organised within the framework of municipality primary care. Home care services are provided to people over long or short periods as a result of illness, impaired health, old age, or other factors (136). Home care is defined as health and social care provided by formal healthcare workers in the homes of older adults and can encompass myriad activities, such as assistance with daily activities, safety alarm services, or interdisciplinary rehabilitation (137), which was the case for participants in paper 4.

A Coordination Reform was effectuated by the Norwegian government in 2012 (138) involving major judicial and organisational changes to meet the demographical changes

involving an increase in the older population and the concomitant ramifications on the national economic and personnel situation in Norway. The justification for the reform was also an addressed lack of preventive focus in the services and patients' need for better coordination between services. Due to this reform, more responsibility for the treatment was relocated from the hospitals to the municipal health care services and a larger proportion of the health care budget was transferred to municipal health providers to reduce the healthcare expenditure in specialist healthcare services (139). As a consequence of the Coordination Reform (138), people are discharged earlier from the hospital, often with complex conditions and comorbidities (101). Some of them require a short-term stay in a nursing home before returning home, which was the case for participants in papers 2, 3, and 4 of this project. Nursing homes have increasingly been used as a post-acute care setting for individuals who require rehabilitation services after a hospital discharge (140), as observed in papers 2, 3, and 4 where the short-term home was the arena where the physical activity program took place. These post-acute stays are intended to be brief as individuals recuperate and prepare to return to their home residences (140).

2.4.2 Rehabilitation

High adherence to exercise is viewed as a prerequisite of successfully implemented interventions in rehabilitation for older adults with mobility impairments (141, 142). Several studies describe approaches or programs to promote physical activity among individuals with disabilities (142-146). The following section focuses on political documents, the field, and patient group rehabilitation, as well as physical activity. One of the consequences of the coordination reform (138), was an increased governmental focus on municipal rehabilitation services. In 2015, the interactive guideline for habilitation, rehabilitation, individual plan, and coordinator (131) was released to explicate the legal regulation in this field of services (127). The definition of habilitation and rehabilitation underwent a process of change till the release of the current definition, and the regulation (127) was updated in 2018. In parallel, the government launched a new "escalation plan" for habilitation and rehabilitation to give extra resources and attention to this service area (132). This plan has recently been evaluated by an external firm, and a portion of the conclusion states:

> The field of habilitation and rehabilitation is a complex field of services where 356 municipalities have a different approach to organization and methods and where many different participants are involved (147, p. iii).

The patient group in need of rehabilitation services are characterised by complexity in their challenges, such as this project's participants, thereby requiring several services and coordination between these. By law, every municipality should have a coordinating unit to cover the responsibility for this coordination (127). Rehabilitation as defined in the regulations (127) is independent of age and diagnosis. This makes cooperation and coordination between departments and sectors necessary, despite the potential challenges, as it contradicts traditional medical-model organisations on which Norwegian healthcare services are built upon. Reablement-teams are an example of a "new" service, including physical activity, which has been implemented in many Norwegian municipalities over the last few years as in other parts of the world, in response to the increased demand for home care services (148). This is a service received by more than 50% of the participants in paper 4. Reablement aims to help home care recipients to regain or retail the ability to manage some aspects of their care and are typically delivered by an interdisciplinary team, in the home, and focus on the client's functional capabilities, including the ability to complete activities of daily living (148). The use of a reablement service has been found to reduce the likelihood of using any home care service for the next 3 years, compared to using conventional home care services, and is thereby associated with lower economical costs (149). The integration of physical activity in reablement service was explored in a systematic scoping review by Mjøsund et al. (150), see Table 3, who found physical activity integrated into the majority of the included studies, but provided little information about the intensity of physical activity or how this was integrated and targeted to the individual's needs and preferences (150, p. 2). There is variability in how the reablement service is carried out in different municipalities:

> Reablement literature tends to describe where the user's training should be provided (the user's home environment) and what to target (the user's own goals). However, how to carry out the reablement interventions is not clearly described (151, p. 1754).

According to the variation of municipalities in size and staffing as well as the space of opportunity to organise services, there is a large variability in the service offerings between municipalities.

2.4.3 Physical activity in older life

The governmental focus on physical activity is according to one of the strategic objectives of WHO's action plan (2018-2030) to support active people and action in order to:

> Enhance the provision of, and opportunities for, appropriately tailored programmes and services aimed at increasing physical activity and reducing sedentary behaviour in older adults, according to ability, in key settings such as local and community venues, health, social and long-term care settings, assisted living facilities, and family environments, to support healthy ageing (37, p. 37).

Focusing on physical activity as important especially for older people in preventing falls and injuries from falls (138), the Norwegian coordination reform focused and supported the development of low-threshold offers focusing on physical activity for older people. The reform emphasised preventive and rehabilitative services aiming to help the citizens to stay healthy by maintaining functions to manage everyday life and mentioned services such as occupational therapy and physical therapy as important in this investment.

In recent national documents, this focus on physical activity for older people, has been repeated, for instance, in the strategy "A full life all your life" (130), where activity is one of the main goals. According to this strategy, older people should be offered at least one hour of activity a day, based on the individuals' wishes and needs, for example, walking or dancing (130). Further, the activity should be targeted, individually tailored, and preferably given in small groups by instructors who can give individual guidance (130). A new action plan for physical activity (152) underlined the need for physical activity for users of health and care services as preventive, treating, and rehabilitative interventions. It also pointed out that physical activity should be integrated as a part of the services when it is necessary to secure the safe and sound quality of the services (152). This plan further revealed that competence about physical activity in many health and social professions are lacking and has not been focused sufficiently on educational programs. Therefore, the government has initiated an interdepartmental cooperation to improve competence about physical activity across health educations (152).

2.4.4 The policy framework of "active ageing"

This framework was developed by WHO's Ageing and Life Course Programme as a contribution to the Second United Nations World Assembly and understands *active ageing* as "the process of optimising opportunities for health, participation, and security to enhance quality of life as people age (2, p. 12)". Further, according to the framework, people are allowed to realize their potential for physical, social, and mental well-being throughout the life course and to participate in society based on their needs, desires, and capacities, while

they are provided with adequate protection, security, and care when they require assistance (2).

Over the years since the framework was presented, the *active ageing* policy has impacted ageing policies and practices all over the world, drawing focus to the new opportunities and challenges that an ageing world brings to both individuals and societies with the idea to embrace both individual's right and responsibility to remain active, and the government's responsibility to create an age-friendly society (153).

The active ageing framework advocates optimising opportunities for health, participation, and security – three key determinants of the quality of later life (153). The active ageing framework comprises six determinants of health, applying them to the health and quality of life of older persons, thus suggesting that all these factors and the interplay between them may predict how well both individuals and populations age (2). The six determinants presented in the framework are as follows: economic determinants, health and social services, behavioural determinants, personal determinants, physical environment, and social determinants. Physical activity, which is focused in this Ph.D. project, serves as an example of a behavioural determinant that can delay functional declines and the onset of chronic diseases in older healthy or chronically ill people and is perceived to be helpful in older people's attempts to stay as independent for as long as possible as well as reducing the risk of falls (2). The economic benefits imparted when older people are physically active caused by lower use of medication and thereby, lower medical costs also assume significance (37). The policy focus of active ageing is intended to reflect a set of values that should shape and underpin policies for promoting well-being in later life as the maintenance of health and functional ability is important (154). Policy should further be guided and informed not by a set of ideas about the inevitable deficits of old age, but rather by a rights-based approach that recognises equality of opportunity and the potential of older people which, in turn, requires active ageing strategies to take on the tasks of changing attitudes/behaviours and creating a social environment that offers plenty of opportunities for maintaining engagement and avoiding unnecessary dependence on others (154).

Recent research has paid attention to the experiences of active ageing with chronic health challenges like in a qualitative study in the UK where authors found that their participants who lived with severe osteoarthritis, pragmatically just 'kept going' both physically and mental despite chronic pain and stiffness (155). A study from two activity centres in Denmark found that participants enjoyed different activities despite a range of serious chronic

conditions, thereby ‘keeping disease at arm’s length’, arguing that engagement in ‘social and/or physical activity creates enough distance to help older adults focus on wellness rather than illness, and manage their everyday life to postpone further physical deterioration (156). Concerning active ageing, these studies (155, 156) show a realistic picture of what it might be like to grow old, one that acknowledges the changes and challenges experienced by older people.

2.4.5 The concept of “Ageing in place”

The *ageing in place* concept is a policy objective where one can remain in the current setting despite increasing age (157) and has increasingly been focused to meet the challenges arising from the aging population (158). The concept has been further popularised and emerged as a major focus for ageing-related policies, programmes, and research, and is today recognised as a key strategy for making the ageing process more sustainable for both individuals and societies (135, 159). Ageing in place is defined as “remaining living at home in the community, with some level of independence” (1, p. 133). All the participants in this project had experienced aging in place. Most of them (28/47) lived in their own home in the municipality (see Table 6) at the time of the interview, while 18 participants were returning to their homes after short-term rehabilitation within two days of the interviews, (see Table 2) Characteristics of the interviewed participants and sample size. The participants sample from papers 2 and 3 was at the point of the interviews currently residing in a short-term rehabilitation unit where they had participated in the exercise program and returned home within two days after the interviews.

Over the last few years, ageing in place initiatives has become an important part of broader strategies across Europe, for instance, “active ageing”, presented in the previous section and are in this respect placed at the forefront of preventative actions that seek to limit the risks of dependency and the economic costs associated with it (52). Since physical and social environments are important factors of health and well-being in old age, a key investment is to ensure everyone with an opportunity to grow old in age-friendly environments. This concept has been of inspiration for municipalities in Norway and in many parts of the world and is reflected in the support for the WHO Global Network of Age-friendly Cities and Communities, including home cities of most of our participants, and which now includes over 500 members in 37 countries.

"Aging in place" policies focus upon the rights, needs, and responsibilities of older people to live independent lives at home for as long as possible and to actively participate in society as well as the transformations needed in current health care systems to meet the challenge of the rising older population (23). The policy is presented as a win-win strategy as it is both cost-effective and at the same time meets the wishes of the older generation to stay at home as they grow older (160), as this is the goal for many older people, such as the participants of this Ph.D. project. To "age in place", a certain level of physical functions needs to be restored or enhanced and for that to happen, physical and occupational therapy are important as well as difficult to follow up. Although the home is important as historical, cultural, and environmental contexts shaping everyday thoughts, activities, and meaning to very old people (161), the ageing in place-concept can also threaten and even diminish their quality of life due to changes in their life circumstances and deteriorating health and mobility (160). As the quality of life has become an important endpoint in the evaluation of public policy (162), assessments containing all relevant domains for the involved people, monitoring quality of life should be made (160).

2.5 State of the art

The purpose of this section is to present literature particularly influential to this Ph.D. project's main topic as well as to highlight the current state of knowledge in the field, leading up to the knowledge gap, rationale, and aim for this Ph.D. project (see 2.6). Research concerning older people and physical activity in a broad perspective is included in this section, with a particular focus on physical activity experiences in the phase after hip fractures. Due to considerable research activity on different aspects of this field, the search disclosed is a large number of studies connected to different sides of these themes, though most of it is in the landscape of quantitative research. This presentation relies primarily on the discovered review articles related to qualitative research, supported by some of the quantitative reviews and single studies discovered. Studies from before the study started and up to the point of writing are included and the search was concentrated on the following databases: Medline, Cinahl, Pedro, Cochrane library, and Google scholar.

In the following sections, the presentation will be organised into two main subsections covering research regarding physical activity in older people (2.5.1) and, research regarding physical activity after hip fractures (2.5.2) identified in the literature search. Lastly in this

section, I will present two small subsections regarding recent research on reablement (2.5.3) and therapeutic alliance (2.5.4) respectively. Additionally, all reviews are presented in a table at the end of each subsection in the same order as they appear in the text.

2.5.1 Research regarding physical activity in older people

Since physical activity levels remain lower in older people (109) and especially in people with disabilities and/or chronic diseases compared to able-bodied, promoting physical activity is of great importance for this heterogeneous population (163, 164). The search disclosed reviews, both qualitative, mixed methods and quantitative regarding different aspects of the topic of physical activity in older people of importance for all older people for example those with disabilities and chronic diseases as described in paper 1 and after hip fractures (papers 2, 3, and 4). The aspects presented in the following reviews, concerning barriers, and facilitators to physical activity, adherence to exercise, physical activity in the retirement period, physical activity concerning particular diseases. Further, the presentation includes studies where well-being – or a health promotion perspective of physical activity in older people were discussed, some focusing especially on falls prevention.

In a large study by Franco et al. (165) 132 studies involving 5987 participants, were included, aiming to identify barriers and facilitators to physical activity and participation among people aged 60 and over. Importantly, 85% of the studies in this review explored community-dwelling participants coming from 24 different countries, see Table 1. The kind of physical activity investigated in the included studies was categorised into structured exercise programmes, other forms of physical activity, or combination of both (i.e., structured exercise programmes and other types of physical activity) (165). The findings from this large study revealed that some old people still believe that physical activity is unnecessary or even potentially harmful (165). The review further identified six themes describing older peoples' reflections on physical activity, which were as follows: social influences; physical limitations; competing priorities; access difficulties; personal benefits of physical activity; and motivation and beliefs (165). The analysis further showed some subthemes like dependence on professional instruction, pain or discomfort, affordability, strength, balance and flexibility, and self-confidence to be more relevant to those engaging in structured exercise programmes. Other specific subthemes more important in the context of other types of physical activity were environmental barriers and maintaining habits. Based on the findings, the authors proposed two themes to include in further strategies for enhancing physical activity participation among older people; to raise awareness of the benefits and minimise the

perceived risks of physical activity and to improve the environmental and financial access to physical activity opportunities (165). Studies focusing on older people's experience with physical activity might raise awareness and minimise the perceived risks of physical activity.

Baert et al. (166) examined in a quantitative review (see Table 1), barriers and facilitators to physical activity among the oldest olds and recommended special attention to be paid to the health benefits of physical activity, to the subject's fears, individual preferences, and social support, and to constraints related to the physical environment. Another quantitative review investigating healthy behaviour among community-dwelling older people to identify evidence gaps, underlined that policy and strategies aimed at increasing physical activity in older people should be encouraged while considering barriers and facilitators to behavioural change (167), see Table 1.

Environmental factors were further studied in a quantitative review of 31 studies by Cauwenberg et al. (168) where the conclusion was inconsistency in the findings, but the majority of studied environmental characteristics such as walkability, access to services, safety, urbanisation, access to public transport and more, were reported *not* to be related to physical activity (Table 1).

Three qualitative reviews (see Table 1) aimed to identify barriers and facilitators to physical activity among certain ethnic groups respectively black and minority ethnic groups in the UK (169), African Americans (170), and South Asians (171). The discovered themes from these reviews aligned in many ways with those of Franco et al. (165) apart from the common finding pointing at the cultural diversity from these reviews indicating a need of taking into account the cultural and religious characteristics when designing interventions aiming at enhancing physical activity levels in particular ethnic groups (169-171). Ige-Elegbede et al. (169) concluded that participants from black minority ethnic groups experienced more barriers to physical activity than white counterparts did and found in total six key themes emerging from the data of the 10 studies they included. The themes the authors (169) found were awareness of the links between physical activity and health, interaction and engagement with health professionals, cultural expectations and social responsibilities, suitable environment for physical activity, religious fatalism and practical challenges; concluding that interventions aimed at improving physical activity participation among older adults should be acceptable and accessible to minority groups. A substantial gap in research was revealed in this review calling for further research to investigate the barriers and facilitators of physical activity among older adults from African backgrounds (169). The findings of Siddiqi et al.

(170) revealed barriers such as lack of time, lack of motivation and self-efficacy, physical disabilities restricting physical activity and unsafe neighbourhoods, and a need for targeted exercise programs addressing the specific needs of older adults (170). On the positive side, health benefits associated with engaging in physical activity were a prevalent enabler, and structured group activities, program availability at the community and church setting, and easy access to open space and parks were facilitators (170). In the review investigating South Asians (171), the overarching concept derived from the synthesis was the influence of empowering and disempowering contexts on physical activity levels of South Asian participants. This was supported by the following themes: communication (e.g. relying on relatives for translation of information, lack of understanding); relationships (e.g. social support from family, friends, community), beliefs (e.g. not culturally appropriate to exercise, fatalism), and environment (e.g. lack of accessible recreational areas/facilities) (171).

Farrance et al. (172) performed a mixed-methods systematic review addressing the views and adherence of participants attending community-based group exercise programmes of a minimum of six months duration including ten studies, see Table 1. The authors identified six key themes important for adherence to group exercise programmes from the qualitative studies, being: social, connectedness, participant-perceived benefits, programme design, empowering/energising effects, instructor, and individual behaviour (172). They also identified some indication that community-based group exercise programmes have long-term adherence rates of almost 70% and that incorporation of the views of older people into programme designs may provide guidance for innovative interventions leading to sustained adherence (172). Finally, the authors addressed the need for more research to ascertain which factors have the strongest influence on exercise adherence (172). The effectiveness of interventions to improve exercise adherence in older people was assessed by Room et al. (173), see Table 1, where findings suggested a need for better reporting, use, and the development of theoretically derived interventions in the field of exercise adherence for older people.

Two studies had a special focus on the experiences of physical activity in the retirement transition period, namely, Morgan et al. (174) and Barnett, Guell, and Ogilvie (175), see Table 1. Morgan et al. (174) examined in their meta-ethnography 39 studies describing experiences of and factors influencing physical activity at the age of 60 and over, suggesting that physical activity can help in regaining feelings of purpose, of being needed in a collective group activity, and by creating routine and structure to the day in this difficult period. In this

study, papers were excluded if the population was recruited owing to a specific disease or health condition; accordingly, participation did not influence the health conditions or personnel, and physical activity included leisure-time physical activities and sports (174). In their conclusion, the authors suggested that an explanation of the failures in increasing levels of physical activity could be an overfocus of the health benefits from it, rather than considering a wider range of goals of greater importance to older people's life satisfaction, sense of purpose and role fulfilment (174). Barnett, Guell, and Ogilvie (175) came to the same conclusion concerning the need for the promotion of benefits of physical activity to other life areas than health in their review aiming to gain a deeper understanding regarding physical activity regarding the retirement transition phase, (175). The authors of this study further underlined the need for interventions for retirees from lower occupational groups to take account of busy post-retirement lifestyles and the low personal value that might be attributed to recreational physical activity and addressed the need of future research regarding the broader benefits of physical activity, and barriers to physical activity among retirees from lower occupational groups (175).

Hunter et al. (176), see Table 1, reviewed 19 studies aiming to find the best available qualitative evidence on the experiences and preferences for physical activity among people with Parkinson's disease. They discovered views of physical activity as an enjoyable and positive experience which aided the participants with control of their symptoms and enhancement of their wellbeing and quality of life (176). The studies examined in this review included a qualitative evaluation of the experiences and views of people with Parkinson's disease regarding physical activity and interventions designed to sustain participation; however, a limitation of this review is that it does not address the views and experiences of people with Parkinson's disease who were inactive (176).

Pedersen and Saltin (177) provided evidence for prescribing exercise as medicine in the treatment of 26 different diseases (see Table 1), including musculoskeletal disorders that were being experienced by all participants in the current Ph.D. project. In a recent review by Cunningham et al. (53), the authors found physically active older adults from 60 years of age and over to be at a reduced risk of all-cause and cardiovascular mortality (low-quality evidence); breast and prostate cancer (low-quality evidence); fractures (high-quality evidence); ADL disability, functional limitation (medium-quality evidence), and risk of falling (high-quality evidence); and cognitive decline, dementia, Alzheimer's disease, and depression (high-quality evidence). They also experience healthier ageing trajectories (high-

quality evidence); better quality of life (medium-quality evidence), and improved cognitive functioning (medium-quality evidence) (53), see Table 1.

Another quantitative review aiming to clarify the effects of exercise over anxiety symptoms (AS) in midlife and older women, concluded that mid-term exercise interventions (MTEIs) of low-to-moderate intensity seem to improve mild-moderate ASs in midlife and older women though the effect of exercise may also be related to a state of "mental disconnection" during the period that the subject is busy performing exercise (178), see Table 1.

Two reviews including both qualitative and quantitative studies focused on psychosocial (179) and mental well-being (180) as outcomes from physical activity interventions respectively as meditative movements such as Tai chi and Qigong (179), see Table 1, and community-based interventions, designed for sedentary older people, well organised and run by trained instructors (180), see Table 1. Rogers et al. (179) perceived benefits to health and a desire to exercise in a group setting for socialization to be reasons for participation in addition to improvements SF12, SF20, SF36 (quality of life indicators), a decrease of pain, and improved function. Windle et al. (180) found mental well-being in later life to be modifiable through exercise and physical activity and had an additional cost-effectiveness focus in their study.

Olanrewaju et al. (167), see Table 1, also focused on healthy behaviours to identify evidence gaps and inform policy relating to ageing well and cognitive health in their review of 40 RCT's. The findings from this study showed small benefits of physical activity to brain health, but evidence on how much activity is required to produce this effect is lacking. They further found behavioural (walking, exercise) and cognitive (counselling and motivational interviews) interventions to be effective for short-term uptake of physical activity in older people, whereas to maintain long-term participation in physical activity, individualised interventions modelled using behavioural theories may be required (167).

Physical activity interventions have also proven to be effective in terms of improving and maintaining the functional capacities of both frail and non-frail older adults shown in a Cochrane review from 2009 (110) as well as another one from 2007 (181), suggesting that multidisciplinary intervention including exercise may increase the proportion of patients discharged to home and reduce length and cost of hospital stay for acutely hospitalised older medical patients. Both reviews are also shown in Table 1.

Paterson and Warburton (182) emphasised in their quantitative review study the relationship between physical activity and functional independence and cognitive function outcomes in older adults, indicating a threshold of at least moderate activity for significant outcomes, see Table 1. The effectiveness of exercise in frail older people was examined in the reviews of Theou et al. (183) and de Labra et al. (184), see Table 1. Emerging evidence from the review of Theou et al. (183), including 47 studies, suggested that exercise has a positive impact on some physical determinants and on all functional ability outcomes. Conclusions of the review of de Labra (184) reported benefits from exercise interventions, although the optimal program remains unclear. The need for more studies of this topic and with frail populations was addressed to select the most favourable exercise program (184). Vogel et al. (185) assessed the health benefits of physical activity in older people in their quantitative review and found walking to be the preferred exercise form among older people. Further findings indicated that exercises including balance training, strength, and flexibility exercises have been associated with a reduced risk of falls in older people, especially in a multidimensional approach, thereby underlining the essential collaboration among physicians and health care workers (185), see Table 1.

Finnegan et al. (186), see Table 1; aimed to explore barriers and facilitators to continued participation in falls prevention exercise after completion of a structured exercise programme and included 14 studies. The findings from this review indicate that older people have their individual and meaningful rationale for either continuing or stopping exercise after completion of a structured falls prevention exercise programme (186). Those barriers and facilitators to continued exercise should be examined during the intervention phase and in this regard, health care professionals must get to know the older person's rationale and offer the best evidence-based practice and support to individuals, to ensure a smooth transition from their structured intervention towards longer-term exercise-related behaviour (186). McInnes and Askie (187), see Table 1, included both qualitative and quantitative studies in their review of older people's views and experiences of fall prevention strategies touching upon physical activity in some of the studies. Key implications regarding physical activity in the findings were that assistance or referral to the appropriate service should be provided to address modifiable individual factors that may be barriers to participation, such as fear of falling, denial of risk of falling, and lack of motivation to participate in a program with a physical activity element (187). Against this backdrop, potential participants should be given written and verbal information on the preventable nature of some falls, how to stay motivated, as well

as the physical and psychological benefits of physical activity and of modifying the risk of falls (187). Lastly, it was emphasised that the social aspects of fall prevention programs may be their strongest selling point particularly among those who do not have a history of physical activity (187).

Several quantitative reviews have investigated the effects of different exercise interventions on preventing falls in older people, all of which are illustrated in Table 1. Thomas, Macintosh, and Halbert (188) evaluated the effect of the Otago Exercise programme (OEP) on the risk of death and fall rate and found significance for both with compliance to the program two times per week. The group exercise participants in this Ph.D. project experienced in paper 1 was built upon principles from the OEP. A qualitative study describing experiences from the HIFE-program, a program designed to improve lower-limb strength, balance, and mobility found that support from the supervisors and belief in personal success facilitated the performance of the exercises (189). The HIFE program is further described in section 4.3.2 as this was the program experiences presented in papers 2 and 3 were building upon. The informants in this single study further opined that the effort they put into this program was worthwhile because participating in strenuous exercise could imply that they might overcome bodily limitations to achieve increased vitality and improved quality of life (189).

A Cochrane review from 2012 (190) showed that group and home-based exercise programmes, and home safety interventions reduced the rate of falls and risk of falling in older people living in the community. Another Cochrane review showed a probable reduction in community-dwelling older people's fear of falling to a limited extent immediately after an exercise intervention (191). Exercise as a single intervention was found to prevent falls in community-dwelling older people where programmes including balance-exercises of a higher dose were shown to have larger effects (192). In a later review, Sherrington et al. (193) found that exercise programmes, primarily involving balance and functional exercises, reduced the rate of falls and the number of people experiencing falls in older people living in the community. In a Cochrane study, Hopewell et al. (194) assessed the benefits and harms of multifactorial interventions and multiple component interventions for preventing falls in older people living in the community, concluding that multifactorial interventions (usually including exercise) may reduce the rate of falls compared with usual care or attention control, but there may be little or no effect on other fall-related outcomes. On the other hand, French et al. (59) studied behaviour change techniques to increase self-efficacy and physical activity in a review comprising 24 studies. The findings indicated that many self-regulation

intervention techniques that are effective for younger adults may not be effective for older adults, and that physical activity and exercise play an essential role in maintaining independence, reducing the risk of falling, and allowing older people to live their lives well (59). All previously mentioned reviews are presented in the table below.

Table 1. Aim and conclusions in qualitative and quantitative reviews of physical activity in older people

Authors/title	Aim	Conclusions
Franco et al. (165) **Older people's perspectives on participation in physical activity: a systematic review and thematic synthesis of qualitative literature** 132 studies included	To identify and synthesise the range of barriers and facilitators to physical activity participation.	Strategies to enhance physical activity participation among older people should include (1) raising awareness of the benefits and minimise the perceived risks of physical activity and (2) improving the environmental and financial access to physical activity opportunities.
Baert et al. (166) **Motivators and barriers for physical activity in the oldest old: A systematic review** 44 studies included	To gain knowledge of motivators and barriers for physical activity for the oldest old.	When promoting physical activity in the oldest old, special attention is paid to the health benefits of physical activity, to the subject's fears, individual preferences, and social support, and to constraints related to the physical environment.
Olanrewaju et al. (167) **Physical Activity in Community-Dwelling Older People: A Systematic Review of Reviews of Interventions and Context** 40 studies included	To identify evidence gaps and inform policy relating to ageing well and cognitive health.	PA can offer small benefits to brain health, but evidence on how much activity is required to produce this effect is lacking. Behavioural (walking, exercise) and cognitive (counselling and motivational interviews) interventions are effective for the short-term uptake of physical activity in older people. To maintain long-term participation in PA, individualised interventions modelled using behavioural theories may be required.
Ige-Elegbede, Pilkington, Gray, and Powell (169) **Barriers and facilitators of physical activity among adults and older adults from Black and Minority Ethnic groups in the UK: A systematic review of qualitative studies** 10 studies included	To undertake a synthesis of existing qualitative studies, using a meta-ethnographic approach, to explore the barriers and opportunities for physical activity among adults and older adults from BME communities in the UK.	Interventions aimed at improving physical activity participation among older adults should be acceptable and accessible to minority groups. Further research is needed to investigate the barriers and facilitators of physical activity among older adults from African backgrounds.
Siddiqi et al. (170) **Understanding impediments and enablers to physical activity among African American adults: a systematic review of qualitative studies** Only 12 studies included the relevant age group and results are grouped in adults and older adults +/- 50 years	In the United States, African Americans are less physically active and have a higher proportion of many chronic diseases in comparison to Caucasians. This disparity needs to be well understood in order to design and implement effective interventions aimed at increasing physical activity levels among African Americans.	Many hindrances were common among both groups while the need for targeted exercise programs addressing the specific needs of older adults posed a unique challenge to this age group. The positive health benefits associated with engaging in physical activity were a prevalent enabler among both adults and older adults. Structured group activities, program availability at the community and church setting and easy access to open space and parks were facilitators among both age groups.
Horne and Tierny (171) **What are the barriers and facilitators to exercise and physical activity uptake and adherence among South Asian older adults: A systematic review of qualitative studies** 11 studies included	To synthesise views and experiences of South Asian (SA) older adults in relation to exercise and physical activity (PA).	Drawing on community resources to generate group norms appears to be important when trying to increase exercise and PA among SA older adults. Implications of the results for PA promotion and provision are discussed.

Farrance et al. (172) **Adherence to community-based group exercise interventions for older people: A mixed-methods systematic review** 10 studies included (five quantitative, three qualitative, and two mixed-methods study designs)	To assess the views and adherence of participants attending community-based exercise programmes of ≥6 month's duration.	Based on limited findings there is some indication that community-based group exercise programmes have long-term adherence rates of almost 70%. Incorporating the views of older people into programme designs may guide innovative interventions leading to sustained adherence.
Room et al. (173) **What interventions are used to improve exercise adherence in older people and what behavioural techniques are they based on? A systematic review** 11 studies included	To assess the effectiveness of these interventions and to evaluate the behavioural change techniques underpinning them using the Behaviour Change Technique Taxonomy (BCTT).	This review provides a synthesis of evidence specifically for older patients, without considering a specific condition. Four papers reported positive results. Three of these interventions were categorised in the feedback and monitoring category. Interestingly, the method of feedback or monitoring differed across these studies, yet they all demonstrated positive results.
Morgan et al. (174) **A life fulfilled: positively influencing physical activity in older adults - a systematic review and meta-ethnography** 39 studies included	This study aimed to conduct a systematic and inductive qualitative synthesis of the large body of qualitative research describing what influences physical activity at this age, and older adults' experiences of physical activity.	Insights from this study suggest we need to reframe our approach to consider the wider set of goals and aspirations which are of greater personal importance to older adults, and future interventions should focus on how physical activity can contribute to life satisfaction, sense of purpose, and sense of role fulfilment in older age.
Barnett, Guell, and Ogilvie (175) **The experience of physical act ivity and the transition to retirement:** **a systematic review and integrative synthesis** **of qualitative and quantitative evidence.** Five qualitative studies included	To gain a deeper understanding of the quantitative review findings, qualitative evidence on experiences of and views on PA around the transition to retirement was systematically reviewed and integrated with the quantitative review findings.	To encourage the adoption and maintenance of PA after retirement, interventions should promote health-related and broader benefits of PA. Interventions for retirees from lower occupational groups should take account of busy post-retirement lifestyles and the low personal value that might be attributed to recreational PA.
Hunter et al. (176) **Experiences of people with Parkinson's disease and their views on physical activity interventions: a qualitative systematic review** 19 studies included.	The objective of the review was to synthesize the best available qualitative evidence on the experiences and preferences of people with Parkinson's disease for physical activity, their perceived motivators and barriers to engagement, as well as their views on support mechanisms and behaviour change interventions designed to sustain participation.	This review revealed that people with Parkinson's disease viewed physical activity as an enjoyable and positive experience, which aided with control of their symptoms and enhanced their wellbeing and quality of life. This review provides important insights into the challenges of undertaking physical activity while living with a progressive and fluctuating disease. A limitation of this review is that it does not address the views and experiences of people with Parkinson's disease who are inactive.
Pedersen and Saltin (177) **Exercise as medicine – evidence for prescribing exercise as therapy in 26 different chronic diseases** Evidence overview	To provides the reader with the up-to-date evidence-based basis for prescribing exercise as medicine in the treatment of 26 different diseases.	We have interpreted the scientific literature and for each of 26 different diseases covering various aspects of the medical curriculum are included, providing the reader with our best advice regarding the optimal type and dose for prescription of exercise. In order to enhance the physical activity level of a population, accessibility is important. There is a need for political statements and laws about "health consequences".
Cunningham et al. (53) **Consequences** **of physical inactivity** **in older adults:** **A systematic review of review s and meta-analyses** 24 studies included	To provide a comprehensive and systematic overview of the epidemiological evidence of the specific consequences of physical inactivity on physical and mental health outcomes in older adults.	This review of reviews provides a comprehensive and systematic overview of epidemiological evidence from previously conducted research to assess the associations of physical activity with physical and mental health outcomes in older adults.

Martínez Domingues et al. (178) **The effect of programmed exercise over anxiety symptoms in midlife and older women: a meta-analysis of randomized controlled trials**	To clarify the effect of programmed exercise over mild-to-moderate anxiety symptoms (ASs) in midlife and older women.	It can be concluded that MTEIs (Mid-Term Exercise Intervention) of low-to-moderate intensity seems to improve mild-moderate ASs in midlife and older women.
Rogers et al. (179) **Perceived Benefits of Meditative Movement in Older Adults**. A systematic review including both qualitative, quantitative, and mixed-method, 37 studies included	The purpose of this review is to report the perceived psycho-social benefits and health outcomes of meditative movement such as Tai chi (TC) and Qigong to inform clinicians on what interventions ‘‘work’’ under what conditions and for whom.	All of the qualitative studies made some reference to social support in their discussion of why individuals joined TC classes. Further, there was a decrease in pain, improvements in SF12, SF20 SF36, and function. Reason for participation: availability or enhancement of social support.
Windle et al. (180) **Is exercise effective in promoting mental wellbeing in older age?** A systematic review including both qualitative and quantitative 13 studies included, only one qualitative study included.	To examine the clinical and cost-effectiveness of exercise and physical activity interventions on mental well-being in people aged 65+.	Mental well-being in later life is modifiable through exercise and physical activity.
Liu and Latham (110) **Progressive resistance strength training for improving physical function in older adults** The Cochrane Database of Systematic Reviews 18 studies included	To assess the effects of PRT on older people and identify adverse events.	PRT is an effective intervention for improving physical functioning in older people, including improving strength and the performance of some simple and complex activities. Physical activity interventions have also proven to be effective in terms of improving and maintaining the functional capacities of both frail and non-frail older adults.
de Morton et al. (181) **Exercise for acutely hospitalised older medical patients**. The Cochrane Database of Systematic Reviews Nine studies included	To determine the effect of exercise interventions for acutely hospitalised older medical patients on functional status, adverse events, and hospital outcomes.	There is 'silver' level evidence (www.cochranemsk.org) that multidisciplinary intervention that includes exercise may increase the proportion of patients discharged to home and reduce the length and cost of hospital stay for acutely hospitalised older medical patients.
Paterson and Warburton (182) **Physical activity and functional limitations in older adults: a systematic review related to Canada's Physical Activity Guidelines** 66 studies included	To conduct systematic reviews of the relationship between physical activity of healthy community-dwelling older (>65 years) adults and outcomes of functional limitations, disability, or loss of independence.	The present systematic review emphasised the relationship between physical activity and functional independence and cognitive function outcomes in older adults. The data support the physical activity recommendations derived from analysis of the relationship between physical activity and morbidity and mortality outcomes.
Theou et al. (183) **The Effectiveness of Exercise Interventions for the Management of Frailty: A Systematic Review** The Cochrane Database of Systematic Reviews 47 studies included	To consider the use of the term “frailty” in relation to exercise interventions and to examine the effectiveness of current exercise interventions for the management of frailty.	Structured exercise training seems to have a positive impact on frail older adults and may be used for the management of frailty.
De Labra et al. (184) **Effects of physical exercise interventions in frail older adults: a systematic review of randomized controlled trials** Nine studies included	To examine the exercise interventions to manage frailty in older people	This systematic review suggested that frail older adults seemed to benefit from exercise interventions, although the optimal program remains unclear.

Vogel et al. (185) **Health benefits of physical activity in older patients: a review**	To assess the health benefits of physical activity in older subjects.	Walking (at least 30 min per day preferentially all days of the week) appears as the exercise of choice among older subjects. Improving collaboration between physicians and other healthcare workers is essential. The heterogeneity of the older people must be taken into account to prescribe individualised and appropriate physical activities. Exercises including balance training, strength and flexibility exercises have been associated with a reduced risk of falls in older people, especially in a multidimensional approach.
Finnegan, Bruce, and Seers (186) **What enables older people to continue with their fall prevention exercises? A qualitative systematic review** 14 studies included	To review the qualitative literature that explores the barriers and facilitators to continued participation in falls prevention exercises after completion of a structured exercise programme.	Older people have their own individual and meaningful rationale for either continuing or stopping exercise after completion of a structured falls prevention exercise programme. Exploring these barriers and facilitators to continued exercise is key during the intervention phase.
McInnes and Askie (187) **Evidence reviews on older people's views and experiences of fall prevention strategies** A systematic review including both qual. and quant., 24 studies included, only two of the ten qualitative studies concerned physical activity	To inform the development of a national guideline on fall prevention in older people. (As many fall programs include an exercise component, the evidence also includes studies relating to older people and exercise in general.	Assistance or referral to the appropriate service should be provided to address modifiable individual factors that may be barriers to participation. To engender and maintain interest in falls prevention programs, potential participants should be given written and verbal information on the preventable nature of some falls, how to stay motivated, and the physical and psychological benefits of physical activity and of modifying falls risk. Lastly, it was emphasised that the social aspects of fall prevention programs may be their strongest selling point particularly among those who do not have a history of physical activity.
Thomas et al. (188) **Does the "Otago exercise programme" reduce mortality and falls in older adults? : a systematic review and meta-analysis** Seven studies included	To evaluate the effect of the OEP on the risk of death and fall rates and to explore levels of compliance with the OEP in older adults.	Exercise programmes like OEP can reduce the risk of death and falls in older community-dwelling people.
Gillespie et al. (190) **Interventions for preventing falls in older people living in the community** The Cochrane Database of Systematic Reviews 159 studies included	To assess the effects of interventions designed to reduce the incidence of falls in older people living in the community.	Group and home-based exercise programmes, and home safety interventions reduce the rate of falls and risk of falling. Multifactorial assessment and intervention programmes reduce rate of falls but not the risk of falling; Tai Chi reduces the risk of falling.
Kenick et al. (191) **Exercise for reducing fear of falling in older people living in the community** The Cochrane Database of Systematic Reviews 30 studies included	To assess the effects (benefits, harms, and costs) of exercise interventions for reducing fear of falling in older people living in the community.	Exercise interventions in community-dwelling older people probably reduce fear of falling to a limited extent immediately after the intervention, without increasing the risk or frequency of falls. There is insufficient evidence to determine whether exercise interventions reduce fear of falling beyond the end of the intervention or their effect on other outcomes.
Sherrington et al. (192) **Exercise for preventing falls in older people living in the community** 108 studies included	To assess the effects (benefits and harms) of exercise interventions for preventing falls in older people living in the community.	Exercise programmes reduce the rate of falls and the number of people experiencing falls in older people living in the community (high-certainty evidence). Exercise programmes that reduce falls primarily involve balance and functional exercises, while programmes that probably reduce falls include multiple exercise categories.

Hopewell et al. (194) **Multifactorial and multiple component interventions for preventing falls in older people living in the community** The Cochrane Database of Systematic Reviews 62 studies included	To assess the effects (benefits and harms) of multifactorial interventions and multiple component interventions for preventing falls in older people living in the community.	Multifactorial interventions may reduce the rate of falls compared with usual care or attention control. Multiple component interventions, usually including exercise, may reduce the rate of falls and risk of falling compared with usual care or attention control.
French et al. (59) **Which Behaviour Change Techniques Are Most Effective at Increasing Older Adults' Self-Efficacy and Physical Activity Behaviour? a systematic review** 24 studies included	To identify behaviour change techniques (BCTs) that increase self-efficacy and physical activity behaviour in non-clinical community-dwelling adults 60 years or over.	Physical activity and exercise play an essential role in maintaining independence, reducing the risk of falling, and allowing older people to live their lives well. Many commonly used self-regulation intervention techniques that are effective for younger adults may not be effective for older adults.

2.5.2 Research regarding physical activity after hip fracture

Following up on the topics of falls, this section presents earlier research connected to a potential consequence of falls, namely hip fractures. The search disclosed reviews of different designs concerning different aspects whereas three had a pure qualitative design (195-197), see Table 2. The aspects discussed in the following presentation relates to experiences and perspectives of routine community physiotherapy rehabilitation, experience concerning the participants' physical and mental health, functional performance, and participation as well as experiences of recovery in a health-promoting perspective. Finally, findings from a scoping review investigating interventions of rehabilitation in the community for patients following hip fractures will be presented. Notably, the results from quantitative reviews and single studies will be presented regarding the respective aspects.

Blackburn and Yeowell (195) (see Table 2) included ten qualitative studies in their thematic synthesis aiming to understand and examine patients' views, experiences, and perspectives of routine community physiotherapy rehabilitation after hip fracture surgery. Further, the interviews were conducted from less than three months after surgery up to 12 months postoperatively. The analysis identified three themes: Engaging in physical activity; Maintaining a positive perspective, and Support (195). Communication was considered a common red thread across the themes and findings further underlined the psychological distress felt by the participants, suggesting support from the rehabilitation services on these matters (195). The authors call for more research focusing on the patient perspective and experience in the improvement of hip fracture care pathways regarding rehabilitation in the community setting after hip fracture, especially concerning communication methods (195). Kulijlaars et al. (198) (Table 2) sought to find out whether supervised home-based exercise

was more effective than a control intervention including usual care in older patients after hip fractures, but found no evidence for this in their quantitative review of nine studies, although the included studies were considered having low therapeutic validity.

Ehlers et al. (199), see Table 2, aimed to identify and synthesize scientific evidence on older adults' experience after hip fracture concerning their physical and mental health, functional performance, and participation and to determine which personal or social factors influence functional capacity after hip fracture. The study included 11 studies wherein the participants were either admitted to hospital, undergoing geriatric rehabilitation at a geriatric clinic, or home-dwelling and living by themselves with family members or with cohabitant partners (199). The following five descriptive syntheses emerged from the analysis: (1) mobility; (2) personal activities of daily living (PADL) and instrumental activities of daily living (IADL); (3) interaction with friends, family, and professionals; (4) residential status; and (5) adaption strategies, indicated that hip fractures affected the older adults' mobility, body image, mental health, and capacity for participation (199). Zusman et al. (200) (see Table 2) focused on sedentary behaviour and physical activity after hip fractures in a quantitative review of 14 studies. The authors of this review concluded that older adults with hip fractures have prolonged sedentary behaviour accompanied by low levels of physical activity during the recovery and rehabilitation period (200).

Chudnyk et al. (201) found, across all of the intervention types, the most frequently reported positive outcomes of hip fracture rehabilitation to be associated with measures of ambulatory ability, see Table 2. Other intervention categories regarded functional recovery, strengths, and balance recovery (201). Further, decreased length of stay and increased falls self-efficacy were associated with two interventions, while one intervention had a positive effect on lower-extremity power generation (201).

Lind and Mahler (202) aimed to describe and interpret how older adults who have returned home to recover from a hip fracture cope with life in a health-promoting perspective in their systematic mixed-methods review consisting of 17 studies, see Table 2. The findings underlined recovery as an individual process of regaining health, the importance of including the person’s resources and own goals in life and that physical training must be combined with psychosocial interventions to promote personal engagement and health (202). A quantitative evidence overview regarding the current prescription of exercise after hip fractures suggested that outcomes are improved with rehabilitation, however, many frail older people with a disability before their hip fracture will require an individualised exercise program including

practice with functionally relevant activities (203), see Table 2. Lind and Mahler further postulate that research should reveal how autonomy and participation in recovery are promoted and respected and that researchers must be aware of intersectional variations concerning, for example, age, gender, culture, religion, and socio-economic status in research in recovery after hip fracture (202). Researchers in clinical nursing must be aware of the differences between *health promotion*, which has an everyday life perspective, and *prevention*, which has a medical perspective (202).

Copanitsanou (204) investigated interventions of rehabilitation in the community for patients following hip fractures in a scoping review (Table 2). The findings indicated contradiction about the effects of extended exercise given that there are studies in which mobility, physical function, strength, balance, and walking ability are improved with exercise, but there are also studies where there is limited or no evidence in favour of exercise for the same outcomes compared to the usual rehabilitation (Table 2). However, exercise rehabilitation programs offered beyond the regular rehabilitation period after hip fractures were reviewed by Auais et al. (98) in a quantitative systematic review and meta-analysis of 11 studies where the authors concluded that extended exercise showed promising results in improving the participants' functional capacities. Beckmann et al. (205) assessed the exercise interventions' effects on enhancing physical functionality in the early phase after a hip fracture (Table 2). From the nine quantitative studies reviewed, they found exercise interventions to have the potential to improve physical function in the early phase after hip fracture, but there was uncertainty regarding what the best kind of exercise might be (205). Two earlier quantitative reviews found similar uncertainty regarding the kind of exercise in their search for what best practice guidelines might be, aiming at improving physical (116, 123) and psychosocial (116) functioning among hip fracture patients, also presented in Table 2.

Lower-limb progressive resistance exercise was examined as an intervention after hip fracture surgery (206) in a review and meta-analysis, as displayed in Table 2, where findings indicated improved mobility, activities of daily living, balance, lower-limb strength or power, and performance task outcomes after performing this kind of exercise. Similarly, Diong et al. (118) found structured, resistance training to result in small improvements in overall mobility in their meta-analysis of 13 studies with an advantage of progressive resistance training (Table 2).

Copanitsano (204) also found conflicting evidence about the optimal intensity of the interventions, with studies reporting that the beneficial effects disappear over time and others demonstrating that the positive effects differ significantly between patients undergoing short and long rehabilitation. In an included qualitative study of community-dwelling older adults' engagement in rehabilitation after a hip fracture, participants emphasised the value of physical activity (207). Another included qualitative study involving a survey of members of multidisciplinary rehabilitation teams and focus groups with patients and carers, participants felt that rehabilitation should be focused on improving patient engagement by individualised interventions focused on reducing fear of falls, on improving self-efficacy to exercise ADLs, and on coordinating rehabilitation delivery (208). A meta-analysis of RCTs (209) (Table 2) found systematic geriatric interdisciplinary rehabilitation performed by teams to increase physical function and mobility significantly compared with conventional care among patients with hip fracture, though the chance of being discharged to one's own home and survival was not impacted.

Table 2. Aim and conclusions in qualitative and quantitative reviews of physical activity after hip fractures

Authors/title	**Aim**	**Conclusions**
Blackburn and Yeowell (195) **Patients' perceptions of rehabilitation in the community following hip fracture surgery. A qualitative thematic synthesis** 10 studies included	This review aimed to understand and examine patients' perspectives, views, and experiences of physiotherapy rehabilitation in the community after hip fracture surgery, to improve future clinical practice for this population.	Findings support the need for the patient perspective and experience to be considered in the improvement of hip fracture care pathways regarding rehabilitation in the community setting after hip fracture. This can help identify key areas of improvement in rehabilitation to enhance and improve the patient's journey after hip fracture.
Kulijlaars et al. (198) **Effectiveness of Supervised Home-Based Exercise Therapy Compared to a Control Intervention on Functions, Activities, and Participation in Older Patients After Hip Fracture: A Systematic Review and Meta-analysis;** Nine studies included	To investigate whether supervised home-based exercise therapy after hospitalization is more effective in improving functions, activities, and participation in older patients after a hip fracture than a control intervention (including usual care).	Research findings show no evidence in favour of home-based exercise therapy after hip fracture for most outcomes of functions, activities, and participation. However, trials in this field have low therapeutic validity (absence of a rationale for content and intensity and reporting of adherence), which results in interventions that do not fit patients' limitations and goals.
Ehlers et al. (199) **Experiences of older adults after hip fracture: an integrative review**. 11 studies included (four qualitative, six prospective cohort studies, and one RCT).	To identify and synthesize scientific evidence on older adults' experience after hip fracture in relation to their physical and mental health, functional performance, and participation and to determine which personal or social factors influence functional capacity after hip fracture.	Hip fracture affected the older adults' mobility, body image, mental health, and capacity for participation. Pain measurement tools focusing on various perspectives of health as well as rehabilitation programs focusing on changes in body function and body image and increased awareness of vulnerability in older adults may promote functional capacity after hip fracture.
Zusman et al. (200) **A systematic review of the evidence for older adults' sedentary behaviour and**	To synthesize evidence on older adults' sedentary behaviour and physical activity during rehabilitation and recovery for hip	Based on available evidence, older adults with hip fractures engage in prolonged sedentary behaviour and have low levels of physical activity during rehabilitation and recovery.

physical activity after hip fracture 14 studies included	fracture (1) across the care continuum and (2) from clinical interventions.	
Chudyk et al. (201) **Systematic Review of Hip Fracture Rehabilitation Practices in the Elderly** 55 studies included	To address the need for a research synthesis on the effectiveness of the full range of hip fracture rehabilitation interventions for older adults and make evidence-based conclusions.	The most frequently reported positive outcomes were associated with measures of ambulatory ability, improved functional recovery, and improved strength and balance recovery.
Lind and Mahler (202) **A systematic mixed methods review: Recovering from a hip fracture in a health promoting perspective** 17 studies included (eight qualitative, one mixed, and eight quantitative).	To describe and interpret how older adults who have returned home to recover from a hip fracture cope with life from a health-promoting perspective.	Recovery is an individual process of regaining health. It is important to include the person's resources and own goals in life. Physical training must be combined with psychosocial interventions to promote personal engagement and health. Research should reveal how autonomy and participation in recovery are promoted and respected.
Sherrington et al. (192) **Physical exercise after hip fracture: an evidence overview** Evidence overview	To provide an overview of the current evidence regarding the prescription of exercise for people after hip fracture.	Outcomes are improved with rehabilitation, however, many frail older people with a disability prior to their hip fracture will require an individualised exercise program. This should include practice with functionally relevant activities. Current guidelines do not include detailed recommendations about exercise for hip fracture.
Copanitsanou (204) **Community rehabilitation interventions after hip fracture: Pragmatic evidence-based practice recommendations** Scoping review	To provide the practitioner with an overview of rehabilitation interventions for patients following hip fracture discussed in the literature.	There are contradictory findings of the effects of extended exercise, as there are studies in which mobility, physical function, strength, balance, and walking ability are improved with exercise, while there are others in which there is limited or no evidence in favour of exercise for the same outcomes compared to the usual rehabilitation.
Auais et al. (98) **Extended exercise rehabilitation after hip fracture improves patients' physical function: a systematic review and meta-analysis** 11 studies included	To review and quantify the reported effects of an extended exercise rehabilitation program offered beyond the regular rehabilitation period on improving physical functioning for patients with hip fractures.	Even modest gains in mobility and balance may translate to substantial cost savings if a second hip fracture is prevented or admission to long-term care is delayed. The introduction of an extended exercise programme has been suggested as a promising strategy for improving their functional capacity.
Beckmann et al. (205) **Effect of exercise interventions in the early phase to improve physical function after hip fracture – a systematic review and meta-analysis** Nine studies included	To examine the effect of exercise interventions to improve physical function in the early phase after hip fracture.	Exercise interventions for persons recovering from hip-fracture surgery could have the potential to improve physical function after hip fracture in the sub-acute phase, but the kind of exercise that might be superior remains unclear, according to this analysis.
Crotty et al. (116) **Rehabilitation interventions for improving physical and psychosocial functioning after hip fracture in older people** The Cochrane Database of Systematic Reviews Nine studies included	To evaluate the effects of interventions aimed at improving physical and psychosocial functioning after hip fracture.	There are no set guidelines for best practice exercise programs after hospital discharge. Further research on interventions described in this review is required, including attention to timing, duration, setting, and administering discipline(s), as well as treatment across care settings.
Handoll et al. (123) **Interventions for improving mobility after hip fracture surgery in adults** 19 studies included	To evaluate the effects of different interventions for improving mobility after hip fracture surgery in adults.	There is insufficient evidence from randomised trials to establish the best strategies for enhancing mobility after hip fracture surgery.
Lee et al. (206) **Effect of Lower-Limb Progressive Resistance Exercise (PRE) After Hip Fracture Surgery: A Systematic Review**	To evaluate whether PRE can improve (1) mobility and (2) other physical functions in elderly patients after hip fracture surgery.	Our meta-analysis revealed that PRE after hip fracture surgery improves mobility, activities of daily living, balance, lower-limb strength or power, and performance task outcomes. Because of the small sample size in this meta-analysis and considering the increasing incidence of hip fractures,

and Meta-Analysis of Randomized Controlled Studies Eight studies included		there is a need for large-scale randomized controlled trials to confirm the functional improvement and adverse effects of PRE.
Diong et al. (118) **Structured exercise improves mobility after hip fracture: A meta-analysis with meta-** 13 studies included	To determine the effect of structured exercise on overall mobility in people after hip fracture. To explore associations between trial-level characteristics and overall mobility.	In summary, this systematic review provides good evidence that structured exercise improves overall mobility after hip fracture. Specifically, clinicians can be confident that greater improvements are possible with progressive resistance training.
Nordström et al. (209) **Effects of geriatric team rehabilitation after hip fracture: a meta-analysis of randomized controlled trials** Seven studies included	The present meta-analysis aimed to evaluate the effects of interdisciplinary geriatric team rehabilitation in older patients with hip fracture.	Systematic rehabilitation by geriatric interdisciplinary teams increases physical function and mobility significantly compared with conventional care in patients with hip fractures. In contrast, the chance of being discharged to one's own home and survival is not influenced.

2.5.3 Reablement (in Norwegian: 'Hverdagsrehabilitering') - recent research

In this subsection, a few findings from research concerning the reablement service will be presented since physical activity is an important part of this service. In addition, the reablement service is described in subsection 2.4.2 as integrated into the rehabilitation service in Norway. Interdisciplinary rehabilitation, like the reablement service, has been focused in Norwegian health care practices over the last years, in response to the increased demand for home care services.

Australia, New Zealand, and the UK have been at the forefront of the development and practice of reablement (210). An effectiveness examination of the reablement service was reviewed including 10 studies in those three regions (210), where findings observed a reduction in healthcare service utilisation, see Table 3. Especially interesting for this study, is the integration of physical activity into reablement settings, which was reviewed by Mjøsund et al. (150), see Table 3; to map existing evidence on this for the group of community-dwelling older adults and to identify knowledge gaps. This study included 51 studies in a systematic scoping review; one of three research questions was: What evidence regarding experiences (of older adults, health care professionals, and family members) and barriers related to physical activity facilitation in a reablement setting can be identified? The findings indicated that there was limited evidence of how physical activity is integrated and targeted to older adults' individual needs and preferences in a reablement setting and that the feasibility and effectiveness of physical activity interventions, as well as experiences or barriers related to physical activity in a reablement setting, should be further investigated (150).

The reablement service and its definition and operationalisation was analysed in a new scoping review by Clotworthy et al. (211), see Table 3 where findings indicate a lack of consensus about how this relatively new service can be more effectively implemented and supported in professional home care practice, and therefore made it difficult to determine a conceptual description of it as a unique and distinct service. In a qualitative study, Eliassen and Lahelle (2020) discussed how physical therapists as part of reablement teams, plan and adapt training interventions to enhance users' functional abilities and found a challenge in combining physical function and goal-oriented activities (212). The use of only one aspect of training may curtail the potential for functional improvement, while a combination of the two is more likely to meet the principles of motor learning theories (212).

Table 3. Aim and conclusions in recent reviews on reablement

Authors/title	**Aim**	**Conclusions**
Tessier et al. (210) **Effectiveness of Reablement: A Systematic Review** 10 studies included	To examine the effectiveness of reablement, as well as its different service models.	The implementation of reablement was studied in three regions, and all observed a reduction in healthcare service utilization. Considering its effectiveness and positive impact observed in several countries, the implementation of reablement is a promising avenue to be pursued by policymakers.
Mjøsund et al. (150) **Integration of Physical Activity in Reablement for Community-Dwelling Older Adults: A Systematic Scoping Review** 51 studies included	To map existing evidence of how PA strategies are integrated and explored in studies of reablement for community-dwelling older adults and to identify knowledge gaps.	There is limited evidence of how PA is integrated and targeted to older adults' individual needs and preferences in a reablement setting. The feasibility and effectiveness of PA interventions, as well as experiences or barriers related to PA in a reablement setting, should be further investigated.
Clotworthy et al. (211) **Reablement through time and space: a scoping review of how the concept of 'reablement' for older people has been defined and operationalised**	Could an analysis of the concept's genealogy illuminate how reablement can be more effective and beneficial in theory and in practice?	Until legislators, health professionals, and older people can collectively reach a consensus about how person-centred reablement can be more effectively implemented and supported in professional home-care practice, it will be difficult to determine a conceptual description of reablement as a service that is unique, separate, and distinct from standard rehabilitation.

2.5.4 Therapeutic alliance - recent research

In paper 2, a therapeutic alliance was discussed, and the theory as such will be further presented in chapter 3. In this section, some recent works, focusing on the therapeutic alliance, will be presented. O'Keeffe et al. (2016) investigated patients' and physical therapists' perceptions of factors that influenced patient-therapist interactions in a qualitative review and meta-synthesis including 13 studies (Table 4). The authors found the following factors to be influential to the interaction; interpersonal factors, clinical factors, and organizational factors, and that physical therapists' awareness of these could enhance patients' interactions and treatment outcomes. Further research should be made to identify

which of these factors actually influenced the interactions (196). Taccolini et al. (213) aimed to investigate the role of therapeutic alliance in pain relief in patients with musculoskeletal disorders treated by physiotherapy in a systematic review of six studies but did not find any evidence of a strong relationship between the therapeutic alliance and pain relief (Table 4). Babatunde, MacDermid, and MacIntyre (214) performed a scoping review of 26 articles to map out conceptual frameworks, themes, measures, and determinants of therapeutic alliance in musculoskeletal rehabilitation across physiotherapy and occupational therapy disciplines (Table 4). In these articles, the relationship between adherence and a therapeutic alliance was examined of which 57 % showed some correlation, although several knowledge gaps were identified concerning therapeutic alliance in rehabilitation (214).

This was supported in a qualitative study (215) examining experiences and perceived impact of physiotherapist-led exercise interventions for knee pain attributable to osteoarthritis. Findings showed that strong therapeutic alliance during treatment appeared to facilitate adherence to exercise and general physical activity. In another systematic review including both qualitative and quantitative studies performed by Kinney et al. (216), a strong therapeutic alliance was indicated to improve pain outcomes for individuals participating in physical therapy for chronic musculoskeletal pain (Table 4). To facilitate a strong therapeutic alliance, physical therapists must understand factors that positively and negatively influence the relationship (216). Since the therapist variability in the alliance appears to be more important than patient variability for improved patient outcomes (217), elucidation of these therapeutic factors may guide professional adjustments to improve health services.

No reviews examining the therapeutic alliance focusing on physical activity interventions or -services delivered to the oldest group of patients were found. There is further a lack of studies on therapeutic alliance regarding rehabilitation (214) and musculoskeletal physiotherapy (213).

Table 4. Aim and conclusions in recent reviews on therapeutic alliance

Authors/title	**Aim**	**Conclusions**
O'Keeffe et al. (196) **What Influences Patient-Therapist Interactions in Musculoskeletal Physical Therapy?** Qualitative Systematic Review and Meta-Synthesis 13 studies included	To investigate patients' and physical therapists' perceptions of factors that influence patient-therapist interactions.	A mix of interpersonal, clinical, and organizational factors are perceived to influence patient-therapist interactions, although research is needed to identify which of these factors actually influence patient-therapist interactions. Physical therapists' awareness of these factors could enhance patient interactions and treatment outcomes. Mechanisms to best enhance these factors in clinical practice warrant further study.

Taccolini et al. (213) **The role of the therapeutic alliance on pain relief in musculoskeletal rehabilitation: A systematic review** Six articles included	To investigate the role of therapeutic alliance in pain relief in patients with musculoskeletal disorders treated by physiotherapy.	A lack of studies on the therapeutic alliance regarding musculoskeletal physiotherapy was verified. Existing studies fail to provide evidence of a strong relationship between the therapeutic alliance and pain relief.
Babatunde et al. (214) **Characteristics of therapeutic alliance in musculoskeletal physiotherapy and occupational therapy practice: a scoping review of the literature** 26 studies included	To map out the available literature on therapeutic alliance conceptual frameworks, themes, measures, and determinants in musculoskeletal rehabilitation across physiotherapy and occupational therapy disciplines.	Therapeutic Alliance has been studied to a limited extent in the rehabilitation literature with conflicting frameworks and findings. Potential benefits described for enhancing therapeutic alliance might include better exercise adherence. Several knowledge gaps have been identified with a potential for generating future research priorities for therapeutic alliance in musculoskeletal rehabilitation. Most of the therapeutic alliance themes extracted were from patient perspectives.
Kinney et al. (216) **The impact of therapeutic alliance in physical therapy for chronic musculoskeletal pain: A systematic review of the literature** 14 studies included	To systematically determine the specific impact of the therapeutic alliance (TA) on chronic musculoskeletal pain, identify factors influencing TA between physical therapists and patients with chronic musculoskeletal pain, and determine the working definition of TA across studies.	Emerging evidence suggests that for individuals participating in physical therapy for chronic musculoskeletal pain, a strong TA may improve pain outcomes. To facilitate a strong TA, physical therapists must understand factors that positively and negatively influence the relationship. Studies demonstrate that the definition of TA remains consistent as it transitions to the physical therapy setting.

2.6 Knowledge gap, rationale, and aim

The overall goal of this Ph.D. project was to contribute to new research-based knowledge on enhancing the quality of health care services that could inform policy, clinical practice, and research on how to better address older home-dwelling people's needs and perspectives in interventions, services, or programs where physical activity or exercise is involved.

In the previous sections of this chapter, an attempt has been made to point at evidence-based knowledge and practice of the importance of physical activities, especially for older people in need of health care services, both in terms of the well-established benefits from it (98, 109, 116, 123, 177, 185, 193, 205) and with respect to the growing focus on physical activity in international (19, 23, 37) and national (129, 130) policy aiming at older people. During the last decade, national health reforms and regulations have increased municipalities' responsibility for rehabilitation services in Norway, of which physical activity denotes a significant element. As rehabilitation services should be targeted to the individual's needs and preferences, knowledge of older peoples' experiences regarding physical activity aspects is imperative to implement physical activity interventions into individual rehabilitation services (172, 174, 186, 195).

The update of the review presented above uncovered that there is continuous research in the field, though there is still much left to future research activity. In the largest review presented previously, see page 27, the authors found that some older people still believe that physical activity is unnecessary or even potentially harmful (165), which makes the low activity levels in older people understandable. Insights from the study of Morgan et al. (174) suggest that the existing approach must be reframed to consider a wider set of goals and aspirations which are of greater personal importance to older adults; also, future interventions should focus on how physical activity can contribute to life satisfaction, sense of purpose/meaning, and sense of role fulfilment in older age. Research should further illuminate how autonomy and participation in recovery are promoted and respected (202). To fully understand older people's perspectives, more qualitative research is needed. This represents the overall knowledge gap for this project, addressed in our overall aim, which was:

> *- to explore and describe community-living older adults' experiences with physical activity as part of their recovery, by participation in two different exercise interventions and in ordinary rehabilitation services, with a special focus on older people who had experienced a hip fracture.*

Furthermore; according to what is known about exercise among the oldest and frailest, frailty is not a contraindication to exercise, but conversely, one of the most important reasons to prescribe it (218). A need for more studies regarding frail populations was felt to select the most favourable exercise program (184). As suggested in section 2.2, people who experience hip fractures are often vulnerable and fragile (98) and inactivity during hospitalisation may contribute to functional decline and post a major health risk to frail, elderly patients (99, 100). More research is needed to ascertain which factors have the strongest influence on adherence to community-based group exercise interventions for older people in a long-term perspective and to address the importance of programme design (172). To address these knowledge gaps, the aim in paper 1, where participants were 80 years and above, was:

> *- to highlight the experiences of older people's motivation for participating in and adhering to a group-based exercise intervention in a local community setting.*

We found no reviews or studies which had examined the therapeutic alliance in physical activity interventions or -services delivered to the oldest group of patients who suffered from hip fractures, which represents a knowledge gap related to this particular aspect. Hall et al. (219) found the alliance between therapist and patient appears to have a positive effect on

treatment outcome in physical rehabilitation settings (Table 4); however, they called for more research to determine the strength of this association. More research on the theme of the therapeutic alliance in musculoskeletal physiotherapy is also needed (213) to identify which of the interpersonal, clinical, and/or organisational factors actually influence patient-therapist interactions (196). Babatunde et al. (214) proposed further research to respond to the disclosed knowledge gaps by focusing on developing a physical rehabilitation themed framework of TA, psychometric testing of existing TA measures and designing trials to investigate the effect of therapist TA training on long term treatment outcomes and treatment adherence in MSK (musculoskeletal) practice. In paper 2, we address the knowledge gap concerning therapeutic alliance in order:

> *- to explore how older people who had participated in an evidence-based exercise intervention after hip fracture surgery describe their relationship with their therapists and how this relationship might have contributed to their motivation to execute their exercise regime*.

Physical activity and exercise are important parts of rehabilitation after hip fractures for older people. Exercise interventions have been found to have the potential to improve physical function in the early phase after hip fracture, but there is uncertainty regarding the best kind of exercise (205). Two earlier quantitative reviews found similar uncertainty regarding the kind of exercise in their search for what best practice guidelines might be, aiming at improving physical (116, 123), and psychosocial (116) functioning among hip fracture patients. In the light of the policy's goal of targeting rehabilitation services to the individual's needs and preference, patients' perspective regarding participation in physical activity programs could be an important contribution to fulfil the knowledge gap regarding best practice guidelines. In paper 3, we sought:

> *-to explore the reflections and thoughts of older people following their participation in the evidence-based High-Intensity Functional Exercise Program (HIFE) during the first three weeks of rehabilitation after hip fracture surgery. We sought information about the impact of the program with respect to the participants' mobility, their own resources for managing the situations they confronted in their everyday lives, and their views on whether the mobility challenges were worth their investment and commitment*.

For older people living in the municipalities, health care services, including physical activity, are of importance after having experienced a hip fracture. However, there is an inadequate description of how these services impact the recovery of older people.

Blackburn and Yeowell (195) call for more research focusing on the patient perspective and experience in the improvement of hip fracture care pathways regarding rehabilitation in a community setting after hip fracture, especially concerning communication methods (195). Ehler et al. (199) indicated that the use of adaptation strategies helped older adults cope with their fracture, but further research is needed to determine how men and women select and use adaption strategies. Reablement is a relatively new municipality service wherein physical activities are integrated. However, there is limited evidence of how physical activity is integrated and targeted to older adults' individual needs and preferences in a reablement setting (150). A contribution to the described knowledge gap is provided in paper 4, where the aim was:

> *- to explore and describe the experiences of recovery among community-living older people receiving rehabilitation services involving physical activity during the first eight months following hip-fracture surgery.*

3. CONCEPTUAL FRAMEWORKS

This chapter will provide an overview of the three conceptual frameworks or theories that are used to support and discuss the complexity of the findings of this Ph.D. project. As an overarching backdrop of the total project, Antonovsky's theory of salutogenesis will be presented as a useful framing for understanding older people's experiences based on its definition as a global orientation that expresses the extent to which one has a pervasive, enduring, and dynamic, feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected (29, p. 10). Salutogenesis is used to discuss overall findings in section 6.1 and is presented in section 3.1 in this chapter.

Further, a presentation of Bordin's conceptual framework of the therapeutic alliance (30) is presented in section 3.2 to highlight the importance of empowering relations to enhance health outcomes during exercise/ physical activity. Finally, a presentation of key enablers of recovery is presented in section 3.3, with a focus on the conceptual framework of recovery by Leamy et al. (28).

3.1 Salutogenesis

In this section, the main characteristics of salutogenesis, which are used in the framing of the discussions in papers 1 and 3, will be elaborated. Sense of coherence (SOC), stress, and general resistance resources (GRR) will be given special attention in subsections 3.1.1, 3.1.2, and 3.1.3, respectively.

The concept of salutogenesis is a combination of "salus", a Latin word for invincibility, wellbeing, or happiness and 2) "genese", which is Greek for genesis, meaning " origin". Aron Antonovsky (1923-1994) was an American Israeli sociologist who went on to be known as the father of the salutogenic theory (29). He rejected the dichotomic classification of people as experiencing either "ease" or "disease" which dominates the established pathogenic model of health and developed his salutogenic theory as an alternative way of understanding health (29, 39, 40). This way of thinking about health is grounded in a healthy perspective and in the resources in human beings and the environments (39, 40). It is referred to as a "strengths perspective", emphasising people's unique abilities, attributes, talents, capacities, hopes, values, visions, and knowledge, rather than focusing solely on problems, difficulties, needs,

and deficits people might have (220). The WHO health promotion conference in Ottawa, Canada, in 1986 (221) incorporated the use of a salutogenic approach, and ever since, a salutogenic approach to health has gradually developed in world health policies. This approach concludes that the way we view the world impacts our ability to cope with stress and that positive feelings help us to cope with life challenges. The theory provides insight into why people – despite stressful situations and hardships – manage to live a good life and focuses on the factors that might facilitate health, instead of searching for curing diseases (39, 40).

This basis suited the aim of this study well and was considered to be consistent with our philosophical perspective. The health promotion field is based on salutogenic health theory, representing an area of knowledge and learning, a way to relate to others, as well as a way of working (222). Physical activity in this project concerns both issues regarding relationships with others and the environment, enabling people to identify and mobilise their resources to cope with life challenges; for this reason, it has been considered a useful theory in health promotion (222, 223).

Antonovsky opined that humans are always interacting with a constantly shifting environment/context (39, 40) and developed his theory on these grounds. Health locus of control concerns the individual's expectation that health and illness may be influenced, regardless of his/her actual objective ability to influence them (224).

Human health and well-being, as well as the interrelationship between health, stress, and coping strategies are the focus of the salutogenic orientation (39, 40, 225). Although this conceptual framework mainly has been used to frame the discussions of the results of papers 1 and 3, and the discussion of the overall findings of the Ph.D. project as a whole, it also has contributed to the understanding of factors associated with how to use physical activity in different interventions and health services and how it may be experienced.

Salutogenesis holds a positive approach to health that is given in five basic assumptions (29, 40). At a rudimentary level, health is defined as a multidimensional continuum built upon an understanding that even if a person may be ill, he or she may still have healthy qualities to build on and will therefore be in a state between health breakdown (dis-ease) and full health (ease) regarding health as a dynamic and lifelong process where people participate actively in their respective contexts (39, 40). This phenomenon might be especially understandable among older people who often have several health conditions that can cause frequent "ups"

and “downs” in their overall experience of health. Physical activity or exercise can also contribute to movements towards the healthier end of the health continuum. Second, it is the holistic “story of the person” that matters, as opposed to the illness focus of the medical approach. The attempts to describe the life-world experiences of the participants in this project communicated well with this holistic and individual “story of the person.” Third, “health-promoting (salutary) factors” or possibilities must be the core of attention, not the pathogens or risk factors. The focus in all papers of this Ph.D. project was on physical activity and exercise, which are highly health-promoting. Fourth, tension and strain might be a potential health-promoting factor rather than a negative factor to fight against. In the context of this study, the health challenges to the extent our participants experienced, generated a right by law to receive health and care services (36) which might contribute to better health for people. The physical activity and/or exercise the participants of this Ph.D. project received can be seen as an example of a “positive” outcome of a basically “negative” experience. Finally, the fifth and last assumption underlines active adaptation as the ideal in treatment instead of assuming a “right treatment based on the right diagnosis” approach. According to these assumptions, Antonovsky’s (29, 39, 40) theory of salutogenesis focuses on the person as a whole, interacting with both internal and external environments.

Furthermore, “persons with a strong SOC are more likely to engage in behaviour that evidence indicates is good for the health, i.e. not eating between meals, not smoking, regular physical activity, and so on (40, pp. 152-153).” This framework is suitable to discuss experiences of physical activity among a group of people who may have a harder time finding motivation for it and for whom the process of change may be especially difficult. From the salutogenic perspective, persons with a strong identity and a strong feeling of self also have a strong SOC (39, 40). It is also concluded that SOC has a unique relation to health in general (paper 3), and the concept also seems to reflect an active self-esteem structure and self-determination (226).

Therefore, salutogenesis is the “core” theory in this Ph.D. project, perceived as an overall theory aligning well with the other theories used. According to Bhattacharya et al. (227), the concept of salutogenesis can advance the understanding of developing and maintaining health, which is in line with the overall aim of this Ph.D. project, presented in the introduction, last section, pages 10-11. Before starting the presentation of central elements of salutogenesis, I will present some criticism of the salutogenic theory, propounded by Lindstrøm and Eriksson (228). Some critical aspects were that the SOC concept is psychometrically unclear, the

theory is confounded with emotionality, and that there are other concepts available to explain health and their lack of evidence on the stability over time. For example, the authors stated that many studies have reported the results of the relationship between the SOC and construct such as locus of control, hardiness, and depression. I will not go into detail since this criticism is presented in "quantitative terms." In the following sub-section, I will separately highlight three central elements of salutogenesis interesting for this study, although they are interdependent, as the presentations will show.

3.1.1 Sense of coherence (SOC)

Antonovsky stated that even when people are exposed to the same external conditions, different people will have different health statuses (39, 40). The individual's cognitive and affective-motivational outlook on life, which in turn influences the degree to which one is in a position to make use of the resources available to maintain one's health and well-being, is termed "sense of coherence" (SOC) (39, 40). The salutogenic model of health–centres around the construct of "sense of coherence" (SOC) defined as:

> A global orientation that expresses the extent to which one has a pervasive, enduring though dynamic, feeling of confidence that one's internal and external environments are predictable and that there is a high probability that things will work out as well as can reasonably be expected (29, p. 10).

"Coherence" may be referring to, "balance", or "harmony" (4). The term "dynamic" refers to being active and changing (4), giving this outlook on life the meaning of constantly encountering new life experiences and being influenced by them, though being confident and in harmony. The strength of SOC will, in turn, influence the kind of life experiences. Consequently, life experiences seem to confirm the basic orientation to life, which, in turn, become stable and enduring. This concept, determining an individual's ability to stay well (29, 40), is claimed to be a culture-sensitive, universal mechanism (228) revealing hope as a coping resource for older people's experiences reduced capabilities and why hope is a determinant of health and wellbeing.

According to Antonovsky, coping with a life experience such as the informants in this Ph.D. project who had experienced hip fractures or other disabilities, will depend on the individual's ability to mobilise available resources. This is further outlined in the three main components, included in SOC, namely (1) *Comprehensibility*, which refers to "the degree to how the stimuli deriving from one's internal and external environments in the course of living are

structured, predictable, and explicable" (39, p. 39); (2*) Manageability*, also termed instrumental confidence defined as: "the extent to which one perceives that resources are at one's disposal which is adequate to meet the demands posed by the stimuli that bombard one" (40, p. 17). Antonovsky (40) stressed that manageability included not only the individual's abilities but also the influence and support of other persons or institutions. And finally (3*) Meaningfulness,* which is referred to as the motivational element in SOC, dealing with whether these demands are challenges worthy of investment and engagement (39, 40, p. 19). These three components assume significance when participating in the physical activities program, which is the case for the older people across the four included papers, especially with being able to live in their own home in the community. The key components of SOC underline the importance of understanding life and to be understood by others; ableness to manage life and most important; to perceive that life is meaningful enough to find the motivation to keep going (228) and are all referable to the situation of the study's participants. Motivation is of special interest to physical activity and exercise and Antonovsky (39, 40) described the meaningfulness in SOC to be most related to motivation. The sense of meaningfulness is further the degree to which one can feel that life makes sense emotionally, that at least some of the challenges posed by the living are worthy of investment, commitment, and energy and are experienced as challenges that are "welcome" in a sense rather than burdens that one would much rather avoid (40). According to Antonovsky (39, 40) this component plays an essential role in the forming of results or outcomes by deciding whether something matters enough for the person to deal with, and is therefore viewed as the most important component of SOC.

The SOC concept is strongly tied to a person's original history and the person's important life areas (39, 40) and, according to Løvheim et al. (229) SOC represents a theoretical construct that has been used to examine factors of influence to cope with life events in old age, where a stronger SOC corresponds with better-perceived health. Antonovsky (39, 40) posited that a high level of SOC is related to the strength of the individual and his or her capacity to make successful adjustments. SOC is a crucial element in the basic structure of an individual's personality (29) and Antonovsky's principal statement is that a strong SOC is a decisive factor for coping successfully with omnipresent stressors and by extension, for the maintenance of health (39, 40). Antonovsky's understanding of "stress" will be elaborated on in the following section.

3.1.2 Stress

Stress can be described as a sudden and non-controllable event (29). It is the reason and starting point for the recovery processes of the participants in this Ph.D. project. In general, the ability to tackle stress and change depends on the degree to which the world is experienced as comprehensible, manageable, and meaningful (39, 40) showing the intertwined nature of stress and SOC (and GRRs) in salutogenic theory. Whether or not a stimulus is a stressor can only be determined by its effect on the individual and can therefore not be predicted. All across the four included papers, the participants had experienced stressors like bad health and the loss of bodily capabilities, in addition to having lost loved ones. In particular, the hip fracture was a sudden and non-controllable event which was described in existential terms in paper 3. According to Antonovsky, stressors begin by causing physiological tension (29), something which can be explained by the fact that individuals do not always know how to react to a given situation. A stressor can further be either negative or positive; for example, experiencing that own capacity in old age is reduced as is the case of the informant in this Ph.D. project might produce a great deal of stress with all the new challenges it poses on their everyday life. The hip fracture represented a reduction in functional abilities and quality of life probably for the present project's participants. Stress may represent "a demand made by the internal or external environment of an organism that upsets its homeostasis, restoration of which depends on a non-automatic and not readily available energy-expending action" (29, p. 72), or a stressor may be any real or perceived event or stimulus of physical, social, or psychological character, causing our bodies to react or respond (230). For example, in papers 2 and 3, the participants were not able to return home after discharge from the hospital after hip-fracture surgery, they had a short-term stay in a primary health care unit at a nursing home before getting home and cope with everyday life at home. This situation might represent mental and physical stress. For Antonovsky, the main task of an organism is to cope with different states of tension (29). When a coping strategy succeeds, it has a health maintaining or health-promoting effect. But when it fails, a situation of stress (strains and its consequences) or a situation that is a burden for the person arises. Since coping strategies not always succeed, stress reactions and stressful situations will be an omnipresent phenomenon.

An appropriate challenge can be understood as something balanced and not too easy to overcome but not too difficult either; in salutogenic terms, a challenge has underload/overload balance (231). This balance was difficult for some of our participants and called for good

communication between patient and therapist. Because of pain and anxiety with the participants, the therapists' knowledge and reassurances were necessary to balance the challenge, as shown in paper 2. The ability to use the resistance resources available determines whether a challenge, caused by "stress" is "appropriate." This, in turn, demonstrates the connection between the GRRs and stress. Antonovsky's concept of GRRs will be further outlined in the following subsection.

3.1.3 Generalised resistance resources (GRRs)

The resources and tools which make people able to experience their environment as comprehensible, manageable, and meaningful are described by Antonovsky as general resistance resources, or GRRs (29). A generalised resistance resource can also be defined as "any characteristic of the person, the group, or the environment that can facilitate effective tension management" (12, p. 29). Generalised, i.e. effective in all kinds of situations and resistance, i.e. resources increase the resistance in a person or continuous impacting life experiences enabling people to make meaningful and coherent life experiences which in turn strengthen the SOC (29) by fostering the development of either comprehensibility, manageability or meaningfulness (231). For example, a generalised resistance resource might be a person's social network that he/she can rely on in various situations. In paper 1, our participants' family members and friends were supportive of the exercise times and never came to visit during exercise times, for instance. GRRs might further represent material, biological, and psychosocial factors that make it easier for individuals to perceive their lives as consistent, structured, and understandable, as stated in paper 1. Examples of GRRs can be money, knowledge, experience, self-esteem, healthy behaviour, commitment, social support, cultural capital, intelligence, traditions, and views of life (228). Coping strategies, physical factors as physical activity or exercise can also be examples of GRRs which might help the person to construct coherent life experiences (228), and which was the purpose of attending the physical activities described in all papers in this Ph.D. project.

According to salutogenesis, resistance resources are important determinants of well-being (29, 40) and these can be divided into two groups based on their usefulness: generalised resistance resources which have a "wide-ranging utility" and specific resistance resources that have a more "situation-specific utility" (232, p. 71). Concerning generalised resistance resources, the participants in this Ph.D. project had to effectively combat a wide variety of stressors both internal (physical decline or experience of sadness) and external (change in interpersonal-

relational and roles), and their need and availability of resources were of crucial importance in their recovery and will be discussed in section 6.1.4.

Having these kinds of resources at disposal or in the immediate surroundings can help deal with the challenges of life and in the construction of coherent life experiences (228). Exercise as an external intervention as presented across all papers can be understood as an environmental resistance resource; however, internal resources, such as motivation, are also necessary to perform the exercises. Antonovsky's concept of salutogenesis and GRRs link health to positive experiences, such as energy, inspiration, creativity, a sense of coping, self-efficacy, and a secure identity (223), all of which were salient in papers 1 and 3. Older people who live in a community where they have access to generalised resistance resources will likely have a strong sense of coherence, relatively good health, and an acceptable quality of life to combat life challenges, than those who are at the opposite end of the scale from resistance resources (40). Resistance resources might consequently be anything that promotes the SOC. Even though some of our participants struggled to overcome barriers to the recovery, they had resources to support their resistance. Antonovsky emphasised that social support and self-identity are the most crucial coping resources (29). Langeland and Vinje (327) further found a good-functioning social network to be a source of coping assets such as availability of help, guidance, alliance, and reassurance for instance (327). The support of the instructors and those being responsible for the physical activity programme focused across all the four papers and hopefully fitted with the theory of therapeutic alliance (30), which will be explicated in the next section.

3.2 Therapeutic alliance

In this study, therapeutic alliance, also referred to as the working alliance, is an umbrella term used to describe the strong collaborative relationship in the interpersonal processes between a person receiving therapy and another person providing it which is relevant in all papers but especially focused on the discussion of findings in paper 2. This alliance is viewed as a consistent predictor of therapy outcomes and therefore, an important aspect of successful treatment in psychotherapy (233, 234).

Edward Bordin (1913-1992) was an American professor in psychology who proposed that the working alliance between a person seeking change and the person providing change, is one of the keys or *the* key to the overall process of change (30). Del re et al. (217) elucidated the

importance of this alliance by noting that it was an "inseparable part of everything that happens in therapy" (217). Bordin (30) further suggested that this alliance may occur in many situations of life, but for this Ph.D. project, the alliance denotes the relationship between a health care professional and a client or patient in which the hope is to engage with each other and affect beneficial change in the client. Bordin's theory (30) of the therapeutic alliance was developed for psychotherapy which is salient in the four propositions of his framework for understanding different approaches:

> 1) All genres of psychotherapy have embedded working alliances and can be differentiated most meaningfully in terms of the kind of working alliance each genre requires; 2) The effectiveness of a therapy is a function in part, if not entirely, of the strength of the working alliance; 3) Different approaches to psychotherapy are marked by the difference in their demands on the patient and on the therapist and 4) The strength of the working alliance is a function of the closeness of fit between the demands of a particular kind of working alliance and the personal characteristics of the patient and of the therapist (30, p. 253).

Therapeutic alliance was further described as consisting of three components, namely the agreement on the goals of therapy, the agreement on the tasks of therapy, and the relationship bond between the therapist and the client (30), important components in all health services also in this Ph.D. project. The goal-setting processes will differ according to both the therapist's perspective and the patient's situation and can result in broad overall goals or in more specific directions. According to differences in characteristics between the participants in this study, these goals may vary (Table 5). The agreement of what tasks assigning to patient and therapist also vary in different therapies and is as the goal-setting process, linked to the nature of the relationship between patient and therapist (30). Referring to the strong collaborative relationship between a person receiving therapy and another person providing it (235), a therapeutic alliance might be applicable as a theory also in other therapies than psychotherapy. In this Ph.D. project, focusing on physical activity or exercise provided to older people as a health service or an intervention from the community, there is a "provider" and a "receiver" and results especially from paper 2 illuminated the importance of the "alliance" between the two. O'Keefe et al. (196) analysed 13 qualitative studies and found that a mix of organisational, clinical, and interpersonal factors influences the relationship and interactions between a patient and a therapist. They also suggested that increased awareness of these factors by physiotherapists could enhance treatment outcomes.

3.3 Recovery

In paper 4, frameworks and perspectives of recovery were used to frame the discussion of findings. As stated across all papers included in this project, physical activity or exercise offered possibilities for recovery for older people participating in the study. Recovery can be described as the process where people learn to live in a new way after they have experienced an acute, life-altering event, or a chronic illness (27, 28). Anthony (26, p. 15) described recovery as a deeply personal, unique process of changing one's attitudes, values, feelings, goals, skills, and/or roles (26, p. 15). Recovery further relates to an active and social life with a feeling of "being in charge of your own body", which is reflected in our participants' testimonies. Goals of the recovery will vary from individual to individual to meet the person's own defined level of valuation before a conscious effort will be made into pursuing it (236). Examples of goals across my produced papers are being able to stay at home in the community with good mental health.

Leamy et al. (28) summarised recovery as follows in their systematic review aiming to develop a conceptual framework for personal recovery in mental health: "The recovery processes that have the most proximal relevance to clinical research and practice are: connectedness, hope, and optimism about the future, identity, meaning of life and empowerment" (28, p. 449). Although this framework was developed for recovery in mental health, it might also apply to other health issues for persons who want to enhance, for example, their physical function. The recovery process after a hip fracture was understood as being influenced by several factors, such as the interventions that the participants received after discharge (237). The individual's pre-fall functional level (238) as well as nursing factors including pain management also played an important role in the recovery process after a hip fracture (239).

The framework of Leamy et al. (28) comprises three overarching categories, which are interlinked, namely the characteristics of the recovery journey, recovery processes, and recovery stages. The overall recovery process is termed among others as a journey and further characterised as an active, unique, and non-linear process, but also as a multidimensional process and a struggle (28). Recovery contains elements of personal motivation in combination with opportunities, that is, what may inhibit and what may promote this positive development of a person. Further, the recovery stages mapped into the transtheoretical model

of change, makes an understandable overview of recovery as a gradual process from the pre-contemplation stage to the maintenance and growth stage, with stages of contemplation, preparation, and action in between (28).

Emotional and professional support to interpret future abilities and empowering patients in their process of adjustment to a new "normality" is further shown to facilitate recovery (240, 241) and maintenance of patients' hope is essential for successful recovery (40, 242, 243) as an important coping resource (243). Thus, hope not only gives disabled people something positive to cling to and stretch their efforts towards, but it also encourages health professionals in the process. Meaningfulness is, however, also influenced by participation in decisions and valued feedback from significant others for example those responsible for the interventions, hopefully, realised across all papers and assuming sufficient emotional support, a sense of meaningfulness can still be maintained (243).

4. METHODOLOGY

According to our already presented aim (see pages 10-11), we searched descriptions of individual experiences regarding physical activity, which guides the direction in the choices regarding methodology, further elaborated in this chapter. Initially, in 4.1, the ontological and epistemological assumptions on which this Ph.D. project is developed upon will be presented followed by a clarification of the chosen design (4.2). In section 4.3, an overview of the recruitment processes is given, as well as of the inclusion and exclusion criteria, followed by a presentation of the participants' characteristics in this Ph.D. project given in section 4.4. I then present the data collection process via semi-structured interviews (4.5), a description of the chosen analysis method, Systematic Text Condensation (STC) (4.6), issues regarding trustworthiness (4.7) and finally a section presenting this study's ethical considerations (4.8).

4.1 Ontological and epistemological assumptions

Krauss (244) summarised the relationship between ontology, epistemology, and methodology by stating that "ontology involves (the) philosophy of reality, epistemology addresses how we come to know that reality while methodology identifies the particular practices used to attain knowledge of it" (pp. 758–759). This study is situated in the naturalistic, interpretive paradigm, where understanding of reality is subjective and the research aim is to describe reality from the participants' perspective (245, 246). In this field of research, there is not a single reality pervading across the world existing irrespective of people's understandings; instead, interpretivists see reality as a complex, human construct (245, 247, 248).

Description and interpretation differ, and in the description, there is an acknowledgment that a "given" reality needs to be described precisely as it appears, and nothing should be added to it nor subtracted from it (249). Interpretation is further a polyvalent word so the sense in which I am differentiating it from description has to be clarified. In this context, what I mean by interpretation is the adoption of a non-given factor to help account for what is given in experience (e.g., a theoretical stance, a hypothesis, an assumption, etc.) (249).

The importance of context and complexity is further emphasised in this paradigm (245), matters that were outlined in chapter 2 of this Ph.D. project. A reflexive attitude is also emphasised in this paradigm and Alvesson and Sköldberg (250, p. 9) stated that "reflexive research has two main characteristics: careful interpretation and reflection where careful

interpretation implies that all references to empirical data are results of interpretation." The second element, reflection, then turns attention "inward" towards the researcher, the relevant research community, society as a whole, intellectual and cultural tradition, and the central importance of language in the research context (250). The researcher's role in this paradigm as respectful and empathetic, requiring listening to those being studied (245) is important as well as emphasizing appreciation regarding the differences between people (251). This was especially important in this study, where the participants interviewed across the four papers had experienced losses and therefore were particularly vulnerable. In the context of empirical research, reflection can be defined as the interpretation of interpretation and the launching of a critical exploration of one's own interpretation of empirical material. In this case, the empirical material is from the interviews presented in the four papers.

The research process in this Ph.D. project is inspired by an epistemological continuum, from a descriptive phenomenological approach to a phenomenological-hermeneutic tradition (252). In consonance with the overall aim of this study (see pages 10-11), I searched the core or the essence in their lived experiences, which is a concept from phenomenological philosophy. In phenomenology, people's "lifeworld" described as: "the world as directly and subjectively experienced in everyday life, as distinguished from the objective physical world of the sciences (16)" is a central concept, and an important phenomenological inspiration to this project as the aims concern experiences from older people's everyday life. Another important task was the interpretation of the informants' narratives transformed to written text, on which hermeneutics focuses (253). The French philosopher Paul Ricoeur (254) is credited with cementing the connection between phenomenology and hermeneutics and pinpointed the mutual affinity between them (252). Given Ricoeur's notion, interpretation is considered an essential element in the performance of phenomenological-hermeneutic research, because description and explanation alone are not sufficient when obtaining an in-depth understanding of the experiences related to human existence. In the following subsections, presentations of the project's basic philosophical positions will be given, namely the phenomenological position (4.1.1), the hermeneutic position (4.1.2), and the bridging of these two philosophies in Paul Ricoeur's phenomenological-hermeneutic position (4.1.3).

4.1.1 The phenomenological position

In paper 1, we took a phenomenological position. Ray (25, p. 119) said that the word *phenomenology* itself is derived from the Greek word *phenomenon*, which means "to show itself.' Edmund Husserl (1859–1938), who was a German philosopher, is considered the

founder of phenomenology. He argued that the purified truth of a phenomenon requires a reductionist attitude in which presuppositions and assumptions are suspended (16). Other philosophers have further developed and refined Husserl's ideas into their own, like Martin Heidegger (64) who took phenomenology in a hermeneutical direction and Maurice Merleau-Ponty (65) who set the body at the centre of his phenomenological philosophy. Phenomenology has been increasingly used in research the recent decades, concerning therapy and rehabilitation to explore experiences regarding illness or the process of recovery (255).

Husserl's phenomenological philosophy is the basis of descriptive phenomenological methods which seek to describe the essence of human experience. Amedeo Giorgi's psychological phenomenological method (249) is an example of this, and the analysis used in the current Ph.D. project, systematic text condensation (STC); (246, 256), is inspired by Giorgi's method. According to Giorgi, phenomenological research intends to capture the way a phenomenon is experienced, as closely as possible within the context of the experience (249). To do this, three terms – phenomenological reduction, epoch, and bracketing – are essential to assuming a phenomenological attitude free from everyday assumptions (16). Husserl studied phenomena as they appeared through consciousness, and claimed that one had to "bracket out" the outer world as well as individual biases to achieve contact with essences successfully (257). This process of suspending one's judgement or bracketing particular beliefs about the phenomenon was necessary to see the phenomenon clearly, "as they are" through intuitive seeing according to Husserl. In this project, I tried not to let my preconceived ideas regarding physical activity affect my judgement while listening to, interacting with, and analysing the narratives of the participants. As a physiotherapist, I am aware of the benefits of physical activity. At the same time, I have experienced challenges concerning motivation to physical activity in older people in my professional work. Putting these preunderstandings and previous experiences in the background and confine my biases throughout the research process was necessary to achieve honest and true narratives from the participants, see subsection 6.2.8 on the researcher's reflexivity.

As the phenomenon under inquiry in this Ph.D. project was physical activity, and the participants all had troubles related to their bodily functions, the thoughts of Maurice Merleau-Ponty (1908–1961) were inspiring. He was a French philosopher and a proponent of Husserlian phenomenology who included the body and human actions in a historical context in his phenomenology (258). He also emphasised the constitutive role that it plays in

subjective experience, contending that one's experience of and knowledge about the world do not originate solely from reflective consciousness, but from one's bodily engagement with the world (65). However, since the body cannot be understood as a purely physical system, we must turn our attention to the body and its relationship with a person's subjectivity and life, and the fact that the body is experienced as the person's own. Thus, the body cannot be understood merely as a complex constellation of parts; rather, it presents itself as undivided. Although Husserl and Heidegger underlined the importance of the body as a dimension of the *lifeworld*, Merleau-Ponty contributed most to the phenomenology of the body (65), by pointing out the active and functional body as fundamental to human "being in the world", relevant for this Ph.D. project. According to Merleau-Ponty (65), the body is the manifestation of the state of mind in which meanings, emotions, memories, and thoughts are created. As a basis of being, a frail and dependent body may consequently lead to a sense of disconnection. The lived body helped the individual gain access to the world, but when the body is threatened by illness and physical limitation, it limits access to the world – and thereby, may threaten human existence.

Husserl's student, Martin Heidegger (1889–1976) developed a distinct phenomenological-hermeneutic philosophy and suggested that individuals are "always in an environing world", by which he meant that people exist in a cultural and historical environment from which they cannot step outside; this thereby introduces the necessity of interpretation or the hermeneutic method in the study of human beings (259). Heidegger (64, p. 141) challenged in his philosophy Husserl's notions of reduction by stating that "interpretation is never presuppositionless apprehending of something to us." In paper 1, where the aim was to describe physical activity experiences from very old (age 80 and above) and frail persons, who had experienced severe losses in life, the underlying philosophical inspiration came from Merleau Ponty's thoughts (65) about the body as fundamental, and Heidegger's thoughts (64) about "being in the world" in the phenomenological approach.

In this project as a whole, inspiration came from both phenomenology and hermeneutics, (252); therefore, a presentation of the hermeneutic position is given in the next subsection. In papers 2, 3, and 4, inspiration came from a phenomenological hermeneutic tradition.

4.1.2 The hermeneutic position

The word *hermeneutics* is derived from the Greek *hermeneia*, which suggests a meaning of "bringing to understanding particulars where the process involves language" (260). Hans

Georg Gadamer (1900–2002) was a student of Heidegger and opined that all existence is hermeneutical, building upon the idea that any situation in which human understanding occurs is always an understanding through the lens of tradition and language. Gadamer also stated that:

> Hermeneutics has to do with a theoretical attitude toward the practice of interpretation, the interpretation of texts, but also to the relation to the experiences interpreted in them and in our communicatively unfolded orientations to the world (261, p. 29).

In this Ph.D. project, which is related to the process of analysis of written transcripts entailed my preconceptions by being an educated and trained physical therapist, and the process of communication during interviewing the participants and discussions between researchers.

To Gadamer (262, p. 18), philosophical hermeneutics is:

> The opening up of the hermeneutical dimension in its full scope, showing its fundamental significance for our entire understanding of the world and thus for all the various forms in which this understanding manifests itself, from interhuman communication to manipulation of society, from personal experience by the individual in society to the way in which he encounters society, and from the tradition as it is built of religion and law, art and philosophy, to the revolutionary consciousness that unhinges the tradition through emancipatory reflection.

For the current project, this definition reflects the complexity of factors influencing understanding of the participants' experiences regarding physical activity.

Like phenomenology, hermeneutics is both a philosophy and a source of research methodology. Gadamer (253) described hermeneutic philosophy as the road of experience. According to Gadamer et al. (263), hermeneutics is a unit of understanding, interpretation, and application. Furthermore, Lindwall et al. (264) suggested that application is the fundamental element in hermeneutic understanding and is always an inner fusion of interpretation and understanding. Gadamer (253) further understood hermeneutics as a co-creation between the researcher and the participant, and in this process, the very production of meaning can occur through a circle of readings, reflective writing, and interpretations (the hermeneutic circle), in the current study through several readings of the text and by going back and forth between text parts. Gadamer saw interpretation as an evolving process, thus a definitive interpretation is likely never possible to achieve (260).

Moreover, texts are understood to include things such as written or verbal communication, visual arts, and music (258), in this project, a large amount of text transcribed from in-depth interviews with older people containing narratives from their lifeworld. Gadamer thought that methods were not totally objective, separate, or value-free from the user. Koch (265) described Gadamer's position as supportive to prejudice as a condition of knowledge that determines what is comprehensible or unmistakable in any situation. These understandings are based on our history of being and that all understanding will involve some prejudice (257). Professional pre-understanding should be understood not as only an existential pre-understanding, but as a pre-understanding with a basis in the profession (266). In my situation, this profession is physiotherapy and that of my two supervising professor's physiotherapy and nursing, which are "built-in" parts of us, which also can be of positive character, causing the interest and curiosity in the phenomenon researched. Gadamer opposed the notion that a knower can leave his/her immediate situation in the present by adopting an attitude (257). Rather, his view acknowledged the unquestionable presence of historical understanding, and he worked to extend the understanding that these play a positive role in the search for meaning (262). Our prejudices are necessary and basic conditions for our understanding of the present but stem from the notion that we never meet the world without prejudice, only with preconceived expectations of it based on prior experience, which is the situation in this Ph.D. project where the past (the researcher's background knowledge) and the present (the participants' narratives) melt together and thus, understanding and interpretation represent a fusion of past and present horizons (267).

Health care professionals acquire their understanding through the culture to which they belong, which involves knowing that we might be aware of or have learned becoming an integrated part of the body (266). In the beginning, hermeneutics focused on a sense of understanding the subjective experience of others. Later hermeneutics studies the understanding of a phenomenon or interprets the initial interpretation of patterns, rules, meanings, and implicit premises that are transferred through socialization processes that require instruction, adaptations, and the establishment of traditions (268). Understanding of the text is further based on the reader's professional pre-understanding, which can enhance or cloud one's view (264). This project is represented by knowledge in the form of a physical therapist who has insight into people's health conditions but also represents a different generation with a different view from the older participants concerning physical activity.

4.1.3 Bridging phenomenology and hermeneutics

As stated, this Ph.D. project is inspired by an epistemological continuum, from a descriptive phenomenological approach to a phenomenological-hermeneutic tradition (252). Paul Ricoeur (1913–2005) was a French philosopher who developed his own philosophy (269), drawing on both phenomenology and hermeneutics and his thoughts are important for our philosophical approach in the papers of this study, especially in papers 2,3 and 4. The "task" of phenomenological hermeneutics in Ricoeur's works can be described as to understand the motives of human action (269). According to Ricoeur, interpretation may be a key element in the performance of phenomenological-hermeneutic research, because descriptions alone are not enough to obtain a deeper understanding of experiences connected to human existence (270). In Ricoeur's (271) view, hermeneutics is a text-oriented interpretation; in this Ph.D. project, it involves reading the transcribed text from the interviews. During this interpretation, the goal is to achieve cognition to interpret and search for a surplus of meaning that is hidden in the human lifeworld (271). The human lifeworld in this study is the older participants' life situations while participating in physical activity and exercise settings. To Ricoeur's theory of interpretation, the understanding of the text and, in particular, his concept of distancing; a standing separate from and objectifying the text is fundamental (252). This means that a Ricoeur-inspired analysis facilitates interpretations of meaningful aspects in the empirical material collected.

Ricoeur (254) also argued that when narratives are transcribed in writing, they create a distance that separates meaning from the event and the author, thus opening an opportunity to interpret. Through this approach, movement from a surface to an in-depth interpretation of the transcribed empirical material occurs, as hopefully shown in the findings across the four papers in this project. Ricoeur (254, p. 214) stated that "a text's importance is not behind the text, but in front of it" and "to understand a text is to follow its movement from sense to reference, from what it says to what it talks about."

4.2 Inductive and qualitative design

The reasoning in inductive approaches assumes a "bottom-up" line, moving from a particular or specific premise to reach a general conclusion (Bluedorn, 1995). This Ph.D. project's methodology was based on an inductive design which proceeded from empirical data gathered from several individual in-depth interviews, suggesting that there might be a connection

between all the single “cases”. Although research traditionally may have been framed in terms of opposing perspectives regarding inductive or deductive research, Young et al. (272) have demonstrated that inductive and deductive research approaches exist on a spectrum, and that the research methodologies investigators use may sit anywhere along that spectrum, showing the grades of either “inductive- or deductiveness”.

The use of theory is different in inductive and deductive approaches (273), and the use of theories applied in this study was a tool for understanding and discussing data when the collection and analysis were nearing an end.

With the previous sections in mind, this Ph.D. project followed an inductive, qualitative design as shown across all four papers (Table 1). Moen and Middelthon (274) have suggested that the most widely known usage of qualitative research methods in health sciences is probably in studies that aim to understand the experiences of health-related issues – as in the case of this study– from the perspectives of older people participating in rehabilitative physical activity (papers 1-4). This aligns with the presented ontological interpretivism philosophy based on the positivism critique in social sciences, and accordingly, emphasises qualitative analysis over quantitative analysis. Brinkmann (283) said that qualitative research allows detailed investigations of human experiences and the meanings they attach to them, which was incorporated in the aim of this project. Research methods have their origin in research methodology (275), presented in previous sections, which is useful both for creating research designs and for understanding which designs are the most appropriate concerning a study’s overall aim, see pages 10-11. Denzin and Lincoln (276, p. 7) affirmed that qualitative researchers study phenomena in their natural settings, “attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them.” The participant perspectives disclosed in this Ph.D. project signify the participants’ subjective experiences of the reality of participating in physical activities, based on the aims presented in the project’s four papers.

This Ph.D. project reports findings from the physical activity programme by using qualitative interviews alongside the trial to capture understand the participants' experiences of the trial (papers 2 and 3). Qualitative methods are an important supplement in trials and interventions as they help explain how complex interventions are implemented within a particular social context; facilitate interpretation of trial or intervention outcomes and highlight to researchers any future trials in which interventions are most likely to be effective (277-281).

The qualitative design in the present study included data collected from semi-structured, in-depth interviews presented in the four papers included in the project; the method will be further elaborated in the following parts of this chapter.

Table 5. Overview of the included four papers with respect to title, aim, and methodology

	Paper 1	**Paper 2**	**Paper 3**	**Paper 4**
Title	The experience of motivation and adherence to the group-based exercise of Norwegians aged 80 and more: a qualitative study	The importance of a good therapeutic alliance in promoting exercise motivation in a group of older Norwegians in the subacute phase of hip fracture; a qualitative study	Mobility—A Bridge to Sense of Coherence in Everyday Life: Older Patients' Experiences of Participation in an Exercise Program During the First 3 Weeks After Hip Fracture Surgery	The journey of recovery after hip-fracture surgery: older people's experiences of recovery through rehabilitation services involving physical activity
Aim	To highlight what motivates older people to participate and adhere to group exercise programmes in a local community setting	To explore how older people who had participated in an evidence-based exercise intervention describe their relationship with their therapists and how such a relationship might have contributed to their motivation to execute their exercise regime	To explore the reflections and thoughts of older people who participated in the evidence-based High-Intensity Functional Exercise (HIFE) Program during the first three weeks of rehabilitation after hip fracture surgery. We sought information about the participants' mobility, their own resources for managing the situations they confronted in their everyday life, and their views on whether the mobility challenges were worth their investment and engagement	To explore and describe the experiences of recovery among community-living older people receiving rehabilitation services involving physical activity following hip-fracture surgery. More specifically, we were interested in understanding how the available rehabilitation services were experienced with respect to everyday life at home following hip fracture surgery
Methodology	Qualitative descriptive design			
Data source	Purposive sample of 7 older persons ≥ 80 years of age who had participated in a long-term group exercise programme	Purposive sample of 19 older persons who had been given one-on-one instruction to perform daily exercise for 10 days in a rehabilitation unit after hip fracture surgery. The exercise was an intervention following HIFE principles		Purposive sample of 21 older persons who followed an ordinary rehabilitation course in their municipality after a hip fracture
Data collection	Semi-structured individual interviews			
Data analysis	Systematic text condensation (STC)			

4.3 Inclusion, exclusion and recruitment procedures

In this section, the processes concerning inclusion, exclusion, and recruitment will be elaborated. As the participants in this Ph.D. project are distributed over three samples, experiencing physical activity from three different interventions/services, the following presentation includes three subsections (4.3.1, 4.3.2, 4.3.3) presenting each intervention/service and the detailing of the recruitment procedure attached.

According to the project's aim (see section 2.6), the intent was to reach out to older persons who had experienced a drop in physical function. The definition of older persons used in most high-income countries, from the age of 65 years and above (23) was used as we know that around two-thirds of persons aged 65 years and above are affected by one or several chronic diseases (24). Furthermore, around 15-20 % of seniors over 75 years of age experience acute and chronic health problems that make them frail and dependent (79). Therefore, in paper 1, the oldest sample of participants was included (older than 80 years). For papers 2, 3, and 4, as well as for the overall project, participants of 65 years and above were included according to age. Further, I wanted to address the experiences of older persons who were still living at home (papers 1 and 4) or aiming for a home transfer after a rehabilitation stay (papers 2 and 3).

Experiences from a physical activity intervention or service were the most important inclusion criterion. I also searched broad and varied information and therefore, included three different participant groups with experiences from different physical activity programs or services. In the smallest group of participants (Paper 1), participants had joined a nine-month long group exercise programme organised by the municipality. The group of 19 participants from where the data regarding papers 2 and 3 were collected (Papers 2 and 3) had fulfilled a one-on-one exercise intervention over 10 days during a rehabilitation stay, directly after hip fracture surgery. Finally, the last group of participants (n=21) had followed standard rehabilitation services including physical activity, in their respective home municipalities.

People who were unable to participate in the programs or were unable to express their perspective in the interviews were excluded from the project. Conditions leading to exclusion might be dementia diagnoses or dizziness affecting their balance and security in participation in the physical activity programmes.

In the current project, the overall recruitment procedure was maximum purposive sampling (282) aiming to achieve as broad variation in data as possible regarding age, gender, culture,

and background within the frame of the inclusion criteria, which also were purposive to be in alignment with the study's aims. Nevertheless, the recruitment processes proceeded somewhat differently in the different samples. The following subsections present the interventions/services as such as well as the recruitment processes followed respectively.

For more details concerning the context of the Norwegian health care system, see section 2.4.

4.3.1 Long-term group exercise programme

This general intervention was a low threshold exercise programme of nine months' duration, with two exercise sessions weekly, instructed by educated and skilled physiotherapists and occupational therapists, which took place in a medium-sized city in the south of Norway. Ten groups in different parts of the municipality followed the same exercise programme and the participants who were interviewed represented six different exercise groups. The intervention programme was built upon the Otago Exercise Programme (OEP), which is a strength and balance exercise programme designed for fall prevention in older people living in a community setting (188). Four times during the program, lessons in physical activity, motivation, nutrition, and restitution replaced the exercises. The municipality had special inclusion criteria for participating in the intervention, which was that the participants, aged 65 or older, should be living in their own homes, be able to understand the instructions, be motivated, be able to walk with or without a cane or walker and able to transport themselves to the locality. Additionally, they should be receiving health services from the municipality.

From the participants in this programme, recruitment of those aged 80 and over who had attended the whole programme from May to September was made. The leader of the programme, who was a physical therapist, acted as the contact person regarding recruitment to the project. He contacted the instructors of the different groups and asked them to recruit participants from the respective groups, reaching out to informant variation regarding age, gender, and group affiliation. Accordingly, differences were covered among the participants and in instruction/locality. Originally, I wanted to interview participants who had both low and high grades of adherence (approximately>< 50 % attendance), and the contact person provided lists of eligible participants who I contacted via mail and follow-up calls. None of the participants with low grades of adherence who were contacted were willing to be interviewed. In the end, seven participants with high grades of adherence (who had attended more than 50 % of the group training during the period) were willing to participate and share their stories in the interviews.

4.3.2 High-Intensity Functional Exercise (HIFE) programme

Participants from Study 2 followed a Randomised Controlled Trial (nr: NCT02815254) where the aim was to evaluate the High-Intensity Functional Exercise (HIFE) programme in eastern Norway. The inclusion criteria for the intervention were having experienced a hip fracture, aged 65 years and older, living at home, being able to walk independently indoors with or without an assistive device, and ableness to provide informed consent to participate. Each exercise session in the HIFE programme tailored to the individual participant (67, 68) included a 5-minute seated warm-up, at least two exercises that strengthen the lower limbs, and two balance exercises. The HIFE programme consists of a selection of functional exercises divided into the following categories: 1) dynamic balance training combined with strength training for lower limbs, 2) dynamic balance training while walking, 3) static and dynamic balance training exercises while standing, 4) lower limb strengthening exercises with continuous support and 5) gait training with continuous support (67). The therapists encouraged high intensity and progression, and there was an opportunity for them in each exercise by using a weighted belt. This was tailored to the individuals' functional level and current health situation. Four physiotherapists were involved in this intervention and served as instructors to our participants. All participants were receiving one-on-one instructed exercise as described above one hour every day for 10 days when they were interviewed. In the first qualitative research as regards HIFE performed by Lindeløf et al. (189), findings showed that the informants, despite their serious impairments, diverse diagnoses, and advanced ages, had believed in the positive outcomes of the programme, expressed a strong desire to be active, and had the will to strive to avoid further loss of capacity although they were struggling with failing bodies that were experienced as barriers to exercise.

The participants in sample 2 followed an RCT that aimed to evaluate the HIFE programme. The intervention took place in a rehabilitation unit, and the participants were recruited from hospitals where they had been treated surgically for hip fractures. Physiotherapists performed the intervention in the RCT, and invited patients were enrolled in the RCT to participate in the current Ph.D. project when they arrived at the rehabilitation unit. All participants who were asked agreed to be interviewed.

4.3.3 Rehabilitation services including physical activity

In the final sample of participants, patients who had followed an ordinary health-service course in their respective municipalities after having experienced hip fracture surgery at their local hospital were included. Some of the participants (n=14) also had had a rehabilitation

stay either in special care or municipality care before their home discharge. The Norwegian Health and Care Service Act (35) is the main law regulating the municipalities' services (see chapter describing study context on pages 19-26) and municipalities must offer services within the framework of this regulation. The participants in this group lived in ten different municipalities and had received different health services, including physical activity such as individual physical therapy in the home and/or at private institutes, team-based rehabilitation programmes, reablement service, group-based exercise programmes, and/or water exercise. The timeline from the surgery to the interview varied from one up to eight months.

In the first part of the recruitment process concerning this group of participants, Sørlandet Hospital's research department provided us lists of patients based on the following criteria: aged over 65 years and having suffered a hip fracture over the last 6 months that required surgical treatment. A dementia diagnosis served as the exclusion criterion during this first stage of the participant recruitment process while the hospital acted as the gatekeeper. During the second stage of recruitment, I made telephone calls to 43 of the 150 individuals on the lists provided by Sørlandet Hospital. The aim was to achieve broad information according to gender, age, time since surgery, and home municipality. I informed the identified patients about the project and asked whether they had had any experiences with rehabilitation services involving physical activity. If they had, given the aim of the present study, I asked if they wanted to participate in the research in an interview. During this process, some patients were excluded because they had moved to nursing homes (3 of 43), did not have the experience I sought (12 of 43), or had dementia/confusion as explained by the next of kin who answered the phone call (1 of 43). Two of the numbers I called were no longer in use, while four of the 43 patients who were contacted declined to take part in the study. Ultimately, a total of 21 patients who satisfied the inclusion criteria and expressed an interest in participating in the research were recruited.

4.4. Participants

The participants included in this Ph.D. project were older people who had experienced different kinds of physical activity provided by their home municipality in different stages of their recovery, already stated in previous sections and outlined in detail in papers 1-4 and in table 6. All participants were further assessed by municipality health care services to need services in some form. The participants' ages ranged from 67 to 95, with a mean of 81.5

years. A majority of the participants (40 of 47) had experienced a hip fracture within eight months before the interviews, while the rest had different health challenges and received health care services from the municipality, and therefore were frail and potentially vulnerable. All the participants in this study were "ethnical" Norwegians. Altogether, 47 participants were involved in this Ph.D. project as informants: among them, 14 men and 33 women. Twelve of the participants were living with a spouse at the time of the interview, while 35 were living alone. All participants were home-dwelling or aiming for home discharge after the rehabilitation stay that they were admitted to when the intervention and interviews took place (papers 2 and 3).

The total number of 47 participants was further distributed over three populations, whereas the smallest group consisted of only seven participants (paper 1), the other two populations consisted of 19 (paper 2 and 3) and 21 (paper 4) participants. Qualitative studies, as presented in papers 1-4, are typically in-depth investigations of smaller samples to provide rich and nuanced information on individual experiences of a phenomenon (283, 284). The sample size is of particular relevance in qualitative interview research regarding the concepts of "saturation" or "information power" (285), although the adoption of saturation as a generic quality in qualitative research may not be appropriate because we do not aim for a complete description of all aspects of the phenomenon we study. This issue will be further elaborated in subsection 6.2.5.

The participants from the group exercise program were recruited from the oldest group of participants (from 80 years and above), which narrowed down the possible population to recruit from and as mentioned in 4.3.1, the recruitment process was difficult. Still, the seven participants included had participated in the intervention for 9 months with high grades of adherence and possessed the information needed to provide sufficient information power. The concepts of information power were also used in participant samples 2 and 3 although these groups included 19 and 21 participants, respectively, and when interviews no longer seemed to yield new information relevant to the study topic, saturation or sufficient information power was achieved (285).

Details regarding participants' characteristics in the three different samples are presented in Table 6.

Table 6. Characteristics of the interviewed participants and sample size

(F=Female, M=Male, Y=Yes, N=No, HF= Hip Fracture)

Participant no.	Gender	Age	Living alone	Main health challenge
Sample 1				
1	F	81	Y	Complications after hip replacement operation
2	M	88	N	Pulmonary embolism with complications
3	F	91	Y	Back pain/heart disease
4	F	81	Y	Bilateral knee replacements
5	M	83	Y	Hip arthrosis/depression
6	M	86	Y	Polyneuropathy
7	F	92	Y	Leg pain/depression
Sample 2				
1	F	85	N	Hip fracture (HF)
2	F	86	Y	HF
3	F	91	N	HF
4	F	72	Y	HF
5	M	88	Y	HF
6	M	88	Y	HF
7	F	79	N	HF
8	F	92	Y	HF
9	M	95	Y	HF
10	F	86	Y	HF
11	F	93	Y	HF
12	F	80	Y	HF
13	F	85	N	HF
14	M	89	N	HF
15	M	81	N	HF
16	F	90	Y	HF
17	F	88	Y	HF
18	F	90	Y	HF
19	M	76	N	HF
Sample 3				
1	F	80	Y	HF
2	F	78	Y	HF
3	M	80	N	HF
4	F	76	N	HF
5	M	68	Y	HF
6	M	80	N	HF
7	F	75	Y	HF
8	F	67	Y	HF
9	F	77	Y	HF
10	F	73	Y	HF
11	M	80	Y	HF
12	F	84	Y	HF
13	M	77	Y	HF
14	F	80	Y	HF
15	F	70	Y	HF
16	F	78	Y	HF
17	F	70	Y	HF
18	F	79	Y	HF
19	F	81	Y	HF
20	F	75	N	HF
21	F	71	Y	HF

4.5 Data Collection

Phenomenology is relevant in the development of how interviews are conducted in qualitative research that focuses on the interviewees' lifeworld and descriptions of how they experience

them (258, p. 46). Semi-structured lifeworld interviews form a good method when the aim is to understand themes from people's everyday lives, as this kind of interview searches for descriptions of people's lifeworld and interpretations of meanings as connected to the phenomenon described (258). Therefore, this data collection method was appropriate for our aim, presented on page 10-11, and in section 2.6. as the participation in the physical activity interventions or health services became part of their life worlds in their vulnerable current life situations.

In total, 47 interviews were distributed over the three participant groups, experiencing the physical activity of different quality and at different times of their recovery, to determine the participants' experiences with participating in the physical activity programmes. A semi-structured interview guide (283) modified to each intervention (see appendices 2, 5 and 7), containing the main interview questions was used, and in response to what the participants said, the interviewer formulated specific questions as the interview progressed to encourage them to answer at length and in vivid detail (245). At the time of the interviews, the participants in samples 1 (paper 1) and 2 (papers 2 and 3) had finished their programme, but most of the participants in sample 3 (paper 4) were still actively participating in a physical activity programme or receiving physical activity services/doing prescribed home exercise.

The interviews for samples 1 and 3 (papers 1 and 4) were performed by the Ph.D. candidate, while the main supervisor performed the 19 interviews in sample 2 (papers 2 and 3). Each interview began with the interviewer providing the participant information about the overall research project and ended with the interviewer kindly thanking the participant for his or her contribution.

Ricoeur (271) has argued that only through a narrative approach can we be able to examine people's lived experiences which means that to gain insights into the phenomena described in a patient's narrative will be able to recognize the patient's status as a person through dialogue. Rather than asking pre-formulated questions, healthcare personnel or researchers should ask open-ended questions, listen to the patients' narratives, and allow the patients to select and describe meaningful events and experiences (286). Such a narrative approach might allow patients to recount their lived experiences. With respect to the interviews described in the four papers, we asked open-ended questions although we had an interview guide with pre-formulated questions, we used this as a guiding document, to promote a relaxed and conversational atmosphere. Conversation can be understood as a process of achieving mutual understanding and quality of every true conversation that each person opens to the other and

truly accepts his/her point of view as valid, transposing themselves into each other to such an extent that they understand not the particular individual but what he/she says (263). In hermeneutical philosophy, language plays an important role in creating the existential world in which reality may be revealed and interpreted, as disclosed in the reported findings in the four papers of this Ph.D.'s projects. According to Gadamer, we say that:

> We conduct a conversation, but the more genuine a conversation is, the less its conduction lies within the will of either partner. Thus, a genuine conversation is never the one that we want to conduct. Rather, it is generally more correct to say that we fall into conversation, or even that we become involved in it (263, p. 401).

In this study, the informants told their stories about participating in physical activity and exercise interventions, and the semi-structured interviews fell into conversations. Some participants were distracted by the audio recorder at the start of the interviews but eventually they grew more relaxed. The interviews were performed in the participants' homes (papers 1 and 4) or in their rooms at the rehabilitation unit, with only the interviewer and the participant present (papers 2 and 3) and lasted 30–90 minutes. The participants knew that the interviewer was a physiotherapist and a researcher.

Examples of the main interview questions asked are:

- Would you please describe what happened when you broke your hip?
- Would you please tell me how you experienced the exercises you performed after having surgery?
- Would you please describe your experience with the services you received that involved physical activity when you returned home?
- Can you describe how the exercises contributed to your recovery with respect to your personal motivation and opportunities for managing your everyday life?

The semi-structured interview guides are available as appendices.

4.6 Analyses

Systematic text condensation (STC) was the analysis method applied in all four papers of this thesis. The analysis process of qualitative data is continuous and starts during the data

collection (246). Efforts were made during the process of analysis to remain true to the empirical data material but at the same time moving beyond merely organizing, describing, and reformulating the data (256). The audio-recorded data from the interviews were transcribed by the Ph.D. candidate (papers 1 and 4) or a professional transcriber (papers 2 and 3), and further analysed using STC, a pragmatic, simplified, and thematic technique developed by Malterud (246, 256). STC is an analysis method aiming to describe and explore qualitative research data that is similar with other thematic methods like Braun and Clarke's (287) method for thematic analysis in psychology and Lindseth and Nordberg's (270) phenomenological hermeneutic method. Although STC is not bound to a specific theory or epistemology (246), the inspiration and point of departure for STC is Giorgi's psychological phenomenological method, which presupposes knowledge of phenomenological philosophy. According to our previously presented chapters concerning theory and philosophical position, we considered this method to match both our chosen theoretical frameworks and our naturalistic, interpretive paradigm, where the understanding of reality is subjective and the aim is to describe the reality of experiences from the participants' perspectives (245, 246). This study's data analysis was performed manually, without any data software programmes, although this might have been helpful in the process.

STC takes the phenomenological position that views subjective experiences from the lifeworld as true knowledge. The attempt to set aside our preconceptions is familiar with Husserl's notion of "bracketing", but in STC, acknowledging the researcher's background is an important prerequisite for situated knowledge (246). Human experiences are always coloured by interpretations based on descriptions (256), which draw on elements from hermeneutic philosophy. So where Husserl searched for *essence*, STC defends that a phenomenon can take different forms, depending on the perspective (246).

We performed a raw data cleanse before the first step of the analysis as the transcripts included all that was said in the interviews, such as a conversation about irrelevant themes, and amounted to several pages (98 in Study 1, 348 in Study 2 and 336 in Study 3, all at 1.5 spacing). The metaphor Malterud (246, 256) used to describe the analysis process refers to laundry, with dirty laundry representing the audio recordings. From there, the first step in STC is to take a "birds' eye perspective" by reading through the data as a whole to capture key concepts and thoughts. In this initial read-through, we did our best to bracket our preconceptions in line with phenomenological theory and stay atheoretical when grasping the meaning of the participants' physical activity experiences (256). Examples of themes that

emerged from this initial analysis phase in Study 1 are “history of bad health”, “loneliness”, “exercising in groups is social”, “wish of regaining functions” and “fear of losing functions” (paper 1). Several researchers were engaged in the whole analysis process in all four papers.

The second step of the analysis is line-by-line coding, where data is organised and meaning units (text fragments containing information about the research question) elucidating the study question are coded. On this point, STC differs from Giorgi’s original procedure, as he considered the whole text a meaning unit (256). Coding implies decontextualisation or temporarily removing parts of the text from their context for cross-case synthesis, with the themes from step 1 as road signs (256). The general advice is to be flexible in the coding process and include too much rather than too little. The number of code groups is adjusted along the way, as are the labels, and as the coding proceeds, new codes might be added. If a code group comprises different nuances of the phenomenon, we can use sub-groups, as we did when “feeling of control” became a sub-group of “satisfaction through better coping” in paper 1.

The third analysis step necessitates systematic abstraction of the meaning units within each code group. Continuing the laundry metaphor, the code groups represent a drawer of different sorts of clothes, and the process of sewing together the clothes from each drawer is a starting point for the new fashion intended for exhibition. In Giorgi’s (249) method, the meaning units are rewritten, thereby making it a detailed procedure. However, in STC, each code group represents an analytic unit for further abstraction (246, 256). The meaning units of the actual sub-groups are then sorted into several sub-groups and the sub-groups are the unit of analysis for a while. Every meaning unit in them is reduced to a concentrate or artificial quotation maintaining, as far as possible, the original terminology the participants used (256). When writing the concentrate, the first-person format is used.

The concentrate is a note in progress, providing a point of departure for the result in the final analysis step, or the reconceptualising stage. This is where coalescing of pieces occurs again and descriptions and concepts emerge (256). In this process, we develop a story about the phenomenon, grounded in an analytic text representing the most salient meaning written, in the third person, that provides distance and reminds us of our roles as responsible researchers (256). The analytic texts constitute the sections in this dissertation’s result chapter with each code group’s concentrated heading. In the laundry metaphor, an adequate and innovative name covering the aspects of the new garments is determined.

4.7 Trustworthiness

To ensure the quality of this Ph.D. project and to prevent potential threats to validity, considerations according to confidence in data, interpretation, and methods were made using the four trustworthiness criteria described by Lincoln and Guba (288) as demonstrated across four papers. The concept of credibility as the most important concept of trustworthiness (289) is analogous to internal validity and concerns questions about whether the chosen methods and approach were followed in a correct way (290). The criterion of credibility was accommodated, for example, through the use of open-ended questioning in the interviews as well as by thorough and long engagement with the data. A detailed description of the methods shown in the previous sections was also provided in an attempt to increase the credibility of the study. Confirmability is about the neutrality or whether the findings are consistent and could be repeated – analogous to the objectivity in quantitative research (289) and a we presented rich quotes from the participants in all papers to depict each theme to satisfy confirmability. In the first paragraph of section 4.1, I mentioned that this project is placed in the naturalistic, interpretive paradigm, where understanding of reality is subjective, and the research aim is to describe reality from the participants' perspective. Dependability refers to the stability of data over time and is similar to reliability in quantitative research (290). To satisfy this criterion, reiterative reading of the interview transcripts by two (or more) authors was performed across all papers to transform the ideas generated into a set of codes and to identify relevant features of the transcribed data-based audiotaped interviews. These codes were then categorised into potential themes which were discussed and reviewed by all authors reflecting on their relevance to the research questions. Finally, transferability reflects the concept of generalization in quantitative research, although transferability is different from statistical generalization and is supported by detailed descriptions of the study's context, location and participants as well as transparency of the analysis (290). Since the organisation of the Norwegian healthcare system is primarily publicly funded and is grounded in a strong welfare state, plus the situation that Norwegian municipalities are organised in different ways and have different populations and geographical challenges, must therefore be considered when discussing the transferability (288) of the results to other contexts. The criterion of transferability was fulfilled by presenting overall context in detail in section 2.4, as well as the contextual characteristics of the interventions as well as an in-depth descriptive data and by quoting the participants.

The concept of triangulation corresponds to credibility and confirmability and is viewed as a qualitative research strategy to test the validity of the findings through the overlapping of information coming from different sources (291). Triangulation might be used concerning methods, data source (i.e. different times, settings, or viewpoints), analysts or theory to enhance trustworthiness (291) and the use of multiple researchers, data consisting of experiences from multiple interventions/health services and time periods in the recovery processes, can be viewed as a sort of triangulation which might have strengthened the credibility of the project as a whole. The trustworthiness concept will be further elaborated in the methodology discussion in section 6.2.

4.8 Ethical considerations

Older people in need of help from their community because of reduced functions represent a group with possible vulnerabilities, due to their limited capacity to act independently and sometimes limited authority (292). Accordingly, ethical considerations must be made throughout the research process, and initial approvals must be collected. We, therefore, applied for approval from the Norwegian Regional Ethics Committee (REC) where this study, together with a larger trial, registered for Clinical Trials Identifier: NCT02815254 received approval (2015/1814 REK south-east B). Concerning the group of participants recruited from Sørlandet hospital, some amendments were required to the original REC approval, which only concerned hospitals in eastern Norway. We applied to the REC to include hospitals in the southern part of Norway, which the committee accepted in a letter dated 14 November 2017 (appendix 8). In addition to the geographical changes, the REC accepted an extension of the study period, as well as an acceptance of the described recruitment method in the same letter. Following this new approval, we reached a research agreement dated 2 May 2018 with Sørlandet Hospital to recruit patients after hip fracture surgery (see appendix 9).

Research participants should participate voluntarily and base their decision on information that enables them to reasonably decide whether to participate (292). All 47 participants in this study received written and oral information about their respective study and were also informed about the possibility to withdraw their consent to participate at any point in the study, without any treatment consequences. All participants provided written consent after having received both oral and written information about the study. We emphasised that participation in the study was entirely voluntary and ensured both data confidentiality and

participant anonymity. In the information letter, the participants were given a telephone number they could call if they had questions or wanted to withdraw their consent. None of the participants in this study withdrew their consent and none of the researchers were involved in the participants' clinical care.

All of the interviews were audio-recorded, and the recorder was always stored in a locked room during the interview period. None of these files were stored on computers and they were transcribed manually where all identifying information, such as the names of persons and places were removed in the transcription process. All recorded files were deleted after transcription. Ethical responsibility is fundamental in all health and research practice and is a cornerstone of Levinas (293) who described ethical responsibility as a response to an appeal that comes from the face of another person – that is, 'the Other'. The face, in Levinasian terms, is an important metaphor for human vulnerability, that reaches out and demands our response as health care providers and researchers (294).

5. RESULTS

In this chapter, I will present a summary of the results from the respective four papers included in this Ph.D. project, and finally, sum up all the results in section 5.5. For more detailed information from the papers, we refer to the complete papers following the thesis. Although the research aims are not considered results, these are nevertheless presented to assist the reader with readability and to contextualize the results, I chose to present. Each paper will be presented chronologically in sections 5.1, 5.2, 5.3, and 5.4.

5.1 Paper 1

The experience of motivation and adherence to the group-based exercise of Norwegians aged 80 and more: a qualitative study.

This study aimed to describe the motivational factors for participating and adhering to group-based exercise programs in a local community setting. Four main interrelated themes emerged from the analysis: (1) Experience of health challenges: A meaningful starting point; (2) Adherence motivated by increased life-manageability; (3) Comprehensibility through skilled instruction; and (4) Social and professional support enhancing motivation.

Theme1: *"Experience of health challenges: A meaningful starting point".* The experiences of challenges affecting both psychological and physical health factors combined with a history with positive feelings connected to physical activity was the gateway to participating in exercise groups and made the choice easy when the information about the exercise groups reached the participants. The potential to fulfil social needs as the exercise was organised in groups, was essential due to the feeling of loneliness and depression stated by several participants.

Theme 2: *"Adherence motivated by increased life manageability".* The belief that health challenges were solvable by exercise and the experience of the reality in this belief, contributed to a high grade of adherence to the program. To notice that their walking distance increased, daily tasks became easier to do because balance and strength had improved as the exercise program progressed, was important motivational factors. Regaining the ability to manage housework was especially important to the women who put pride and joy into these domestic tasks.

Theme 3*: "Comprehensibility through skilled instruction".* The way the exercise was presented and delivered by the instructors, was also an important contributor to the high grades of motivation and adherence to the program. The instructors were described as inspiring and supportive in addition to possessing the relevant knowledge about exercise and muscles and they provided comprehensibility by enhancing the understanding and insight of the exercises. The instructors' ability to tailor the exercises to each participant's specific need was especially important.

Theme 4: *"Social and professional support enhancing motivation".* The support from family, friends, and GPs was importance hugely important factor for the motivation and adherence to the exercise program. Relatives encouraged adherence and never came to visits on exercise hours, for example. A supporting collective relation between the participants in the group emerged throughout the sessions and was also an enhancing factor to the motivation for adhering to the groups.

5.2 Paper 2

The importance of a good therapeutic alliance in promoting exercise motivation in a group of older Norwegians in the subacute phase of hip fracture; a qualitative study.

This study aimed to explore how older people who had participated in an evidence-based exercise intervention described their relationship with their therapists and how this relationship might contribute to their motivation for exercise. The analysis yielded three main themes integrated into the core theme "Therapeutic alliance is an interpretative filter for the participants' experiences." The three themes were: (1) The feeling of mutuality and respect in the alliance"; (2) A trusting and motivating relationship and (3) Tailoring of the instruction and program to make the task understandable.

Theme 1: *"The feeling of mutuality and respect in the alliance".* The participants felt they were in a team with the therapist and this feeling generated mutual respect and helped galvanise the participants' own will to put the effort into the exercise. The collaboration was also named a co-ownership and the common goal was for the participants to be able to come home and manage like before. The respectful attitude from the therapist gave room for the participants to be in charge of their own process although efforts from both sides were needed to "make magic happen".

Theme 2*: "A trusting and motivating relationship".* The therapists managed to create a relationship of trust which was important for the participants to overcome fear and pain in the exercise sessions. The feeling of acceptance and being seen formed part of this trust and important for the motivation to continue and give the best into the exercise. The generation of trust was predicated on the therapists' knowledge about hip fractures and the participants' post-operative situation and skills in the psychological consequences of the fracture.

Theme 3: *"Tailoring of the instruction and program to make the task understandable".* The therapist managed to individualize the instructions and answering questions in an easy and individual manner by listening carefully to the participants. The tailoring was taken further to the practical way to perform the exercises, where alternative ways to do it were guided. By showing interest in each participant's situation, the exercises were put into their context to create understanding and motivation.

5.3 Paper 3

Mobility— A bridge to a sense of coherence in everyday life. Older patients' experiences of participation in an exercise program during the first three weeks after hip fracture surgery.

This paper aimed to explore the experiences of older people who participated in the evidence-based High-Intensity Functional Exercise (HIFE) Program during the first three weeks of rehabilitation after hip fracture surgery. One overarching theme: "Exercise is the key for regaining mobility and a sense of coherence (SOC) in everyday life" emerged from the analysis in addition to these five themes: (1) understanding the existential importance of mobility; (2) maintaining a positive self-image by regaining mobility; (3) regaining one's old life and independence in everyday life; (4) maintaining interpersonal relationships through mobility; and (5) creating positive emotions by being able to move. The findings highlight the importance of exercise as a strategy for regaining mobility, illustrated by the essential role it played in the participants' lives after suffering a hip fracture.

Theme 1: *"Understanding the existential importance of mobility".* In addition to the participants' overall situation, the hip fracture made them uncertain of the future and was considered existential. The ability to be mobile, especially to stay on their feet and walk, meant a lot for the participants' sense of freedom, happiness, and ability to fulfil personal needs, and the exercise was a way to regain this ability which was described as necessary.

Their legs were described as important, as they "carry me through life", which was a quote describing the existentialism in the ability to walk.

Theme 2: *"Maintaining a positive self-image by regaining mobility".* The participants' self-image was affected by the physical decline and the restoration of functions. The participants used the concept "self-image" in a broad context and related it to the meaning of life, mobility, mastering, continuity, possibilities, independence, self-esteem, self-realisation, positivity, and control. As the fracture jeopardised the participants' self-image, the exercise helped them regain functions and activities which were central to their restoration of self-image and added meaning to their lives and gave them back control.

Theme 3: *"Regaining one's old life and independence in everyday life"* The participants talked about values such as independence, self-reliance, autonomy, and individualism and underlined the importance of these values concerning their everyday lives. The way in which the exercises were organised and integrated with everyday movements was meaningful for the participants since it helped them to understand the utility and transfer value of the exercises in their everyday lives.

Theme 4: *"Maintaining interpersonal relationships through mobility"* A mobile body was essential to how the participants experienced the world and their perceived ability to maintain relationships and roles in their lives. They were not willing to give up their social life because of their poor functioning and actively used this as motivation for exercise. The role of being a grandmother or grandfather seemed especially important and was mentioned repeatedly by the participants and playing with grandchildren was one of several benefits they had experienced from performing their exercises, which were demanding in terms of mobility.

Theme 5: *"Creating positive emotions by being able to move"*. Exercise helped the participants to improve their ability to cope with stress, the tension of everyday life, anxiety, and depression and made them nicer to people around them. Furthermore, the participants made multiple statements elucidating different types of positive emotions following exercise, including optimism, happiness, and being in a good mood.

5.4 Paper 4

The journey of recovery after hip-facture surgery: older people's experiences of recovery through rehabilitation services involving physical activity.

The purpose of this study was to explore and describe the experiences of recovery among community-living older people undergoing rehabilitation involving physical activity following hip-fracture surgery. The following themes emerged from the analysis: (1) What participants bring to the recovery situation matters; (2) Support through individually tailored rehabilitation services, involving physical activity- is key to recovery following hip fracture surgery; (3) Needing professional help on the journey from helplessness and vulnerability to being more confident and active and (4) Making progress and regaining function represent the essence of recovery.

Theme 1: "*What participants bring to the recovery situation matters."* The participants' personal traits and ways of facing life challenges seemed to serve as motivational assets in the recovery as well as their positive attitude towards physical activity. Two-thirds of the participants had other diseases or injuries, either from before or as a consequence of the fall, which put an extra load on them in their recovery and seemed significant in how they experienced the rehabilitation services involving physical activity.

Theme 2: "*Support through individually tailored rehabilitation services, involving physical activity, is key to recovery following hip fracture surgery*". In the earliest days of their recovery, the participants were instructed in how to manage in and out of bed, walking with a pulpit aid or crutches, and how to manage the stairs. Further, after hospital discharge, some continued the recovery in rehabilitation homes where they received physical therapy, group exercise and could do self-exercise using the facilities on the premises. When the participants returned home, the municipality organised for them to have the equipment to make it easier to manage on a daily basis, and their recovery was supported by team-based or one-on-one services from the municipalities. Half of the participant group received the reablement service which was a team-based, functional and intensive rehabilitation service provided over three to four weeks. This service was highly valued by the participants. The one-on-one services involving physical activity, mostly provided by municipality-employed physical therapists in their homes or by private physical therapists in a private institute, were also described as supportive and appreciated although it was demanding in terms of energy.

Theme 3: "*Needing professional help on the journey from helplessness and vulnerability to being more confident and active".* The participants' need for professional support both physical and psychological during the recovery period was evident, though their state of mind shifted from downheartedness to more confidence as the recovery proceeded. The helplessness they felt when they were left alone to manage their disability is well described as

well as the physical sensation of walking on a "rubber-leg" or having trouble managing movements they could easily do before. Meanwhile, pain was also a part of the picture during the recovery period and professional support and reassurances concerning their challenges on different levels were needed to take the participants further in their recovery.

Theme 4: "*Making progress and regaining function represent the essence of recovery".* The process of regaining functions and the improved state of mind enhanced the participants' positive emotions and encouraged motivation to put in further efforts. The ability to do their usual housework was especially commented on and appreciated by the women who put pride in having a tidy home. Even small signs of progress, like managing to put on the sock on the wounded side were noticed and the regaining of the ability to drive their car, was commented on and appreciated and described as giving a wonderful feeling. All these signs of progress, added up, gave the participants the possibility to live their lives like they had before the fracture and was the essence of the recovery process.

5.5 Summary of results

Across all four papers in this Ph.D. project, findings concerning the participants' overall life situation, especially their health status, were common as starting points or reasons for joining the interventions. In paper 1, the participants followed a long-term group exercise programme and reported on their experiences of negative changes in health and function as the major drivers of participation in the exercise groups. The changes experienced by the participants from a situation of bad health to an improved health situation on their journey towards their "old" habitual life were described by most participants as a process enhancing motivation, although it was energy demanding. In paper 1, the process of regaining functions was described as increased life-manageability, while a corresponding theme in paper 4 described progress-making or regaining of functions as the essence of recovery. The timeline from the hip fracture varied in the findings from paper 4, but for most participants, the fracture was several weeks behind, and they seemed to have processed some of the bad experiences from the fall and the fracture. Their focus was more on their quality of walking and how to regain the last details of their functions, which they perceived as the essence of recovery.

Experiences from the one-on-one evidence-based programme in the early days after hip fracture surgery revealed this recovery period as particularly vulnerable, and the starting points were more described in terms of crisis. Two overarching themes further emerged from

the findings from this sample; “Therapeutic alliance is an interpretative filter for the participants’ experiences” (paper 2) and “Exercise is the key for regaining mobility and a sense of coherence (SOC) in everyday life” (paper 3). The supportive contribution from the instructor/professionals were described across all the papers but were most salient in the early recovery phase where the important features of the instructor-participant relationship were connected to basic feelings, such as mutuality and respect, as well as trust and aspects related to the balance of power.

Paper 3 outlined the essential role of mobility in this process and in the participants’ life. The ability to use the body to move from one place to another and to manage daily tasks was described as much more than simply the mechanical movement and was strongly connected to the participants’ feelings of self-image as well as to their mental state of mind and their relationship to others.

6. DISCUSSION

The overall goal of this Ph.D. project was to contribute to new research-based knowledge on enhancing the quality of health care services that could inform policy, clinical practice, and research on how to better address older home-dwelling people's needs and perspectives in interventions, services, or programs where physical activity or exercise is involved. This chapter discusses some aspects of the main findings from the four included papers within the frame of salutogenesis (section 6.1), as well as some methodological considerations (section 6.2). Additional discussions can be found in the attached papers.

6.1 Salutogenesis – the relevance

In the following section, the findings will be discussed viewing them through the theoretical perspectives of salutogenesis. First, a discussion concerning the usability of the salutogenic theory for this Ph.D. project will be presented. The discussion will further be organised into the following subsections: 6.1.1 Loss of mobility and functional independence: a stressful experience; 6.1.2 SOC, health and physical activity; 6.1.3 Understanding the situation: Comprehensibility; 6.1.4 The need and availability of resources: Manageability and 6.1.4 Meaning, motivation and progress in recovery.

Looking back to section 3.1, salutogenesis sets out from the healthy perspective also termed a "strengths perspective", placing the emphasis on patients' unique attributes, talents, abilities, capacities, hopes, values, visions, and knowledge, rather than focusing solely on their problems, difficulties, needs, and deficits (220). The interventions of physical activities across all papers included in this study were based on the use of the individual's ability and active participation in maintaining their health and well-being, concepts strongly related to salutogenesis in all segments of the human population: young, old, healthy, and those with diseases (222). With the general background knowledge in mind (chapter 2) as well as the participants' characteristics (table 6), the usability of salutogenesis in the heterogenic group of older people with their complex needs is especially appropriate in my opinion.

As stated in paper 1, the participants reported that attending the group exercise sessions meant positive changes in physical, mental, and social functioning, which enhanced their motivation

to sustain their attendance and leading to positive behavioural changes which were essential in their everyday lives. The concept of health can be widened to include sociocultural dimensions, where health develops as a relation between the individual and their surroundings (295, 296). Human beings are whole persons, noted by Antonovsky (29) comprising different dimensions shown across all papers; individuals comprise a wholeness of body-mind-spirit, which cannot be separated into a body, a mind, and a spirit; these three parts are integrated. The participants in papers 1 and 3 increased their confidence that life's events are comprehensible, manageable, and meaningful for example better coping with their roles as grandparents, where having the strength and balance to be able to play with their grandchildren was a necessity and a goal that enhanced their motivation to exercise. Thus, a holistic physical-psychological-social-spiritual model of health is required to provide high-quality and effective health care in older people who have experienced a drop in functional abilities like all the participants in this Ph.D. project had.

Physical activity in the context of this study can be considered important for health promotion, rehabilitation, health education, and preventive, protective, and curative health as shown across the included papers. Salutogenesis embraces all these areas of health into a holistic theory (see Fig. 1). Attempts have been made to describe the recovery process of older adults in a health-promoting perspective, for instance, in the review of Lind and Mahler (202) where the researchers found that physical training after hip fractures must be combined with psychosocial interventions to promote personal engagement and health. According to our participants, the differences between the "disciplines" mentioned above might be corresponding to their different degrees of support needed to perform the different physical activity-based programs in the different recovery stages shown across the papers. Participants receiving the one-on-one instructed exercise program from papers 2 and 3, for instance, needed high grades of support due to their vulnerable situation and were given high-level health and care services within a rehabilitation institution. The clarification of how much support the individual older person needs in rehabilitation regarding physical activity is a responsibility of the health services (35, 36) and can also be seen in parallel with the recovery stages from Leamy et al.'s (28) framework which determines stage-specificity for clinical interventions. The framework can further offer guidelines on how professionals can support recovery and respects the understanding that recovery is a unique and individual experience (28). The professional's support is highlighted by the participants in paper 1 within the context of group exercise, in papers 2 and 3 during participation in the evidence-based High-

Intensity Functional Exercise as well as in paper 4, during the rehabilitation services involving physical activity. This support will be further discussed in section 6.1.4 as an important GRR for the participants.

The theory of salutogenesis recognises that health is a multidimensional continuum, with explicit inclusion of well-being as well as illness and pathology (39, 40) corresponding well with the description of health across the papers in this Ph.D. project. Hip fracture is an example of disability (papers 2, 3 and 4) and as shown in paper 3, the five themes—"understanding the existential importance of mobility", "maintaining a positive self-image by regaining mobility", "regaining one's old life and independence in everyday living", "maintaining interpersonal relationships through mobility", and "creating positive emotions by being able to move"—might indicate a multidimensional health concept. Other examples were highlighted in paper 1, in which the participants' narratives illustrated a bond between coping and health, which is crucial in Antonovsky's works (29, 40, 223).

Across the four papers in this study, the informants asked for social support, empowerment, patient education, guidance, meaning, and coping strategies to manage their life situations. Patient empowerment concerns a process of strengthening and supporting patients' individual resources and capabilities to exercise self-care (297). Health-promoting approaches should further be resource-oriented, focusing on the origin of health along with people's abilities and capacities for well-functioning and well-being. Lind and Mahler (202) adds that research should reveal how autonomy and participation in recovery are promoted and respected, which seems to be in line with our results concerning patients' experiences in papers 2 and 3, as well as the experiences reported in Tutton et al.'s (298) study, which aimed to gain an understanding of patients' and informal carer's experience of recovery in the early stage after hip fracture. Tutton et al. (298) disclosed how participants who had fractured their hips moved forward together after injury by sustaining relationships while experiencing strong emotions and actively helping and becoming aware of uncertainty about the future and working through possible outcomes. Consistent with our results and the theory of salutogenesis, the researchers (298) concluded, that research should focus on developing interventions that can promote well-being during this transition period to help provide the foundation for patients and carers to live fulfilled lives. To promote well-being, it is important to know what patients consider important in their everyday lives. Examples of important factors for motivation for participants in sample 1 are highlighted in paper 1 in some of the four main themes for example "increased life-manageability", "comprehensibility through skilled instruction" and

"social and professional support". Griffiths et al. (299) explored the factors hip fracture patients considered important when evaluating their recovery from hip fractures and how these factors could be used in the evaluation of the quality of hip fracture services. Their semi-structured interviews explored the experience of recovery from a hip fracture at four weeks and four months postoperative hip fixation, disclosing that stable mobility (without falls or fear of falls) for valued activities was considered most important by participants. Mobility is important for the management of personal care, for day-to-day activities such as shopping and gardening, and to maintain mental well-being (299).

Antonovsky (39) used the river metaphor (Figure 1) to proclaim the salutogenic orientation as a paradigm for health promotion, adding that we all are always in the dangerous river of life, which in this Ph.D. project might illustrate the journey of recovery, and that the questions are how dangerous the river is and how well we can swim. An illustration of the river metaphor of the salutogenesis theory was formulated by Lindstøm and Jernstrøm (300) (Figure. 1).

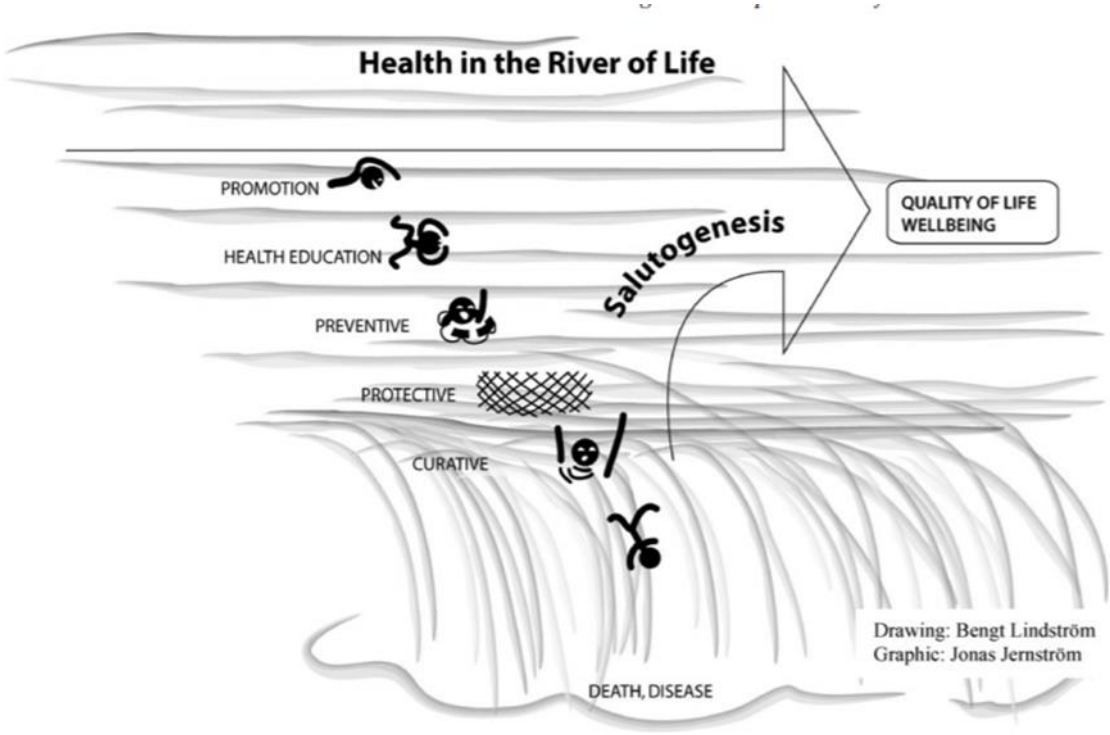

Figure 1 Illustration of salutogenesis

Salutogenesis may open the possibility of asking questions about health from a broader perspective and can provide knowledge of the ways in which the river, and the swimmer's relationship with the river change across historical, social, and cultural contexts (301), as indicated in the findings where the historical importance of physical activity made

participation in physical activity in their current, vulnerable situation a natural choice for some participants (paper 1).

The meaning made by a person from experiences thus forms, as stated by Antonovsky (29), individuals' ways of being in the world, where the person (the swimmer) and the environmental context (the river) are important for the meaning attached to the experience. From this perspective, a health resource (GRR) will be helpful in "making sense" and in making meaningful and coherent life experiences which in turn will contribute to the development of SOC' (302, p. 31). By using the notion "being in the world", Antonovsky links his thoughts to Heidegger's (64) philosophy which is part of the philosophical umbrella covering this study. A qualitative study describing strategies (GRRs) (303) for women to deal with lack of freedom, demonstrates the usability of both phenomenological and salutogenic perspectives, combined, like in this project.

Further discussion regarding SOC and GRR will be presented in sections 6.1.2 and 6.1.4, respectively, but first, a discussion regarding stress will be presented below.

6.1.1 Loss of mobility and functional independence: A stressful experience

The overall findings of this Ph.D. project, reflect a situation of hardship felt by our participants before the physical activity or exercise intervention, which can be explicated in terms of the salutogenic aspect of stress (29), as presented in section 3.1.2. The hardship is for example expressed in the first theme in the result section of paper 1: "Experience of health challenges: A meaningful starting point", or in paper 4: "*What participants bring to the recovery situation matters",* describing the situation which was the participants' rationale for taking part in the interventions. Furthermore, the participants had experienced a change in health status and/or life situation and had feelings of helplessness (paper 4), loneliness (paper 1), and/or insecurity about the situation they had been "thrown into" by the hip fracture (paper 3). Over time, the participants had stressful experiences as bodily changes, inevitably happening through ageing, in addition to more recent musculoskeletal trauma/conditions, such as hip fractures, which most of the participants had experienced (papers 2, 3, and 4). Other serious stressful changes were the loss of loved ones (paper 1) and their careers, as they became pensioners. A positive, new experience of being a grandparent was often described as an important and relatively new role to maintain (all papers) as an example of a more "positive" stressor.

Antonovsky (29) described stress as sudden and non-controllable events, either positive or negative.

> A stressor can be met in the start by a psychological tension where the person does not know how to react and may represent a demand made by the internal or external environment of an organism that upset homeostasis, restoration of which depends on a non-automatic and not readily available energy-expending action (29, p. 72).

Further, salutogenesis captures this tension as potentially health-promoting, rather than as inevitably health-damaging, stressing the use of potential and/or existing resistance resources (further outlined in section 6.1.4) to enhance coping and emphasises active adaptation as the ideal in treatment (Antonovsky, 1987).

The participants in this Ph.D. project were interested in regaining their pre-morbid level of physical function, see paper 3, theme 3: *"Regaining one's old life and independence in everyday life."* Research has shown that more than half do not regain pre-fracture levels of mobility in the first year after hip fractures (49, 304). In particular, mobility was highlighted as important for the quality of life and dependency across all four papers in this Ph.D. project. Mobility is the physical ability, most studied and most relevant affecting quality of life, with strong prognostic value for disability, ageing in place, and survival (305). Walking is, in fact, a component of the activity of daily living (ADL), which is important for the main determinants of quality of life in older age, such as maintaining independence in ADL, enjoying an adequate level of social interaction, and retaining good emotional vitality (306). In this study, stressful events were connected to the participants' experience of reduced mobility, bad health, and/or overall life situations, which affected their lives in negative ways. For example, as shown in paper 3 (pages 2–3 with the heading 'Participant'), all the participants used either a pulpit aid or a rollator when they started the programme. Physical function measured by a short physical performance battery (SPPB) showed a mean score of 4.3 at baseline and 6.6 at the completion of the intervention. Lower SPPB scores have been shown to predict poor outcomes, such as falls, mobility loss, disability, hospitalization, longer hospital stays, nursing home admission, and death (31, 307-314). Furthermore, previous research suggests that the SPPB can detect the early stages of frailty (315) and that a total score ≤9 points can distinguish frail from non-frail individuals (316).

The hip fracture or other events experienced by the participants in this study represented sudden, non-controllable, and significant changes in their lives owing to reduced functional abilities, fitting well with Antonovsky's (223) description of stress. Papers 2 and 3 showed that hip fracture patients experienced a loss of abilities, especially in connection to mobility, which had many consequences, profoundly impacting their lives. Our participants scored from 1 to 9 on SPPB. The mean score was 4.7. A score lower than 10 indicates one or more mobility limitations. In paper 2, one participant stated that '*my personal objective is to be able to walk better*" (male, 90–99 years). Mobility was described in existential terms and meant much more to the participants than simply the movement from place to place (paper 3), and walking was an ability the participants indicated was well worth fighting for (paper 3).

Richardson, Grime, and Ong (155) studied older people with chronic joint pain who described their health as good and found that stressors like loss of mobility due to osteoarthritis might be experienced with different degrees of adversity, depending on the perceived severity and the meaning and significance of the loss for the person. One loss can trigger other losses so that there is a cascade of adverse events and felt adversity might fluctuate over time (155). The stressful event experienced by our participants is further supported by the findings of Dyer et al.(317), who found that hip fracture survivors experienced significantly worse mobility, functional independence, quality of life, health, and higher rates of institutionalisation than age-matched controls, with 10–20% of patients suffering from hip fractures in Western nations institutionalised following fractures. They further observed that for people independent in self-care before the fracture, 20–60% required assistance for various tasks 1 and 2 years after fracture (317), while 35% became permanently incapable of walking independently after a hip fracture. These numbers indicate that, for many patients, as well as for our participants, a hip fracture leads to a loss in independence (103) caused by reduced mobility, which, in turn, may affect mental well-being and lead to a limited ability to social participation. This may result in long-lasting consequences for up to one year or more beyond the fracture (122, 318). Safe mobility without the fear of falling and falls have been identified as the most crucial factor in coping with personal care and day-to-day activities in the recovery phase following a hip fracture (299). Thus, rehabilitation post-hip fracture should include routine assessment of fear of falling as a potential barrier for return of physical activities (87). Jellesmark et al. (319) examined the association between fear of falling and avoidance of activities and between fear of falling and functional ability. Their results further revealed a high prevalence of fear of falling among community-dwelling elderly people after

a hip fracture and a significant association between fear of falling and functional ability 3–6 months after hospital discharge. The participants who had a high degree of fear of falling, additionally avoided more activities, were in need of assistance in ADL, and were less mobile (319).

In line with our findings, Ziden et al. (318) described the consequences of a hip fracture felt by older participants as being more insecure, anxious, and afraid of falling, resulting in more limited mobility. To our participants, independence was an important value and a motivating factor for physical activity/exercise. They felt that physical activity restored their independence to walk and drive a car, for instance (papers 3 and 4). Magaziner and Hawkes (304) also found that reduced mobility increased dependence on others, as restricted mobility affected everyday activities, which, in turn, affected the patient's emotional state and often resulted in a loss of confidence (320). The feeling of being dependent on others might represent that of being a burden, and the feeling of dependency and of being a burden might add to the stressful situation, resulting in a detrimental effect on patients' quality of life and sense of dignity (321). Hagsten et al. (322) found that many older people perceive a hip fracture to be the end of an independent life, which underlines the existential nature of this functional loss. In a Korean cohort study (323), the authors found increased suicide rates in patients with hip fractures during the first-year post-fracture, which illustrates the severity of the experience of hip fracture and calls for a psychiatric evaluation and management of older people with hip fractures. Findings from the current Ph.D. project indicated depressive feelings among the participants, especially in the early days after the surgery, although none ever mentioned anything about wanting to end their lives.

The participants' experiences of lost independence and mobility can be understood in the light of Antonovsky's (223) description of human stress, which involves psychic, somatic, and social aspects. Our study provides an understanding of the magnitude of the consequences a hip fracture or other mobility-reducing conditions can entail for an individual at a psychic, somatic, and social level, and the intertwined nature of those aspects. Ehlers et al. (199) supported this in their integrative review, in which they found an important interaction between pain, mobility, mental health, and capacity for participation in the recovery process among older people who had experienced a hip fracture, which underlines the complexity in older people's experiences of a hip fracture. There is also a strong relationship between painful musculoskeletal conditions, as our participants had, and a reduced capacity to engage

in physical activity, which may result in functional decline, frailty, reduced well-being, and loss of independence (324). Multilevel strategies to care, adopting a whole-person approach are needed to address the impact of impaired musculoskeletal health and its consequences. However, painful musculoskeletal conditions, profoundly limit people's ability to make lifestyle changes (324).

The physical consequences of our participants' health challenges made participation and socialisation difficult for them, which greatly impacted both their state of mind and quality of life and represented a movement in the direction of the unhealthy end of Antonovsky's continuum of health (39, 40). Four months after a hip fracture, Gesar et al. (320) found that previous healthy and independently living participants described hip fracture as an interruption that still affected everyday life, and some had lost the ability and inspiration to participate in social activities. The traditional "treatment" of a hip fracture in the context of the study was mostly directed by the somatic part of it, and the philosophy behind it is in the traditional pathogenic thinking of cure. There was a limited focus on the psychological and social aspects of hip fracture, as described in the findings. Gesar et al. (320) stated that this absence of psychological support may be one of the reasons for dependency four months after experiencing a hip fracture.

To our participants, physical activity contributed to the restoration of their mobility and independence, supported by French et al. (59), who found that physical activity and exercise played an important role in the maintenance of independence, reduction in the risk of falling, and allowing older people to live their lives well (59). However, Gesar et al. (320) found that this process was also challenging, and some previously healthy people considered surrendering, affected by impaired mobility and psychological restraints. Others experienced struggling with efforts to regain independence, whilst others were convinced that they should manage to regain pre-fracture functions (320). Although our findings indicate struggle and striving in the recovery process, our participants represented a group of patients who were either living at home or were considered able to return to their homes after a short rehabilitation stay and therefore had a higher functional level than other hip fracture patients. Regardless of the strategies employed in rehabilitation, the focus should be on, for example, maximising the performance of activities of daily living, cognitive, mobility, skills, and independence in the home and community (325). To think in a rehabilitative way implies

assisting the person's own efforts in achieving the optimal level of functional ability, coping, independence, and social participation (326).

6.1.2 SOC, health, and physical activity

The way all participants of this project dealt with the stresses they experienced in life is important, and according to Antonovsky (39, 40), the ability to manage this depended on the extent to which the world was experienced as comprehensible, manageable, and meaningful. These are the components of SOC, and having a strong SOC is connected to being motivated to cope with the stresses in life, to believe that the challenge is understood, and to believe that coping resources are available (327). Despite the negative changes in the participants' lives discussed in the previous section, they found resources to adjust to and engage in physical activity because they believed it would give them a positive outcome; managing to swim in the river of life. On this background, the participants' focus on regaining as much independence as possible is understandable. To experience good health despite challenges is supported in a longitudinal survey of older people with joint pain (North Staffordshire Osteoarthritis Project (NorStOP)), where 58% reported good, very good, or excellent health in general (155).

A growing body of evidence has shown that SOC, representing a cornerstone in the salutogenic health concept, is strongly related to health, well-being, and coping (222). Tan et al. (328) reviewed salutogenesis and health in older people and found SOC to be strong but varied among older people living both in the community and in care facilities, with two of the included studies suggesting lower scores for those living in care facilities. Older people living in the communities, who have access to generalised resistance resources are more likely to have a strong sense of coherence, relatively good health, and an acceptable quality of life (328). A Swedish study reported levels of SOC among 144 patients in a geriatric rehabilitation ward (mean age= 77,1 years) and found a median SOC score of 152 (329), while Drageset et al. (330) found a median SOC score of 69,1 in a sample (n=227, mean age 85,4) of nursing home residents in Norway, indicating a higher SOC-level among older people who were aiming for a home discharge, like participants in sample two of this Ph.D. project, who were staying in a nursing home for short-term rehabilitation at the time of the interview. Their overall goal was to return to their "old life" and the exercise helped them regain functions and activities which were central to their restoration of functions and necessary for managing in their own home.

A strong SOC among older people was correlated with better physical, social, and mental health whereas the use of generalised resistance resources, such as appraisal, coping strategies, and social support, was correlated with their SOC, perceived holistic health, and quality of life (328). Measures relating to quality of life were taken of the participants in sample 2 (papers 2 and 3). The 36-item Short-Form Health survey referred to as PCS-36 (physical health measures) and MCS-36 (mental health measures) (331), were described in paper 2 and showed an increase in the mean scores during the exercise period from 30.85 to 36.40 according to the PCS-36, and from 46.02 to 46.07 in the MCS-36, respectively. Although SOC and health are two different constructs, the strength of SOC affects how the health of a person is conceptualised and maintained (300). In the review of Tan et al. (328), the authors found that SOC moderated stress and was associated with health, particularly with mental health (329, 330, 332).

The experiences described by participants in paper 3, where the regained mobility fostered regained self-image, independence, relationships, and created positive emotions, strongly correspond to the quality of life and health. Mobility seemed to connect to important life areas for the participants of this project. Antonovsky (39, 40) underlined the importance of the history of an individual when applying a salutogenic perspective and stated that a deeper understanding of people's complex lives was a prerequisite to understanding the reasons why some people manage to change behaviour to move towards obtaining a better health status. The pleasure participant felt in being able to use their bodies, to go for walks, or to keep a tidy home, seemed to be a contributory factor to the internal forces that helped them mobilise motivation to attend to the physical activity/exercises. An individual's health challenges, and overall life changes become a part of his or her history and life situation and contribute to the basis for the person's SOC (39, 40), which was seemingly important for the participants' decisions to participate in physical activity.

Our participants' stories implied that they had important life areas. Mobility, as outlined in paper 3, was important for them both in itself and for their ability to manage their role as grandparents (papers 1, 2, and 3). Having important life areas in which one is especially engaged and involved is decisive for having a strong SOC (39, 40). People do not have to perceive all events in life as comprehensible, manageable, and meaningful to have a strong SOC if they do in these important life areas. Earlier research has underscored the importance of not overly focusing on health benefits but also considering a wider set of goals

corresponding to important life areas, such as life satisfaction, sense of purpose, and fulfilment of roles (174). Our participants' descriptions indicated a strong SOC, and Antonovsky (29) proposed that older people are more likely to have a stronger SOC because of reinforcement through the successful management of stressful situations, although SOC is established by early adulthood. Compared to our modern society, our participants, who were born between 1920 and 1950, had experienced a time in which bodily mobility and the use of their bodies in their working lives had a different meaning; thus, they connected to their experiences, building the base for their SOC.

The strength of people's SOC is further shaped by three kinds of life experiences, according to Antonovsky (223), namely consistency, underload–overload balance, and participation in socially valued decision making. SOC is a flexible construct (228) and is not cultured bound, as what influences the concepts of SOC may vary greatly from culture to culture and from situation to situation (223). According to Antonovsky, our focus must attend to an individual's SOC and the health resources circulating within the river of life" (301, p. 114). Four areas of life have to be of importance for the person to have a strong SOC: the person's inner feelings, close interpersonal relations, primary role activities, and existential themes (39, 40). Tan et al. (328) recommended that further intervention studies should address how older people can develop and employ generalised resistance resources in order to strengthen their SOC.

The findings of this study indicate that mobility and the process of regaining this ability and the functions that depend on it are connected to these four areas of life (papers 1, 2, 3, and 4). A strengthening of SOC seems to be a possibility experienced by the participants in this Ph.D. project in their recovery processes through the different physical activity interventions. The themes— comprehensible, manageable, meaningful, and—are discussed in the following three sections.

6.1.3 Understanding the situation: Comprehensibility

Comprehensibility refers to how well one perceives the character and phenomenon of the stressor as consistent, expected, and clear. Insecurity and lack of knowledge concerning future expectations was therefore a significant topic for patients (who had experienced a hip fracture) who were recruited from two wards at a Danish university hospital (333). In line with the findings in paper 4, Jensen et al.'s (333) study observed that the stressors rendered

the participants' health challenges demanding, whereas this Ph.D. project indicated that the participants managed to make sense of what had happened to them and what consequences this had in their lives. The extent to which the stressor or challenge is understood is the comprehensibility component of SOC (39, 40). In paper 4, the matter of the personal assets of the participants was described as important to the recovery. For instance, while he was in an ambulance after a hip fracture, one participant told himself that he would manage to get on his feet again. This kind of attitude also acting as an internal GRR, (elaborated in the next subsection) can indicate an acceptance of the situation and was evident among the rest of the participants as well, although some described temporary feelings of downheartedness for a while immediately after experiencing a drop in their health and/or function. Of course, nobody wants to experience a hip fracture or other tragic events in life, but persons scoring high on comprehensibility will manage to put events that are naturally negative into a broader, more understandable context, instead of describing the situation as chaotic, unorganised, and random (39). Antonovsky posited that the three concepts of SOC are insolubly attached, and that comprehensibility and manageability, in particular, are connected, as the experience of having available resources presupposes an understanding of the demands of the situation (39, 40). This was evident in our findings concerning the instructor–participant relationship, where the instructor contributed to enhanced comprehensibility by explaining both the health condition and the physical activity/exercise techniques and how they impacted the participants' functions, especially outlined in papers 1 and 2.

As shown by Franco et al. (165), older people see physical activity as unnecessary or potentially harmful and lack important knowledge about it. This lack of awareness of the link between physical activity and health was also found by Ige-Elegbede et al. (169), who pointed to the need for a cultural perspective. The way the instructor helped the participants make sense of the exercises was important for their participation and motivation to perform the program in this project. Although the instructor was a health professional, the instructing situation resembles a learning/educational situation, for instance, in the cross-disciplinary field of adapted physical activity (APA) expounded by Standal (334) in the article titled *Celebrating the Insecure Practitioner. A Critique of Evidence-Based Practice in Adapted Physical Activity*. APA aims to enable professionals to interact with individuals who have experienced difficulties with movement and to provide services that help people with disabilities take part in physical activities (334). Standal debated the hegemony of the medical understanding of disability and the subsequent focus on evidence-based practice in making

decisions about the professional service provided to participants in APA programmes, pointing to the complex networks of social interactions taking place in an educational setting that cannot be totally controlled and thus are confounding factors making it inappropriate to generalise findings (334, p. 204). Self-determination, understood as being in control over one's lives and participating in decision-making regarding one's lives, has been an important strategy in APA (334). In paper 2 of this study, these elements are evident in the descriptions of the therapeutic alliance in which the instructor's ability to perform in a way that allowed the participant to be in control and participate in the process was underlined as important for the participants performance. In the settings of this study, there was both educational and medical orientation. Standal (334) argued that in APA, professional practice has an educational rather than a medical orientation. Moore et al. (215) concluded, in line with the findings in paper 2, that a strong therapeutic alliance during treatment appeared to facilitate adherence to exercise and general physical activity. The process of tailoring the exercise programme or making it comprehensible was highlighted in Papers 1 and 2 and seemed important in the project. Although the programmes presented were, respectively, built upon elements from the Otago Exercise Programme (OEP), a strength and balance exercise programme designed for falls prevention in older people living in a community (188) (paper 1) and the HIFE program (67, 68), aimed to enhance lower limb strength and balance, both were developed on evidence-based practice (EBP). The insecurity Standal (334) highlighted in his article is observed in the practitioner who appreciates that the flux of the learning situation cannot be controlled by EBP and that the solution or the way to perform activities ought to be found for each particular participant and his/her specific situation. This notion is supported by Blackburn and Yeowell (195), who call for the patients' perspective, and experience to improve the care pathways for people suffering from hip fractures regarding rehabilitation in the community setting to enhance and improve the patients' experience of the journey of recovery after hip fracture. Finnegan et al. (186) stated that older people have their own reasons for continuing or stopping exercise after the completion of an intervention programme and that it is important that the health professionals get to know the older person and their reasons to enhance the possibilities for a longer-term exercise related behaviour. This corresponds to the tailored exercises performed by the instructors of this study, as well as to the comprehensibility factor of SOC.

6.1.4 The need and availability of resources: Manageability

The manageability element in SOC refers to the sense of having adequate resources to handle situations in life and a realization that these resources are available to solve life challenges (301). Antonovsky (29, p. 99) termed these resources as generalised resistance resources (GRRs) and defined them as "every characterization of a person, group, or environment that promotes effective management of tension" and where a higher level of GRRs is associated with a stronger SOC (327). A strong SOC, in turn, is associated with better health (as already stated). All GRRs are not possible to identify, as the interaction between the environment and the person always will be in flux, as for the swimmer in the river of life (301). GRRs can be external (artefactual-material, interpersonal-relational and macro-sociocultural) or internal (physical and biochemical, evaluative-attitudinal and cognitive-emotional) (29).

In the current Ph.D. project, the physical activity experienced by the participants can be regarded as a GRR, as well as their overall life situation, their internal assets, and social support, further elaborated in the following. Tan et al. (328) performed an integrative review exploring the relationship between generalised resistance resources, sense of coherence, health, and the quality of life in people aged 65 years and over, and found several GRRs, both external and internal, to have an impact on the participants' measures of SOC and health. The authors found "physical activity" to be an external, artefactual-material resource, together with financial status, and the availability of these to correlate with a stronger SOC (328), and those who participated in preventive health behaviour such as physical exercise was found to have higher SOC (332). In our context, the physical activity interventions might also be considered an external macro-sociocultural GRR, given the overall focus on physical activity elaborated in sections 2.3 and 2.4. All participants in the current study received physical activity/exercise as a service organised by the community. Although differences were noted, between the municipalities concerning offers of rehabilitation services to our participants, especially noted in paper 4, the national legislation gives all citizens equal rights to receive the services they need (36). Antonovsky (29) affirms that GRRs connect to the contextual reality people live in and addresses both cultural, religious, material, and sociocultural aspects.

The review of Tan et al. (328) further found that less physical activity was associated with a deterioration in functional and holistic health as well as the quality of life (332). Findings from this project suggests that participation in physical activity helps to modify the mental

well-being of older people, which is supported by the findings of Windle et al. (180). Read et al. (332) investigated GRRs such as family income, cognitive functioning, years of formal education, marital status, and physical exercise and found good cognitive functioning and physical activity to be associated with a strong SOC, which in turn, was positively related to health. The higher the level of self-reported time spent doing physical exercise, the stronger was their SOC (332). The health benefits of physical activity for older people found in earlier research have been underlined earlier in this thesis (98, 109, 116, 123, 177, 185, 193, 205) and aligns with the findings from it.

According to financial status as an external GRR, no information was collected regarding the participants' economic situation in this Ph.D. project, but they were all living in one of the world's richest countries, with high grades of social participation, good health care system, and social services and their availabilities of contextual GRRs was high, and the probability for having a strong SOC might be considered high. Living conditions might be considered a specific GRR and Tan et al. (328) found in their review that two studies of older people living in care facilities reporting lower SOC scores than in community dwellers. In a Swedish study already presented in 6.1.2 (329), higher levels of SOC were seen among older people in a rehabilitation ward, where the goal is to return to their pre-morbid living conditions. To be living in their own homes or have the possibility to return to their homes, might have added to the motivation for exercise among participants in the current Ph.D. project.

The experiences described by our participants strongly reflected the need for social and professional support (papers 1, 2, and 4) in the physical activity, exemplified in paper 1, where group participants were giving each other praises and encouragements during the exercise hours. Support was provided from fellow participants in groups (335-337)

Social support is a crucial GRR, according to Langeland and Vinje (327), and people who have close relationships with others are likely to resolve tension more easily than people who don't have that quality in their relationships (327). Most of the participants in this Ph.D. project were living alone, and only twelve of 47 participants were living with a spouse. To be provided with the opportunity for long-lasting commitment as a marriage can represent, might be a powerful supportive factor in the recovery situation. The perceived certainty about the availability of social support might often be sufficient for this to be an effective component of GRRs, especially the quality of social support, such as intimate emotional ties. Those who were living with a spouse described being supported in doing the exercises as well as in

practical tasks in line with findings from Tan et al. (328) where having another person in the household was associated with fewer limitations on physical health. Marital status was found to be a significant GRR for men only in the study of Read et al. (332), in line with Antonovsky's (29) statement, and for this reason, the model was constructed to allow for the elucidation of possible gender differences. Social support has further been found important for older people's participation and maintenance of physical activity in earlier research for instance as in the works of Gesar et al. (320), Blackburn and Yeowell (195), Rogers et al. (179), and Young et al. (338).

Tan et al. (328) found that social support was linked to mobility, especially interesting for this Ph.D. project's paper 3, and that having few opportunities to receive a "helping hand" could lead to immobility and low SOC and to reduced capacity to reach out to ask for further support and help. The professional support most important for our participants in physical activity was provided by the instructor, who, in most of the cases, was a physical therapist. Findings from all papers indicate the importance of this relationship, both as professional and personal support. Paper 2 concerns the important relationship between the participants and the instructor, in which values such as trust, respect, and a feeling of mutual alliance were underlined as important for the participants' fulfilment of the programme, indicating the participants' ability to have developed close ties to the instructors. This relationship can be considered an important external GRR in itself, especially described in papers 1 and 2. In paper 1, the exercise intervention was group-based and long-lasting, which may have contributed to the development of a strong relationship and the participants' capabilities to develop such relations, and the importance of professional support from instructors in group exercise settings is in line with earlier works regarding older people (336, 337). Although the intervention in paper 2 was of a much shorter duration, the participants described that they developed trust in the instructor, which in turn was very important for their motivation to perform the exercises.

The GRRs presented above have been mainly external, although systems work together and internal and external GRRs must interact with each other. External GRRs may be present in the person's environment, but it is necessary to use internal GRRs to utilize external GRRs. The relationship between GRRs and SOC is further reciprocal, thus implying that GRRs, such as social support for our participants, lead to a stronger SOC, and it is SOC that made them mobilise and make use of social support (243). The more GRRs people are conscious of, able

to mobilise, and make use of, the stronger SOC. The regaining of functions, experienced by participants in this project, fostered new motivation to continue to adhere to the program, showed in theme 2 of paper 1: *"Adherence motivated by increased life manageability.* A stronger SOC will, in turn, help people mobilise more of their resources, leading to better health and well-being. For example, a better-coordinated interaction between internal resources and existing community resources keeps older people cognitively stimulated and socially connected with society (328). As stated in paper 4, there were differences regarding the kinds of programs and services offered to the older patients who had experienced a hip fracture, which might suggest that communities have a way to go in facilitating their services for the group of older patients. Franco et al. (165) supported this by stating a need for improving the environmental and financial access to physical activity opportunities for older people and Morgan et al. (174) suggested a need to focus beyond health benefits to embrace more holistic needs in order to increase levels of physical activity in older people.

The importance of the participants' internal personal assets showed across all papers, impacting the way the participants experienced physical activity as part of their recovery. Read et al. (332) found cognitive functioning to be correlated with a higher SOC and as a consequence, better physical, social and mental health among community dwellers. This was presented as a cognitive-emotional resource in the review of Tan et al. (328). An exclusion criterion in this Ph.D. project was cognitive impairments in which prevented the participants from taking part in the programs or from expressing their perspectives in the interviews; consequently, all participants had a certain level of cognitive functioning which may be described as an internal GRR, helping them understand and adopt the exercise instructions. The concept of emotional closeness refers to the degree to which a person experiences emotional ties and social integration in different groups (339), and can be considered a personal asset or internal GRR, which might have facilitated the important and close relationship participants in paper 1 and 2 developed with their instructors/therapists. Psychological dispositions, termed as evaluative-additive resources by Tan et al. (328) such as rationality, flexibility, foresight, knowledge, and intelligence, can be considered GRRs, according to Antonovsky (29). According to the current project, stubbornness or implementation power, as well as a positive attitude, were traits that helped the participants fulfil the exercise programme as a resource. Last but not least is a strong self-identity, which is listed as a crucial coping resource (29). It was addressed in our findings and supported by both Gesar et al. (320) and Young et al. (338). Finally, self-determination and a positive

attitude were deemed important for older people's ability to fulfil and maintain physical activity.

6.1.5 Meaning, motivation, and making progress in recovery

Findings from this Ph.D. project reveal the process of regaining functions and making progress as the essence of recovery for the participants; enhancing their motivation to participate as they experienced it as meaningful to cope with everyday life (papers 1, 3, and 4). The thoughts about returning to their "old life" and the experiences of changes in that direction were strong motivators in the performance of the physical activity. According to Antonovsky, meaningfulness refers to one's appraisal of the value and experience brought about by the stressor (39, 40) which also is demonstrated in the existential dimensions described by the participants in paper 3 where the connection between mobility and their overall meaning of life is salient. Rasmussen et al. (340) underlined the importance of meaningful relationships with other people, a sense of own identity, and being at peace, in the facilitation of activity in older people after hip fractures, in line with findings from this project. Antonovsky suggested an unequal weight placed on the three SOC components (39, 40), where meaningfulness plays a pivotal role in motivating an individual to engage in the search for understanding and resources within one's contexts. Thus, it was found to strengthen the other components—comprehensibility and manageability. Thus, the second important component is comprehensibility, followed by manageability—perceiving which resources can be mobilised.

Looking back to section 2.1, the complexity of ageing was outlined, demonstrating the diversity in the group of "older people"; consequently, the individual and meaningful rationale for engaging in physical activity programs will differ between individuals. With the overall goal of this project in mind, interventions should know and address the older persons' individual needs, as stated by Finnegan et al.: "Enabling older people to continue with lifelong exercise requires understanding the place of exercise in their life and helping them to integrate it into their daily life while keeping it relevant to them and their story" (186, p. 12). In a recent systematic review and thematic synthesis of qualitative studies focusing on how to reduce sedentary behaviour and contribute to healthy ageing, the authors stated that a first step is to shape knowledge on the health benefits of sedentary behaviour reduction and that further steps will be needed to enhance the uptake of, and to sustain adherence to, interventions that reduce sedentary behaviour, which physical activity might represent (341). Health behaviour

is influenced by three components—capability, opportunity, and motivation—which interact to generate behaviour (341). According to Antonovsky (342), various experiences impact health differently depending on the meaning created from experience. The meaning made by a person thus forms, as Antonovsky (29) stated, our way of being in the world, where both the individual and the environment are important concerning the meaning of an experience. The way the instructors used the participants' old lives to motivate the participants helped them see meaning in the situation. The meaningfulness factor of SOC is strongly connected to the participants' important life areas, in which activities with links to these areas are meaningful to engage in (39, 40).

Participants of this study were either home-dwelling or were aiming for a home discharge. Their goal of returning to their "old life" indicates a wish to go back to their previous living conditions or maintaining functional ability to stay at home creating meaning and strengthening the meaningfulness element of SOC. Tan et al. (343) supported this endeavour by stating that the striving to remain at home provides purpose and meaning and enhances people's SOC. Davey et al. (1) connected the definition of "ageing in place" to independence, which also was a valued concept among participants in this Ph.D. project requiring a certain level of functional ability to continue "age in place". Wiles et al. (344) explored the meaning of "ageing in place" to older people and found the concept to relate to older people's identity through independence, autonomy, and through caring relations and roles in the places people live, correlating to what this study participants describe as values they strongly connect to mobility.

Pol et al. (345) performed a qualitative study aiming to gain insight into what older adults after hip fractures perceive as most beneficial to their recovery from everyday life. The authors discovered three different resources which were beneficial for recovery in "supporting and coaching", "myself" and "technological support". Having successful experiences during recovery led to doing everyday activities in the same manner as before; unsuccessful experiences led to ceasing certain activities altogether. The participants highlighted their own role as crucial for recovery, which is the key feature in physical activities-based rehabilitation (345). Consistent with our results, Pol et al. (345) stated that coaching provided emotional support, which boosted self-confidence in performing everyday activities. As revealed in paper 4 of this Ph.D. project, the findings of Pol et.al. (345) suggest that more attention should be paid to follow-up interventions after discharge from inpatient rehabilitation to

support older adults in finding new routines in their everyday activities. Motivation coming from the experience of functional improvements is described as extrinsic motivation since the activity is performed as a means to an end and chosen by the individual (346). The participants in the study described how exercise triggering good feelings, which, in itself, was a positive accomplishment. This indicates that the participants experienced self-determined extrinsic motivation, which is intrinsically regulated but is performed to reach a goal irrespective of the activity (346). To make this self-determined decision, information and knowledge about the intervention, representing a collective GRR, and the participants' situation are needed, corresponding to the comprehensibility element of SOC and showing the intertwined nature of all elements in SOC. Antonovsky (39, 40) described how health personnel may help strengthen a person's SOC by creating internal coherence, balancing stress, and encouraging self-determination, as the instructors in the group exercise program did by leading the groups and taking the participants' needs into account to sustain their motivation and adherence. Supported by other studies (336, 347, 348), the findings may suggest that the instructors' roles are crucial in facilitating motivation and adherence by acting as expert consultants and supporting participants through group sessions and their everyday lives. The instructors helped the participants to reflect upon and interpret their bodily experiences and in building up their confidence, thus making the new exercise situation more comprehensible, meaningful and manageable, whilst indicating that the instructors provided the participants with the cognitive, emotional, physical, or material resources that could help them cope with the challenges in their daily lives (228, 349).

Although motivation through the meaningful process of making progress concerning participants' important life areas was common across all papers, the differences between the interventions demanded motivation of different degrees from the participants. The intervention in paper 1, which was a low-threshold group activity for older, home-dwelling people with a link to the municipality care services that they could use at will, demanded more engagement and motivation by the participants than the interventions in papers 2–4. The interventions in papers 2–4 were more "woven" into the services given from the municipalities as part of the original rehabilitation services and were based on a one-on-one follow-up, providing more support to the participants in the process. Additionally, the programme from Paper 1 was long-lasting, which demanded persistent motivation over time. In paper 1, the participants fulfilled the programme with high grades of adherence, indicating high grades of motivation. The intervention in paper 1 was designed as a group intervention in

which the relationship between group members served as a social supportive GRR; this might have been an advantage to the interventions/services in the other papers. Functional improvements as a source of new motivation are also supported by earlier qualitative research. De Groot and Fagerstroem (335) found that functional independence and the sustainability of walking were essential motivating factors for participation and adherence.

In section 6.2, the methodological considerations will be addressed.

6.2 Methodological considerations

In this section, some of the methodological choices and decisions presented in chapter 4 will be further discussed concerning the assumed relevance for the trustworthiness of the project, which is based on a qualitative methodology. In the following subsections, trustworthiness will initially be given focus in 6.2.1, followed by a section reflecting on the choice of design and philosophy (6.2.2). In sections 6.2.3, 6.2.4, 6.2.5, 6.2.6, 6.2.7 and 6.2.8, the recruitment processes, the participants, the data collection, the analysis, and the ethical considerations as well as the researcher's role and reflexivity will be discussed, respectively.

6.2.1 Ensuring trustworthiness

Trustworthiness in qualitative research involves establishing credibility, confirmability, dependability, and transferability including the examination of the researcher's role and reflexivity (288). Ensuring the trustworthiness of the findings by designing and incorporating proper strategies is paramount (350) in qualitative research, which hopefully appears in this chapter. Strengths and limitations related to trustworthiness have also been discussed in the papers mainly within the framework of Lincoln and Guba but also according to Maxwell (351) and Malterud (246, 256, 285).

Connelly (290) refers to trustworthiness as the degree of confidence in the data, interpretation, and methods used to ensure the quality of a study (290). The choice of methods and the use of different theoretical frameworks are also of great relevance for trustworthiness. The theoretical frameworks used in this Ph.D. project are thoroughly presented and argued for in chapter 3. The project also adhered to the Consolidated Criteria for Reporting Qualitative Research (352), to increase the possibility of the methodology applied in this Ph.D. project to be fully evaluated and utilised.

In the following, we will consider how each of the trustworthiness concepts was ensured in the current project.

Credibility was ensured through unstructured, in-depth qualitative interviews. The performance of the interviews was conducted by two different researchers, the Ph.D. candidate and the main supervisor, and followed the standard procedure as presented in chapter 4. The interviewer kept journals from the interviews, and transcripts were read several times and discussed by all researchers. Triangulation was made considering data sources by interviewing groups of participants at different times in their recovery assuming the experience of physical activity might be experienced differently early or later in the recovery period. Triangulation concerning the geographical affiliation of the participants was also made and can enhance the credibility of the findings as well as analyst triangulation by having several researchers actively participating in the analysis (291). The representation from different geographical regions among the participants, yielding a wider range of perspectives and may also represent a strength of the study. We did not implement methods triangulation in this study although this might have enhanced credibility even more. During the process of analyses, I began by transcribing and reading the data several times; then, the entire data corpus was coded systematically, this was done to avoid missing out on important elements which were not initially apparent. This process was validated by the co-authors to increase credibility. It is important to go back and forth between the codes and the raw data and to consider the context carefully, a process which in many ways resembles the hermeneutic circle described earlier (267, 353, 354).

Confirmability was achieved by substantiating each emergent theme with rich quotes extracted from the participants' responses, to show how data represented the participant's voices and not the researcher's points of view. According to Lincoln and Guba (288), this could contribute to the confirmability of a study. Reporting direct quotations from participants may enable the readers to grasp the essence of the participant experiences and also enhance the study's *authenticity*. Further, confirmability was ensured by providing detailed descriptions of the setting, participants, methods, and ethical considerations (see chapter 4). Formal member checking is one of Lincoln and Guba's (288) main sources of confirmability and means a form of the external audit with the actual participants in the research project. However, member checking requires careful planning and execution (355) and was not employed in the current study. It is furthermore important to remember that member checking

may be perceived to rest on a realist epistemology, implying that there is a fixed truth that can be accessed and accounted for by the researcher and thus confirmed by a participant (355).

To ensure *dependability*, the transcripts were reviewed several times and then checked and coded by the authors. Interpretations and final themes were also based on consensus through continuous reflexive discussions among all the researchers (288). By involving a team with different professional backgrounds, experiences, and knowledge in the analytic process, broader perspectives and possible meanings were uncovered.

All the four included papers in this Ph.D. project have been submitted to journals with peer review. This means that persons who are not related to this project in any way have evaluated the research process and presentation of findings (282). This process led to changes in the papers for the better and enhanced the overall trustworthiness of the study. Dependability was obtained in the current empirical study by informal and formal meetings between supervisors and me to discuss data. Lastly, Lincoln and Guba (288) recommend an external audit by an informed but disinterested peer. The fact that the articles in the thesis have gone through peer review therefore probably strengthens the dependability of the findings. However, these findings are not dependable in the sense that other researchers' would have reached the same conclusions (288) which would assume a fixed and objective reality and be against the philosophical assumptions underpinning this research. Regarding thematic analysis, the choice to work primarily inductively can be questioned. This qualitative Ph.D. study is inductive, but the inductive approach is perhaps more suitable when there is little prior knowledge in the field (246).

Transferability in qualitative research reflects generalisability or the external validity of a study and this concept is much discussed (356). Lincoln and Guba (288) use the term transferability instead of generalizability, which indicates that the findings have relevance in other contexts, thus highlighting the difference from generalisability in the quantitative or statistical sense of the word. Although the knowledge produced in this study is situated and depends on the researchers' positions, we wanted to contribute with knowledge that was in some way relevant beyond the local context. We believe the choice of design facilitated transferability (278, 351). In line with the views of Lincoln and Guba (288), the intention was to obtain vivid descriptions during data collection, and efforts were made to do this during the interviews by asking follow-up questions and by reporting them in the articles to enable the readers to assess the transferability of the findings. The description of the context of Norwegian municipal health care where the current project has been conducted was

thoroughly described (see chapter 2), which hopefully strengthened the possibility to assess transferability (288). The knowledge produced may invoke recognition and reflections among other stakeholders from other similar contexts (356); hence, it is ultimately the readers or consumers who decide on the transferability and importance of this thesis' findings (288, 357).

We sought to increase the *transferability* of the findings in this Ph.D. study by applying an in-depth, detailed, and descriptive analysis of the methodology, method as well as the data by showing participants' responses in quotes to substantiate the findings. The purposive sampling of older patients, to embrace heterogeneity in terms of common experiences, also promotes transferability. We thus believe our findings can be transferable in similar contexts. The fact that Norwegian municipalities are organised in different ways and have different population- and geographical challenges, must be considered when discussing the representativeness of the study findings for other populations. However, as the participants of this study represented both rural and urban districts, their experiences may still be transferred to similar situations or people. Nevertheless, a thorough description of the contexts and participants has been provided to allow the reader to assess the transferability of the findings.

6.2.2 Choice of design and philosophy

Opposing perspectives are often included in the reasoning of methodology in research, such as inductive – deductive or qualitative – quantitative, where qualitative research often conflates with a inductive approach (272). An inductive approach assumes a "bottom-up" line of reasoning that moves from a particular or specific premise to reach a general conclusion (358). Young et al. (272) have demonstrated that inductive and deductive research approaches exist on a spectrum, and the research methodologies investigators use (be they quantitative or qualitative) may sit anywhere along that spectrum. The qualitative methodology most "purely inductive according to this spectrum, is traditional grounded theory, where the aim is to make sense of a phenomenon to develop new theories (272). This Ph.D. project was placed near the inductive end of the inductive – deductive spectrum, as we did not intend to develop new theories, but aimed to contribute to previous understandings, building on the work of others and using conceptual frameworks (272). Thus, our methodology was based on an inductive design which proceeded from empirical data gathered from several individual in-depth interviews, suggesting that there might be a connection between all the single "cases".

A purely qualitative design was chosen in this project to explore the older peoples' experiences and understandings of physical activity as part of their recovery, by participation in two different exercise interventions and in ordinary rehabilitation services with a special focus on hip fractures, in line with the overall aim. A qualitative design allows detailed and in-depth investigation of human experiences and the meanings attached (283, 284), and suited the sub-aims and purposes presented in the four published papers.

In this Ph.D. project as a whole, we argue that inspiration came from an epistemological continuum, from a descriptive phenomenological approach to a phenomenological-hermeneutic tradition (252). There is debate concerning the question of whether the philosophy of science is, should be, or could be, useful to science and/or influences, should influence, or could influence science, which has been recently reignited by philosophers of science as well as scientists (359-362). Advocates of a tighter relationship between philosophy of science and the sciences have mostly relied on individual examples of philosophers of science who have made significant philosophical contributions to understanding and resolving scientific problems, clarifying scientific concepts, or critiquing scientific assumptions (363) which are our intention in this section. There are a variety of philosophical frameworks that could have been used in this project to obtain more and/or different knowledge about people's experiences of the phenomenon 'physical activity/exercise as part of older people's recovery processes after experienced reduction of functional abilities including people with hip fracture (papers 2, 3 and 4) and people with health challenges (see paper 1, table 2).

Reasoning about mechanisms is central to understanding relevant components and relations of phenomena in science. This explains our choice of both using phenomenology (paper 1) as described in section phenomenological position 4.1.1 (see page 63), and phenomenological hermeneutics in papers 2,3 and 4, as previously elaborated in sections 4.1.2 and 4.1.3.

Regarding paper 1, inspiration came from Merleau Ponty's thoughts about the body as fundamental and his thoughts about the broken body. He also left suggestions for implications of the broken body, which is relevant to our study aim. Later phenomenologists have considered Merleau-Ponty's broken body concept, such as Toombs (364) investigating illness, pain, and other bodily dimensions. The body as broken, vulnerable, and dependent was particularly relevant in paper 1, and for recovery per se. Recovery and restoration are additional parts of the discussion of broken bodies and bodily breakdowns, and can call forth

resources from the bodily repertoire to create new normality (365), relevant for this Ph.D. project.

The choice of a phenomenological hermeneutic approach inspiration (271) may be useful for facilitating interpretations of meaningful aspects in the empirical material collected as well as it may benefit the practice field by stimulating reflections on current and ideal practices. Further, interpretation can be considered a key element when performing phenomenological-hermeneutic research, because description and explanation alone are not enough to obtain a deeper understanding of the experiences related to human existence (270). Two assumptions of hermeneutics are that humans experience the world through language and that this language provides both knowledge and understanding (366). It can be defined as the theory or philosophy of the interpretation of meaning (367). This interpretation of the meaning of the participants' statements in the interviews was the central focus of the current Ph.D. project, especially in papers 2, 3, and 4, whereas Gadamer's philosophical hermeneutics focuses on the interpretation of transmitted texts (253). In the phenomenological hermeneutic tradition, the essential meaning from people's life world has to be expressed through ways of living, actions, narratives, and reflections (270) which was achieved through the steps of this project. In research, the lived experiences have to be fixed in texts which always needs interpretation (270). This study is based on the intertwined nature of both phenomenology and hermeneutics in qualitative research is further described by as follows:

> We do not believe in 'pure' phenomenology in which essences are seen intuitively, 'uncontaminated' by interpretation. Nor are we interested in 'pure' hermeneutics, i.e. in text interpretation that does not transcend the text meaning to reveal essential traits of our life world (270, p. 147).

Across the included papers, this project is therefore inspired by an epistemological continuum from a descriptive phenomenological approach to a phenomenological-hermeneutical tradition referring to Paul Ricoeur whose philosophy connected phenomenology and hermeneutics stating the mutual affinity between the two (252).

6.2.3 The recruitment processes

Inclusion and exclusion criteria can be considered as the first "framing" of the recruitment process. Further, the recruitment's goal is to achieve information which in the best way possible can describe our research questions (368). As described in section 4.3, the overall recruitment procedure was maximum purposive sampling (282) aiming to achieve as broad

variation in data as possible regarding participant characteristics. The most important characteristic for recruiting our participants, across all four papers, was the experience of doing physical activity or exercise as part of an intervention program or health service as part of their recovery. All the participants had different health challenges (see Table 2), in papers 2, 3, and 4. All participants had experienced a hip fracture surgery during the last eight months. According to Malterud (246), pragmatic choices might be taken, for instance, when the recruitment is difficult and time-consuming and there is a time limit like the frame of a Ph.D. project, as is the case with this study. Practical considerations must also be made concerning sample size and data amounts to make the project manageable as further elaborated in 6.2.6.

In the current thesis, the overall recruitment procedure was maximum purposive sampling (282) aiming to achieve as broad variation in data as possible regarding kind of physical activity/exercise, age, gender, culture, and background within the frame of the inclusion criteria. This study comprises three participant groups where the physical activity/exercise participants had experience from, were as follows: a long-term group-exercise program, a one-on-one exercise intervention, and physical activity/exercise, respectively, embedded in real-life health services in municipalities in a certain part of Norway. Further details about the programs/services and the recruitment processes are described in chapter 4.3. The rationale for using a purposive sampling strategy was the obviousness in reaching out to individuals who were in the position of having perspectives on the phenomenon in question (369), in this case, physical activity.

Even though the recruitment processes transpired in myriad ways, participation was of course voluntary. For that reason, the participants included may have had an overly positive attitude towards physical activity and exercise, which could involve a selection bias (370). In sample 2 (papers 2 and 3), all the participants had experienced a hip fracture and were already enrolled in an RCT intervention when they were in the hospital. Upon arriving at the rehabilitation unit, they were asked by the staff if they wanted to participate in this Ph.D. thesis by being interviewed when the exercise intervention was fulfilled and all the participants who were asked agreed to participate. Since they all were willing to participate in an exercise intervention, they might have been positive towards exercise in the first place as already mentioned.

In the recruitment of participants from the group exercise program (paper 1), which was a 9-month long intervention, the original thought was to recruit both participants with high and

lower grades of participation (approximately>< 50 % attendance) to get descriptions from both those who had a high grade of motivation and those who struggled with motivation. Unfortunately, we failed to recruit participants with lower grades of adherence, i.e. less than 50%, which might have provided us with even broader information. In paper 4, we searched for information concerning the experiences of physical activity following hip-fracture surgery. The recruitment of this participant group was complicated because municipality-based services, including physical activity, were difficult to operationalize. Sørlandets hospital provided us with lists of patients who had undergone hip fractures but recruiting further from these lists when patients had returned to their home municipality, was difficult. Different methods were discussed to reach these patients, for instance, cooperating with the municipalities service offices, which several municipalities gave consent to do, but as physical activity is no service as such, we found no other way to do this but to ask them directly in a phone call if they had had experience with physical activity or exercise after being discharged from hospital. This phone call was taken by the Ph.D. candidate who also performed all the interviews. We could have sent letters with information before contacting the participants by phone calls, but due to a paucity of time at this stage of the project, we chose to reach out to them by telephone. They were provided with both oral and written information regarding paper 4 before the interviews were commenced. I was very careful in the dialogue to inform them about the study and give them a lot of possibilities to ask questions. Furthermore, I attempted my very best to not put pressure on them if they expressed reluctance towards participation. There is always a possibility that the information given to the participants during recruitment may not have met the different individuals' information needs. The patients may have been motivated or deterred about entering the study, depending on their expectations of what participation would entail (370). In addition, being asked to participate in a study by healthcare professionals involved in their care like it was done in papers 1-3 could cause them to feel pressured to participate by someone they rely on.

6.2.4 The participants

In this section, some of the characteristics describing the recruited participants, presented in chapter 5.2.3 as well as in the four papers, will be discussed.

As in all qualitative research, our findings are text-bound to the participants and study setting (351), in our case a Norwegian-specific context, described in section 2.4. However, it needs to be noted that their views may not represent the broader population. As described in section

4.3 regarding recruitment, this process was difficult, especially in papers 1 and 4. This may have led to the recruitment of people who are overly positive towards physical activity, as they had high grades of adherence (paper 1) and fulfilled the most important inclusion criteria, which was participation in physical activity and the willingness to participate in a research project regarding physical activity. Notably, if they were reluctant to participate, they might not have been willing to be interviewed.

Our participants were recruited from two areas of Norway, one urban and the other both urban and rural, which might include differences in cultural backgrounds, but only ethnical Norwegians were interviewed. Knowing that ethnical minorities traditionally are underrepresented in clinical research (371, 372) and several reviews have pointed at the need of taking into account the cultural and religious characteristics when designing interventions aiming at enhancing physical activity levels in particular ethnic groups (169-171), please refer to Table 1, we might have missed valuable data coming from different cultural angles in our findings by not making efforts to recruit participants with minority backgrounds.

Even though we aimed at maximum purposive sampling maximum variation regarding gender in the recruitment procedure, the total sample of 47 participants consisted of 14 men and 33 women. The reason for the overrepresentation of women in the sample might be that women live longer than men (373) and that hip fractures, which a majority of the participants had experienced, occur more frequently among women (374). This female overrepresentation may therefore be a strength of this study, as the sample reflects the population regarding gender.

As a large number of our participants had experienced a hip fracture and the worldwide average age of people who experience hip fractures was 80 years (375), the age diversity of the participants, with age spanning from 68 to 95 and a mean of 81,5 years, should reflect the group of older people patient experiencing a hip fracture

Qualitative studies, as presented in papers 1-4, are typically in-depth investigations of smaller samples to provide rich and nuanced information on individual experiences of a phenomenon (283, 284). According to Malterud et al.(285), to offer sufficient information power, it is an advantage to include a less extensive sample holding characteristics that are specific for the study aim as well as determined by items such as sample specificity, use of established theory, quality of dialogue, and analysis strategy. Thus, we recruited older patients who had experiences from different kinds of services or interventions including physical activity and were living in their own homes (papers 1 and 4) or aiming to return home after the

rehabilitation stay (papers 2 and 3). Having three different samples of participants with experiences from group exercise (papers 1), from a one-on-one evidence-based exercise program (papers 2 and 3), and from regular municipality-based health services including physical activity, in different recovery periods as well as the participants represented different geographical areas, contributed to sample specificity and credibility through data triangulation. Not all the informants were able to provide rich information, as the older patients interviewed in this study were physically frail, whereas others found it difficult to describe their experiences concerning the study's theme. The Ph.D. candidate performing approximately half of the interviews was not very experienced either. These factors may have contributed to shorter interviews and may have decreased the quality and richness of these interviews.

Although saturation as a generic quality in qualitative research may not be appropriate as Malterud et al. (285) argued, we have reflected upon the sample size and information power during the research process. Information power indicates that the more information a sample holds, relevant for the actual study, the lower number of participants are needed and consequently, what sample size that can provide sufficient information power will depend on the aim of the study, sample specificity, use of established theory, quality of dialogue and analysis strategy (285). The sample sizes varied in this project, and so did the aims, sample specificity, and quality of the dialogues.

Malterud et al. (285) further contended that qualitative researchers are usually satisfied when a study offers new insights that contribute substantially to or challenge current understandings. Regarding the participant samples of this project, all three data-samples provided rich and substantial of the phenomena under research.

6.2.5 The Data Collection

The following section will touch upon and discuss some aspects of data collection. Regarding the choice of data collection method, we wanted to explicate the experiences of physical activity from the lifeworld of older people and to do so, semi-structured interviewing was considered the best method. The participants' subjective experiences emerged through the interviews (283). Semi-structured interviews were the method used in all three samples, and we conducted one interview of each participant. We might have conducted interviews twice; to cover possible changes in experiences as participants recovered and regained functions, but as the three populations were interviewed on different stages in their recovery, we believed

that we had covered for this effect. Doing focus group interviews could also have been a relevant method, to exploit the value of interaction between participants and thereby get a different insight in addition (246) and might have been of special value in the description of experiences from the group exercise intervention. In the end, due to our aim and the vulnerability of the participants, we considered individual interviewing a better method. Complementing data with observations could have contributed to enriching the overall picture and validating, discarding, or generating new perspectives on the findings (351). Observation would also have given information concerning the therapeutic alliance between the instructor and the participants. However, this study aimed to capture the participants' individual experiences connected to physical activity, which can be considered bodily and very personal. Thus, semi-structured, individual interviews were considered the best method for giving a voice to the participants.

The interview is considered the main method of data collection in phenomenological and hermeneutic research, as it provides a situation where the participants' descriptions can be explored, illuminated, and gently probed (283); therefore, we considered a combination of a qualitative phenomenological hermeneutic and hermeneutic interview study, exploring the experiences of those involved, to be the best approach concerning the overall aim of this Ph.D. project, see pages 10-11.

From a philosophical perspective, the interview is described by Marshall and Rossman (376) as a specific type of in-depth interviewing grounded in the philosophical tradition of phenomenology. This acknowledges the relationship between the philosophical tradition and method which distinguishes this interview from other forms. Conducting interviews in this perspective, an empathic interest in and attitude towards the people being interviewed is necessary as well as attentively listening and asking appropriate follow-up questions which were the intention of the interviewers across the three participant groups. Based on the hermeneutic position, the interviews were performed as an interpretive conversation wherein both partners reflectively orient themselves to the interpersonal or collective ground that brings the significance of the phenomenological question into view.

The interviews generated rich data providing nuanced knowledge from the perspectives of three different samples of older people, who had experienced different kinds of physical activity at different times in their recovery processes, as presented in chapter 5 in this thesis. The 19 interviews provided by the most skilled researcher in the early days after hospital discharge generated thicker descriptions than the ones taken later in the recovery period.

According to Kvale and Brinkmann (258), the role of the interviewer is crucial for the results and to acquire the competence of a good interviewer takes time and practice. The researcher's role and reflexivity are further discussed in section 6.2.8. All the participants seemed to be open about their experiences and appeared to be unafraid of talking about challenging issues. My clinical experience with old patients helped me to establish a climate for trust and understanding prior to and during the interviews by showing courtesy and respect and focussing on non-judgemental active listening. However, as a novice interviewer, I found it challenging to get clearer descriptions from the participants and present good follow-up questions.

Most of the interviews were conducted at a place of the participants choice, which was in their own homes except for the 19 participants in sample two (papers 2 and 3) who were in a short-time rehabilitation stay and interviewed in their respective rooms on the last day of their stay at the premises. We considered this sample of participants to be the most vulnerable because they had been through a hip fracture only two or three weeks before the interview, and the experience from the skilled interviewer was an advantage.

Being interviewed can be tiring, upsetting, and/or enervating, and the interviewer needs to be aware of how the interview situation affects the person being interviewed, even if he or she seems comfortable with the situation (377). What seemed most uncomfortable and disturbing at the start of the interviews was the audio recorder. To ensure the participants' dignity and welfare, I gave the participants an easy start and sufficient time to talk, even about topics that did not concern the study, to make them feel relaxed. To be perceived as an empathic listener can sometimes be sufficient (351). I used an empathetic and supportive style of communication with the patients while being careful not to take the role of friend or therapist, even if this was challenging. Some of the participants asked me questions about their condition and their exercise which I had to answer in general terms without getting too deeply involved in it, albeit in a respectful manner. As it also is important to consider the participants' time and inconvenience of being involved in my research (351), I was careful to clearly explain initially the purpose of the Ph.D. project and what will be done with the data. The participants seemed to like to talk about their experiences and to appreciate the situation of being "needed" by being part of a study. The fact that most of the participants (35/47) were living alone and spending much time alone, might have been a contributing factor to this. A semi-structured in-depth interview is useful when the aim is to understand themes from everyday life from the person's own perspective (258), like in the current study. Further, the

interview is not an open conversation or a closed survey but is conducted in accordance with an interview guide (258), giving directions/suggestions for the themes the interview should be about along with examples of questions. As the interviews proceeded, I felt free, and the use of the interview guide changed from the first to the last interview from being more dependent on it, to be more as a guiding document.

Related to the biases inherent in different data collection methods, a strength of this study is that populations and theories were used to broaden and expand understanding of the subject matters and to make findings more robust (274). Interviews of different groups as shown in the papers, give access to different forms of data and helps the researcher to see the phenomena from different angles or viewpoints, which may help to research a more comprehensive understanding (351). Another limitation of this thesis is that it does not explore the phenomena in the relevant contexts from the point of view of health professionals.

6.2.6 The analysis

In the following sub-section, aspects of the chosen method of analysis will be discussed. As already presented in chapter 5, the reason for choosing systematic text condensation (STC) developed by Malterud over other methods, was because it is a thematic method that seemed to suit the purpose, the theoretical frameworks and the naturalistic, interpretive paradigm well (245, 246). STC, as well as other phenomenological and hermeneutic approaches, are considered to be more appropriate methods for this project than for example grounded theory. Grounded theory has an even more open approach with the aim of exploring to create new theory (378). Thematic analysis has a systematic approach and is flexible and relatively easy to do. Other systematic methods have similarities with STC, like the method of Braun and Clarke (287) or the method described by Nordberg and Lindseth (270). Looking back, this phenomenological hermeneutic method for researching lived experience (270) may also have been an appropriate analysis method in this Ph.D. project and could have made the argumentation for the philosophical background easier. A disadvantage of thematic analysis might be the proclivity to lose nuances in the single participant interviews due to the focus on commonalities across the data sets (287).

Malterud (246) strongly recommends researchers to perform the transcribing process themselves, which I did regarding data from participant samples 1 and 3 (papers 1 and 4). Based on the time frame of this Ph.D. project, we decided to hire professional help for transcription of the data from participant sample 2 (papers 2 and 3). When I initiated the

analysis, the familiarisation with the data from the transcripts which were performed by a professional was more time-consuming for me than the analysis of the data I had collected and transcribed myself. By doing the transcribing procedure myself (in papers 1 and paper 4), the coding process and additional steps of the analysis were easier to perform. This felt like an advantage in the process because I remembered the situation where the words were said; hopefully, this prevented me from major misunderstandings, although the text in transcripts never must be confused for reality The data produced were rich, and data saturation was reached, so as to provide sufficient information power (285, p. 3). This might be considered a strength of the study with a less extensive sample holding characteristics that are highly specific to the study aim (285).

The analysis was carried out in cooperation between me, a Ph.D. student with clinical experience as a physical therapist and long-term engagement from a rehabilitation unit for older people, and my co-authors who were my supervisors in the study. One of the co-authors was a physical therapist whereas the others were nurses, in addition to being experienced researchers. I initiated the analysis, and the co-authors (my supervisors) supported with their assessments. In the analysis of paper 3, two researchers coded the data together in fruitful cooperation which compensated for my lack of research experience and secured and strengthened the findings. In the analysis process, we attempted to present the findings with clarity and transparency.

6.2.7 The ethical considerations

The study procedures followed the guidelines of the National Research Ethical Committee (REC). All the participants included in this Ph.D. project received verbal and written information before the interviews were conducted regarding the following points:

- how the project was to be carried out practically
- a brief description of the project's content
- how the results were going to be presented and used
- that the results were going to be made anonymous
- that it was possible to withdraw from the project at any time if so desired, including withdrawing their contribution
- that the contents of the interviews were confidential

In this Ph.D. project, ethical approval given in a prior overall project also served as a guideline for recruitment procedures. The wording in the information letters emphasised that participants would be treated with respect, and concerns were taken to signal awareness of the

vulnerability inherent in sharing insights into their lives. Identifiable material is securely locked away, in accordance with REK guidelines. All participants in this study (papers 1-4) were people who needed health care services and might thereby be characterised as vulnerable to different extents (379). Thus, it was important not to impose or cause them distress of any kind. According to Levinas (293), ethical responsibility for 'the Other' is not something we choose. It is a personal sensation, and we are confronted with a demand that we cannot avoid, ignore, or transfer (293). Ethical responsibility is therefore a fundamental phenomenon and an inherent part of being human (294).

6.2.8 The researcher's role and reflexivity

In this section, I will elaborate on the researcher's role and reflexivity, although some aspects of this already have been discussed in the previous sections. In a qualitative research process, the researcher must concentrate on his or her own pre-understanding (246) throughout the research process. Based on the phenomenological hermeneutical perspective (see chapter 5), all people have a professional pre-understanding that should be understood as a pre-understanding gained from the profession, as well as an existential pre-understanding (266). Those preconceptions involving work experience, values, motivation, and expected findings are important to be aware of. The pre-understanding can help motivate the initiation of research within a specific topic (246) as was the situation in this project.

My pre-understanding came from my education as a physical therapist, my experience from working in a rehabilitation centre for older people over more than 10 years, and from a prior master thesis concerning the theme as well as my own experience of physical activity and exercise. A clarification of pre-understanding is recommended by the literature (288, 351). An awareness of the routines and procedures in a rehabilitation centre, where physical activity plays an important role and the possession of knowledge about the challenges older people face concerning physical activity as well as knowledge of the Norwegian health care system and legislation, were advantages that helped me to better understand the context of the project. The authors' backgrounds, especially the interviewers, who both were physical therapists by profession, might have contributed to bringing forward positive narratives regarding physical activity in the study, although we tried to remain open-minded and to encourage the participants' honest responses. The positive attitudes in the culture and the society regarding physical activity could also have influenced both the researchers and the participants in such a way as to have hampered the critical meanings. The interviewer was

immersed in the field and so faced the challenge of balancing closeness and distance as an interviewer (380).

Appraising qualitative research depends on the transparency with which the research process is described. An awareness of the professional background can be particularly important (381). Therefore, I was open about my background and experience as a physical therapist with work experience in the field of rehabilitation and this helped establish contact. However, I did not share my pre-understandings regarding physical activity with the participants of the study because I wanted to collect their experiences as “pure” as possible.

7. CONCLUDING REMARKS

The overall goal of this Ph.D. project was to contribute to research on enhancing the quality of health care services that could inform policy, clinical practice, and research by producing qualitative knowledge on how to better address older home-dwelling people's needs and perspectives in interventions, services or programs where physical activity or exercise is involved. Hopefully, this project has contributed to a wider knowledge base of how older people experience physical activity in a situation of recovery from functional "unhealth". In the following sections, the conclusions of the Ph.D. project will be summarised (7.1) as well as some implications for practice (7.2) and finally a suggestion for future research projects (7.3).

7.1 Conclusions

Bringing all the papers together, the overall aim was to explore and describe community-living older adults' experiences with physical activity as part of their recovery, by participating in two different exercise interventions and in ordinary rehabilitation services with an emphasis on hip fractures. The sub-aims of the included papers were, respectively:

1. To describe the experiences of older people's motivation for participating in and adhering to a group-based exercise intervention in a local community setting (paper 1).
2. To explore how older people who had participated in an evidence-based exercise intervention after hip fracture surgery describe their relationship with their therapists and how this relationship might have contributed to their motivation to execute their exercise regime (paper 2).
3. To explore the reflections and thoughts of older people following their participation in the evidence-based High-Intensity Functional Exercise Program (HIFE) during the first 3 weeks of rehabilitation after hip fracture surgery (paper 3). We sought information about the impact of the program regarding the participants' mobility, their own resources for managing the situations they confronted in their everyday lives, and their views on whether the mobility challenges were worth their investment and commitment.
4. To explore and describe the experiences of recovery among community-living older people receiving rehabilitation services involving physical activity following hip-fracture surgery (paper 4).

Some conclusions can be made with respect to the general importance of physical activity interventions for older people, the importance of maintaining a relationship with their instructors, motivation for participation, as well as the recovery to managing everyday life.

Physical activity and exercise, in a group setting, in an individual one-on-one setting, or as a service given individually by a single professional or as a team-based service, are important contributors to the recovery processes, both in long term perspective as well as during the first weeks for older people after having experienced a decline in physical functions like a hip fracture.

The participants' experiences regarding physical activity and exercise in their recovery processes, further focused on the instructor, typically a physical therapist, presenting the program, and the quality of the relationship or the therapeutic alliance between the instructor and the participant. The importance of having a person alongside while performing the program, who possessed skills concerning their illnesses, concerning physical activity and exercise, and about how the activity might affect their conditions, was crucial for the participants' motivation and implementation power. The therapist's relational competence, involving skills in communication and ability to establish and maintain a satisfactory relationship with the participant, appeared to be crucial for the negotiation of various sources of knowledge relative to the older people's preferences. Further, an atmosphere of trust and acceptance in the instruction setting assumes significance for the participants in their vulnerable state, indicating the importance of attitude and personality traits from the instructor. This might indicate a need for tight and long-term follow-up by professionals when physical activity and/or exercise is recommended as "therapy" for older people with disabilities like hip fractures. Knowledge of older patients and their wider context could provide an important linkage between life before a hip fracture or other conditions and life thereafter and to be met as a whole person, wherein their goals were incorporated in the physical activity services offered, and the exercises were tailored to them, seem to be the key to ensuring adherence to programs among older and vulnerable patients.

The personal importance of mobility both considering the participants' physical and psychological health as evident in the findings, was strongly connected to their meaning in everyday life. To restore mobility and functional abilities to return to their old life, including habits, roles, and independence, was the overall goal and motivational assets in their recovery.

The long-term municipality follow-up of patients suffering from hip fractures in Norway, seems to differ in terms of quality and duration. Even months after the fracture, the need for professional help and support in exercise towards enhanced physical functioning was evident from the participants' perspectives as showed in paper 4. To be left to do exercises from a program by themselves seemed to be a difficult task to pursue.

Older people's preferences, knowledge, motivation, abilities, and skills influence them to varying degrees to make important health-related decisions and, therefore, are crucial for their participation in exercise interventions. Contextual factors such as policies and organisational structures provide preconditions for clinical practice and must be duly considered to develop better and equal services regarding physical activity in the municipalities of Norway, following up the purpose of policy presented in section 2.4.

7.2 Implications for Practice

The findings of this study could prove useful about the development of rehabilitation services for hip-fracture patients and, further, contribute to the identification of best practices in terms of aiding their rehabilitation, given the complexity of their overall health status as well as the inevitable diversity of the services required to meet their needs.

The current study adds important knowledge about the complexity of older people's lives. It further demonstrates the influence of the physical and psychological state of the participants, policies, organisation of the services, and the relationship between the patient and the instructor. In the following, some recommendations to meet some of the challenges described above will be provided.

The health care professional occurring most often in this thesis is the physical therapist although also occupational therapists were instructors in the group exercise intervention from paper 1. The need for the therapists to know the patient as a whole person by recognizing their needs, resources, and preferences seems essential and crucial to understand the patient's perspective, comprehending how the disease affects the patient's entire life situation (382), and use this knowledge in the instruction of the program. More systematic use of psychological techniques by physiotherapists has been suggested to be beneficial (383) in increasing their sense of self-efficacy and in promoting self-management among their patients (384). Moreover, physiotherapists should consider employing well-directed communication;

they should also promote their patient's self-control over their problems and avoid reinforcing their patient's pain behaviour inadvertently (384).

To give older people in need of professional help and support to do physical activity and exercise longer and tighter follow up from physical therapists, may put pressure on the health care system and be an economic burden to the services and the municipalities. The development after the Coordination reform (138) in Norway, has forced municipalities to prioritize patients discharged from hospitals when it comes to already marginal physical therapy resources. Long-term follow-up of physical activity is often left to nurses in the home care services who also lack time and resources.

7.3 Future Research

The theme of this thesis is comprehensive, and the choices taken in the research process have consequently left some questions behind. A research project raises new questions in addition to bringing answers to others (246).

One limitation to this project was that we may have reached people who were innately positive to physical activity and that we, therefore, failed to describe experiences of those who struggled more to motivate themselves to attend to physical activity interventions, or who did not attend to any physical activity at all. Among our participants, there was no one with a minority background. The need to take into account the cultural and religious characteristics when designing interventions aiming at enhancing physical activity levels has been underscored (169-171), as minorities traditionally have been underrepresented in clinical research (371, 372) and recruitment of minority groups can be difficult (348). A suggestion for future research might therefore be to encompass the needs of ethnic minorities in designing physical activity interventions by using already produced knowledge to create cultural-sensitive interventions acceptable and accessible to minority groups and possible to implement in society.

Another large group of patients in need of physical activity or exercise after hip fractures or other conditions is older people with dementia diagnoses. This group was excluded from this study because they need a different approach both in kind of intervention and research. Future research concerning physical activity in older people should include this particularly vulnerable group.

As shown in paper 4, the municipalities of Norway are very different both in geographical and population size and have extensive freedom by law to design their health services. Physical activity as such is not a health service, but a tool used in many kinds of services and by different professionals. Paper 4 also showed a difference in terms of the different kinds of services our participants received due to what municipality they lived in as that might jeopardise the equal rights in the Patients' and Users' Rights Act (36). As a commendable starting point, future research should map how physical activity is organised and implemented as a service or part of a service for older people in the municipalities.

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