

Active Ageing a Path towards Ageing Well

**Physical Functioning, Physical Activity,
Falls Self-Efficacy and Social Participation
in Community-Dwelling Elderly**

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ABSTRACT

The overall aim of this thesis was to study factors of importance for active ageing with a focus on physical functioning, physical activity, falls self-efficacy, health-related quality of life and social participation in community-dwelling elderly above 60 years old.

Methods: Study I (n=108) evaluated the psychometric properties of the Falls Efficacy Scale-International (Arabic version) (FES-I (Ar)) using validity and reliability testing. Study II (n=176) addressed the association between physical functioning and falls self-efficacy. Data were collected using five different tests of physical functioning and the FES-I (Ar). Study III (n=176) assessed the association between physical activity and health-related quality of life (HRQoL) using the Physical activity socio-cultural adapted questionnaire (PA-SCAQ) and the EuroQol-5Dimensions-5Levels (EQ-5D-5L) questionnaire. Between group comparisons were based on the PA-SCAQ by dividing the participants into three Physical activity (PA) groups: low (n=74), moderate (n=85), and high (n=17). In study IV (n=17), a narrative approach was applied as a qualitative research design to explore the participants' experiences with social roles and role reversals. Data were collected by in-depth interviews and participant observation, and analyzed using a narrative interpretative method.

Results: FES-I (Ar) was found to be a comprehensible, valid, and reliable measure of the concern about falling among community-dwelling elderly.

Study II showed that values of physical functioning were significantly higher in non-fallers ($p < 0.05$). Higher physical functioning values were associated with lower incidence of falling and lower level of fear of falling. Study III revealed strong associations between higher levels of physical activity and all dimensions of health-related quality of life. Findings from study IV yielded into three central themes: health and social roles, social connectedness, and adapting to the role reversals.

Conclusions and Impact: Physical functioning, physical activity, falls self-efficacy and social participation contribute to active ageing and subsequently to the process of ageing well among community-dwelling elderly. In clinical practice and in future research, the FES-I (Ar) could be used to effectively assess concern about falling in Arabic-speaking elderly persons. Maintaining and improving physical functioning influences falls self-efficacy and risk of falling. Adopting a physically active lifestyle may result in a better HRQoL in elderly persons. In this thesis, understanding the mechanism of social roles gave a better insight about the impact of social participation on the state of well-being in elderly persons. This knowledge can be used to develop health interventions that may contribute to facilitate the process of ageing well.

Keywords: Active ageing, ageing well, health-related quality of life, physiotherapy, qualitative analysis, social roles.

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SAMMANFATTNING PÅ SVENSKA

I hela världen ökar andelen äldre över 60 år snabbare än någon annan åldersgrupp. År 2050 kommer det att finnas två billioner personer över 60 år varav 80% i utvecklingsländerna. Begreppet aktivt åldrande har utvecklats sedan 90-talet med fokus på förhållandet mellan aktivitet och hälsa. Aktivt åldrande beskriver processen att åldras väl på ett holistiskt sätt och innefattar faktorer som livskvalitet, fysiskt och mentalt välbefinnande samt social delaktighet. I Palestina är den äldre populationen en av de mest sårbara grupperna. Två tredjedelar lider av en eller flera kroniska sjukdomar i kombination med en förväntad ökad livslängd.

Denna avhandling består av fyra delarbeten som belyser viktiga faktorer för aktivt åldrande med fokus på fysisk funktion, fysisk aktivitet, livskvalitet, social delaktighet och upplevt självförtroende i att kunna undvika fall. Ett instrument för att mäta självskattat självförtroende i fallsituationer har översatts till arabiska. Enkla test, anpassade för hemmiljö, har använts för att utvärdera fysisk funktion och fysisk aktivitet och hälsorelaterad livskvalitet har utvärderats med ett självskattningsformulär. Intervjuer av äldre i hemmiljö ligger till grund för förståelse för upplevelse av social delaktighet.

Hälften av kvinnorna och en tredjedel av männen promenerade mindre än 150 minuter/vecka vilka anses tillhöra gruppen med låg fysisk aktivitet. Personerna i denna grupp uppvisade högre andel diagnostiserade sjukdomar. Gruppen kvinnor och män yngre än 68 år uppvisade bättre värden på alla test av fysisk funktion i jämförelse med gruppen över 68 år. Gruppen som fallit under de senaste sex månaderna uppvisade sämre värden på fysisk funktion i jämförelse med dem som inte fallit. Graden av fysisk aktivitet visade även starka samband med hälsorelaterad livskvalitet. Hälsa och sociala roller, tillhörighet och social anpassning är teman som kom fram i den kvalitativa studien.

Bibehållen god fysisk funktion visar sig vara av stor betydelse för upplevt självförtroende vid risk för att falla hos äldre. En fysiskt aktiv livsstil kan medföra bättre fysisk funktion och högre livskvalitet. Förståelsen för sociala roller ger en insikt i betydelsen av delaktighet som en del av välbefinnande hos äldre. Denna kunskap kan ligga till grund för att utveckla hälsoprogram i syfte att underlätta den åldrande processen.

LIST OF PAPERS

This thesis is based on the following studies, referred to in the text by their Roman numerals. The published papers are reprinted with kind permission from the publishers.

- I. Halaweh H, Svantesson U, Rosberg S, Willen C. Cross-Cultural Adaptation, Validity and Reliability of the Arabic Version of the Falls Efficacy Scale-International (FES-I). *Medical Principles and Practice*. 2016;25(1):1-7. (Karger AG, Basel).
- II. Halaweh H, Willen C, Grimby-Ekman A, Svantesson U. Physical functioning and fall-related efficacy among community-dwelling elderly people. *European Journal of Physiotherapy*. 2015;1-7. (Taylor & Francis).
- III. Halaweh H, Willen C, Grimby-Ekman A, Svantesson U. Physical Activity and Health-Related Quality of Life among Community Dwelling Elderly. *Journal of Clinical Medicine Research*. 2015; 7(11):845-852. (Elmer Press).
- IV. Halaweh H, Rosberg S, Svantesson U, Willen C. Social Participation, experiences of social roles and roles reversals among community-dwelling elderly. *In manuscript*.

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ABBREVIATIONS

ADL	Activities of Daily Living
BCQ	Background Characteristics Questionnaire
BADL	Basic Activities of Daily Living
EQ-5D-5L	EuroQol-5 Dimensions-5 Levels
EQ-VAS	EuroQol Visual Analogue Scale
FES-I	Falls Efficacy Scale-International
FES-I (Ar)	Falls Efficacy Scale-International (Arabic)
FOF	Fear of Falling
HGS	Hand Grip Strength
HRQoL	Health-Related Quality of Life
HoFC	History of Falling Checklist
MIA-PA	Moderate Intensity Aerobic- Physical Activity
PA	Percentage Agreement
PA	Physical Activity
PA-SCAC	Physical Activity Socio-Cultural Adapted Questionnaire
ProFaNE	Prevention of Falls Network Europe
RP	Relative Position
RV	Relative Variance
SPPB	Short Physical Performance Battery
TUG	Timed Up and Go

DEFINITIONS IN SHORT

Active ageing Is the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age [1].

Old age The thesis uses the definition by the United Nations, which is consistent with the Palestinian Central Bureau of Statistics (PCBS) for the elderly, which defines an old person as a person who has reached 60 years and above [2].

1 INTRODUCTION

Worldwide, the proportion of people age 60 and over is growing faster than any other age group. By 2025, there will be 1.2 billion people over the age of 60. By 2050, there will be two billion people over the age of 60 and about 80% of these will be living in developing countries [1]. This trend of rapid ageing will be accompanied by dramatic changes in family structures and social roles, especially in developing countries [1].

In Palestine, there has recently been a shift from extended families, where the elderly are surrounded by their children and grandchildren, to nuclear family patterns, where the elderly live alone [2]. The number of elderly is continuously increasing as life expectancy has increased over the last decades, rising from 67.0 years for both males and females in 1992 to 72.0 for males and 75.0 for females in 2015 [3]. The elderly population is one of the most vulnerable groups with a rate of poverty of 34.0% and a rate of illiteracy of 52.7% (females 68.0% and males 32.0%), and 71.7% suffer from one or more chronic diseases [2, 3].

As the number of elderly increases, the process of ageing well becomes a priority [1]. All countries will need to reconsider how to care for elderly in order to maximize the elderly's health, well-being, and functioning [4]. According to the World Health Organization "In all countries and in developing countries in particular, measures to help older people remain healthy and active are "a necessity, not a luxury"[1]. The concept of active ageing began to develop in the early 1990s, with an emphasis on the link between activity and health [5]. Active ageing aims to extend healthy life expectancy and quality of life for all people as they age, including those who are frail, disabled, and in need of care [1]. Active ageing approaches the process of *ageing well* in a holistic manner that includes quality of life, physical and mental well-being, and social participation [5, 6].

In this thesis, the concept of *active ageing* is used to address the process of *ageing well*. The thesis is based on four studies addressing factors of importance for active ageing with a focus on physical functioning, physical activity, falls self-efficacy, health-related quality of life and social participation in community-dwelling elderly Palestinians ≥ 60 years old.

2 BACKGROUND

2.1 Ageing

Though ageing is a biological reality which has its own dynamic largely beyond human control [7], ageing cannot be comprehended entirely in biological terms. That is, ageing is a complex interaction among biological, psychological, and social process [8, 9]. As such, not all societies share the same understanding of what it means to grow old [7].

The meaning of old age can be subjected to different constructions [7]. In many developed countries, chronological age plays a dominant role where the age of 60 or 65 is roughly equivalent to retirement. Conversely, in many developing countries, including Palestine, old age is not entirely related to chronological age, as other socially-constructed meanings influence how old age is defined, meanings that may be understood according to the social roles assigned to elderly people. In these countries, old age is seen as loss of roles associated with physical decline, and begins when active contribution in the society is no longer possible [10].

2.1.1 Biological and social theories of ageing

Over the last 50 years, research and theories of ageing have expanded from a primarily biological and medical centred approach on the biological reality of the ageing process, to a more comprehensive approach that encompasses a wide range of factors including health, social, psychological, and financial [11].

Biological theories of ageing focus on the biological impacts of ageing, moving from cells to tissues to major bodily systems (e.g., the endocrine, immune, and nervous system) [12]. The DNA damage theory of ageing suggests that intrinsic causes of DNA damage are important drivers of ageing [13], and the cross-linkage theory views ageing as accumulation of cross-linked compounds that interfere with normal cell function[14]. Non-biological theories of ageing, also known as the social theories of ageing, such as disengagement theory [15], activity theory [16], and continuity theory [17] focus on the psychosocial changes experienced by people as they grow

old [11]. Although these theories share similar ideas, they ultimately approach ageing from different assumptions. For example, disengagement theory claims that it is natural and acceptable for older adults to withdraw from society [15], whereas activity theory [16] proposes that socially-active old people can delay the ageing process and enhance quality of life.

2.1.2 Ageing Well

As the age group 60 years old and older is growing faster than any other age group worldwide, new strategies need to be developed that maximize health and well-being of the elderly [18]. The state of well-being is a multifaceted phenomenon in the elderly population which generally involves happiness and contentment, satisfying social relationships, and autonomy [19]. The sense of well-being refers to an individual's feelings at the time they are expressed, so the term "subjective well-being" is often used [20, 21].

In the last two decades, contemporarily theoretical frameworks of *ageing well* have been developed (e.g., healthy ageing, successful ageing, productive ageing, and active ageing) [11, 12, 22]. As ageing well is not entirely related to physical health, these theoretical frameworks integrate both biological and social sciences, considering as well as social participation, psychology, lifestyles, activities, finances, and other domestic and environmental factors [11].

2.1.3 Successful ageing versus Active ageing

Researchers have framed the concept of ageing well using the terms successful ageing and active ageing [5]. Rowe and Kahn define *successful ageing* "as including three main components: low probability of disease and disease-related disability, high cognitive and physical functional capacity, and active engagement with life" [23]. The WHO defines *active ageing* [1] as "the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age. Active ageing allows people to realize their potential for physical, social, and mental well-being throughout the life course and to participate in society".

This thesis uses the term *Active ageing* to address the process of ageing well. The word "active" refers to continuing participation in social, economic, cultural, spiritual and civic affairs, not just the ability to be physically active

or to participate in the labour force [1]. Studied factors of ageing well are illustrated in (Figure 1).

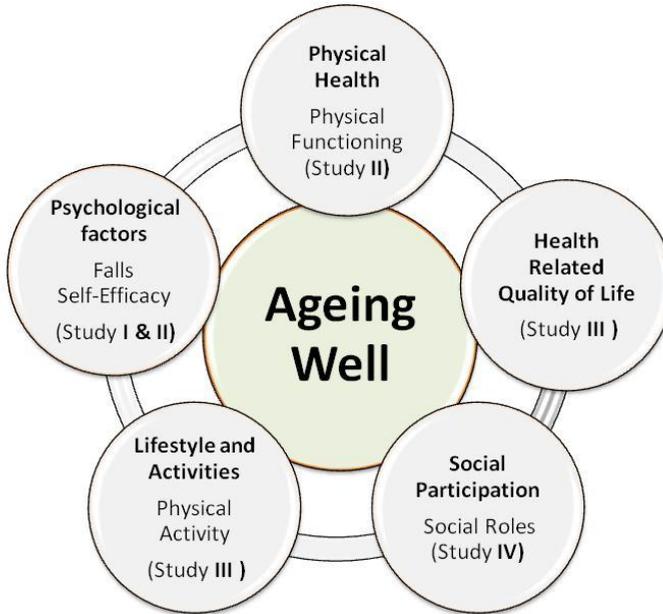


Figure 1. Studied factors of ageing well.

2.2 Physical Functioning

Physical functioning is associated with quality of life and feelings of well-being among the elderly [24, 25]. The basic components of physical functioning are strength, balance, coordination, flexibility, and endurance [21]. Higher level of physical functioning enables the elderly to perform more integrated functional tasks which include activities of daily living, and the fulfillment of social roles as well as recreational activities [21, 26]. For example; the strength of the hand grip may reflect on the nature of social roles that elderly occupy. The strength of the hand grip and other bodily muscular functions are necessary to maintain daily activities such as cooking,

carrying groceries, and lifting grandchildren. Moreover, preserving muscle strength improves the chances that an elderly person will participate in social activities and plays an important role in facilitating mobility for walking, climbing stairs, and gardening [21].

With ageing, these components are negatively influenced by changes occurring in the skeletal muscles and body composition [27-29]. The progressive functioning loss of muscle strength and other systems may lead to functional decline [28, 30, 31], a condition associated with risk of falling in the elderly [32-34]. Balance and gait problems are major predictors of falling as people age [35-38]. Muscular weakness of the lower extremity such as impaired sit-to-stand performance can effectively predict injurious falls [33, 34, 39]. Furthermore, reduced mobility and handgrip strength are common in elderly who have fallen one or more times compared to those who have not fallen [40-42]. Several studies have shown that level of physical functioning is associated with incidence of falls in elderly persons and that lower levels of physical functioning were recorded among fallers [40-43].

2.3 Physical Activity (PA)

Annually at least 1.9 million people die as a result of physical inactivity [44]. PA is defined as any bodily movement produced by skeletal muscles that require energy expenditure [45]. Participation in physical activity (PA) plays an important role in improving health-related quality of life (HRQoL) among community-dwelling elderly [4, 46-50]. Participating in regular moderate intensity PA (e.g., walking, cycling, or light sports) has significant benefits for health, including improved treatment of many diseases [51-55]. Relatively regular moderate PA can help elderly prevent a decline in HRQoL and even improve their enjoyment of life [56]. Evidence suggests that higher level of physical activity is associated with better physical functioning in elderly [24-26, 57]. Regular physical activity is safe and reduces the risk of falls by nearly 30% in the elderly [4].

The evidence of health benefits of PA is stronger for adults above 65 years old than any other age group, since the consequences related to inactivity are

more severe in this age group [4]. Active elderly have lower rates of all-cause mortality and better muscular fitness compared to less active elderly [4, 58].

The WHO [4] recommends that the elderly do at least 150 minutes of moderate-intensity aerobic physical activity (MIA-PA) throughout the week. MIA-PA is defined as “activity in which the body’s large muscles move in a rhythmic manner for a sustained period of time. Examples include walking, running, swimming, and bicycling” [4]. Walking is one of the most common physical activities among the elderly and can easily be adapted into daily lifestyle [59]. Daily walks for at least 30 minutes have shown to be positively related to leg muscle strength and self-rated physical fitness [60, 61]. Adopting a physically active lifestyle, including increasing leisure time physical activity, may result in a better long-term HRQoL among the elderly [62, 63].

In the elderly, physical activity includes leisure time, transportation (e.g. walking or cycling), household chores, sports or planned exercise, and family and community activities [4]. Patterns of PA may change with ageing [64], and may differ between different populations. For example, in the West Bank (Palestine), the prevalent domain of PA among elderly revolves around activities such as walking, gardening, and households’ chores mainly among elderly women [2].

2.4 Falls and Fear of falling

Falls and Fear of falling (FoF) have a long-term negative impact on physical and functional well-being [65, 66] and may lead to activity restriction, social isolation, and reduced quality of life (QoL) [66-69]. Therefore, this thesis considers falls and falls self-efficacy as important factors contributing to active ageing and subsequently to ageing well.

This thesis defines a fall as an “unintentionally coming to rest on the ground or floor” [70]. Falls in elderly are common [71, 72], and often devastating problems contribute to higher rate of morbidity and mortality among elderly persons above 65 years old [73]. Annually, 35% to 40% of people aged 65 and over fall [33, 74]. Each year an estimated 424,000 individuals die from falls globally, of which over 80% are in low and middle income countries [75]. Injuries in connection with falls have

become a major public health problem [74]. Falls-related injuries form a major source of disability and dependence [33, 76]. In addition, fear of falling and falls self-efficacy influence the incidence of falls in the elderly [77].

2.4.1 Self-Efficacy

Fear of falling is identified as a common fear among community-dwelling elderly [78]. The concept of fear of falling is processed by different theoretical constructs: balance related self-efficacy and falls self-efficacy [79]. Self-efficacy measures are grounded in social cognitive theory [80], which defines self-efficacy as the individual's perceptions of his or her capabilities within a particular domain of activities. *Falls self-efficacy* has been defined as “perceived self-confidence at avoiding falls during essential, non-hazardous activities” [76]. *Balance related self-efficacy* addresses a person's confidence in maintaining balance and has been defined as “individual's degree of belief in one's ability to avoid a loss of balance during activities of daily living” [81]. The relationship between fear of falling and falls among community-dwelling elderly can be understood using a multicomponent model [82] of fear of falling, that is based on the idea that fear of falling “originates from an individual's appraisal of his or her own abilities to maintain balance in combination with other contributors”. The model proposed that falls self-efficacy is a mediator in the relationship between fear of falling and falls [82].

Different approaches and tools that measure falls self-efficacy have been developed [65, 67, 83]. The original scale of falls self-efficacy (FES) has been developed to assess confidence in performing ten basic activities of daily living (e.g., cleaning the house and dressing oneself) without falling [84]. The (FES) is most applicable with elderly persons who are homebound and who have low mobility [65]. The items of the FES address basic activities rather than demanding or complex activities that may be relevant for higher functioning older people [68]. To address these issues, the Falls Efficacy Scale-International (FES-I) has been developed by the Prevention of Falls Network Europe (ProFaNE) [67]. The 16 items in the FES-I include the ten original items from the FES [84] and six new items that assess more demanding physical activities and social activities [67, 68]. The FES-I has been used to assess fear of falling among elderly persons in diverse

populations and has been described as a reliable and valid measure of fear of falling among elderly persons in different countries [67, 68, 85-89].

This thesis addresses both physical and social activities. Thus, the first study [89] adapted and translated the FES-I into Arabic to make it culturally appropriate. This culturally sensitive and validated instrument assessed the elderly's concern about falling while performing basic activities as well as more demanding physical and social activities.

2.5 Physiotherapy and Elderly Care

Physiotherapy has an important role in maximizing function and preventing functional decline in elderly [90]. Strength, balance, coordination, flexibility, and endurance are important components of physical functioning that are assessed and treated by physiotherapy interventions; these interventions often improve an individual's physical condition and restore function [90-93]. In addition, physiotherapy programs including balance, strength and walking training are effective in reducing the risk of falling in elderly populations [94-96].

Physiotherapy practice appears to be an effective route for promoting a physically active lifestyle [97]. "Physical therapists work with a wide range of people to optimize their physical activity, from elite athletes to older people seeking to remain active as they age. More than any other profession, they prevent chronic disease by helping people become more active" [91]. Physiotherapy contributes to promote physical activity in the elderly through adapting physical activity in accordance with the mental and physical status of the elderly [91].

2.6 Health-Related Quality of Life (HRQoL)

Quality of life (QoL) is related to people's perceptions of their position in life in the context of culture and value systems and is influenced in a complex way by people's physical health, psychological state, level of independence, and social relationships [98]. Health-related quality of life (HRQoL) is part of a multidimensional approach that considers physical, mental, and social aspects [46].

Assessing HRQoL is an essential component of health care evaluation [99]. Several instruments have been developed to assess HRQoL in different populations [99-101]. Demographic and clinical characteristics (e.g., age, health status, culture, and native language) are important determinants for using a relevant valid and reliable HRQoL measure [95]. This thesis uses the Arabic version of EuroQoL-5Dimensions-5Levels (EQ-5D-5L) [100], to assess functioning and subjective well-being [20].

2.7 Social Participation and Social Roles

The International Classification of Functioning, Disability and Health (ICF) defines participation as the “involvement in a life situation”[102]. When the elderly participate in social and leisure activities, their well-being improves [103], as participation in social activities can reduce the risk of disability and depression [104]. Social participation by maintaining social roles among elderly is related to maintenance of health and well-being [103-108]. Elderly who live alone report more fatigue and more health difficulties than elderly who have an active social life and live with other people [109].

Because social participation is one of the key factors contributing to ageing well [11], social participation is addressed in this thesis through studying social roles and role reversals among the elderly in study IV. The definition of social role is based on the role theory [110] that considers most of the everyday activities to be as the acting out of socially-defined categories (e.g., worker, employer, mother, teacher, and housewife). Roles consist of a set of rights, duties, and norms that a person encounters and fulfils [110].

Social participation in social, economic, cultural, spiritual and civic activities allows the elderly to realize their physical, social, and mental potentials [1]. These activities, whether physical or intellectual, help the elderly maintain active roles in society [111-113]. Elderly who are actively involved in a variety of activities and who establish new roles are more likely to age with a sense of satisfaction [16]. Additionally, occupying multiple roles is associated with higher life satisfaction and self-efficacy and lower depressive symptoms [114, 115].

As people age, they start losing their roles as parents, employees, and spouses [116]. This change might lead to a painful role reversal, from being a

provider of support to being a receiver of support [117]. To adapt to this new reality, the elderly might need to develop new interests and roles that might require developing new strategies to preserve or change social roles [118]. At the individual level, preserving one's social roles influences one's self-concept and makes the reversal of roles less intimidating and stressful [16]. For example, retirement might be invigorating if people actively maintain their familial, recreational, volunteer, and community roles [16]. However, participation is an outcome of a complex relationship between an individual's specific circumstances and external circumstances in which the elderly persons live. These circumstances may either hinder or encourage active participation [102].

3 RATIONAL OF THE THESIS

Active ageing can make *ageing well* more likely. *Ageing well* is influenced by physical functioning, physical activity, falls self-efficacy, social participation and health-related quality of life. Participation in social and leisure activities positively contributes to the well-being of elderly [103, 104, 119]. Physical functioning enables the elderly to participate in tasks of daily living, social roles, and recreational activities [21, 26]. Better physical functioning is associated with higher levels of physical activity and better health-related quality of life (HRQoL) [24-26, 46, 47, 120-122]. Furthermore, the level of physical functioning among the elderly is associated with the incidence of falls and falls self-efficacy [33, 42, 123, 124].

Very little is known about how physical functioning, physical activity, social participation, falls self-efficacy, and HRQoL affect active ageing in the elderly population in Palestine. To fill this gap, reliable and valid instruments that are culturally sensitive are needed to be established to assess concern about falling in the elderly. Factors of physical functioning and physical activity and their impact on falls self-efficacy and HRQoL are essential to be identified. Exploring the dynamic of social role experiences may add a new dimension within a more comprehensive view of the concept of *active ageing*. Therefore, the four studies in this thesis were designed to address factors of importance for active ageing with a focus on physical functioning, physical activity, falls self-efficacy, health-related quality of life and social participation in community-dwelling elderly Palestinians ≥ 60 years old.

4 AIMS

The overall aim of this thesis was to study factors of importance for active ageing with a focus on physical functioning, physical activity, falls self-efficacy, health related quality of life and social participation in community-dwelling elderly above 60 years old.

Specific aims:

- To evaluate the validity and reliability of an Arabic language version (Ar) of the Falls Efficacy Scale-International (FES-I) with respect to its use with Arabic-speaking elderly persons.
- To determine the association between physical functioning and falls self-efficacy in community-dwelling elderly.
- To assess the association between physical activity and health-related quality of life in community-dwelling elderly above 60 years old.
- To explore the experiences of social roles among community-dwelling elderly.

5 METHODS

This thesis uses both quantitative and qualitative approaches. Study I evaluates the psychometric properties of the Arabic version of the Falls Efficacy Scale-International (FES-I) using validity and reliability testing. Study II and III are cross sectional studies: Study II assesses the association between physical functioning and falls self-efficacy and Study III assesses the association between physical activity and health related-quality of life. Study IV, a qualitative study, uses a narrative approach [125-127] to explore how the elderly experience their own social roles and role reversals.

5.1 Recruitment procedure

Community-dwelling elderly Palestinians living in the West Bank aged ≥ 60 years were invited to participate in this thesis. Recruitment procedure was arranged through coordination with different community and physiotherapy centres in the West Bank (Palestine). Data were collected between April 2013 and August 2014. All tests and interviews were conducted at the participants' homes or at the community centres.

5.2 Participants

In total, 176 participants were recruited. To be included in the study, the participants had to be community-dwelling Palestinians living in the West Bank and be at least 60 years old. The inclusion criteria also included being independently ambulatory with or without walking aids. Exclusion criteria included being diagnosed with a disease that would make investigations impossible and communication deficits (i.e., the individual could not answer questions about their age, their children, current place, time, season, and year). Distribution and flow of participants is presented in (Figure 2).

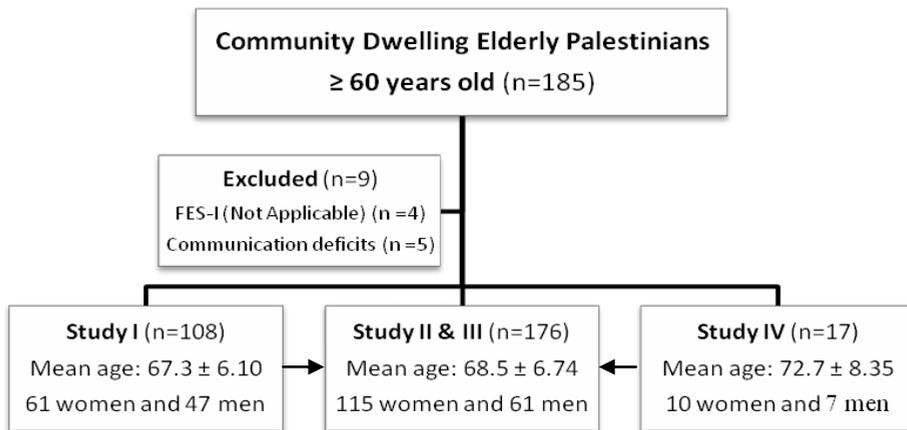


Figure 2. Distribution of the participants presented with mean age and standard deviation given for each study population.

5.3 Ethical Considerations

The four studies received ethical approval from the research ethics committee of Al-Quds University, Palestine (Ref No: 1/REC/13), which complies with the Declaration of Helsinki.

All participants were given verbal and written information about the aims of the studies and signed an informed consent. If the participants were unable to read the written information, a close relative verified that the information was read to them and understood by the participant. The participants were ensured confidentiality and informed that their participation was voluntary and that they could drop out of the study at any time.

5.4 Data Collection Methods

Methods for data collection are described in this section. The methods used in each study are presented in Table 1.

Table 1. Overview of the used data collection measures in Study I-IV.

Measures	Study I	Study II	Study III	Study IV
Background Characteristics Questionnaire (BCQ)	X	X	X	X
FES-I (Arabic version)	X	X		
History of Falling Checklist (HoFC)	X	X		
Katz 'index		X	X	
Timed Up &Go (TUG)	X	X		
Hand Grip Strength (HGS)		X		
Short Physical Performance Battery (SPPB)	X	X		
A physical activity socio-cultural adapted questionnaire (PA-SCAC)			X	
EQ-5D-5L (Arabic version)			X	
In depth interviews				X
Participant observation				X

5.4.1 Background Characteristics Questionnaire (BCQ)

The following demographic clinical data were recorded: age, gender, educational level, job status, smoking habits, medication, diagnosed disease (cardiovascular, musculoskeletal, hypertension, and others), and sensory functions (visual, hearing, and speech). Participants were asked if they received medical treatment or had been hospitalized during the previous year. The participants' weight and height were also recorded.

5.4.2 Falls - Related Measures

History of Falling Checklist (HoFC)

The HoFC included questions about incidence of falls during the last six months, number of falls, injuries related to falls, and medical care as the result of falls. In this thesis, a fall is defined as "*unintentionally coming to rest on the ground or floor*" [70], and a faller is defined as a participant who

had sustained one or more falls during the previous six months. In addition, the HoFC included a categorical question about fear of falling: Are you afraid of falling? The question had four answer alternatives: no, not at all afraid; yes, a little afraid; yes afraid; and yes, very afraid [68].

Falls Efficacy Scale International (FES-I)

The FES-I [67] consists of 16 items that include the ten original items from the FES and six more demanding items that assess the following: walking on slippery, uneven, or sloping surfaces; visiting friends or relatives; going to a social event; and going to a place with crowds. Falls efficacy is rated on a four-point scale for each activity (1= not at all concerned; 2= somewhat concerned; 3= fairly concerned; and 4= very concerned). The total score ranges from 16 (no concern about falling) to 64 (severe concern about falling) [67, 68]. The FES-I is a reliable and valid measure of fear of falling among elderly persons and is suitable in a cross-cultural context [68, 85, 87]. The scale was translated into Arabic and validated in Study I [89]. The Arabic version of Falls Efficacy Scale-International (FES-I (Ar)) was used to assess falls self-efficacy in Study II [43].

5.4.3 Measures of Physical Functioning

Hand Grip Strength (HGS)

The participant was tested in a sitting position, shoulder adducted and neutrally rotated with the elbow flexed at 90°. The forearm was placed in a neutral position and the wrist was placed between 0° and 30° dorsiflexion and between 0° and 15° ulnar deviation. The participant was asked to squeeze the handle of the Jamar® Hydraulic Hand Dynamometer as hard as possible for five seconds and then relax [128]. For each hand, the best value of three was registered in kilograms. Hand grip strength is a valid measure and good marker of physical performance among elderly [129, 130] and has very high test-retest reliability [131].

Timed Up and Go (TUG)

The Timed Up and Go test requires the participants to stand up from a seated position on a regular chair without using their arms, to walk three meters, to turn around and walk back to the chair, and to sit down again. The time it took to complete the activity was registered in seconds [132]. A cut-off value of 14 seconds was used to identify older people with limited functional

mobility and who are at risk for falling [133]. Reliability and validity of the Time Up and Go test has been established for quantifying functional mobility with older community-dwelling adults and it is recommended as a screening tool for identifying older people who are at risk for falling [133-135].

Short Physical Performance Battery (SPPB)

The SPPB tests lower body functions (balance, gait speed, and five times sit-to-stand test) [136]. The balance tests include side-by-side stand, semi-tandem stand, and tandem stand. Gait speed was tested using a four-meter gait speed; the participant was asked to walk at a self-selected speed for four meters. This test was repeated twice at the participant's usual pace, and the shorter time of the two tests was recorded in seconds. In the five times sit-to-stand test, the participant was instructed to stand up straight as quickly as possible for five times without stopping in between, keeping arms folded across the chest. The time taken to accomplish the test was registered in seconds. Each SPPB test (balance, gait, and chair stand) was scored from 0 to 4 with a score of 0 indicating no attempt made or could not do the test and a score of 4 indicating the highest category of performance. The total score of SPPB ranges from 0 (low performance) to 12 (high performance) [136]. Participants with a total score of 10 or less have higher risk of mobility disability [137]. The SPPB is a valid and reliable measure of muscle strength and physical performance in community-dwelling older people and it has been tested for validity and reliability in diverse populations [138, 139].

5.4.4 Measure of Activities of Daily Living (ADL)

The Katz Index was used to assess personal activities of daily living [140]. The index has been described as a valid and reliable measure to determine independency level in performing activities of daily living [140, 141]. The assessment is based on the person's ability to perform the activity without assistance from another person. The Katz Index of activities of daily living (ADL) includes six basic activities of daily living (BADL) (bathing, dressing, toileting, transferring, continence, and feeding). The ability to perform each activity was assessed using a two-point scale: 1= independence and 0 = dependence. A total score ranges from 0 (low function, dependent) to 6 (high function, independent).

5.4.5 Measure of Physical Activity (PA)

To measure physical activity (PA), this thesis uses the physical activity socio-cultural adapted questionnaire (PA-SCAC). The PA-SCAQ includes the following questions: How often do you take outdoor walks? How long are your walks? What household activities and other activities (e.g., yard work, gardening) do you do? The questionnaire was designed using the WHO's global recommendations [4] as well as considering some culturally applicable items of the valid PA measures for elderly [142, 143]. Accordingly, PA variables were categorized into walking, household activities, and outdoor activities. To compute the accumulated frequency and duration of all the activities, the minutes spent per week on each of these activities were summed. The participants were categorized into three groups based on their moderate-intensity aerobic physical activity (walking) throughout the week: low physical activity (less than 150 minutes/week); moderate physical activity (between 150-300 minutes/week); and high physical activity (more than 300 minutes/week).

To assess whether the questions and the response categories were understandable and appropriate, the PA-SCAQ was pilot tested with ten community-dwelling elderly Palestinians (six women and four men, age ranged between 62 and 83 years all with different levels of education). All questions and response categories were considered comprehensible; the piloted version was not subjected to any additional modifications and was used in Study III [48] as the PA-SCAQ.

5.4.6 Measure of Health-Related Quality of Life: EuroQol - 5 Dimensions-5Levels (EQ-5D- 5L)

The EQ-5D-5L is a standardized, non-disease-specific instrument developed to describe and measure health-related quality of life. The instrument has been translated into most major languages, including Arabic [100, 144]. In addition, the EQ-5D is a valid and reliable instrument to assess HRQoL in different populations [145, 146].

The Arabic (Jordan) EQ-5D version was used in Study III to measure quality of life among elderly Palestinians [100]. Permission to use the validated Arabic version was obtained from the EuroQoL Group in March 2013. The EQ-5D-5L consists of the descriptive system and the EQ visual analogue

scale (EQ-VAS). The descriptive system includes five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has five levels of coding: 1= no problems, 2= slight problems, 3= moderate problems, 4= severe problems and 5= extreme problems. In addition, the respondent reported self-rated health on the EQ visual analogue scale (EQ-VAS), a scale with endpoints labelled 100 (the best health you can imagine) and 0 (the worst health you can imagine).

5.4.7 In-depth Individual Interviews

The in-depth interviews [147] were conducted using a narrative approach [125-127]. The intention of the researcher during the interviews was to elicit stories; some broad questions were predetermined to guide the interviewing. The participants used their spontaneous language in the narration of different life events connected to their social roles.

5.4.8 Participant Observation

This method of qualitative data designed to learn about the participants' activities in a natural setting [148]. The process provides the context for development of data collection and interview guides [149].

5.5 Procedure and Statistical Analysis

5.5.1 Study I

In this study, the cross-cultural adaptation of the Falls Efficacy Scale-International (FES-I) was constructed based on the Prevention of Falls Network Europe (ProFaNE) and using a ten-step translation protocol [67]. The English version of the FES-I was translated from English into Arabic by two native Arabic language speakers working independently. These translators are health professionals, proficient English language speakers, and familiar with the concept of fear of falling. A provisional local version of the FES-I Arabic (Ar) was produced via consensus with the translators. A professional translator whose native language is English performed a back translation from the Arabic language into English. A third meeting of the initial translators was held to arrive at a consensus about the back translation. The pre-final FES-I (Ar) version was reviewed by the translators considering the intentional meaning of the back translation, but not the literal meaning.

The FES-I (Ar) was pilot tested with ten community-dwelling elderly Palestinians (six women and four men; age range 62 to 83 years) with different levels of education. All items and response categories in the pre-final FES-I (Ar) were considered comprehensible by the participants. The piloted version was not subjected to any additional modifications and was deemed to be the final version of FES-I.

Handling of missing data

Based on the ProfaNE guidelines [150], if data were missing for more than four items of the FES-I, then that questionnaire was not used. If data were missing for no more than four of the 16 items, the sum score of the completed items was computed and divided by the number of the completed items and then multiplied by 16. The new sum score was rounded up to the nearest number to give the score for an individual item. In six of the FES-I questionnaires data were missing for one to three items; in these cases, the total score was calculated based on the ProfaNE guidelines.

Assessment of psychometric properties of FES-I

The developed FES-I (Ar) was administered during face-to-face interviews. Demographic descriptive data on age, gender, living status, education level, smoking habits, medication, and presence of specific muscle diseases and/or other serious diseases were registered during the first interview. In addition, categorical questions about history of falling [68, 151] were asked.

Reliability

Test-retest reliability between the two test occasions was assessed in accordance with Svensson's method; a rank based statistical method developed to determine levels of agreement in rank invariant paired ordinal data. The Percentage Agreement (PA), Relative Position (RP), and the Relative Variance (RV) were calculated. PA of $\leq 59\%$ was considered a low percentage agreement, PA of 60-69% as moderate, and PA of $\geq 70\%$ as high. RP (values ranging from -1 to 1) measures the systematic shift in categorical levels between the two assessments. Higher RP values indicate higher systematic group change, and RP values close to zero indicate negligible change over time. RV measures the observed individual variability (values ranging from 0 to 1); higher values indicate higher individual variability

[152]. To evaluate test-retest reliability, the FES-I (Ar) was re-administered seven to ten days later, to minimize content recall by the participants from initial assessment or changes in events that may have influenced the participants' concern about falling. Condition of interest was determined based on history of falls during the test-retest interval and was used to evaluate whether the participants' condition of interest was stable between assessments. The participants were asked about their history of falls between the two assessments. Elderly who recorded history of falls during the test-retest interval were excluded from the retest assessment.

Construct validity

Spearman's rank correlation coefficient was used to determine the correlation between the total scores of FES-I (Ar) and TUG, gait speed, balance, and fear of falling (categorical question). Correlation coefficients >0.70 were considered high, 0.50-0.69 moderate, and 0.26-0.49 low [153]. The FES-I (Ar) total scores and TUG, gait speed, balance, and fear of falling were hypothesized to have a correlation (>0.5). In accordance with the Consensus-based Standards for the Selection of Health Measurement Instrument (COSMIN) guidelines [154], construct validity of the FES-I (Ar) was defined to be good if 75% of our hypotheses were confirmed.

5.5.2 Study II and III

Background characteristics were registered by the participants or their companions and were thoroughly reviewed by the researcher. All measures of activities of daily living, falls efficacy, physical activity, and quality of life were conducted during face-to-face interviews. All interviews, anthropometric measurements and the tests of physical functioning were performed by the same researcher (HH).

Statistical analysis

In Study II and III, descriptive statistics were used to characterize the sample. In Study II, values of physical functioning and FES-I (Ar) were calculated as mean (SD) and median (min-max). Between groups comparisons were performed based on SPPB and TUG cut-off values. Independent sample t-test was performed on continuous variables. For ordinal variables, the Mann-Whitney U tests and Kruskal-Wallis tests were used to determine differences between the groups according to age (the cut-off value of 68 years was used based on the mean age of the participants), gender, education, use of walking

aids, fear of falling, and history of falls. Spearman's rank correlation coefficient was used to examine the correlation between the total scores of FES-I (Ar) and TUG, hand grip strength, and total SPPB score.

In Study III, Kruskal-Wallis tests were performed on the ordinal variables of the physical activity (PA) groups to determine differences between the groups according to gender, BMI, and the prevalence of co-morbid conditions. Mann-Whitney U and Kruskal-Wallis tests were performed on the ordinal variables of the EuroQol-5 Dimensions (EQ-5D), to determine differences between women and men and between the three PA groups (low, moderate, and high). Spearman's rank correlation coefficient was used to examine the correlation between EQ-5D and level of PA. Statistical significance was set at $p < 0.05$.

5.5.3 Study IV

The participants were purposefully selected and invited from a previous related cross sectional study [43]. The participants included elderly women and men with varied ages and marital status. A total of 17 community-dwelling elderly Palestinians ≥ 60 years old (range between 64 and 84 years old) were recruited (ten women and seven men). This sample was chosen to provide a more comprehensive view of the elderly's experiences.

Data were collected during in-depth individual interviews [147] and via participant observation [149]. All interviews took place in the participants' homes, which helped enrich the narrative material as the natural environment provided a realistic view of how the participants related to their every day surroundings [148]. Field notes were recorded after each interview.

Each interview lasted between 60 and 120 minutes; the interviews were digitally audio-recorded. In addition, with permission from the interviewees, some interviews were video-recorded.

Data analysis

Data were analysed using a narrative interpretative method. Data elements from all interviews were organized by synthesising the data rather than by separating the data into constituent parts [125, 126]. Events and happenings that were central to the story's construction became apparent; accordingly,

significant events [155] were identified. Data were processed through narrative smoothing, focusing on the most relevant elements of their narratives [156]. The interpretative analysis was carried out by building up a plot within the notion of the hermeneutic circle where the development of the text was riveted by the back and forth movements from parts to whole [127, 157]. The lived experiences of social roles and role reversals were categorised into three central themes: health and social roles, social connectedness, and adapting to the role reversal process.

To enhance credibility of the qualitative data, two kinds of triangulation were used: triangulation of qualitative data sources and reconciling qualitative and quantitative data [158]. Triangulation of qualitative data sources means “comparing and cross checking the consistency of information that derived at different times and by different means within qualitative methods” [158]. The second type of triangulation “reconciling qualitative and quantitative data” [158] was used to compare data collected through qualitative methods with data collected through quantitative methods [43, 48].

6 RESULTS

In total, 176 participants were included in the four studies. Clinical characteristics of the participants are presented in Table 2.

Table 2. Clinical characteristics of the participants (n=176).

Clinical Characteristics	All (n=176)	Women (n=115)	Men (n=61)
Mean (SD)			
Age (years)	68.2 (6.74)	67.7 (6.49)	69.0 (7.16)
Weight (Kg)	79.2 (13.78)	77.6 (14.7)	82.3 (11.27)
Height (cm)	161 (0.09)	156 (0.06)	170 (0.06)
Body Mass Index	30.7 (5.11)	32.3 (5.09)	28.0 (3.84)
N (%)			
Diagnosed disease			
Yes	152 (86)	101 (78)	51 (84)
No	24 (14)	14 (22)	10 (16)
Cardiovascular	39 (22)	22 (19)	17 (28)
Hypertension	86 (49)	57 (50)	29 (48)
Diabetes	54 (31)	36 (31)	18 (30)
Musculoskeletal	95 (54)	70 (61)	25 (41)
Osteoporosis	30 (17)	28 (24)	2 (3)
Sensory Function			
Visual problems	127 (72)	83 (72)	44 (72)
Hearing problems	30 (17)	23 (20)	7 (12)
Using assistive devices			
Glasses	109 (62)	66 (57)	43 (71)
Hearing aids	4 (2)	3 (3)	1 (2)
Cane	24 (14)	12 (10)	12 (20)
Taking medications	145 (82)	95 (83)	50 (82)
Been hospitalized in the last year	39 (22)	28 (24)	11 (18)
Regular medical check up	97 (55)	63 (55)	34 (56)
Fallen in the last six months	67 (38)	48 (72)	19 (28)
Been injured as a result of falling	49 (72)	35 (73)	14 (70)

The majority of the participants (76.6%) lived with their families and 23.4% lived alone. About 42% of the participants had less than six years of education. The majority of the participants (92%) were fully independent in the basic activities of daily living (BADL), and 8% were partially independent according to the Katz Index [159].

6.1 Instrument Evaluation

Results of Study I ($n = 108$) showed the FES-I (Ar) scores were significantly different when divided into subgroups according to age, gender, education, use of walking aids, fear of falling (FOF), and history of falls ($p < 0.05$). Values of FES-I (Ar) scores according to gender and fear of falling categorical question are presented in (Figure 3).

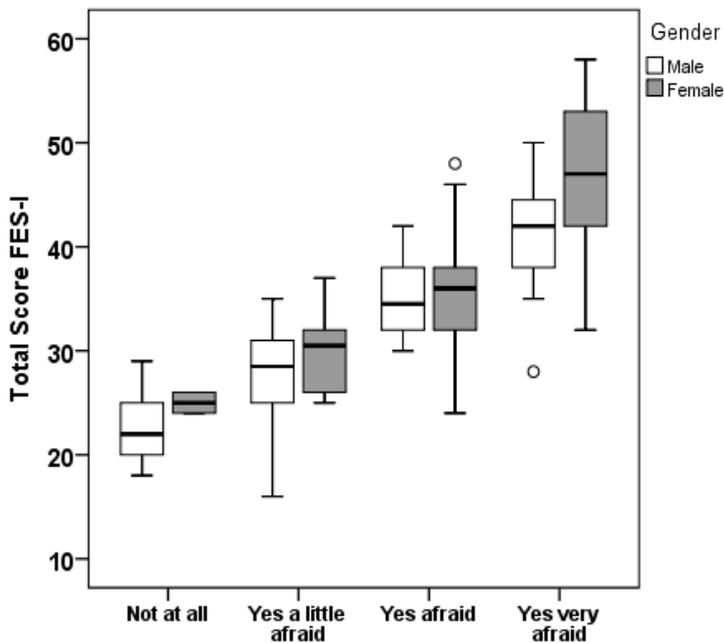


Figure 3. Values of FES-I (Ar) total scores according to gender in relation to fear of falling categorical question in the history of falling checklist (HoFC).

Reliability

The sixteen items of the FES-I (Ar) indicated a high percentage of agreement, ranging from 88% to 93%. The Relative Position (RP) ranged from 0.01 to 0.06 (Table 3). The values for Relative Variance (RV) were zero for all items, demonstrating no individual variability.

Table 3. Test-retest reliability of the FES-I (Ar) (n =108).

Falls Efficacy Scale Items	PA %	RP	RP 95 % CI
1. Cleaning the house (e.g., sweep, vacuum or dust)	92	0.00	- 0.03 - 0.05
2. Getting dressed or undressed	91	0.01	- 0.02 - 0.06
3. Preparing simple meals	90	0.02	- 0.02 - 0.08
4. Taking a bath or shower	89	0.02	- 0.00 - 0.06
5. Going to the shop	93	0.00	- 0.03 - 0.04
6. Getting in or out of a chair	88	0.02	- 0.02 - 0.07
7. Going up or down stairs	90	0.06	- 0.02 - 0.10
8. Walking around in the neighborhood	91	0.01	0.03 - 0.06
9. Reaching for something above your head or on the ground	91	0.00	- 0.04 - 0.04
10. Going to answer the telephone before it stops ringing.	92	0.06	0.01- 0.11
11. Walking on a slippery surface (e.g., wet or icy)	90	0.06	0.02 - 0.10
12. Visiting a friend or relative	89	0.04	- 0.00 - 0.09
13. Walking in a place with crowds	91	0.03	- 0.01- 0.08
14. Walking on an uneven surface (e.g., rocky ground, poorly maintained pavement)	89	0.02	- 0.01- 0.07
15. Walking up or down a slope	90	0.02	- 0.00 - 0.07
16. Going out to a social event (e.g., religious service, family gathering, or club meeting)	89	0.05	0.00 - 0.11

Test-retest reliability is given as percentage agreement (PA %). PA of $\geq 70\%$ is considered high. Higher RP values indicate higher systematic group change.

Construct validity

High positive correlation between the FES-I (Ar) total score and the responses to the question about fear of falling were recorded ($r_s = 0.759$, $p < 0.001$). There was a moderate positive correlation between FES-I (Ar) and TUG ($r_s = 0.641$, $p < 0.001$), and moderate negative correlations were recorded

between the total scores of FES-I (Ar) and the gait speed ($r_s = -0.670$, $p < 0.001$) and balance scores ($r_s = -0.592$, $p < 0.001$). The results confirmed all the prior formulated hypotheses.

6.2 Physical Functioning

Results of Study II showed that there were significant differences in all values of physical functioning for each gender according to age except for TUG (Table 4).

Table 4. Values of physical functioning measures for each gender according to age group (n=176).

Variable	Women			Men		
	< 68 years (n=66)	≥ 68 years (n=49)	<i>p</i> - <i>value</i>	< 68 years (n=31)	≥ 68 years (n=30)	<i>p</i> - <i>value</i>
	<i>Mean (SD)</i>	<i>Mean (SD)</i>		<i>Mean (SD)</i>	<i>Mean (SD)</i>	
Hand Grip (kg)						
Right (RT) hand	21.8 (5.67)	17.0 (4.56)	<0.001	35.9(10.60)	29.6 (7.58)	0.010
Left (Lt) hand	20.2 (5.11)	15.8 (4.97)	<0.001	34.4 (7.64)	28.0 (7.05)	0.003
TUG (Seconds)	10.0 (3.20)	14.9 (8.67)	<0.001	10.2 (5.17)	12.5 (7.38)	0.16
Total SPPB Score	9.7 (2.19)	7.5 (3.05)	<0.001	10.4 (2.76)	8.4 (2.82)	0.006

No significant differences were recorded between genders on the physical functioning measures except for hand grip strength ($p < 0.001$), where men scored higher values than women.

6.2.1 Physical functioning and falls self-efficacy

Regarding the association between physical functioning and falls self-efficacy, the FES-I (Ar) total scores were positively correlated with TUG ($r_s = 0.615$, $p < 0.001$) and negatively correlated with SPPB total score ($r_s = -0.720$, $p < 0.001$) and hand grip strength ($r_s = -0.522$, $p < 0.001$).

Values of physical functioning among fallers and non-fallers showed that participants who had fallen one or more times during the previous six months had recorded lower hand grip strength, took a longer time to complete the TUG, and recorded a lower SPPB score ($p < 0.05$). Values of physical functioning among fallers and non-fallers are presented in (Figure 4).

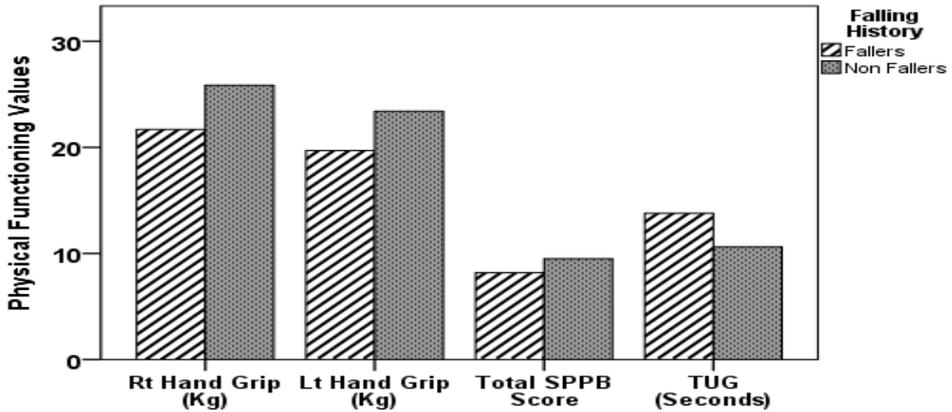


Figure 4. Values of physical functioning among fallers and non fallers.

Results showed that there were significant differences of the FES-I (Ar) scores according to TUG and SPPB cut-off values; participants who took longer than 14 seconds to complete the TUG and participants who scored less than 10 on SPPB total score recorded significantly higher scores in the FES-I (Ar) ($p < 0.001$) (Table 5).

Table 5. Comparisons of the FES-I (Ar) scores according to physical functioning cut-off values (n=176).

Variable	N (%)	FES-I Score Mean (SD)	Median (Range)	<i>p-value</i>
TUG (Seconds)				
≥ 14	36 (21)	42.3 (5.64)	42 (34-58)	<0.001
<14	140 (79)	33.0 (6.51)	33 (16-52)	
SPPB Scores				
≤ 10	113 (64)	37.9 (6.72)	38 (18-58)	<0.001
> 10	63 (36)	29.5 (5.11)	30 (16-39)	

6.3 Physical Activity

The participants (n=176) in Study III were categorized into three groups based on their moderate-intensity aerobic physical activity (walking minutes) throughout the week: low physical activity (less than 150 minutes/week), moderate physical activity (between 150-300 minutes/week), and high physical activity (more than 300 minutes/week). Three physical activity groups were identified: low (n=74), moderate (n=85), and high (n=17).

Descriptive values of PA variables showed that 50% of the women and 28% of the men walked less than 150 minutes/week, which is also how this thesis defines a low physical activity group. The PA variables showed that 45% of the women and 52% of the men recorded walking minutes between 150-300 minutes/week, and 5% of the women and 18% of the men recorded walking minutes more than 300 minutes/week. In addition, 17% of the women and 79% of the men spent less than 150 minutes/week doing household activities, 69% of the women and 6% of the men spent more than 300 minutes/week doing household activities, and 70% of the women and 46% of the men spent less than 150 minutes/week participating in other activities (e.g., yard work and gardening).

The low PA group showed higher prevalence of diagnosed diseases (97%, $p < 0.001$), hypertension (64%, $p < 0.001$), and diabetes (50%, $p < 0.001$). In addition, the majority (77%) of the low physical activity group were women.

6.4 Health-Related Quality of Life

Results of health-related quality of life (HRQoL) showed that 64% of the participants recorded problems walking, ranging from slight problems to moderate and severe problems. In addition, 68.7% of the participants indicated that they had problems doing their usual activities. The majority of the participants (80%) recorded having pain or discomfort, ranging from slight to extreme pain.

6.4.1 Physical activity and health-related quality of life

Results of Study III showed that higher physical activity groups recorded higher scores in all EU-QoL dimensions ($p < 0.05$) (Table 6).

Table 6. Health-related quality of life (HRQoL) among physical activity (PA) groups (n=176).

HRQoL EQ-5D-5L	Low PA Group (n=74)	Moderate PA Group (n=85)	High PA Group (n=17)	p₁	p₂
MOBILITY (n %)					
I have no problems in walking about	11 (15)	41 (48)	13 (76)		
I have slight problems in walking about	33 (45)	42 (49)	3 (18)		
I have moderate problems in walking about	21 (28)	2 (3)	1 (6)	<0.001	<0.001
I have severe problems in walking about	9 (12)	0(0)	0 (0)		
I am unable to walk about	0 (0)	0 (0)	0 (0)		
SELF-CARE (n %)					
I have no problems washing or dressing myself	25 (34)	64 (75)	13 (77)		
I have slight problems washing or dressing myself	16 (22)	20 (24)	4 (23)		
I have moderate problems washing or dressing myself	28 (38)	1 (1)	0 (0)	<0.001	<0.001
I have severe problems washing or dressing myself	4 (5)	0 (0)	0 (0)		
I am unable to wash or dress myself	1 (1)	0 (0)	0 (0)		
USUAL ACTIVITIES (e.g. work, study, housework, family or leisure activities) (n %)					
I have no problems doing my usual activities	13(18)	31 (36)	11 (65)		
I have slight problems doing my usual activities	14 (19)	33 (39)	5 (29)		
I have moderate problems doing my usual activities	33 (44)	17 (20)	1 (6)	<0.001	<0.001
I have severe problems doing my usual activities	11 (15)	4 (5)	0 (0)		
I am unable to do my usual activities	3 (4)	0 (0)	0 (0)		
PAIN / DISCOMFORT (n %)					
I have no pain or discomfort	10 (13)	20 (23)	5 (29)		
I have slight pain or discomfort	27 (36)	49 (58)	7 (42)		
I have moderate pain or discomfort	22 (30)	14 (16)	5 (29)	<0.001	0.034
I have severe pain or discomfort	13 (18)	2 (2)	0 (0)		
I have extreme pain or discomfort	2 (3)	0 (0)	0 (0)		
ANXIETY / DEPRESSION (n %)					
I am not anxious or depressed	15 (20)	27 (32)	8 (47)		
I am slightly anxious or depressed	27 (37)	46 (54)	8 (47)		
I am moderately anxious or depressed	17 (23)	6 (7)	1(6)	0.001	0.002
I am severely anxious or depressed	14 (19)	6 (7)	0 (0)		
I am extremely anxious or depressed	1 (1)	0 (0)	0 (0)		
EQ- VAS (Mean (SD))	63(13.1)	78 (9.74)	85 (9.43)	<0.001	<0.001

EQ-5D-5L: EuroQoL-5 Dimensions-5 Levels

p₁: comparison between low and moderate PA groups; p₂: comparison between low and high PA groups

No significant differences were recorded according to gender on all HRQoL dimensions except on the mobility dimension. Men recorded a mobility median score of 1 (“I have no problem walking about”) and women recorded mobility median score of 2 (“I have slight problems walking about”) ($p < 0.030$). Significant correlations were recorded between the five dimensions of (EQ-5D-5L) and level of PA in terms of walking minutes ($p < 0.001$) (Table 7).

Table 7. Correlations between HRQoL variables and PA level (n=176).

Variable	r_s	95% Confidence Interval	
		Lower	Upper
HRQoL Variables			
Mobility	-.630	-.669	-.418
Self-care	-.526	-.614	-.352
Usual activities	-.536	-.617	-.356
Pain / Discomfort	-.353	-.458	-.174
Anxiety / Depression	-.381	-.479	-.197
EQ Visual analogue scale	.657	.463	.706

HRQoL: Health-related Quality of Life, PA level: Physical Activity Level

6.5 Social Participation, Social Roles

Study IV yielded three central themes: health and social roles, social connectedness, and adapting to the role reversals process.

Health and social roles

The participants' narratives within this theme illustrated how the participants created meaning for their social roles in combination with current health status. The health and physical abilities of the elderly determined their roles in the community. Optimal health, according to the participants, was connected with performing daily activities and being able to independently take care of themselves. The participants related their status of being physically active with their capabilities of maintaining their roles at both the familial and community level.

The dynamic integration of physical status with the assigned social roles was reflected in how the elderly created meaning of their social roles. The findings suggest that poor physical performance might inhibit participation in social roles.

Social connectedness

The participants stated that their social roles were sustained through feelings of social connectedness and belonging. Social connectedness was achieved through familial and social links. Living within a family or being surrounded by others helped the participants create meaning of their social roles, providing a sense of belonging, recognition, and worth.

In addition, the vitality of social participation with the intention of achieving well-being to others was prominent in the participants' stories. The acted roles displayed in this circumstance around the achievement of the well-being to others, based on their recognition that they are still having active roles in being needed by others.

Adapting to the process of role reversals

Adapting to role reversals included both internal and external dimensions. Located within the participants, the internal dimension depended on the participants' potential, motivation, and skills to adapt and to maintain their social roles commensurate with their physical and social capabilities. In this

context, the participants adapted to their changing roles by developing new interests and strategies. However, the participants' environment, including the people around them and their physical setting, influenced how they adapted to their new roles. The participants created meaning for their new roles through a dynamic interaction with the people around them and their physical surroundings. That is, the participants wanted their physical environment to be such that it encouraged them to be active in their community and they wanted the people around them to recognise them as valuable and respected members of the community.

7 DISCUSSION

7.1 Conceptual Considerations

Ageing well is conceptualised using different terms, including healthy ageing, positive ageing, productive ageing, active ageing, and successful ageing [5, 11]. The most prevalent used terms are active ageing and successful ageing [5]. This thesis adopts the term active ageing as active ageing encompasses the process of ageing well in a comprehensive manner that includes quality of life, physical and mental well-being, as well as social participation [5, 6]. This approach can be applicable in both developed and developing countries. Furthermore, active ageing as a policy framework [160] aims to extend healthy life expectancy and quality of life for all people as they age, including those who are frail, disabled, and in need of care [1].

Compared to other terms, active ageing seems to be more precise, less ambiguous, and allow less space for individual interpretations. The concept of “active” as defined by WHO refers to continuing participation in social, economic, cultural, spiritual, and civic affairs, not just the ability to be physically active or to participate in the labour force [1]. On the other hand, “productive ageing” tends to be more instrumental or economical, related more to “productivity” in the sense of activity that produces goods and services [161], which is not in line with the scope of this thesis. In addition, the use of “successful ageing” might be problematic as it implies winners and losers, as if the elderly can win or lose at ageing. Clearly, this phrase might not be the most appropriate word to describe an elderly person who is diagnosed with chronic disease or disability [162].

In this thesis, the majority of the participants, about 86% had one or more chronic diseases. These elderly are not necessarily considering themselves as unsuccessful agers. Strawbridge et al., [162] for example, found that 50.3% of their participants with chronic conditions and with functional difficulties rated themselves as aging successfully compared to using Rowe and Kahn’s criteria, of absence of disease, disability, and risk factors; maintaining physical and mental functioning; and active engagement , where only 18.8% of the participants classified themselves as successful agers.

7.2 Methodological Considerations

This thesis uses quantitative and qualitative methods to develop a more comprehensive understanding about active ageing among the elderly.

The cross-cultural adaptation of the FES-I (Ar) was constructed based on the Prevention of Falls Network Europe (ProFaNE) ten-step translation protocol [67]. The translation process was carried out in light of possible cultural interpretations of different items. For example, in the FES-I the word “concerned” expresses a more cognitive disquiet about the possibility of falling rather than an emotional disquiet that might be associated with language such as “anxious” or “fearful”. Therefore, it was important to use a similar unemotional term, as respondents may be hesitant to declare their emotions.

The mean FES-I (Ar) scores in this study were higher compared to similar studies in Greece and Turkey [86, 87], studies that used self-reported data. Conversely, comparing these results with the Chinese FES-I [163], which used interviews to collect data, the mean scores in this study were somewhat higher. This variance might be related to the mode of administration: self-reported or interview mode. This study used interviews and recruited elderly persons with different levels of education, including people with no education (illiterate). Total mean score values are higher in studies using an interview than in studies using self-reported administration [163, 164]. A similar study [165] showed that the completion rate of questionnaires for people who were interviewed was higher than for elderly persons who completed questionnaires by themselves. The interview mode was recommended for use with frail older adults with and without cognitive impairment [165].

Construct validity of the FES-I (Ar) was considered to be good as the entire prior formulated hypotheses were confirmed. Fear of falling as a single categorical question was significantly correlated with total FES-I (Ar) score, a finding that agrees with similar studies [68, 86, 87, 163]. Strong positive correlation was recorded between the FES-I total score and TUG, indicating that higher scores on the FES-I may reflect limited functional mobility among community-dwelling elderly. These findings are similar to comparable studies [68, 86, 87, 163].

Since the FES-I is an ordinal scale, we considered using the rank based statistical Svensson's method [152], to determine systematic group change and to measure the observed individual variability. The ability of Svensson's method to detect this variability between the two assessments made it merited to be used for reliability testing in the first study.

In Study II [43], physical functioning tests: TUG, SPPB, and handgrip strength were used. TUG was used to measure physical functioning and to identify older people who are at risk for falling [133, 134]. The TUG cut-off [133] value was 14 seconds. The SPPB [136] tested balance, gait speed, and sit-to-stand performance; these items are independently associated with falls in the elderly [33, 35-37]. The reference values of SPPB can give a rapid and valid assessment of the functional state of elderly [138]. Balance and gait problems are major predictors of falling among the elderly [35-37]. The sit-to-stand test can be used to determine fallers and non-fallers [39]. Reduced hand grip strength and lower level of mobility have been recorded among elderly who have fallen one or more times compared to those who have not fallen [40-42], which is in line with the present study's findings.

Determining a precise PA measurement to be used for elderly persons is very challenging due to physiological and cognitive changes that occur with aging [166, 167]. This challenge can be more intense in a circumstance where the available valid measures for assessing physical activity in the elderly [142, 143], cannot be entirely applied according to different modes of physical activity within diverse cultural contexts [4]. Most elderly Palestinians get their PA by walking, gardening, and doing household chores [2, 4]. Therefore in Study III [48], to assess physical activity (PA), an adapted questionnaire that considers social and cultural issues was used. The PA-SCAQ was pilot tested with ten participants, and the findings of the PA-SCAQ pilot testing corresponded with these more common activities. Thus we believe the PA-SCAQ had good face validity and enabled us to obtain the required descriptive statistics about PA in the elderly.

Study III used the Arabic (Jordan) version of EuroQoL-5 Dimensions-5 Levels (EQ-5D- 5L) [100], to assess health-related quality of life (HRQoL) among the elderly Palestinians. In this study, the HRQoL focused on functioning and subjective well-being [20]. To evaluate functioning,

dimensions of mobility, self-care, and usual activities were assessed. Subjective well-being was assessed based on pain/discomfort, anxiety/depression, and VAS.

EQ-5D-5L is a practical and simple tool for assessing HRQoL in elderly populations [145, 146]. Using interviews to administer the EQ-5D-5L made it easier for elderly participants to understand the questions and to respond more precisely to the questions. This was especially true when differentiating between the two levels of coding: 4 = severe problems and 5 = extreme problems. During an interview, the researcher could explain the differences between the two choices by illustrating that nothing could be worse than extreme, a choice that confused some of the participants. Therefore, we recommend that these two coding levels be carefully explained when using the EQ-5D-5L with the elderly. Administering the EQ-5D-5L via interviews can be more appropriate to ensure that elderly participants understand this distinction.

Using a narrative approach [125-127] in Study IV helped us to get a better understanding of how the participants were creating meaning of their social roles within their physical, social, and cultural context. The narrative approach made it possible to combine diverse events and actions in a way that allowed for the exploration of the meanings of social roles and roles reversals. Narrative descriptions necessarily convey human activity as purposeful engagement [125] in specific places and in a specific sequences [168].

To enhance credibility of the qualitative data, two kinds of triangulation were used: triangulation of qualitative data sources and reconciling qualitative and quantitative data [158]. Triangulation of qualitative data sources means “comparing and cross checking the consistency of information that derived at different times and by different means within qualitative methods”[158]. In Study IV, all interviews were based on two to three encounters with the participants, so the information was necessarily derived at different times. Recurrent interviews with the participants created a relaxed interviewing atmosphere and helped build trust with the participants. This strategy improved consistency of the interviews and thereby the derived data. Data consistency was also checked by comparing observational data with

interview data. In this study, data were collected during in-depth individual interviews [147] and observations of participants [149]. All interviews took place in the participants' homes. This approach helped the researcher get a realistic view of the narrative material and the possibility to compare observational data with interview data. Consistency in overall patterns of derived qualitative data from different sources in this qualitative study contributed significantly to the credibility of the findings.

Reconciling qualitative and quantitative data involves comparing data collected through qualitative methods with data collected through quantitative methods [158]. In this thesis, the combined qualitative and quantitative approaches helped develop a more comprehensive view of what active ageing means. This combined approach was evident throughout the whole period of this thesis, from study design to recruitment procedure to data collection to data analysis.

In Study IV, findings from Study II and Study III were processed along with findings from Study IV. For example; the strength of the hand grip may reflect on the nature of social roles. Therefore, using different kinds of data through study IV analysis yielded more balanced overall results.

7.3 Discussion of the Results

The results of the cross-cultural adaptation of the FES-I showed that the total mean scores of the FES-I (Ar) were significantly higher in females and in participants over 68 years of age, indicating that falls self-efficacy was influenced by demographic factors such as gender and advancing age [67, 68]. In addition, the total mean score of the FES-I (Ar) was higher among the participants who reported one fall or more in the previous six months. Thus, the history of falls might influence falls self-efficacy among the elderly [67]. In a longitudinal validation study of FES-I [169], results indicated that FES-I scores increased over time with a trend of higher FES-I scores for people who fell more than once. These factors contribute to *ageing well*, since falls and fear of falling (FoF) may lead to activity restriction, social isolation, and reduced quality of life (QoL) [66-69]. Therefore, we considered both fall and falls self-efficacy important factors that contribute to active ageing and subsequently to ageing well.

On both tests occasions, the two highest individual FES-I (Ar) mean scores (the most difficult to perform) were recorded for item 11 (walking on slippery surface) and item 14 (walking on uneven surface). These results are consistent with similar studies [67, 88, 163]. The recorded scores for these two new items represent more demanding activities in the FES-I and indicate that there is a need for such an instrument. The sensitivity of the FES-I in measuring both simple and more demanding physical and social activities, makes it a suitable instrument for assessing concern about falling among elderly Palestinians. Similar results were found in different cultural contexts, including Germany, the Netherlands, the UK [68], Greece [86], Turkey [87], Sweden [88], and China [163].

Construct validity of the FES-I (Ar) was considered to be good as the entire prior formulated hypotheses were confirmed. Fear of falling as a single categorical question was significantly correlated with total FES-I (Ar) score, a finding that agrees with similar studies [68, 86, 87, 163]. Strong positive correlation was recorded between the FES-I (Ar) total score and TUG, indicating that higher scores on the FES-I may reflect limited functional mobility among community-dwelling elderly. These findings are similar to comparable studies [68, 86, 87, 163].

Reliability for the sixteen items of the FES-I (Ar) indicated high percentage agreement; three items (7, 10, and 11) showed higher values of Relative Position (RP), indicating a higher systematic shift between the two test occasions. This variance might be attributed to the fact that these items allow for individual interpretations [170]. For example, some participants indicated that their concern of falling while going down stairs was greater than their concern for going up stairs (item 7). Based on these results, we recommend considering the potential individual interpretations for these items in the FES-I related studies.

Findings revealed that the magnitude of falls among the elderly Palestinians is relatively high (38%); this corresponds with the magnitude of falls worldwide. Approximately 28-35% of people 65 years old and over fall each year, increasing to 32-42% for people over 70 years of age [74]. Incidence of falls is associated with age [72, 171]. In addition, women tend to fall more

frequently than men [32, 172]. These findings are consistent with our findings; the majority of the fallers were ≥ 68 years old and women.

The results showed that both men and women less than 68 years old recorded better scores on all physical functioning measures. This finding indicates that with increasing age, components of physical functions are influenced by changes in skeletal muscles and this decline in muscle strength may lead to functional decline in elderly persons [28]. Several studies have shown that the level of physical functioning is associated with incidence of falls in elderly persons and that fallers exhibited lower levels of physical functioning [40, 41]. Fear of falling has been associated with reduced leaning balance [173] and impaired gait [174] in community-dwelling elderly, and balance and gait problems are major predictors of falling for the elderly [35-37].

In this study [43], discriminate analysis indicated that measures of physical functioning differentiated between fallers and non-fallers: fallers recorded lower levels of physical functioning compared to non-fallers. In addition, limited functional mobility as indicated by lower performance in the physical functioning tests was associated with higher scores on the FES-I (Ar). Similar findings were recorded in comparable studies [68, 87].

The cut-off values for TUG and SPPB yielded interesting results in terms of level of falls self-efficacy, differentiation between fallers and non-fallers, and differentiation between the PA groups. Therefore, the thesis supports the use of a cut-off value of 10 for SPPB and a cut-off value of 14 seconds for TUG to determine functional mobility and risk of falling. A TUG cut-off value of 10 seconds might be appropriate for elderly less than 68 years old, as our results indicated that elderly participants whom are less than 68 recorded an average time around 10 seconds on the TUG.

For individuals to contribute to society, good health is a key, and an active life enhances better chance of being healthy [160, 175]. Higher levels of physical activity appear to be associated with better functioning and better HRQoL [46, 47, 121, 122, 176]. Our results showed that higher physical activity groups recorded better values in all EQ-5D-5L dimensions.

Women recorded lower scores on the mobility dimension of the HRQoL, and they constituted the majority of the low PA group. This result might be

attributed to the fact that elderly women more than elderly men are more likely to spend time performing household activities so they may spend less time walking outdoors.

At least 60% of the global population fails to achieve the minimum recommendation of 30 minutes moderate intensity physical activity daily [44]. The target of 30 minutes PA daily might be viewed reasonable to health professionals and the public. However, many people, especially in older age groups are not able to achieve it [177]. Although physiotherapists experience barriers to promoting physical activity [178], physiotherapy practice appears to be an effective route for promoting a physically active lifestyle [97]. A physiotherapist can adapt physical activity in accordance with the elderly abilities taking into consideration both physical and mental status [91] .

Better physical functioning is associated with higher levels of physical activity and better health-related quality of life (HRQoL) in the elderly [24-26, 62, 121, 122]. Results of physical functioning tests showed a significant difference with respect to total SPPB score and TUG between the low and moderate and between the low and high PA groups ($p < 0.05$). However, no significant differences were recorded between the moderate and high PA groups. These findings are vital especially in the elderly population, it might be appropriate to encourage a moderate PA, although the elderly should be encouraged to gradually progress from moderate to high PA [4] .

In terms of co-morbidity, PA can help older adults reclaim or maintain a healthy aging process [175, 176]. Study III showed that the low PA group recorded higher prevalence of chronic diseases such as cardiovascular, hypertension, and diabetes. Several studies have shown that regular moderate intensity PA such as walking has significant benefits for health and for the treatment of a number of diseases [47, 52, 53], results also supported in this thesis.

In study IV, the meaning of the social roles among the elderly was connected to acting, the participants seemed to create meaning for their social roles by reflecting on who they are and who they want to become [179], identities intimately related to their level of activity and social connectedness [180-182]. The fulfilment of social roles among elderly can be influenced by physical functioning; the more physically fit, the more likely elderly can

participate in daily living and recreational activities [21, 26, 108]. The dynamic integration of physical functioning with the assigned social roles (Study IV) was reflected in how the elderly created meaning for their social roles. Good physical performance might increase participation in social roles, and poor physical performance might decrease participation in social roles. This limited participation in social roles could result in elderly losing interest or and motivation to stay active. Our results are consistent with other studies: elderly who stay active by participating in multiple social roles have a better sense of well-being and improved health [105, 183].

The meaning of social roles (Study IV) was manifested by exploring how the elderly participated in activities as a way to keep moving. The status of being active was connected with the participants' ability to maintain both familial and community connections. This connectedness was strongly related to their ability to adapt to new roles within the family and the community, and it depended on their motivation and skills to maintain and adapt their social roles commensurate with their physical and social capabilities (internal dimension).

These findings are in harmony with the concept of active ageing [1], which enables elderly people to realize their diverse potentials for well-being. However, the well-being of a person does not only depend on the individual. Well-being has a social component as well. The social dimension also affects how well elderly people adapt to role reversals. According to the elderly participants, this external dimension includes respect and recognition as active members of a community. These findings are consistent with the prescribed external dimension in the International Classification of Functioning, Disability and Health (ICF) [102] for social participation, which defines external dimensions as environmental factors (i.e., the physical, social, and attitudinal environment in which people live). These factors can either enhance or inhibit social participation and influence the ability of the elderly to adapt to role reversals.

7.4 Generalizability

The 176 recruited participants in this thesis represent a range of demographic characteristics in the West Bank, including different age groups, cities, gender, and levels of education. There is a rise in the number of female elderly compared to male elderly: 100 females vs. 83.6 males [3]. This difference was reflected in the composition of our study population, as women constituted 65% of the participants.

The adopted approach of active ageing in this thesis can be applicable in many countries, including developed and developing countries, with respect to national and cultural diversity. Generally, active ageing as a policy framework [160] approaches the process of *ageing well* in a comprehensive manner by including quality of life, physical and mental well-being, and social participation [5, 6].

The studies within the thesis were constructed based on the international literature; the majority of the applied methods were described as valid and reliable measures within the international context. Study I addressed a cross-cultural adaptation of an important instrument for a large language/cultural group. To our knowledge, this is the first study that shows cross-cultural adaptation of the FES-I into Arabic based on the Prevention of Falls Network Europe (ProFaNE) ten-step translation protocol [67]. Therefore, these findings may contribute to geriatric care for Arabic-speaking elderly.

The results in this thesis were comparable to the international literature including studies from Asia, Europe, USA, and Australia. Study II addressed physical functioning and falls self-efficacy within the international context; therefore, the findings in this study may be generalized to other countries. Study III, PA was addressed using the WHO recommendations [4], and health-related quality of life was assessed using a standardized instrument developed for describing and measuring health-related quality of life in different cultural contexts [100, 144]. Thus, the results may be generalized to a larger population of elderly. In Study IV, the methodological narrative approach was applied within the international perspective [125, 126]. Social participation was addressed in the context of active ageing. However, differences in patterns of participation in term of social roles among elderly in different countries should be considered.

7.5 Limitation and Strength

A possible limitation in this thesis was that the PA-SCAQ determined an overall description of physical activity level based on the walking minutes without quantifying various types of physical activity, an issue that was challenging to address within the scope of this thesis. However, this limitation was minimized because the PA-SCAQ was developed in accordance with the WHO global recommendations on physical activity [4].

The same researcher conducted all the tests and interviews, a condition that contributed to more consistent results. In addition, the applied physical functioning tests were convenient to be administered in home settings, and the tests were appropriate for evaluating the physical performance of the participants. Therefore, we believe that hand grip strength, TUG, and SPPB are practical and efficient measures in the field of physiotherapy for testing and studying physical functioning of the elderly.

8 CONCLUSIONS AND IMPLICATIONS

Physical functioning, physical activity, falls self-efficacy, social participation, and health-related quality of life contribute to *active ageing* and subsequently to *ageing well* for community-dwelling elderly. Higher physical functioning values were associated with a lower incidence of falling and a lower level of fear of falling. Therefore, maintaining and improving physical functioning should be considered a priority, as these will influence falls self-efficacy and risk of falling in the elderly. In clinical practice and future research, the FES-I (Ar) instrument could be used to effectively assess concerns about falling in Arabic-speaking elderly persons.

The thesis supports the evidence that better physical functioning is associated with higher levels of physical activity and better health-related quality of life (HRQoL) in elderly. The results showed that there were strong associations between higher levels of physical activity and all dimensions of health-related quality of life. Thus, adopting a physically active lifestyle may contribute to better HRQoL in the elderly.

For the HRQoL dimensions, no significant differences were recorded with respect to gender except on the mobility dimension. Women constituted the majority of the low PA active group, findings that support the association between level of physical activity and HRQoL. Consequently, the mobility dimension of the HRQoL for women can be enhanced by increasing their physical activity (walking) duration to at least to 150 minutes/week.

In addition, there were significant differences on all physical functioning values between low and moderate and low and high PA groups, but no significant differences were recorded between the moderate and high PA groups. As such, elderly participants should be encouraged to gradually progress to higher levels of physical activity.

This thesis focused on the social participation of elderly Palestinians in the context of familial and community participation. Health and social connectedness were considered important factors that interact in the process of maintaining of social roles for the elderly. The adaption process of role reversals could be understood as a bi-dimensional process consisting of both

internal and external dimensions. This knowledge can be used to develop health interventions that would facilitate social participation for community-dwelling elderly.

The concept of *active ageing* was used to address the process of *ageing well* emphasising “active” as the continuing participation in social, economic, cultural, spiritual, and civic affairs, not just the ability to be physically active or to participate in the labour force or as an issue of retirement. Both quantitative and qualitative studies addressing active ageing in different contexts and in different countries would be helpful to explore the interaction between different factors of active ageing and the process of ageing well.

9 FUTURE PERSPECTIVES

Globally, a growing ageing population can be viewed from both negative and positive perspectives: old age can be viewed as a period of inactivity and dependency or old age can be viewed as a social and economic resource [5, 160]. In light of the increasing number of elderly worldwide, the process of *ageing well* has become an international priority, so society will need to reconsider how to care for elderly in order to maximize health, well-being, and functional capacity of the elderly [4].

This thesis contributes to the understanding of *ageing well* through the path of *active ageing* with a focus on the dynamic integration of physical, lifestyle activities, social, and psychological factors among community-dwelling elderly persons. Understanding the impact of this complex dynamic integration of active ageing factors on the state of well-being among elderly is fundamental. This knowledge can be used as an important component in the development of health interventions for elderly within the relevant health and social care systems in different countries, a finding that agrees with the concept of active ageing as a policy framework, taking into consideration national and cultural diversity.

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