Examining the Factors Associated with Community Ambulation in an Older Adult Day Hospital Population

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CITATION

Conroy, Bronagh (2021): Examining the Factors Associated with Community Ambulation in an Older Adult Day Hospital Population. Royal College of Surgeons in Ireland. Thesis.
https://doi.org/10.25419/rcsi.15035445.v1

DOI

10.25419/rcsi.15035445.v1

Examining the Factors Associated with Community Ambulation in an Older Adult Day Hospital Population.

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A thesis submitted to the School of Postgraduate Studies, Royal College of Surgeons in Ireland, in fulfillment of the degree of Master of Science by Research

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January 2020

CANDIDATE THESIS DECLARATION

Candidate Thesis Declaration

I declare that this thesis, which I submit to RCSI for examination in consideration of the award of a higher degree Master of Science by Research (MSc) is my own personal effort. Where any of the content presented is the result of input or data from a related collaborative research programme, this is duly acknowledged in the text such that it is possible to ascertain how much of the work is my own. I have not already obtained a degree in RCSI or elsewhere on the basis of this work. Furthermore, I took reasonable care to ensure that the work is original, and, to the best of my knowledge, does not breach copyright law, and has not been taken from other sources except where such work has been cited and acknowledged within the text.

Signed 

Student Number 17175054

Date 30th January 2020

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LIST OF ABBREVIATIONS

2MWT	Two Minute Walk Test
6MWT	Six Minute Walk Test
10MWT	Ten Metre Walk Test
ABC	Activities-specific Balance Confidence Scale
ASCQ	Ambulatory Self Confidence Questionnaire
BC	Bronagh Conroy (Lead researcher)
CAQ	Community Ambulation Questionnaire
CFS	Clinical Frail Scale
CGA	Comprehensive Geriatric Assessment
CNM	Clinical Nurse Manager
COREQ	Consolidated Criteria for Reporting Qualitative Research
Cs-PFP	Continuous scale Physical Functional Performance
EAMQ	Environmental Analysis of Mobility Questionnaire
EF	Executive Function
ELSA	English Longitudinal Study of Ageing
FAC	Functional Ambulation Category
FH	Frances Horgan (Supervisor)
FIM	Functional Independence Measure
FrPCs	Fall-Related Psychological Concerns
GDPR	General Data Protection Regulations
GDS	Geriatric Depression Scale
HADS	Hospital Anxiety and Depression Scale
HSE	Health Service Executive
ICC	Intraclass Correlation Coefficient
ICF	International Classification of Functioning, Disability and Health
ID	Identification
IQR	Interquartile Range
LIPSE	Life-Space Mobility in Old Age Study
MDT	Multidisciplinary team
MMSE	Mini Mental State Examination

m/sec	metres per second
NCPOP	National Clinical Programme for Older People
NEADL	Nottingham Extended Activities of Daily Living index
PIL	Participant Information Leaflet
RCSI	Royal College of Surgeons Ireland
REC	Research Ethics Committee
RMDH	Robert Mayne Day Hospital
SC	Sinead Coleman (External Validator)
SD	Standard Deviation
SJH	St James's Hospital
SK	Sinead Kinsella (Research Assistant)
SCI-FAI	Spinal Cord Injury Functional Ambulation Index
SPSS	Statistical Package for the Social Sciences
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
TILDA	Irish Longitudinal Study on Ageing
TMT	Trail Making Test
TUG	Timed Up and Go
WAQ	Walking Ability Questionnaire
WHO	World Health Organisation

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SUMMARY

Introduction

The ability of an older adult to walk independently outdoors in their community assists with maintaining independence, a healthy lifestyle and a good quality of life. In clinical practice, mobility is often one of the first activities where a decline is observed and where an older adult becomes dependent. The ability to walk outdoors is often a major goal for older adults attending a day hospital for rehabilitation.

Aims and Objectives

The aim of this study was to examine the factors associated with community ambulation in community dwelling older adults attending a day hospital.

Methods

A mixed methods study design was used. The main study, a cross sectional study used quantitative methods to assess community dwelling older adults attending a day hospital. The primary outcome measure was a community ambulation questionnaire. A range of other outcome measures were completed assessing motor, cognitive, executive function and behavioural domains. The qualitative substudy used Photovoice Methodology. Participants, all of whom had completed the main study, were provided with single use cameras. They had one week to take photographs of their perceived barriers and facilitators to community ambulation. These photographs formed the basis for focus group discussions. Focus groups were recorded, later transcribed and thematic analysis was used to identify key themes.

Results

One hundred and sixty one participants completed the cross sectional study. The median age was 83 years old (IQR 9), female participants represented 64% of the study population and 49.1% of participants lived alone. Frailty ($p<0.001$), self-efficacy ($p<0.001$) and gait speed (p 0.03) were all independently associated with

community ambulation in an older population attending a day hospital. Eight participants completed the Photovoice substudy and three themes were identified: personal, environmental and strategic factors, all associated with an older adults' ability to ambulate in the community.

Conclusion

This study demonstrated the complexity and multifactorial nature associated with independent community ambulation in older adults. This suggests that physiotherapists should adopt a broader approach to the assessment and treatment of older adults, to promote the achievement of independent community ambulation.

ACKNOWLEDGEMENTS

This study would have not been possible without the help and support of a number of people. I would like to sincerely thank:

My supervisors, Professor Frances Horgan (RCSI), for her guidance, advice and support throughout this entire research process and Professor Conal Cunningham for his advice and assistance particularly with statistical analysis.

Physiotherapy Manager Niamh Murphy for her continued moral support, encouragement and leadership.

The patients of Robert Mayne Day Hospital (RMDH) for giving their valuable time to participate in this study. Thanks to each and every one of the 161 participants for sharing their views, insights, their knowledge and not forgetting their humour.

Professor Roman Romero Ortuno, RMDH Medical Registrars and Clinical Nurse Managers Tracy Byrne and Saira Matthews, Physiotherapists Sinead Coleman, Lucinda Edge and Grainne Sheils and Research Assistant Sinead Kinsella, all of whom provided their valuable time, support and expertise.

I would also like to thank and acknowledge my Physiotherapy and RMDH colleagues for their help and support throughout this study.

I want to thank my wonderful family especially my husband Gerard, daughter Nora and son James for their patience, support and love. A special mention to my Dad Hugh, sister Claire and brother Jonathan for their continued support and inspiration.

I would like to also acknowledge the funding assistance provided by the Centre for Learning and Development and Medicine for the Elderly Directorate at St James's Hospital.

DEDICATION

In loving memory of my wonderful Mum, Margaret, for all her love, wise words and inspiration and for always having faith in my ability to succeed.

INTRODUCTION

Ageing is an inevitable process and statistics show that the world's population is ageing. A report by the United Nations (2017) stated that the number of adults over 60 years of age is projected to double from its current levels to more than two billion by 2050. This is reflected in the Irish population which is both increasing and ageing. The average life expectancy in Ireland in 2016 was 79.9 years for males and 83.6 years for females (Department of Health, 2019). The Central Statistics Office (CSO) (2018) has projected an increase in the elderly population of 629,800 in 2016 to nearly 1.6 million by 2051. There is expected to be an even more dramatic increase in the over 80 year old population with a projected increase of 271%, from 147,800 in 2016 to approximately 549,000 by the year 2051. Currently in Ireland (2018), those aged 65 years and older are estimated to be 13.9% of the total population as compared to 12% in 2012 (CSO, 2018). Recent data from The Irish Longitudinal Study on Ageing (TILDA) reported that by 2030, one in five people residing in Ireland will be over 65 years old, with the greatest increase being noted in the over 80s.

Ageing can result in the progressive decline of the body systems. The reality and consequence of ageing is the increasing rates of frailty and prevalence of multimorbidity and chronic diseases such as heart conditions, diabetes, respiratory conditions and stroke (Beard et al., 2016). These can result in functional decline, decreased quality of life, increased risk of hospitalisation and institutionalisation Marengoni et al., 2011). An increasing ageing population is expected to result in increased demands on healthcare and social services (Prince et al., 2015).

The literature identifies personal factors including increasing age to decreasing mobility and mobility limitations. In the older adult population, mobility, defined as the ability to move around one's environment, is a predictor of physical disability and one of the first activities in which an older adult becomes dependent (Shumway-Cook et al., 2003). Mobility limitations affect between one third and one half of adults aged over 65 years old, affecting their general health and well-being (Rosso et al., 2013). The ability to independently walk outdoors in their community is a basic and extremely important aspect of daily life, assisting with the maintenance of a healthy lifestyle and a good quality of life (Asano et al., 2007). The ability to walk is often a major goal for older adults attending a day hospital for rehabilitation.

Community ambulation has broadly been described as the ability to walk outdoors for the purposes of work, social or leisure activities (Lord et al., 2010; Patla and Shumway-Cook, 1999). Community ambulation has been shown to be impacted by personal (Lord et al., 2010), physical (Salbach et al., 2014) and environmental factors (Patla and Shumway-Cook, 1999). The majority of studies investigating community ambulation in older adults, have studied healthy community dwelling older adults who were cognitively intact and able to walk outdoors independently (Lord et al., 2010, Brown et al., 2010). To date there is minimal literature relating to community ambulation of older adults who are attending an outpatient hospital setting due to a change or decline in their health or functional ability.

The WHO International Classification of Functioning, Disability and Health (ICF, 2001), a classification of health and health domains, describes the functioning of an individual in terms of an interaction of their health conditions with physical, social and environmental factors. This model refers to a number of domains, one of which is participation, an individual's involvement in life and social situations. Community ambulation may be described in the domain of participation, an activity that enables an individual to participate within community settings. As community ambulation involves a complex interaction between the person and the environment it can be challenging for older adults to return to community ambulation, especially following a period of illness or hospital admission. The purpose of this research was to examine the factors that affect community ambulation in community dwelling older adults attending a day hospital. This study examined the personal, physical and environmental factors that may affect older adults who are attending a day hospital for multidisciplinary team rehabilitation, partaking in community ambulation.

CHAPTER 1: LITERATURE REVIEW

1.0 Introduction to Literature Review

Ageing is an inevitable process and in 2002 the World Health Organisation (WHO 2002) replaced the term ‘active ageing’ with ‘healthy ageing’. They defined healthy ageing as ‘maintaining the functional ability that enables wellbeing in older age’. With ageing there is a progressive decline in both the physical and mental functions of the body which can lead to slowness of gait, difficulty with functional transfers and increasing dependency. The research highlights the risk of deconditioning and risk of functional decline of older adults during a period of bed rest or hospitalisation with decreased activity levels common during hospitalisation of older people (Brown et al., 2004; Villumsen et al., 2015). Mobility has been identified as one of the first activities in which an older person becomes dependent. The ability to walk both indoors and outdoors is an important determinant in the independence of an older person, assisting with the maintenance of a healthy lifestyle and good quality of life (Asano et al., 2007). Difficulty with mobility, specifically outdoor community ambulation is a common problem and often stated as an important rehabilitation goal (Corrigan and Mc Burney, 2008). It is therefore necessary for clinicians to have an understanding of the ageing process and the factors associated with maintaining community ambulation in an older adult population.

1.1 Ageing

Ageing is a normal, inevitable and complex process involving changes in the body’s systems over time, encompassing the physical, biological and psychosocial. In the older adult population, normal ageing can result in a progressive decline of these systems, causing accumulative deficits with the resultant outcome of functional decline, increased risk of illness, hospitalisation and decreased social participation (Marengoni et al., 2011). In clinical practice, clinicians require an awareness and understanding of the ageing process and the challenges an older adult faces within the ageing process to comprehensively manage their care, ensuring they can age successfully in their home environment.

1.1.1 Frailty

Frailty is a complex syndrome, commonly associated with ageing and has been described as a ‘Geriatric Syndrome’ (Fairhill et al., 2011). It is characterised by a decline in multiple body systems and decreased reserve. It is highly prevalent in older adults and frail older adults typically present with multimorbidity, low physical activity levels and reduced life space mobility, the area an individual moves through over a defined period of time (Portegijs et al., 2016). This in turn is related to adverse health outcomes including increasing risk of falls, decreasing function, admission to hospital or long term care placement and death (Fried et al., 2001, Clegg et al., 2012, Mc Phee et al., 2016). Frailty has been defined by the British Geriatric Society (2014) as ‘a distinctive health state related to the ageing process in which multiple body systems gradually lose their in-built reserves.’ Cruz-Jentoft et al. (2010) highlighted that frailty goes beyond the decline in the body but encompasses the social dimensions, cognitive status and environmental factors related to the person. This decline leads to a vulnerability especially to falling and a reduced ability to tolerate or recover from a sudden health change such as acute infection or following a medical procedure.

There are a number of operational methods for defining frailty. Fried et al., (2001) describes a Frailty Phenotype which diagnoses people as frail if they present with three or more of five criteria: slow gait speed, weakness (assessed by grip strength), self-reported exhaustion, unintentional weight loss (>10lbs in the previous year) and low physical activity levels. Alternatively clinicians can define frailty by quantifying the deficits the individual presents with. Rockwood (2005) developed the Clinical Frail Scale which is based on clinical judgement and encompasses multiple domains including physical wellbeing, multimorbidity, cognition and social support (Rockwood and Mitnitski, 2011).

1.1.2 Sarcopenia

Sarcopenia is associated with the ageing process and is a key component in frailty. It is a progressive loss of skeletal muscle strength and quality presenting the risk of increased likelihood of adverse health outcomes. Sarcopenia has been defined as a muscle disease and in 2018 the European Working Group on Sarcopenia in Older People (EWGSOP) (Cruz-Jentoft et al., 2018) reviewed and

updated their original definition of sarcopenia developed in 2010.They stated that low muscle strength should be used as the primary indicator of sarcopenia as compared to low muscle mass. They report that diagnosis is confirmed by the additional presence of low muscle quantity or quality with the diagnosis of severe sarcopenia noted if a person presents with low muscle strength, quality or quantity and low physical performance. Castillo et al. (2003) investigated the prevalence of sarcopenia and associated risk factors in community dwelling older adults. Their findings highlighted that sarcopenia increased with age, reporting an increase from 4% of men and 3% of women aged 70–75 to 16% of men and 13% of women aged 85 and older. They also reported the relationship between sarcopenia and the increased risk of falls, reduced grip strength and decreased physical activity levels. These findings have been widely documented by further research in the area. Loss of muscle mass and strength is a contributing factor to lower limb weakness which can result in a loss of balance affecting gait leading to falls and a reduction in mobility and function (Cruz-Jentoft, 2010). The risks of adverse health outcomes subsequently place an increased burden on the health care system resulting in increased demands and cost on health care systems (Prince et al., 2015).

1.1.3 Gait

It is well documented that gait speed decreases with increasing age. Gait speed has been shown to predict functional decline and hospitalisation (Studenski et al., 2003), falls (Montero-Odasso et al., 2005; Viccaro et al., 2011) and impaired quality of life (Cruz-Jimenez, 2017) in older adult populations.

Normative walking speeds (Bohannon, 1997) and risk cut off values (Van Kan et al., 2009) are well established for community dwelling older adults. Bohannon et al. (1996) and Bohannon (1997) presented normative reference data for both comfortable and maximal walking speeds of adults in each decade from 20’s through to 70’s. They timed 230 healthy, community dwelling adults aged between 20 and 79 walking over 7.62m of smooth uncarpeted floor and found gait speed decreases as age increased with maximal gait speed declining more quickly. They also noted the gender difference. They reported that the mean gait speed of women in their seventies was 1.27m/sec and 1.74m/sec for comfortable and

maximal respectively as compared to 1.33m/sec and 2.07m/sec respectively for men in their seventies.

Following their review of the literature, Steffen et al., (2002) documented that average gait speeds for healthy community dwelling adults aged over 60 years ranged from 0.60 to 1.45m/sec for comfortable walking speed and from 0.84 to 2.1m/sec for maximal walking speeds. They then investigated 96 healthy community dwelling older adults with an age range from 60 to 88 years. They assessed the participants across four commonly used clinical tests – Six Minute Walk Test, Berg Balance Scale, Timed Up and Go and comfortable and fastest walking speeds using a 10m walkway. They reported mean comfortable and fast gait speeds for both male and female in three different age range's (60 – 69; 70-79; 80-89). Their results concurred with Bohannon (1997) in the finding that gait performance measures showed an age related decline for both genders, with women in their seventies mean gait speed 1.33m/sec and 1.71m/sec for comfortable and maximal respectively as compared to 1.38m/sec and 1.83m/sec respectively for men in their seventies.

Kenny et al. (2013) reported normative walking speed values for the Irish population. Data was taken from The Irish Longitudinal Study on Ageing (TILDA) and based on a sample of 4931 community dwelling individuals over the age of 50 years. This sample excluded those individuals with dementia, Alzheimer's Disease, Parkinson's Disease or who scored less than 10 on MMSE. Gait speed was measured via the GAITRite. They presented their results as percentiles together with the mean and standard deviation for every fifth year of age from 50 to 85 years. Similarly to Bohannon (1997) and Steffen et al. (2002), they also demonstrated an age related decline for both genders and also reported a height difference with taller individuals walking faster across both genders.

A systematic review by Van Kan et al. (2009), involving 27 studies and an expert panel meeting of the International Academy on Nutrition and Ageing (IANA) Task Force, reported on the use of gait speed as a strong predictor of adverse outcomes in community dwelling older adults. Based on the literature, they presented cut off values of gait speed at usual pace. They reported older adults who walk faster than 1.0m/sec generally have lower risk of health issues and suggested using the cut-off value of 0.8m/sec in clinical settings to predict adverse outcomes. This was supported by further research by Studenski et al. (2011).

In comparison, Graham et al. (2010) highlighted that normative gait speed and risk threshold values may not be sensitive for hospitalised patients who are medically unwell. They investigated walking independence in hospitalised older adults, assessing usual walking speed using the shorter 2.4m walk test in a population of 174 ambulatory older adults with a mean age of 75 years (SD 7) who were admitted to an acute care ward of a University Hospital. They reported participants' mean walking speed was 0.43m/sec, observing that 75% walked slower than documented normative cut-offs for community dwelling older adults yet 90% were discharged home. However, their method of assessing gait speed using a shorter distance of 2.4m would lead to lower speed measurements compared to the more standard 10m walk test distance. While these shorter walk tests are a quick, easy and reliable option for older adults, gait speed calculated using shorter walkways do not demonstrate sufficient concurrent validity with the 10MWT to be used interchangeably and for comparisons (Middleton et al., 2015).

Subsequently a systematic review carried out by Peel et al. (2013) reported similar findings to Graham et al. (2010) when they reviewed gait speed in older adult inpatient and outpatient populations aged over 70 years. On review of forty eight studies they also reported gait speed was below the reported threshold of 1.0m/sec and highlighted that gait speed in an acute care setting was 0.46m/sec which was significantly slower than the gait speed recorded at outpatient clinics of 0.74m/sec. This may be explained by the relative health of the individual at the time of assessment, however may also be due to the variations and inconsistencies in methods across the studies. These include the vast range of distance used for the timed walk which varied between two to fifteen metres, the type of equipment used such as a computerized pressure mat compared to marked walkway in a gym or clinical environment and variations in protocol or instruction given, for example a static start compared to a moving start.

The literature highlights the wide range of previously reported walking speeds across older adult populations. As noted above these differences may be explained by a range of factors such as differing populations, ranging from healthy community dwelling older adults to those attending hospital, and methodological differences including length and type of walkway, environmental conditions and protocol. All studies however demonstrated an age related decline in gait speed and as the literature suggests gait speed is an important measure in the

comprehensive geriatric assessment for identification of older adults for major health related outcomes.

1.1.4 Falls

Falls are common in the older adult population and one of the leading causes of morbidity and mortality globally (Kannus et al., 2005). The risk of falling increases with age and the Health Service Executive (HSE, 2008) reported that one in three older people fall annually with approximately 7000 older people requiring hospital admission annually for treatment of falls related injuries. A more recent study in Ireland of middle aged and older Irish adults by Bhangu et al. (2017) reported the prevalence of falls in Ireland as 19.2% or 192 per thousand persons, approximately one in five people and this increased with age, notably in the older population were the prevalence of falls increased to 24.4% in the over 75 year old age group.

A fall may be defined as ‘an event which results in a person coming to rest inadvertently on the ground or floor or other lower level’ (WHO, 2018). Recurrent falls (more than one fall) are associated with increasing age, female, poorer reported health, increased difficulty with instrumental activities of daily life and increased co-morbidities (Shumway-Cook et al., 2009). Falls in the elderly rank high among serious clinical issues reported by the elderly. Older people are more likely to suffer serious injury as a consequence of falling with resultant loss of function, mobility and ultimately independence, placing increased demands on health care providers (Prince et al., 2015). Fear of falling and other Fall-Related Psychological Concerns (FrPCs) such as fall related self-efficacy, balance confidence and the outcome expectancy or consequence of falling are common among community dwelling older adults (Hull et al., 2013; Payette et al., 2016).

1.1.5 Polypharmacy

Polypharmacy refers to the use of multiple medications and is commonly defined as the use of five or more medications with excessive polypharmacy defined as ten or more medications (Fulton and Riley Allen, 2005). Due to the ageing population and the increase in those living with long term conditions, people are

presenting with increased number of conditions - multimorbidity. Multimorbidity has been defined as the co-occurrence of two or more chronic health conditions and is associated with increased demands on health care use with decreased health status, decreased quality of life and increased risk of mortality (Salive, 2013). Subsequently multimorbidity results in increased medications being prescribed and taken to improve the individual's quality of life (Richardson et al., 2011).

It is well documented that polypharmacy is predictive of adverse outcomes in the older adult population and associated with functional impairments, reduced gait performance, increased falls, increased fracture risk, confusion, hospitalisation and mortality in an older population (Richardson et al., 2011; Montero-Odasso et al., 2019). Richardson et al. (2012) presented the findings from the TILDA study providing data from the Irish population. They reported that 69% of the 50 years and over population reported regular medication use. This percentage increased with age, with 85% in the over 65 year olds and 90% of those over 75 years taking medications regularly. The reported average number of medications taken by the over 65 years age group was 3.4 and in the over 75's was 3.9. Polypharmacy is reported to be more prevalent in women and those of lower socioeconomic class (Richardson et al., 2011).

A recent study by Montero-Odasso et al. (2019), investigated 249 community dwelling older adults with an average age of 76.6 years, reported that polypharmacy was cross sectionally associated with lower gait speed. On comparing groups they reported those participants without polypharmacy as having a mean gait speed of 1.2 m/sec as compared to those with polypharmacy as having a gait speed of 1.02 m/sec (p value <0.001). Previous studies have reported an association between polypharmacy and falls in the older population (Zia et al., 2015), however longitudinal studies in Ireland and Holland report the association is only with fall risk increasing medication (Richardson et al., 2015). The TILDA report (Richardson et al., 2015) on polypharmacy and subsequent falls in community dwelling older adults reported that polypharmacy was not associated with falls risk once adjusted for co-morbidity however polypharmacy which included antidepressants or benzodiazepines were associated with increased reporting of falls. The English Longitudinal Study of Ageing (ELSA) reported on review of 5213 participants over the age of 60 years old, that of the 1611 participants reporting polypharmacy, 569 of those reported at least one fall within

the past two years. The rate of falls was 21% higher in people with polypharmacy as compared to without polypharmacy (Dhalwani et al., 2017).

The results of these studies demonstrate the associations between polypharmacy and adverse health outcomes however it is important to highlight the complexities of this association. The adverse health outcomes may be caused by the side effects of the medication such as orthostatic hypotension or Parkinsonism which contribute to decreased functional performance and may contribute to the development of frailty. On the other hand, polypharmacy maybe a causality in relation to frailty because of the multimorbidity requiring multiple medications. The literature reports that frailty and multimorbidity are related in older adults however, following a recent systematic review and meta-analysis of frailty and multimorbidity, Vetrano et al. (2019) reported most frail individuals are multimorbid however few multimorbid individuals present as frail, with only 6% presenting with both multimorbidity and frailty. They reported the findings were inconclusive and highlighted the need for further investigation of this relationship owing to a range of factors, including the cross sectional study design of the majority of the studies included and the large variety of frailty and multimorbidity assessment tools.

Multimorbidity and polypharmacy pose major challenges to health care clinicians and this is observed in the increased utilisation of healthcare by the older adult population with literature reporting polypharmacy being responsible for more than half of both hospital inpatient and outpatient visits (Richardson et al., 2012; Le Couteur et al., 2016).

1.1.6 Self-efficacy

Self-efficacy is an individual's self-belief to perform a task and is related to increased functional and mobility issues in the older adult, with factors such as increasing age, female gender and poor self-reported health related to low self-efficacy (Yeom et al., 2008). Emerging research suggests that self-efficacy and confidence may influence an older adult's ability to participate in community based activities (Yeom et al., 2008) and independent community ambulation (Dennett et al., 2012).

Self-efficacy is often measured in clinical settings to provide additional information to complement objective performance measures. White et al. (2009) investigated 321 community dwelling adults with a mean age of 63.8 (SD 9.6) years, and hypothesised that physical activity would directly affect self-efficacy and influence quality of life. Participants completed a number of self-reported questionnaires addressing their physical activity, self-efficacy, quality of life and mental health status. Results demonstrated that being more active was associated with more efficacious, fewer disabilities and generally more satisfaction with life. Further research in an older community dwelling population by Lord et al. (2010) studied 113 healthy community dwelling older adults with a mean age of 75.8 years (SD 7.3). They reported that self-efficacy was more relevant than executive function in the functional performance of this cohort, concluding that a broad range of factors contribute to an older adult's ability to independently ambulate in community. This is reflected in more recent research of community dwelling stoke and hip fracture populations. Following a study of 50 community dwelling stroke patients, Robinson et al. (2011) reported that balance self-efficacy was strongly associated with both subjective and objective measures of participation in community walking. This was later supported by further research in the stroke population by Durcan et al. (2016) who identified balance self-efficacy as the only factor independently associated with community ambulation in a study of 40 community dwelling chronic stroke patients with a mean age of 66 years (SD 13.4). Similarly, Dennett et al. (2012) reported lack of confidence and self-perceived participation restrictions as issues reported by older adults post hip fracture. They studied twenty two participants, with a mean age of 78 years, all living independently in community post hip fracture. Although their study had a small sample size and included only those living independently it highlights the impact of confidence on the ability to community ambulate.

1.1.7 Cognition and Executive Function

Normal ageing is associated with cognitive decline in certain abilities such as memory, reasoning, processing speeds and executive function abilities. While changes may be slow and small they may impact on certain activities and day to day life of an older adult (Harada et al., 2013). It is widely accepted that cognitive

flexibility and processing is required for mobilising and instrumental activities of daily life (Cahn-Weiner et al., 2002; Soumare et al., 2009).

Executive function and its relationship to walking is widely reported in the literature. Executive Function (EF) has been defined as the cognitive ability to plan and execute complex goal orientated actions. The ability to walk whilst completing another task such as holding a conversation, planning and switching between tasks requires the use of higher order processes, referred to as EF (Poranen-Clark et al., 2018). A number of studies have been carried out investigating the relationship between physical activity or functional performance and executive function in the elderly. The InCHIANTI study is an epidemiological study which involved 926 community based older adults with a mean age of 74.6 years. This study investigated the relationship between EF and the performance of mobility tests with differing additional demands. Mobility was assessed using walking speed on a 4m course at usual speed and walking speed on a 7m obstacle course at fast speed. Results showed that EF is independently associated with complex mobility tasks (Ble et al., 2005). Further analysis of those who participated was undertaken by Coppin et al. (2006) who reported that gait speed was consistently lower among participants with poor EF. The InCHIANTI study demonstrated the association between cognitive status and gait performance concluding that older adults with poor EF show decline in physical ability. This study however did not account for the complexity of community ambulation in terms of both the cognitive and physical demands in an external environment, however they did suggest that impaired EF may result in reduced ability to react to and plan for more complex physical tasks such as dealing with street hazards (Ble et al., 2005).

More recently Poranen-Clarke et al. (2018) investigated 157 community dwelling older adults with a mean age of 82.6 years as part of the Life - Space Mobility in Old Age (LIPSE) study. They examined both the cross sectional and longitudinal associations between EF and life space mobility. Executive function was assessed using the Trail Making Test and life space assessed using a 15 item Life Space Assessment. Mobility indicators were assessed using short physical performance battery and perceived walking difficulties together with difficulties using public transport or driving were self-reported. They concluded that those with better EF had a better life space mobility which was explained by better lower limb performance and no difficulties using public transport or driving.

1.1.8 Rehabilitation and Pathways of Care

The current model of care for the older adult is based on the collaborative Comprehensive Geriatric Assessment (CGA). It has been defined by Rubenstein et al. (1991) as a:

> 'multi-dimensional, interdisciplinary diagnostic process to determine the medical, psychological and functional capabilities of a frail older person in order to develop a coordinated and integrated plan for treatment and long-term follow-up'.

The CGA permits a coordinated plan and delivery of care for the older adult. This organised and comprehensive approach includes assessment of cognition, social supports, nutritional status and medications and supports the older person in their current needs and sets a long term plan in place (NICE, 2016). The Irish National Clinical Programme for Older People (NCPOP) (HSE, 2016) reports the many benefits of the CGA as it has been shown to reduce the rates of older adults admitted to residential care and mortality. Physiotherapy intervention is fundamental within this framework. Improvements in functional ability and returning to their home environment is often a shared rehabilitation goal by older adults and professionals following an acute admission to hospital. An older adult's ability to walk independently is a basic and extremely important aspect of daily life, assisting with maintenance of a healthy lifestyle and a good quality of life (Asano et al., 2007). They are many documented benefits of physical activity and regular exercise for the older adult with improvements in functional mobility and participation (Mc Phee et al., 2016).

A day hospital is a dedicated outpatient service for the older adult and was developed in the UK in the 1950's with the aim of providing medical care and rehabilitation to community dwelling older adults (Black, 2005). A day hospital was described by Brocklehurst (1973) as 'the shop front for the geriatric service and is a logical extension of the progression from an acute and rehabilitation ward and forms a bridge between the hospital and community'. A recent systematic review by Brown et al. (2015) compared geriatric day hospitals to non-integrated serveries and although evidence was limited they reported the benefits of day hospitals, suggesting that integrated geriatric day hospitals reduced the risk of functional disability, institutionalisation and mortality.

O'Caoimh et al. (2018) reviewed the use of geriatric day hospitals and suggested that due to our ageing population and burdens on health care systems, geriatric day hospitals have the potential to evolve to manage older adults with more complex needs across the full spectrum of ageing, from active ageing through to end of life care, achieved through continued high quality CGA but with the addition of education and technology to promote healthy ageing and activity.

In Ireland, day hospitals remain an important facility for the provision of sub-acute care and multi-disciplinary team rehabilitation to community dwelling older adults who present with a change or decline in their health or functional ability. Health care professionals work with patients to improve their functional ability, promoting independence and social participation, enabling them to remain independent and active both in their home and in their community.

1.2. Defining Community Ambulation

There is currently no uniform definition of community ambulation in the literature, however the general consensus states that *community ambulation* is the ability to walk outside of the house, in the community, for the purposes of employment, social activity and recreation. A variety of terms are noted to be used in the literature such as *community mobility* (Patla and Shumway-Cook,1999; Gardner, 2014; Nanninga et al., 2018), *community ambulation* (Lord et al., 2004; van de Port et al., 2008; Lord et al., 2010; Andrews et al., 2010; Brown et al., 2010; Durcan et al., 2016), *community walking* (Lamont et al., 2012; Elbers et al., 2013; Bijleveld-Uitman et al., 2013) and *outdoor walking* (Eronen et al., 2014) however it is unclear if the terms are the same or interchangeable.

1.2.1 Community Mobility

Patla and Shumway-Cook (1999) reported mobility as a key factor in an individual's ability to maintain independence and defined mobility as the capability of moving independently from one point to another. They defined community mobility as 'locomotion in environments outside the home' and developed an operational model of community mobility that considered eight environmental dimensions: minimum walking distance, time constraints, ambient conditions,

terrain characteristics, external physical load, attentional demands, postural transitions and traffic level. They subsequently observed 36 community dwelling adults over 70 years old, during three trips in community, recording the frequency of encounters within each domain, comparing those with a mobility disability (n=17) to those without a mobility disability (n=19). They defined the absence of disability as the ability to walk 0.8km and climb stairs without assistance. They reported four environmental dimensions that differed between groups as postural transitions, physical load, terrain and time constraints. In conclusion they described community mobility as a complex task that requires an individual to adapt their mobility to account for environmental factors (Shumway-Cook et al., 2002) and later described mobility as the ability to walk safely and independently in an individual's own environment (Shumway-Cook et al., 2007).

Community mobility has also been described as a complex and dynamic process which is challenged by multiple personal and environmental factors that are constantly changing (Gardner, 2014). Their study employed ethnographic research methods to investigate six community dwelling older adults with a mean age of 82.5 years old, all of whom lived alone. Data was collected over an eight month period and each of the six participants completed an average of eight interviews lasting between 2 and 4 hours. This small study reported that social engagement and identity played a key role in community mobility of older adults.

Nanninga et al. (2018) also used the term, 'community mobility'. They studied 33 moderate to severe stroke survivors, using qualitative research methods to gain an understanding of mobility practices post discharge from rehabilitation. Participants in their study reported alternatives to walking in order to achieve community mobility such as a wheelchair or mobility scooter. Their study supported previous research findings highlighting the complexities of community mobility such as the social, environmental and resources available post stroke and the multiple ways they interact with each other.

1.2.2 Community Ambulation

Lord et al. (2004) developed a definition of community ambulation following the investigation of 130 community dwelling post stroke adults with a mean age of 68.8 years. They completed a number of standardised mobility measures and a six

item self-reported questionnaire (Community Ambulation Questionnaire) identifying relevant community destinations and the importance of walking in the community. They defined community ambulation as 'the ability to independently mobilise outside the home, which includes the ability to confidently negotiate uneven terrain, private venues, shopping centres and other public venues'.

Subsequently a large number of studies have used the term 'community ambulation' and cited Lord et al's.(2004) definition of community ambulation in their research, including studies in stroke populations such as Durcan et al. (2016) who investigated 40 post stroke community dwellers with a mean age of 66 (SD 13.4) years and van de Port et al. (2008) who investigated 102 community dwellers, three years post stroke with a mean age of 59 (SD 10) years.

A number of studies investigating community ambulation in older adult populations also cited Lord et al's (2004) definition of community ambulation. Lord et al. (2010) investigated 113 healthy community dwelling older adults, completing a battery of performance measures together with measures assessing motor, cognition, executive and behaviour characteristics. Andrews et al. (2010) investigated 139 adults which included over 65 year olds and measured distance at 141 frequently used establishments and Brown et al. (2010) completed a mixed method study involving nineteen community dwelling older adults, who identified and described locations and businesses they frequently visited, following which researchers measured the specific walking distance an individual walked to complete the task.

1.2.3 Community Walking and Outdoor Walking

Studies investigating community dwelling Parkinson Disease populations, Lamont et al. (2012) and Elbers et al. (2013) who used qualitative and quantitative methods respectively, cited the term 'community walking' however used the definition of community ambulation as per Lord et al. (2004). Bijleveld-Uitman et al. (2013) who investigated 241 community dwelling mild-moderately affected individuals, nine months post stroke with a mean age of 58.1(SD 10.3) years also used the term 'community walker' but again used Lord et al. (2004) definition of community ambulation and their community ambulation questionnaire. These studies suggest that community walking and community ambulation appear to be interchangeable phrases.

Eronen et al. (2014) used the term, ‘outdoor walking’. They investigated outdoor walking and the impact of environment on the development of walking difficulty in a population of 261 community dwelling older adults aged between 75 and 81years old. They used a combination of standardised questionnaires and measures to assess cognition, depressive symptoms and maximal walking speed and concluded that environmental facilitators, specifically having a green space or park nearby reduced the risk of an older person developing outdoor walking difficulties.

In summary, the WHO International Classification of Functioning, Disability and Health (ICF) (2001) define mobility as:

> ‘moving by changing body position or location or by transferring from one place to another, by carrying, moving or manipulating objects by walking, running or climbing and by using various forms of transportation’(p.142).

Mobility is therefore an umbrella term which includes a person’s ability to move safely in various different ways, for example, standing up from a chair, walking, driving or taking public transport; hence walking is only one form of mobility. Eronen et al. (2014) defined mobility as the ‘corner stone of independent living among older people’ and stated walking was only one form of mobility however is an important prequisite for other forms of mobility, for example, public transport. The literature suggests, the term ‘community mobility’ may imply walking, driving or public transport whereas ‘community walking’, ‘outdoor walking’ and ‘community ambulation’ appear to be interchangeable phrases as they describe walking or locomotion outdoors.

1.3 Measuring /Categorising Community Ambulation

On review of the literature there is no current reliable and valid measurement for community ambulation in an older adult population or indeed other populations. Current measures used both in research and clinical setting are comprised of those which are considered to best represent the task and cover a number of domains of the International Classification of functioning (ICF) namely activity, participation, health related quality of life and environmental influence (Lord and Rochester, 2005).

1.3.1 Performance Based Measures

The most common approach to defining and measuring community ambulation has been through the use of objective performance and activity based tests such as gait speed, endurance and distance mobilised (Lord et al., 2010; Brown et al., 2010; Steffen et al., 2002). It is well documented that performance measures particularly gait speed are valid, reliable and sensitive measures for assessing functional performance and in predicting heath related risk in older adults and have been designated in the literature as a global marker or '6th vital sign' (Studenski et al., 2003; Fritz and Lusardi, 2009, Middleton et al., 2015). Walking speed and distance are two parameters with direct relevance to a person's ability to walk in the community, however these parameters vary widely (Salbach et al., 2014).

1.3.1 (i) Gait Speed Requirements for Community Ambulation

There is minimal literature describing the relationship between gait performance and its prediction of an older adults' ability to ambulate in the community. A number of studies have however investigated gait speed in healthy, community dwelling older adults, all who were independently walking in the community (Lord et al., 2010; Peters et al., 2013). Lord et al. (2010) investigated what internal characteristics are important for community ambulation in older adults. They recruited 113 healthy community dwelling older adults with a mean age of 75.8 years (SD 7.3) with almost one third of their sample over 80 years old. All participants were cognitively intact (MMSE greater or equal to 24/30) and all participants were able to walk independently in the community for greater than six minutes. They completed a battery of measures to assess gait variables (10MWT, stride length, step frequency and dual task, 6MWT) motor domain (BESTest, Activities-specific Balance Confidence Scale), cognitive domain (COWAT), executive function (Trail Making Test A and B) and behavioural domains (Hospital Anxiety and Depression Test, Multidimensional Fatigue Inventory). Their results found that gait speed ranged from 0.437 to 1.18m/sec with an average of 0.79m/sec, however they reported that due to the complex nature of community ambulation, factors beyond motor control and gait performance contributed to independent community ambulation such as self-efficacy.

Peters et al. (2013) however reported a greater range of gait speed and higher mean gait speed following assessment of 43 healthy older adults living in the community with a mean age of 84.3 years (SD 6.9). Average walking speed on the 10MWT ranged between 0.5 – 1.43m/sec with a mean score of 0.96m/sec.

There are a number of studies which investigated the use of gait speed to predict community ambulation in other populations such as stroke (Lord et al., 2004; van de Port et al., 2008; Bijleveld-Uitman et al., 2013; Durcan et al., 2016) and Parkinson's Disease (Elbers et al., 2013). These studies showed a large variability in gait speed cut off values to predict community ambulation. Lord et al. (2004) investigated 115 community dwelling stroke patients discharged home following inpatient rehabilitation with a mean age of 68.8 years (SD 11.3). Participants were categorised into one of four categories for community ambulation using the Community Ambulation Questionnaire and completed four standardised mobility tests: 10m timed walk, 300m treadmill walk, Functional Ambulation Categories and the Rivermead Mobility Index. Their results showed that 60.7% of participants were community walkers and mean gait velocity was 0.539m/sec. van de Port et al. (2008), Bijleveld-Uitman et al. (2013) and Durcan et al. (2016) studied gait speed and other factors associated with community ambulation in community dwelling stroke patients with mild to moderate disability. These three studies used the same Community Ambulation Questionnaire and categorisation developed and used by Lord et al. (2004), categorising their cohort into non-community and independent community walkers. Van de Port et al. (2008) investigated 102 community dwellers, three years post stroke with a mean age of 59 years (SD 10), Bijleveld-Uitman et al. (2013) investigated 241 community dwelling mild-moderately affected individuals, nine months post stroke with a mean age of 58.1 years (SD 10.3), whilst Durcan et al. (2016) investigated 40 post stroke (between 1-3 years) community dwellers with a mean age of 66 years (SD 13.4). Gait speed varied between the three studies with van de Port et al. (2008) reporting 74% of their population as community ambulate with a cut off for gait speed of 0.66m/sec used to distinguish between community and non-community walkers. Bijleveld-Uitman et al. (2013) found that 79.3% of their sample were independent with community ambulation with a higher gait speed at 0.78m/sec. Thirdly Durcan et al. (2016) reported 57.5% were independent community ambulators with a mean gait speed of 1.33m/sec. The remaining 42.5% of participants were deemed as non-

community walkers and presented with a mean gait speed of 0.76m/sec, they were independently mobile indoors, however unable to walk outdoors unsupervised. Van de Port et al. (2008) found that 43% of people who were classified as community walkers by Lord et al's (2004) classification were being classified as non-community walkers by gait speed. They concluded that although gait speed was an important determinant in community ambulation, it was not the sole determinant. They reported limitations to this study in the nature of size and generalisation to the larger stroke population as this did not include those people with aphasia. Bijleveld-Uitman et al. (2013) concluded there was a statistically significant association between gait speed and community walking ($p<0.001$). They stated that gait speed was a good marker for prediction of community walking post stroke. The variability between the studies may be explained by differences in the studies sample sizes but more specifically participant age, different inclusion/exclusion study criteria as well as differing measures to define community ambulation.

Elbers et al. (2013) investigated the use of gait speed as a measure to predict community ambulation in a cohort of 153 community dwelling adults with a diagnosis of Parkinson's disease. Participants were aged 18 - 80 with the mean age 67.06 years (SD 7.54). Their study used two questions from the Nottingham Extended Activities of Daily Living Index (NEADL) to determine community ambulation. They reported mean gait speed was 0.84m/sec (SD 0.20). A gait speed of 0.88m/sec predicted 70% of participants as community walkers. Their research concluded that timed walking tests were valid measures to predict community walkers in Parkinson's Disease.

Gait speed is commonly used in research and clinical setting due to its robust psychometric proprieties however it is important to note that this measure is conducted indoors in controlled environments and the skills required to perform this test cannot be assumed to transfer to outdoor community ambulation (Lord and Rochester, 2005).

1.3.1 (ii) Distance requirements for Community ambulation

There are a number of studies that investigated the distance required for an older person to mobilise in the community to reach commonly frequented locations

(Brown et al., 2010; Andrews et al., 2010; Shumway-Cook et al., 2002). Salbach et al. (2014) carried out a systematic review of literature from 1948 to 2012 screening 3191 titles and abstracts of which fifteen were selected for detailed review. Seven studies were selected and included in the review which examined 24 community sites and cross walks in USA, Australia and Singapore. The reported distances varied from between 16 to 677 metres depending on the destination and that a walking distance of between 20 and 381 metres was required for places which older adults frequented regularly e.g. post office, pharmacy, doctor. This corresponds with a study by Bijleveld-Uitman et al. (2013) who studied the stroke population and reported a walking distance of 367.5m as the optimal cut off score. Research by Mudge and Monachino (2013) not included in Salbach et al's (2014) systematic review, investigated the mean community walking distances in greater Auckland City, New Zealand. They measured distances from disabled carpark spaces to randomly selected supermarkets and also measured two task distances e.g. shop, then pharmacy and return to car. They reported the mean distances for a single task similar to that reported by Salbach et al. (2014) at 393 metres, however they reported that incorporating a second location increased distance by over double to 871 metres. They recommended that rehabilitation should include the training of longer distances with rehabilitation and training to focus on longer distances from 400 metres to one kilometre.

1.3.2 Self-Reported Measures

Self-reported questionnaires provide additional information, complementary to performance based measures and are advantageous as they provide the individuals perception of their ability. Self-reported questionnaires have also been used to categorise participants into levels of community ambulation.

1.3.2 (i) Categorisation of community ambulation

On review of the literature there appears to be limited research on the categorisation of older adults into levels of community ambulation, however there are a number of studies in the stroke population which categorised participants into levels of community ambulation. Lord et al. (2004) investigated 115 community dwelling stroke patients and asked them to complete a short, self-reported questionnaire - Community Ambulation Questionnaire (CAQ). Following

completion, the researcher categorised the participant into one of four categories of community ambulation (1. Unable to walk outside; 2. Can walk outside e.g. as far as gate; 3. Can walk in immediate environment; 4. Can walk in wider environment). Subsequently Bijleveld-Uitman et al. (2013) and Durcan et al. (2016) used this self-reporting questionnaire in their investigations of community dwelling stoke populations as documented above.

Previously, Perry et al. (1995) published a study in which they demonstrated that gait speed could discriminate among different levels of walking categories in the stroke population. They used a self-reported, 19 item Walking Ability Questionnaire (WAQ) in which participants rated their level of mobility entering and leaving commonly frequented locations, both in the home and community. Participants also completed a number of physical assessments of lower limb function and gait speed. They categorised 147 participants into one of six categories of functional walking which included household and community walking using a modified version of the Hoffer classification. They reported 17.6% of their sample recorded a gait speed of 0.48m/sec for the highest level of community ambulation however 53% of their sample achieved some level of community ambulation. This gait speed of 0.48m/sec is well below the normative adult gait speed thresholds as discussed previously in Section 1.1.3. As gait speed was assessed using a 10 metre walkaway it was comparable to normative data so the difference may be explained by the functional disability of this study population. This study was completed on a stroke population and although participants were at least three months post stroke, the authors do not report the specific time range or if participants were continuing to engage in rehabilitation.

1.3.2 (ii) Measures of participation

Measures of participation which contain sections associated with community ambulation or mobility have been used in conjunction with performance measures to measure community ambulation in various populations. Elbers et al. (2013) used two questions from the Nottingham Extended Activities of daily Living Index (NEADL) to determine community ambulation and investigate the use of gait speed as a measure to predict community ambulation in a cohort of 153 community dwelling adults with a diagnosis of Parkinson’s disease. Those who

scored maximum points on item 1 (Did you walk around outside?) and item 5 (Did you cross roads?) were considered community walkers. Their research concluded that timed walking tests were valid measures to predict community walkers in Parkinson's Disease. A limitation to this study was that it did not reflect all domains of community walking, for example shopping centres, terrains, weather conditions.

The Environmental Analysis of Mobility Questionnaire (EAMQ) is a self-reported questionnaire, whereby participants record the frequency with which they encounter and avoid community based walking challenges. This questionnaire, together with observed community ambulation was used by Shumway-Cook et al. (2005) to assess the effect of environment on mobility behaviours in fifty four community dwelling adults aged over 70 years old. They concluded that there was a relationship between self-reported environmental encounters and avoidance and the observed behaviours of community mobility.

1.3.2 (iii) Self-efficacy

Self-reported, self-efficacy scales such as the Activities-specific Balance Confidence Scale (ABC) and Ambulatory Self Confidence Questionnaire (ASCQ) which have been shown to be valid and reliable in older adult populations and assess walking and balance confidence both in the home and outdoors in community (Asano et al., 2007). Self-efficacy has been shown to be an important factor in an older adults ability to maintain community ambulation (Lord et al., 2010; Sessford et al., 2015).

1.3.3 Global Measure of Function

Global measures of functional activity, for example the Functional Independence Measure (FIM) and Barthel Index, include items that may be considered for community ambulation however as measures they do not give a complete understanding of the individual's ability to walk in the community. There are a number of measures used in other populations such as the Functional Ambulation Category (FAC), a valid and reliable measure used to predict community ambulation in the acute stroke population (Mehrholz et al., 2007). In the spinal injury population there are a number of scales developed for the measurement of

functional ambulation, a term used to describe the ability to walk with or without an appropriate assistive device. The Spinal Cord Injury Functional Ambulation Index (SCI-FAI) is a reliable and valid measure to assess functional walking ability in spinal cord injury populations and has adapted and included in its measure, a categorisation previously used by Perry et al. (1995) in a study of community ambulation in stroke patients (Lam et al., 2008).

1.4 Community Ambulation in Older Adults

The ability of older adults to remain independent and active both in their home and in their community is critical to maintaining functional independence and quality of life. Difficulty with mobility, specifically outdoor community ambulation is a common problem and often a major goal of those attending rehabilitation (Corrigan and Mc Burney, 2008).

There is minimal literature relating to community ambulation of older adults who are attending an outpatient hospital setting due to a decline in their function. Petrella and Cress (2004) examined the differences in activity and functional performance between two groups of community dwelling older adults. They categorised 20 community dwelling older adults into one of two groups based on their functional performance scored using the Continuous scale Physical Functional Performance Test (Cs-PFP). Those who scored below the threshold where classified as preclinical disability and categorised in the LOW group. The remaining ten were assigned to the high functioning group - HIGH. They recorded steps per day, number of tasks reported with difficulty and number of tasks reported with modifications. Their results showed that older adults with preclinical disability were less active as compared to their counterparts and reported modification of a larger number of daily tasks due to difficulty. They concluded that the benefits of early detection in decline in physical ability, will allow for early intervention and maintenance of independent ambulation. This study however was a small, cross sectional study of twenty participants with possible underpowering and study findings should be treated with a degree of caution.

Other studies have investigated community ambulation in healthy community dwelling older adults who were cognitively intact and able to walk outdoors independently (Lord et al., 2010, Brown et al., 2010). These studies investigated

gait performance and other measures such as executive function, depression and self-efficacy. Lord et al. (2010) stated that maintaining independent community ambulation in older adults was associated with improved quality of life and community participation. Their findings indicated that independent community ambulation was multidimensional and complex, highlighting that factors beyond motor control such as self-efficacy and executive function needed to be considered. Further research by Brown et al. (2010) investigated the range of locations older adults frequently visited and the distance requirements for community ambulation. They reported that a minimum of approximately 200m was required for community ambulation and locations deemed essential to attend included the bank, grocery shop, doctors surgery or pharmacy.

Older adults living in the community, especially in urban areas, cited crossing the road as necessary to maintaining independence at a community level. A large study of 1231 community dwelling older adults in a US city found 11% of participants reported difficulty crossing the street with the percentage increasing with age (Langlois et al.,1997). Less than 1% of the population tested had a walking speed of 1.22m/sec, the speed documented in the US as the speed required to cross an intersection. The Irish Traffic Management Guidelines (2003) indicate that a minimum walking speed of 1.2m/sec is required to cross the road at light controlled pedestrian crossings. Donoghue et al. (2015) investigated 4909 community dwelling adults aged over 50 years as part of The Irish Longitudinal Study on Ageing (TILDA). They assessed walking speed using the GAITRite®. They concluded that the majority of older adults had insufficient time to cross the road at pedestrian crossings reporting 61% of Irish adults aged 75years or older walked slower than the required speed of 1.22m/sec.

1.5 Other Factors Associated with Community Ambulation

As the literature reports and as outlined above there are a number of factors associated with community ambulation: gait speed, distance, falls, self-efficacy and executive function. There are a number of other factors that also may need to be considered in relation to community ambulation.

1.5.1 Anxiety and Depression

Although not a direct result of ageing, anxiety and depression can be common issues in older adult populations. Previous studies have investigated the relationship between anxiety and depression on mobility and activity avoidance. Lord et al. (2010) examined the internal characteristics of older adults in relation to community ambulation and assessed anxiety and depression using the Hospital Anxiety and Depression Scale (HADS). They found the scores for both anxiety and depression in their 113 study population, to be within normal limits hence no direct relationship between anxiety/depression and community ambulation. However, within their study they reported nineteen participants to have fallen and observed that if they had performed subgroup analysis, they may have found anxiety and depression to influence those faller to a greater extent.

There are a number of larger studies of community dwelling older adults (van Haastregt et al., 2008; Hull et al., 2013) that support Lord et al's (2010) hypothesis that anxiety and depression are more common in those individuals with fear of falling and fear related activity avoidance. Van Haastregt et al. (2008) studied 540 community dwelling adults in an urban area, aged over 70 years who reported a fear of falling and associated activity avoidance. Data collection was via self-administered questionnaires. Their study highlighted that participants with a fear of falling were more likely to present with feelings of anxiety and symptoms of depression. Their analysis revealed that 28.5% of participants reported feelings of anxiety and 22.6% displayed symptoms of depression with reported severe fear related activity avoidance. Subsequently, Hull et al. (2013) investigated 205 community dwelling older adults with an average age of 81 (SD 7.5 years) recruited from urban located day centres. The participants completed a battery of assessments relating to falls and fear of falling. They also completed the Geriatric Anxiety Inventory and Geriatric Depression Scale (GDS). They concluded that depression was linked to activity avoidance in community dwelling older people, with anxiety a significant factor in falls related psychological concerns and mobility.

Brandler et al. (2012) investigated the association between depressive symptoms and specific gait dysfunction in adults over 70 years old. Study participants were part of the Einstein Longitudinal Ageing Study, a longitudinal study of community dwelling older adults in Bronx County, USA. They assessed 610 non-demented, community dwelling older adults using the 15 item GDS and gait performance on

the GAITRite. They tested eight gait variables (velocity, stride length, cadence, swing phase, stance phase, double support, stride length variability and swing time variability). Linear regression analysis showed a significant association between depressive symptoms and gait performance with higher scores on the GDS corresponding with worse gait performance on all the measures except stride length variability. Similar results have been presented in an Irish population. Briggs et al. (2018) reported from The Irish Longitudinal Study on Ageing (TILDA) where more than 3600 people aged over 50 have been assessed and there is growing evidence of an association between gait disturbance and depression in older adults with symptoms associated with slower gait speed and shorter stride length. Both these studies looked specifically at gait performance in a gait lab using a GAITRite system under controlled circumstances therefore not accounting for environmental factors in community.

In contrast, studies in stroke populations are conflicting with one study by Robinson et al. (2011) reporting that depression with significantly correlated to reduced participation in community walking however a more recent study by Durcan et al. (2016) reported factors such as depression were not significantly associated with community ambulation. Both these studies stated they were small cross sectional studies of community dwelling stroke patients (50 and 40 participants respectively) which may limit generalisation.

1.5.2 Sociocultural and Physical Environmental Factors

The ability to go outdoors in the community is important for the maintenance of independence. Sociocultural environment has been highlighted by older adults as a barrier to physical activity or community ambulation. Fear of crime, leading to the feeling of being unsafe in their own home (Novek and Menec, 2014), personal safety (Chaudhury et al., 2012) and neighbourhood atmosphere depicted by vandalism, graffiti and street litter (Belon et al., 2014) have all been highlighted by older adults as an important factors that can hinder and reduce activity and community ambulation.

Perceived environmental factors are associated with decreased ability to go outdoors, causing decline in mobility and reduced participation with activities outside of the home in community (Rantakokko et al., 2009) with previous studies

supporting perceived environmental barriers contributing to loneliness (Rantakokko et al., 2014). Physical features such as footpath conditions, ability to cross the road (Langlois et al., 1997), weather conditions or seasonality (Kimura et al., 2015) also affect an older person's ability and willingness to ambulate in community. Patla and Shumway-Cook (1999) described the relationship between community mobility and different environments reporting that it is critical to have an understanding of the relationship between the individual's walking mobility and environment for the rehabilitation of older adults. They established eight environmental dimensions which an individual has to take into account when ambulating outdoors in community. These dimensions are outlined below and are supported by further research studies.

1.5.2 (i) Minimum walking distances

Minimum walking distances vary depending on type of community, specifically urban versus rural locations. The literature reports various distances required to access frequently visited locations with ranges which varies between 20 and 381metres (Salbach et al., 2014), to a mean distances of 393 (SD 113) metres for a single task and 871 (SD 276) metres for dual tasks (Mudge and Monachino, 2013). In a study by Eronen et al. (2014), older adults reported having a park or other outdoor recreational areas within walking distance of their home as a motivating factor and facilitator for getting out and engaging in physical activity.

1.5.2 (ii)Time constraints

The most obvious time constraint is crossing the road specifically at traffic lights which has an allocated time frame to cross the road (Langlois et al., 1997; Donoghue et al., 2016). Pedestrian crossings have been identified as a hazard to community walking, with older adults citing insufficient time to cross the road, busy, speeding traffic and vehicles not stopping at crossing as hazards and hence barriers to community walking (Lockett et al., 2005).

1.5.2 (iii) Ambient conditions

Ambient conditions refers to weather conditions (Lockett et al., 2005), time of day (Chaudhury et al., 2012), light including street lighting and seasonality (Kimura et al., 2015). Older adults reported safety concerns about going out in the evening time due to groups of youths which are intimidating (Chaudhury et al., 2012). Kimura et al. (2015) recommended the need to take into account seasonality when assessing for outdoor mobility in older adults. Their quantitative study investigated 39 healthy older adults in Japan as part of a seven year longitudinal study. Participants age ranged from 65 to 80 years. All volunteers were active and able to mobilise independently of a gait aid. Results showed that stride length and walking speed were both greater in the winter months but grip strength and steps were greater in the summer. They explained this both as a reaction to temperature change and sociocultural factors, concluding that therapists should consider seasonality when assessing and discussing outdoor mobility with older adults.

1.5.2 (iv) Terrain conditions

Terrain conditions vary greatly in an outdoor environment with individuals requiring the ability to negotiate steps, kerbs, ramps and uneven ground often under varying weather conditions such as rain or ice (Novek et al., 2012). These differing conditions pose an increased risk to the individual (Patla and Shumway-Cook, 1999). Qualitative research by Belon et al. (2014) and Chaudhury et al. (2012) which both used Photovoice Methodology to assess older adults perceptions of their barriers and facilitators to being active and ambulate in their community environment reported the most common physical barriers were uneven, broken or cracked footpaths which posed to be tripping hazards, making it unsafe to walk.

1.5.2 (v) External physical load

Carrying an extra physical load imposes additional demands on both cardiovascular and balance/postural systems. Loads are present in two forms, tonic and phasic. A tonic load is a relatively constant load e.g. a bag whereas a phasic load is one that the individual interacts with for a short interval e.g. pushing

or pulling open a door. Both these types of external loads have the capacity to add complexity to the task of walking (Patla and Shumway-Cook,1999).

1.5.2 (vi) Additional demands

Additional demands may involve the cognitive element of walking, the ability to divide attention between the physical and cognitive elements of walking such as holding a conversation, traffic noise, reading signs. It is well documented in the literature the relationship between reduced executive performance and slower motor performances (Coppin et al., 2006; Soumare et al., 2009).

1.5.2 (vii) Postural transitions

Postural transitions refers to an individual's ability to adapt to the various postural movements or changes their body must make when outdoor walking in community, for example stop-starts, changing directions, turning head to check traffic, stepping back to allow someone pass. All of these transitions require higher level balance centres and motor control (Patla and Shumway-Cook, 1999).

1.5.2(viii) Traffic level

Traffic level includes the interaction with stationary but particularly moving traffic, including people, animals and vehicles which an individual will encounter when out walking in community. Awareness of and avoiding collision with this traffic is important from a safety aspect (Patla and Shumway-Cook,1999). Older adults have reported busy streets with high vehicular traffic volume and speed as having a negative influence on outdoor walking (Chaudhury et al., 2012).

1.6 Summary

With ageing there is a progressive decline in the body's systems, which can lead to a decline in functional performance and as the literature highlights, a further decline in functional ability is common in older adults following a period of bedrest or acute admission to hospital (Brown et al., 2004; Villumsen et al., 2015). Mobility has been identified as one of the first activities in which an older adult becomes dependent and the preservation of community ambulation is associated with functional independence and quality of life in older adults. The literature reports the complexity of community ambulation and highlights that factors other than physical performance must be considered. Factors such as psychological and cognitive factors (Lord et al., 2010) and environmental factors (Shumway-Cook et al., 2002) require consideration in an older person's ability to participate in community ambulation. It is evident from the research that physiotherapists require knowledge and understanding of these factors to correctly guide their assessment and treatment of older adults, maximising their outcome.

To date, the majority of the research investigating community ambulation in older adults has been performed in healthy community-dwelling populations and not in older adult populations attending day hospital following a change or decline in their health and function. There is also a lack of research investigating this populations perceptions and experiences of what factors impact their ability to independently ambulate in their community.

The aim of this current study was to examine the factors that affect community ambulation in community dwelling older adults attending a day hospital. This was completed using a mixed method study design, using quantitative and qualitative methodology, examining a range of physical and psychological variables and exploration of the experiences and perceptions of the factors impacting an older adults ability to ambulate in community.

CHAPTER 2: METHODOLOGY MAIN STUDY

The purpose of this chapter is to describe the methodology used to establish the factors that affect community ambulation in community dwelling older adults attending a day hospital.

2.0 Research Aims and Objectives

The aim of this study was to examine the factors that affect community ambulation in community dwelling older adults attending a day hospital.

The objectives of this study were:

- To determine the prevalence of independent community ambulation in a day hospital group.
- To examine whether personal factors as characterised by demographic, physical and psychological variables, are significantly associated with community ambulation in an elderly population who are attending a day hospital.
- To examine whether impairments in gait speed and endurance, walking balance, anxiety, depression, self-efficacy and executive function are associated with reduced community ambulation.
- To determine which variables are independently associated with community ambulation.

2.1 Study Design

This was a cross-sectional study design. The reporting of this quantitative study was completed in line with STROBE guidelines (2009) (Appendix 1).

2.2 Study Participants

Study participants were recruited from those presenting to the Robert Mayne Day Hospital (RMDH) at St James's Hospital (SJH), Dublin, This is the largest teaching hospital in Ireland servicing a catchment area with approximately 30,000 adults aged over 65 years. RMDH is a five day outpatient unit providing acute medical care and multi-disciplinary team (MDT) rehabilitation for older adults living in the

community. Approximately 800 new patients are referred to RMDH annually following a change or decline in their health and function. Referrals are received from a variety of both inpatient and outpatient Medicine for the Elderly services. These include post hospital discharge, Home FIRsT (Medicine for the Elderly MDT based in the Emergency Department with the aim of avoiding hospital admission), ambulatory care services such as Bone Clinic, Falls and Syncope Unit, Stroke Clinic and General Practitioners.

On the patient's initial visit to RMDH, a medical assessment is completed by the medical registrar with referral to the multidisciplinary team as indicated. Approximately 600 of these patients are referred to physiotherapy annually for assessment. Physiotherapy assessment is completed on the patient's second visit to RMDH. Following patient assessment, discussion and based on their needs the physiotherapist develops an individualised, goal orientated treatment programme. This can include individual treatments or group exercise classes. An average of 3500 physiotherapy treatment sessions are provided annually at RMDH. Patients attend RMDH once per week for between four to six visits depending on their individual needs.

2.3 Participant Recruitment

The participants were attending the RMDH for rehabilitation and had been referred to physiotherapy. Recruitment commenced on November 6th, 2017 and was completed on December 18th, 2018.

Participant recruitment was completed either on their first or second visit to RMDH. On the patient's initial visit to RMDH, a medical assessment and multidisciplinary team referrals were completed by the medical registrar. If the patient was referred to physiotherapy, their medical chart was screened by the lead researcher (BC) and the gatekeeper (Clinical Nurse Manager (CNM) or Medical Registrar). If suitable for inclusion, the patient was invited to participate (Appendix 2) and given the participant information leaflet (PIF) (Appendix 3) by the gatekeeper or the lead researcher (BC).

On the patient's second visit the lead researcher (BC) approached the patient, discussed the PIF, answered questions and gained informed consent. Patients

may also have been approached on their second visit (week 2) and invited to participate. If the study invitation and PIF were provided on Week 2 (day of their Physiotherapy Assessment), the patient was approached on their arrival and provided with this information and given sufficient time to read the material and ask questions prior to consenting.

2.3.1 Inclusion Criteria

- Attending RMDH, St James's Hospital for a weekly multidisciplinary team rehabilitation programme following a change or decline in their health.
- Referred to RMDH physiotherapy service.
- Adults aged 65 years old or older.
- Community dwelling - Living at home in community.
- Able to ambulate at least 10 metres with or without an assistive device.
- Able to give informed written consent.

2.3.2 Exclusion Criteria

- Inability to complete the pen and paper tests and questionnaires, secondary to communication or cognitive difficulties.
- Medically unstable (significant cardiac condition).

2.4 Sample Size Estimation

A planned sample size of 160 participants was calculated on the basis of ten observations per variable (Peduzzi et al.,1996).

2.5 Ethical Considerations

An ethics application (Appendix 4) was submitted and approved by the St James's Hospital/Adelaide and Meath Hospital, incorporating the National Children's Hospital Research Ethics Committee on 30th June 2017 (Appendix 5). An ethics amendment letter (Appendix 6) requesting two amendments; the inclusion of the medical registrar as a gate keeper and a change in the consent process to enable

patients to be approached on week 1 or week 2 (day of assessment) was submitted and approval was granted on 11th December 2017 (Appendix 7). The study was also approved by the Royal College of Surgeons (RCSI) Research Ethics Committee (REC) (Appendix 8).

All eligible participants were provided with an invitation letter (Appendix 2) and participant information leaflet (Appendix 3). The lead researcher discussed the study with the participant and answered any questions. Participants who agreed to take part were asked to complete a written consent form (Appendix 9). Participants were informed that their participation in the study was completely voluntary, that they could withdraw at any stage and it would not affect their current or future hospital treatment.

Each participant was issued with an identification number (ID Number) in accordance with data protection and general data protection regulations (GDPR). There was no identifiable information on the data collection sheet (Appendix 10). This ID number, name and their medical record number was kept on a spreadsheet stored on a password protected computer to which only the lead researcher (BC) had access too. All written documentation - consent forms and data collection sheets were stored in a locked cabinet in a swipe access building. Data from these hard copies was converted to electronic data and stored on Excel spreadsheets on the hard drive of a password protected, encrypted computer. Data collection and storage was carried out in accordance with GDPR recommendations (European Commission, 2018).

2.6 Procedure

Following participant recruitment and consent process, the participant was accompanied to the physiotherapy gym of the RMDH where the assessment was completed by the lead researcher (BC). Each assessment, which consisted of nineteen variables, was completed in the same sequence to ensure ease of repeatability (Table 2.1). In the context of this study, personal factors were assessed through a collection of demographic data and a range of secondary research as indicated in Table 2.1. Standardised instructions were applied for each of the outcome measures. The assessment took approximately 60 minutes to complete, but varied between 60 - 90minutes depending on the time taken for the

participant to complete the tasks and if a rest period was required. If the participant had forgotten their glasses or required a break due to fatigue, the particular outcome measures were completed on their second attendance, prior to their physiotherapy session. Following assessment as individualised, goal orientated treatment programme was established.

Table 2.1 Sequence of Assessment

Demographic Data	▪ Age ▪ Gender ▪ Marital Status ▪ Living Status ▪ Use of assistive mobility aid indoors and outdoors ▪ Number of falls ▪ Number of medications ▪ Number of co morbidities
Primary Research Measure	▪ Community Ambulation Questionnaire (CAQ)
Secondary Research Measures	▪ Walking Ability Questionnaire (WAQ) ▪ Trail Making Test A and B (TMT A and B) ▪ Timed Up and Go (TUG) ▪ Ten Metre Walk Test (10MWT) ▪ Two Minute Walk Test (2MWT) ▪ Ambulatory Self Confidence Questionnaire (ASCQ) ▪ Hospital Anxiety and Depression Scale (HADS) ▪ Mini Mental State Examination (MMSE) ▪ Clinical Frail Scale (CFS) ▪ Hoffer Classification

2.7 Assessment

2.7.1 Demographics

Demographic information was collected for each participant. Data included age, gender, marital status, living status, use of assistive mobility device both indoors and outdoors and number of falls in the past six months. The participant's medical

record was reviewed by the lead researcher (BC) to collect information on the number of medications and co-morbidities.

2.7.2 Primary Research Measure

2.7.2 (i) Community Ambulation Questionnaire (CAQ)

The Community Ambulation Questionnaire (CAQ) is a self-reported questionnaire developed by Lord et al. (2004) for use in the community dwelling stroke population to identify levels of community ambulation (Appendix 11). It has been used in previous community ambulation studies with post stroke population to establish the correlation between self-reported level of community ambulation with other measures such as gait speed, self-efficacy and fatigue (Lord et al., 2004; Bijleveld-Uitman et al., 2013; Durcan et al., 2015). To date the questionnaire has not been used in an older adult community dwelling population.

It consists of six short questions, a combination of tick boxes and comment answers:

1. How important is it for you to be able to get out of the home?
2. Which places outside the home did you like to go before your stroke?
3. Are you able to get out and about by yourself, without physical assistance or supervision from anyone?
4. Do you require special equipment to achieve this?
5. Does the assistance you require to get out and about cause any problems to you or your carers?
6. Do you have any comments you would like to make regarding getting out of the home?

If the participant requested help to complete the questionnaire, the lead researcher provided assistance, ensuring each question was asked as per documented and the answer documented verbatim.

The questionnaire took approximately five minutes to complete following which, the lead researcher categorised the participant into one of four categories of community ambulation based on the answers. The four categories were:

(i) Unable to walk outside

(ii) Can walk outside e.g. as far as the car/post box without assistance or supervision

(iii) Can walk in immediate environment

(iv) Can walk to shops/friend's house or activities in community

The study participants were then dichotomised into two groups (community ambulators and non-community ambulators) as had been completed in previous studies (Lord et al., 2004; Bijleveld-Uitman et al., 2013). These studies classified only participants in category 4 as independent community ambulators with all other categories classified as non-community ambulators. In the context of this study, and informed by clinical practice, participants in categories 3 and 4 were classified as independent community ambulators as although limited, participants in category 3 were able to ambulate independently in their immediate community environment. Two small modifications were made to this questionnaire for use in this study of community dwelling older adults: removal of the word stroke and the addition of specific definitions for each category in order to categorise RMDH participants (Appendix 12).

2.7.3 Secondary Research Measures

2.7.3 (i) Walking Ability Questionnaire

The Walking Ability Questionnaire (WAQ), a self-reported questionnaire was developed by Perry et al. (1995) for use in the community dwelling stroke population to provide a more detailed assessment of the patient's walking ability both in their home and in community (Appendix 13). Participants were asked to state their mobility aid, a lower limb evaluation assessing range of movement and power was completed and the participant was asked to state their level of mobility entering and leaving 19 commonly used locations, eight within the home and 11 in community. Mobility was classified using a five point numerical, ordinal scale: independent (4), supervision (3), assisted (2), wheelchair (1) or unable (0). An overall score was calculated with a range from 0 – 76, a higher number indicating a better functional ability. This questionnaire took approximately five minutes to complete following which the lead researcher totalled the score. If the participant

requested help to complete the questionnaire, the lead researcher assisted with same, ensuring each question was asked as per documented and the answer documented verbatim. This questionnaire has been used in previous studies with community dwelling stroke populations (Fulk et al., 2010), however to date has not been used in the older adult community population. Two modifications were made to this questionnaire in order to make it appropriate for use in this community ambulation study: removal of lower limb evaluation and the addition of a footnote defining specific terms for example; grocery store (local shop), Other recreation (theatre, concert, cinema, gym), Unlimited recreation (overseas travel) (Appendix 14).

2.7.3 (ii) Hoffer Classification

The Hoffer Classification was initially designed in 1973 to classify functional ambulation in children with spina bifida into one of four categories; non-ambulatory, therapeutic, household and community ambulant. An expert clinical group adapted and validated the Hoffer Classification for use in a community dwelling stroke population (Perry et al., 1995). They established a total of six categories by removing the non-ambulatory level and increasing the household and community levels of ambulation and established specific criteria for each category. No literature is currently available for the use of the Hoffer Classification in a community dwelling older adult population. The Perry et al. (1995) version of the Hoffer was used in this study (Appendix 15). Following completion of assessment, the lead researcher (BC), categorised the participant into one of the six categories: Physiological walker, Limited household walker, Unlimited household walker, Most limited community walker, Least limited community walker or Community walker.

2.7.3 (iii) Trail Making Test A and B (TMT A and TMT B)

The Trail Making Tests A and B (Appendix 16) are neuropsychological tests used as a screening tool or as part of a larger battery of tests, measuring attention, mental flexibility, visual scanning and speed of processing. Originally it was used in 1944 in the Army Individual Test of General Ability and subsequently was

incorporated into the Halstead-Reitan Neuropsychological Battery (Tombaugh, 2004). These tests are used in individuals aged over 18 and have been used in previous studies involving community dwelling older adults examining the associations between gait speed/mobility and executive function (Poranen-Clark et al., 2018; Lord et al., 2010; Ble et al., 2005). The TMT has been shown to have excellent inter rater reliability and a valid measure in community dwelling older adults (Tombaugh, 2004). Normative data is available for community dwelling older adults (Appendix 17). The TMT is a pen and paper task and consists of two timed tests; Part A which assesses visual search and motor speed skills and Part B which assess higher level cognitive skills such as mental flexibility. Instructions were provided in accordance with Trail Making Test administration guidelines (Bowie and Harvey, 2006).

TMT Part A: consists of 25 circles numbered 1 to 25 randomly distributed on a page. The participant was asked to draw lines, connecting the circled numbers in numerical order as quickly as possible without lifting the pen/pencil from the paper.

TMT Part B: consists of 25 circles numbered 1 to 13 and lettered A to L which were randomly distributed on the page. The participant was asked to draw lines connecting the circles as quickly as possible alternating between numbers and letters e.g. 1A, 2B, 3C etc. without lifting the pen/pencil from the paper.

If the participant made an error, they were directed back to the previous circle and asked to continue. The number of errors was not tallied as it is assumed that would be reflected in the overall time to complete the test. The time taken to complete the test ranged from 5-10minutes depending on the participants speed of completion. A cut off time of 300 seconds was used for both Part A and Part B whereby the test was discontinued and hence the maximum score for each (Lerche et al., 2018; Bowie and Harvey, 2006). Delta TMT was calculated by subtracting the time taken to perform TMT A from time taken to perform TMT B. The literature suggests that Delta TMT is more accurate measure of executive function than TMT B alone to control for effects of psychomotor functioning, visual scanning and processing speed (Poranen-Clarke et al., 2018).

2.7.3 (iv) Timed Up and Go (TUG)

The Timed Up and Go test (TUG), is a simple and quick test of basic functional mobility in the older adult and a commonly used falls screening tool for both inpatients and community dwelling older adults (Appendix 18). It was developed by Podsiadlo and Richardson (1991) as a modified version of the 'Get up and Go' Test (Mathias et al., 1986). It has been shown to be a reliable and valid measure in community dwelling older adult populations. The time taken to complete the test is strongly correlated with functional ability in the older adult, a faster time indicating a better functional mobility with a cut off score of 13.5 seconds indicating an increased risk of falling in community dwelling older adults (Shumway-Cook et al., 2000). The TUG has both excellent inter rater reliability (r=0.99) and test retest reliability (ICC=0.98) among older adults (Podsiadlo and Richardson, 1991) and a valid measure of functional mobility in older adults over 65years of age (Shumway – Cook et al., 2000). It is recommended as a useful screening tool by the both the Health Service Executive (HSE) Strategy for Falls (2008) and The National Institute for Clinical Evidence (NICE) (2013). However following a systematic review and meta-analysis, Barry et al. (2014) stated that the TUG should not be used in isolation to identify community dwellers at risk of falls due to its limited ability to predict falls.

The participant was asked to sit in a standard height chair with arm rests (approximate seat height of 46cms) with their back resting against the back rest. A marker was placed on the floor three metres in front of the chair. The participant was instructed: *'when I say GO, stand up, walk to the marker, turn around, walk back to the chair and sit down with your back against the back rest. Walk at your normal pace.'* The participant wore their regular footwear and used the gait aid they normally used when walking but were not assisted by another person. The participant was asked not to speak during testing unless necessary. A practice trial which was untimed was completed prior to completing the timed test. The participant was timed from the word GO until they were fully sitting back in the chair, with their back against the back rest (Podsiadlo and Richardson, 1991).

2.7.3 (v) Ten Metre Walk Test (10 MWT)

The ten metre walk test (10MWT) is a measure used to assess walking speed in metres per second over a short distance (Appendix 19). This test has been found to be a reliable measure of gait speed in the elderly both inpatient and community dwelling older adults (Peters et al., 2013*).* Bohannon (1997) presented normative data for both comfortable and maximum walking speed for community dwelling individuals aged between 20 – 79 years of age (Appendix 20). They reported a gender difference - women in their seventies mean gait speed was 1.27m/sec and 1.74m/sec for comfortable and maximal respectively as compared to 1.33m/sec and 2.07m/sec respectively for men in their seventies.

The 10MWT is a quick and easily accessible screening tool requiring a ten metre expanse of smooth, uncarpeted corridor and a stop watch. 10 metres was measured and markers placed at the start (0 metre) and at the 10 metre mark. Markers were then placed at 2 metres and 8 metres. The participant was instructed to walk without assistance for 10 metres and the time was recorded when any part of the lead foot crossed the 2 metre marker and stopped when any part of the lead foot crossed the 8 metre marker. The timed distance was 6 metres allowing for acceleration and deceleration. The participant was allowed to use their regular walking aid as required. Participants were instructed '*I will say ready, set, go. When I say go, walk at your normal pace, until the last marker'.* Three trials of the test were performed and the average calculated. Gait speed was then calculated by the researcher by dividing the test distance (6 metres) by the average time taken and documented as m/sec.

2.7.3 (vi) Two Minute Walk Test (2 MWT)

The Two Minute Walk Test (2MWT) is a measure of functional performance and endurance. It measures the distance walked in metres over a two minute time period (Appendix 21). It was originally developed by Cooper (1968) as a 12 minute performance (run) test to measure the fitness of healthy young men. It was later modified to an indoor walk test to measure the endurance of those with chronic bronchitis and shorter versions of this 12 minute walk test, namely the two minute and six minute walk tests were subsequently developed to measure the walking

performance and endurance in populations with respiratory conditions (Brooks et al., 2004). These shorter versions have been used in many population groups including frail elderly inpatients, long term care residents and older adults living in retirement homes and has been found to be a valid and reliable measure in an elderly population and more tolerable than a six minute walk test (Brooks et al., 2007). It demonstrates excellent test retest reliability (ICC = 0.95) and excellent correlation with the 6MWT in older adults (Brooks et al., 2007; Connolly and Thomas, 2009). Connolly and Thomas (2009) stated the mean distance (SD) for long term care residents was 77.5 metres and 150.4 metres for retirement home dwelling older adults.

The participant was asked to walk without assistance for two minutes, using their regular walking aid if required. Due to space limitations in the physiotherapy clinical setting, 10metres was marked out on a straight corridor with a coloured cone marking the start and end points. The participant was instructed to *"Cover as much ground as possible over 2 minutes. Walk from cone to cone, turning and continuing to walk continuously if possible, but do not be concerned if you need to slow down or stop to rest. The goal is to feel at the end of the test that more ground could not have been covered in the 2 minutes."* To minimise the effects of pacing, the lead researcher walked slightly behind the participant timing them using a stop watch. When the two minutes was completed, the participant was asked to stop and a marker was placed on the floor. Once the participant was safely resting in a chair, the researcher calculated the distance mobilised, using a measuring tape to measure to the nearest metre walk. Participants did not complete a practice test with one timed test being completed.

2.7.3 (vii) Ambulatory Self Confidence Questionnaire (ASCQ)

The Ambulatory Self Confidence Questionnaire **(**ASCQ) was developed by Asano et al. (2007) to measure walking confidence in community dwelling older adults over 65 years of age (Appendix 22). This 22 item self-reporting, self-efficacy measure was used to assess ambulatory confidence in different environmental situations both within the home (3 items) and outdoors in community (19 items). This measure was found to be a reliable and valid measure for use in community dwelling older adults (Asano et al., 2007). It demonstrated excellent test retest

reliability and is highly correlated with the Activities-specific Balance Confidence (ABC) scale (p=0.87) and moderately correlate with the TUG (p=-0.46)

The participant was asked to rate their confidence on a 0 (not confident at all) - 10 (extremely confident) response scale. An overall score was calculated with a range from 0 - 220, a higher score indicating a better functional ability and a higher level of self-confidence with ambulation. This questionnaire took approximately five minutes to complete following which the lead researcher totalled the score. If the participant requested help to complete the questionnaire, the lead researcher assisted with same, ensuring each question was asked as per documented and the answer documented verbatim. The ASCQ measure was chosen over the ABC scale due to the increased number of outdoor tasks assessed. Permission to use this measure was gained from the developer (Appendix 23).

2.7.3 (viii) Hospital Anxiety and Depression Scale (HADS)

The Hospital Anxiety and Depression Scale (HADS) was developed by Zigmond and Snaith (1983) as a measure to detect anxiety and depression in adults (Appendix 24). This measure has been shown to be valid and reliable in the screening for anxiety and depression in adults, including older adults, both in hospitals and community settings (Snaith, 2003; Djukanovic et al., 2017). This is a self-reporting questionnaire and consists of 14 items, seven items for the anxiety section and seven items for the depression section. Each item has four possible answers scored on a four point (0 - 3) response scale. Score range was from 0 - 21 for each of the two sections. Zigmond and Snaith (1983) recommended a score of 0 - 7 could be regarded as normal for either subscale, 8 - 10 being suggestive of the presence of the state and a score of 11 or higher indicating probable presence of a mood disorder. Standardised instructions were given to the participant. The participant was asked to complete the questionnaire indicating how they have felt in the past week. Participants were asked not to think too much about their answer but to answer spontaneously. The HADS takes between two to five minutes to complete after which the lead researcher took approximately one minute to complete calculation of the score.

2.7.3 (ix) Mini Mental State Examination (MMSE)

The Mini Mental State Examination (MMSE) was developed by Folstein et al. (1975) and is a widely used validated instrument in the screening of cognitive impairment in both hospital and community dwelling older adults (Appendix 25). The MMSE is a reliable measure for the older adult population, however it is not reliable for those are illiterate or not fluent in the language the test is being administered in (Monroe and Carter, 2012).

The MMSE is a 30 point questionnaire and includes tests of orientation, attention, memory, language and visual spatial skills. The MMSE is scored from 0-30 with a maximum score of 30 achievable. Several differences in reported cut off scores are documented in the literature however the original work of Folstein et al (1975) states a score of greater or equal to 24 out of 30 indicates normal cognition and a score less than 20 indicating likely dementia. Following an extensive review of the MMSE, Tombaugh and McIntyre (1992) recommended 24-30 as no impairment, 18-23 indicative of mild cognitive impairment and 0-17 indicating severe cognitive impairment. Cullen et al. (2005) recommended a cut off <23 for optimal screening of cognitive impairment in an Irish community setting.

In this study the (MMSE) was documented from the medical record however if this was unavailable, it was completed with the patient at the end of the assessment taking less than 10 minutes to complete and standardised MMSE instructions were provided.

2.7.3 (x) Clinical Frail Scale (CFS)

The Clinical Frail Scale (CFS) developed by Rockwood et al. (2005) allows clinicians to easily stratify older adults according to levels of frailty (Appendix 26). The CFS has been validated and found to be a reliable tool in a community dwelling older adult population. It is an easily applicable and effective measure of frailty in an older adult, describing the level of frailty based on symptoms and functional status and provides predictive information on the individuals need for institutional care/mortality. It has high inter-rater reliability (intra-class correlation coefficient (ICC) 0.97 $p<0.01$) (Rookwood et al., 2005). It is a nine point tool which uses descriptors and pictures to categorise older adults according to their levels of

frailty. The lead researcher categorised the participant into one of nine categories: 1.Very Fit, 2. Well, 3. Well with treated comorbid disease, 4. Apparently vulnerable, 5. Mildly frail, 6. Moderately frail, 7. Severely frail, 8. Very severely frail, 9. Terminally ill.

2.8 Pilot Study

A pilot study was conducted between 28th September and 4th October 2017 on five participants. This pilot study was to test the CAQ, to establish the most appropriate outcome measures for gait (TUG, 10MWT, 2MWT) and self-efficacy (ASCQ, ABC), to inform the length of time required to complete the individual outcome measures and to highlight any difficulties with their administration. The lead researcher (BC) identified essential changes to the inclusion of outcome measures and the flow of assessment.

Community Ambulation Questionnaire (CAQ): Following the pilot study, two small modifications were made to the CAQ to make it relevant to this study population. The two modifications were: removal of the word 'stroke' from question number two and the addition of specific definitions for each category of community ambulation making it relevant to an Irish urban population (Appendix 12).

Gait: it was deemed beneficial to include all three gait measures in the study as it allowed assessment of walking balance, speed and endurance, all features necessary for outdoor mobility.

Self-efficacy: The Activities-specific Balance Confidence Scale (ABC) (Appendix 27) was considered as a measure of self-efficacy however the lead researcher (BC) identified the ASCQ as a more appropriate measure for this study due to the increased number of outdoor tasks assessed.

Flow of assessment: It was established that the TMT A and B would be completed prior to the walking test as fatigue was noted as an issue in the pilot study.

2.9 Statistical Methods

All information collected was inputted into a data collection sheet which was subsequently coded and inputted into an Excel spreadsheet. SPSS software

(Version 25.0) was used to statistically analyse the data. The distribution of data was assessed for normality using the one sample Kolmogorov-Smirnov test. Descriptive statistics were used to describe demographics characteristics and outcome measures for the total population. The sample was then dichotomised into non-community or community ambulant. Bivariate comparison analysis was completed to determine if there was a statistically significant difference between each of the variables in each group. Parametric methods (t-test) were used to analyse normally distributed variables and non-parametric methods (Mann Whitney U test) used to analyse non-normally distributed variables. The mean and standard deviation or median and interquartile range was calculated for each variable. Multivariate logistic regression analysis was carried out to examine which variables were independently associated with community ambulation in a community dwelling older adult population attending a day hospital for rehabilitation due to a decline in their health or functional ability. The level of statistical significance was set at $p < 0.05$. The results of this study will be presented in Chapter 3.

CHAPTER 3: RESULTS

3.1 Introduction

The aim of this study was to examine the factors that affect community ambulation in community dwelling older adults attending a day hospital.

The objectives of this study were:

- To determine the prevalence of independent community ambulation in a day hospital group.
- To examine whether personal factors as characterised by demographic, physical and psychological variables, are significantly associated with community ambulation in an elderly population who are attending a day hospital.
- To examine whether impairments in gait speed and endurance, walking balance, anxiety, depression, self-efficacy and executive function are associated with reduced community ambulation.
- To determine which variables are independently associated with community ambulation.

3.2 Participant Recruitment

Participant recruitment was completed over a 13 month period between November 2017 and December 2018. The participants were recruited from those patients referred to RMDH for rehabilitation (n=854) and had been referred to physiotherapy (n=558). Following screening for inclusion, 405 patients were deemed suitable for study inclusion. In total, 175 patients were approached and invited to participate, with 161 people consenting and completing the assessment. The lead researcher (BC) had a full clinical caseload while carrying out this research and due to resources, 230 patients were not approached or invited to participate, however non-participant analysis was completed, comparing the two groups. While similar in age (p 0.09) and gender (p 0.59) the non-participant group had a median TUG that was 2.36 seconds slower than the study sample (p 0.01) (Appendix 28). On review of the dataset, 151 participants had complete data and included in the final statistical analysis model. The flow of participants through this study is shown in Figure 3.1.

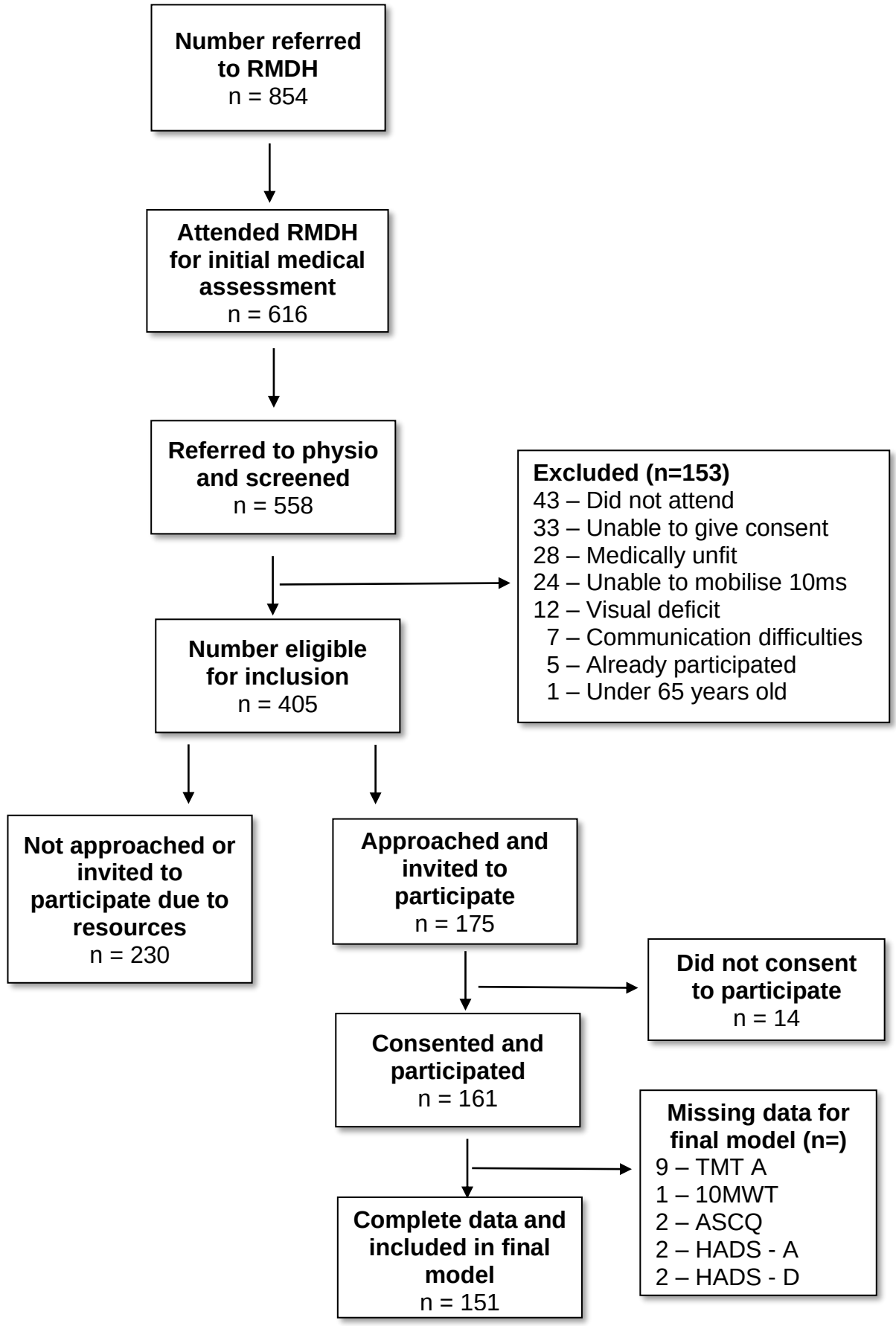


Figure 3.1: Flow of participants through the study

3.3 Description of Study Participants

The participants in this study had a median age of 83 years with an age range between 65 and 97 years. Female participants represented 64% of the study population and 49.1% of the participants lived alone. A walking aid was used indoors by 41.6% and outdoors by 70.2% of participants. Over half of participants (54%) reported having a fall in the past six months with the number of falls ranging from zero to ten and a median of one. Polypharmacy was identified in over three quarters of the participants (78.9%) with the number of medications ranging from one to twenty two. Descriptive details of the study population are provided in Table 3.1.

Table 3.1 Description of the study participants (n=161)

Variable		n/%
Age, years, Median (IQR)	Range 65 - 97	83 (9)
Gender, n (%)	Male	58 (36)
	Female	103 (64)
Marital Status, n (%)	Married	58 (36)
	Widowed	68 (42.2)
	Single	35 (21.7)
Living Status, n (%)	Lives Alone	79 (49.1)
	Lives with spouse	43 (26.7)
	Lives with other	39 (24.2)
Walking aid Indoors, n (%)	Unaided	94 (58.4)
	Stick	38 (23.6)
	Frame/other	29 (18.0)
Walking aid outdoors, n (%)	Unaided	48 (29.8)
	Stick	48 (29.8)
	Frame/other	65 (40.4)
Falls in past 6/12, n (%)	Yes	87 (54)
No of falls in past 6/12, Median (IQR)	Range 0 - 10	1.00 (1)
No of medications, Median (IQR)	Range 1 - 22	7 (5)
Polypharmacy, n (%)	Yes	127 (78.9)
Co Morbidities, Median (IQR)	Range 0 - 16	6 (4)

IQR = Inter quartile range; % = percentage

3.4 Outcome Measures

Eight outcome measures were completed. Gait speed, 2MWT and ASCQ showed a normal distribution on Kolmogorov Smirnov test (Appendix 29) therefore mean and standard deviation are presented. The remaining five outcome measures showed a non-normal distribution and for this reason, median and inter quartile ranges of scores are presented. Median MMSE was 27, indicating normal cognition in this study population, with low levels of anxiety and depression reported. Median TUG score was 16.64 seconds, indicating this study population as a falls risk. Mean gait speed was 0.78m/sec. Table 3.2 provides full details of outcome measures for the study population, including the number of participants included in the analysis.

Table 3.2 Outcome Measures for total study population

Outcome Measure	Value	n =
MMSE, Median (IQR)	27 (5)	157
TMT-A (secs), Median (IQR)	78.39 (53.5)	152
TMT-B (secs), Median (IQR)	264.10 (143.10)	152
TMT-Delta (secs), Median (IQR)	132.70 (117.7)	152
TUG (secs), Median (IQR)	16.64 (11.42)	160
10MWT (secs), Median (IQR)	7.99 (4.98)	160
Gait speed (m/sec), Mean (SD)	0.78 (0.33)	160
2MWT (m), Mean, (SD)	74.20 (32.47)	156
ASCQ, Mean (SD)	131.11 (47.24)	159
HADS-A, Median (IQR)	5 (8)	159
HADS-D, Median (IQR)	4 (5)	159
HADS-Total, Median (IQR)	9 (12)	159
CFS, Median (IQR)	4 (2)	161

IQR = Inter quartile range; SD = Standard deviation; secs = seconds; MMSE = Mini Mental State Examination; TMT-A = Trail Making Test A; TMT-B = Trail Making Test B; TMT-Delta = Trail Making Test B-A; TUG = Timed Up and Go; 10MWT = 10 Metre Walk Test; 2MWT = 2 Minute Walk Test; ASCQ = Ambulatory Self Confidence Questionnaire; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D= Hospital Anxiety and Depression Scale – Depression; HADS-Total = Hospital Anxiety and Depression Scale; CFS = Clinical Frailty Scale;

3.5 Levels of Community Ambulation

3.5.1 Community Ambulation Questionnaire

Based on results from the Community Ambulation Questionnaire (CAQ) (Appendix 12), participants were classified into one of four levels of community ambulation, ranging from level 1, unable to walk outside independently through to level 4, independently able to walk in the wider community (Table 3.3).

Table 3.3 Participants classified into levels of Community Ambulation using the CAQ

Level	Description	% (n)
1	Non-community ambulator: Unable to walk outside independently	17.4 (28)
2	Non-community ambulator: can walk outside e.g. as far as the gate, car, footpath without assistance or supervision	27.3 (44)
3	Limited community ambulator: can walk in their immediate environment without physical assistance or supervision e.g. to their local shop, neighbour's house	20.5 (33)
4	Independent community walker: can walk in their wider community to shops, activities, access city centre and other locations without physical assistance or supervision	34.8 (56)

Participants were then dichotomised into two groups as had been completed in previous studies (Lord et al., 2004; Bijleveld-Uitman et al., 2013). Participants in both level 3 and level 4 were classified as independent community ambulators (55.3%, n=89) and the remaining 44.7% (n=72) were classified as non-community ambulators (Figure 3.2). Those participants who were classified as independent community ambulators (n=89), were asked to provide up to three locations they regularly liked to go. Twenty three different locations were recorded, the most popular locations being local shops/shopping centres, parks, family/friends' homes and churches (Appendix 30).

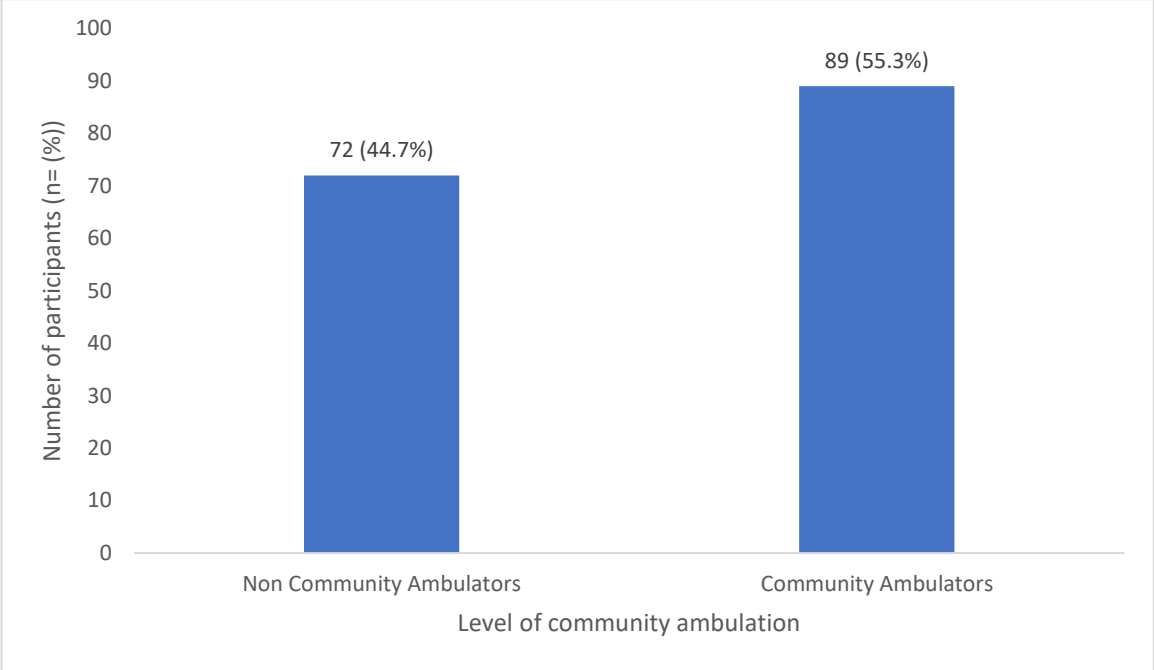


Figure 3.2 Community Ambulation Groups

3.5.2.Walking Ability Questionnaire (WAQ)

This WAQ questionnaire is scored between 0 - 76 with a higher number indicating a better functional ability (Appendix 14). The mean score in this study population was 54.3 (SD 15.6) with a range of between 20-76 (Table 3.4).

Table 3.4 Walking Ability Questionnaire Scores

Outcome Measure	Mean	SD	Range
WAQ	54.3	15.6	20 - 76

WAQ = Walking Ability Questionnaire

3.5.3.Hoffer Classification

Following completion of assessment, the lead researcher (BC), categorised the participants into one of the six categories of community ambulation using the Hoffer Classification (Appendix 15): Physiological walker, Limited household walker, Unlimited household walker, Most limited community walker, Least limited community walker or Community walker (Table 3.5). The two most common categories were unlimited household walker with 33.5% (n=54) of participants and

community walker with 38.5% (n=62) of participants. When dichotomised into two categories, 64% (n=103) were deemed independent community ambulators as compared to 36% (n=58) non-community ambulators.

Table 3.5 Community Ambulation categorised using the Hoffer Classification

Hoffer Category	Value n/(%)
Physiological walker	0
Limited household walker	4 (2.5)
Unlimited household walker	54 (33.5)
Most limited community walker	14 (8.7)
Least limited community walker	27 (16.8)
Community walker	62 (38.5)

The three community ambulation measures (CAQ, WAQ, Hoffer Classification) were correlated using Spearman's rho and showed a strong intercorrelation of above 0.6 (Appendix 31). Only one measure was therefore chosen to determine levels of community ambulation - Community Ambulation Questionnaire (CAQ).

3.6 Bivariate Comparison Analysis

Participants were dichotomised into two groups using the CAQ classification; non-community ambulators (n=72) and independent community ambulators (n=89). Bivariate comparison analysis was used to determine if there was a difference between the two groups for each variable. The nineteen variables as presented in the Methods Section (2.7) were split into subsections creating twenty eight variables (Table 3.6). Analysis showed there was a statistically significant difference between fifteen of the twenty eight variables (Table 3.6). These variables are: lives with other (p 0.040), no assistive device indoors (p <0.001), frame or other indoors (p <0.001), stick indoors (p 0.003), no assistive device outdoors (p <0.001), frame or other outdoors (p <0.001), TMT- A (p 0.003) (Figure 3.3), TUG (p <0.001) (Figure 3.4), 10MWT (p <0.001), gait speed (p <0.001)

(Figure 3.5), 2MWT (p <0.001), ASCQ (p <0.001) (Figure 3.6), HADS-A (p 0.038), HADS-D (p 0.01), CFS (p <0.001) (Figure 3.7).

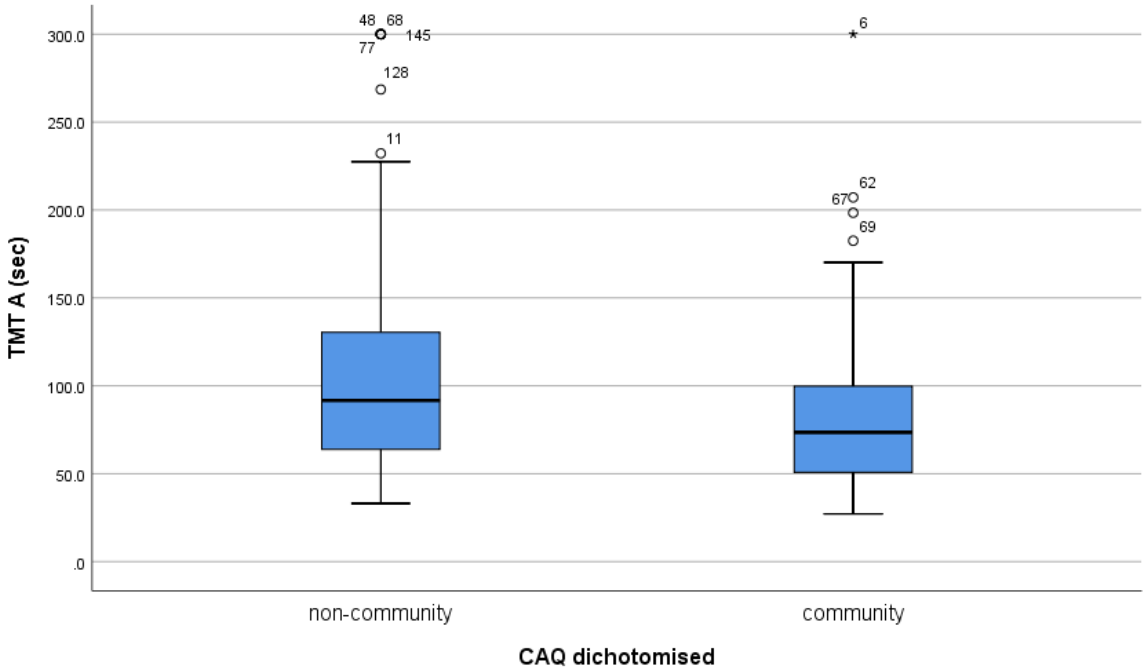


Figure 3.3 Comparison of TMT – A (seconds) between non-community and independent community ambulators

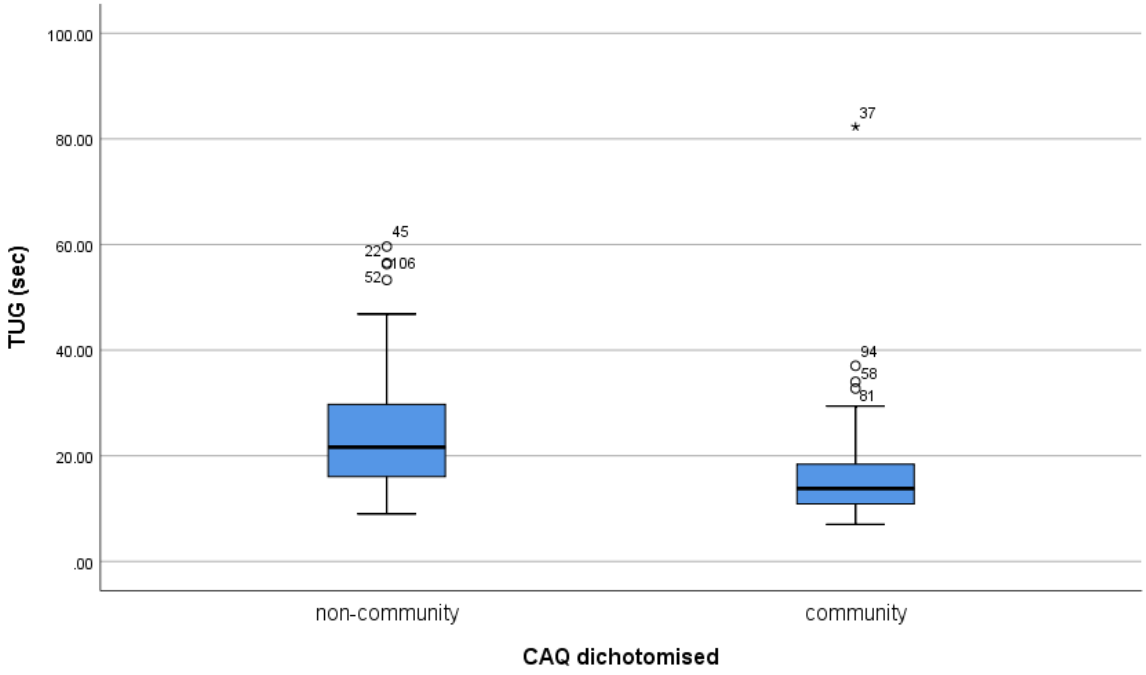


Figure 3.4 Comparison of TUG (seconds) between non-community and independent community ambulators

Table 3.6 Bivariate Comparisons

Variable	Non-community Ambulators (n=72)	Independent Community Ambulators (n=89)	p value
Age, Median (IQR)	83.5 (8)	82 (9)	0.186^
Female gender (%)	72.2	57.3	0.050*
Lives alone (%)	41.7	55.1	0.091*
Lives with spouse (%)	26.4	27.0	0.934*
Lives with other (non-spouse) (%)	31.9	18.0	**0.040***
No assistive device indoors (%)	29.2	82.0	**<0.001***
Stick indoors (%)	34.7	14.6	**0.003***
Frame or other indoors (%)	36.1	3.4	**<0.001***
No assistive device outdoors (%)	11.1	44.9	**<0.001***
Stick outdoors (%)	22.2	36.0	0.058*
Frame or other outdoors (%)	66.7	19.1	**<0.001***
Falls in the past 6/12 (%)	55.6	52.8	0.728*
No. of falls in past 6/12, Median (IQR)	1 (2)	1 (1)	0.217^
No. of medications, Median (IQR)	8 (6)	7 (6)	0.167^
Polypharmacy (%)	83.3	75.3	0.213*
No. of comorbidities, Median (IQR)	7 (4)	6 (4)	0.056^
MMSE, Median (IQR)	27 (5)	26 (5)	0.610^
TMT A (secs), Median (IQR)	91.7 (68)	73.5 (50.9)	**0.003^**
TMT B (secs), Median (IQR)	272 (120.9)	249.6 (158)	0.325^
TMT Delta (secs), Median (IQR)	123 (111)	146.1 (119)	0.083^
TUG (secs), Median (IQR)	21.7 (13.8)	13.8 (7.6)	**<0.001^**
10WT (metres), Median (IQR)	10.3 (5.2)	6.4 (3.3)	**<0.001^**
Gait speed (m/sec),Mean (SD)	0.61 (0.24)	0.92 (0.33)	**<0.001 ˜**
2MWT (metres), Mean (SD)	56.7 (25.7)	88.8 (30.3)	**<0.001 ˜**
ASCQ, Mean (SD)	99.9 (44.3)	155.6 (33.0)	**<0.001 ˜**
HADS-A, Median (IQR)	6 (8)	4 (6)	**0.038^**
HADS-D, Median (IQR)	4.5 (6)	3 (4)	**0.010^**
CFS, Median (IQR)	5 (1)	3 (1)	**<0.001^**

^ Mann Whitney U test ; * Chi-squared test ; ˜ T-test

IQR = Interquartile Range; SD = Standard Deviation; secs = seconds; m/sec = metre per second; MMSE = Mini Mental State Examination; TMT-A = Trail Making Test A; TMT-B = Trail Making Test B; TMT-Delta = Trail Making Test B-A; TUG = Timed Up and Go; 10MWT = 10 Metre Walk Test; 2MWT = 2 Minute Walk Test; ASCQ = Ambulatory Self Confidence Questionnaire; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D= Hospital Anxiety and Depression Scale – Depression; HADS-Total = Hospital Anxiety and Depression Scale; CFS = Clinical Frailty Scale;

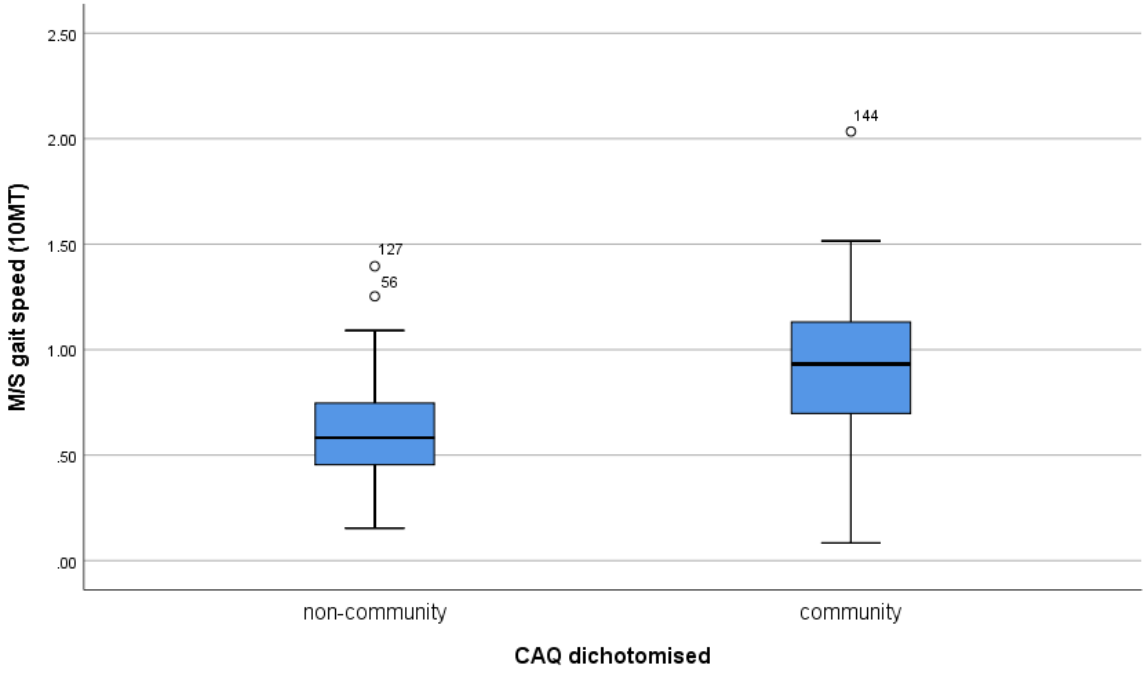


Figure 3.5 Comparison of gait speed (m/sec) between non-community and independent community ambulators

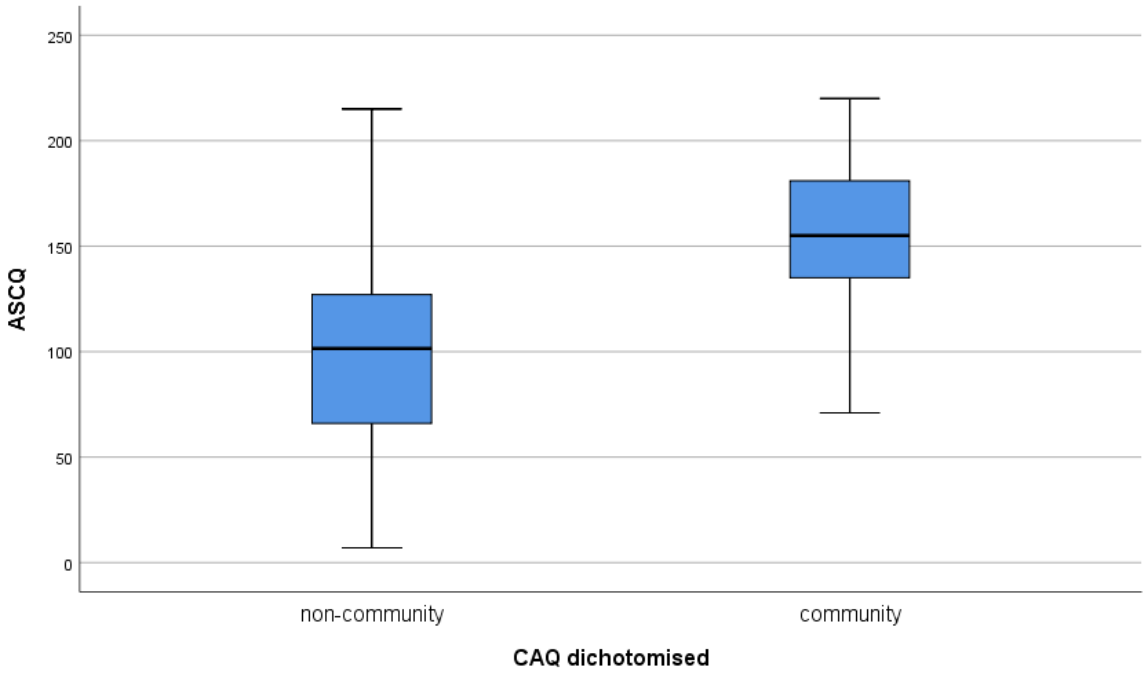


Figure 3.6 Comparison of ASCQ between non-community and independent community ambulators

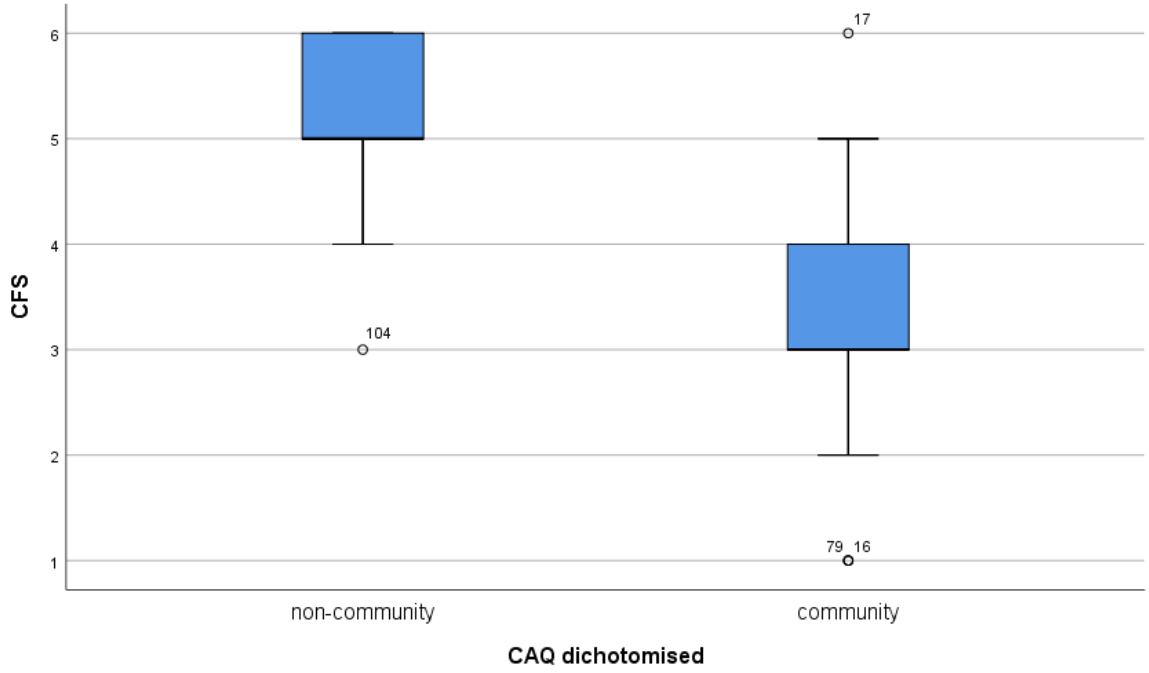


Figure 3.7 Comparison of CFS between non-community and independent community ambulators

3.7 Multivariate Binary Logistic Regression Analysis

All data was reviewed and allowing for missing data, 151 cases from a total of 161 cases were included in the multivariate binary logistic regression analysis. This analysis was carried out to examine which variables were independently associated with community ambulation in a community dwelling older adult population attending a day hospital for rehabilitation due to a decline in their health or functional ability.

Fifteen variables were found to be significantly associated ($p \leq 0.05$) with community ambulation on the bivariate comparison analysis (Table 3.6). Entered in the multivariate model, were characteristics that were significant or had a trend toward significance on bivariate analyses and were not intercorrelated amongst themselves (m/sec, TUG) (Appendix 32). Age was entered into the analysis as although it was not shown to be significantly associated with community ambulation in the bivariate analysis (p 0.186) it is an important personal demographic is this study of the older adult. Two models were analysed initially, one with TUG (Table 3.7) and one with gait speed (Table 3.8).

Table 3.7 Multivariate binary logistic regression model including CFS and TUG

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Age (years)	.023	.044	.283	1	.595	1.024	.939	1.116
	Sex	-.487	.605	.648	1	.421	.615	.188	2.010
	Lives alone	.354	.527	.452	1	.502	1.425	.507	4.002
	Co-morbidities	.046	.096	.230	1	.631	1.047	.868	1.263
	TMT A (sec)	-.003	.005	.343	1	.558	.997	.988	1.006
	ASCQ	.022	.009	6.419	1	.011	1.022	1.005	1.040
	HADS A	.009	.069	.016	1	.899	1.009	.881	1.155
	HADS D	.066	.092	.514	1	.474	1.068	.892	1.279
	CFS	-1.974	.418	22.299	1	.000	.139	.061	.315
	TUG (sec)	.035	.026	1.723	1	.189	1.035	.983	1.091
	Constant	3.665	4.277	.734	1	.392	39.054		

TMT-A = Trail Making Test A; ASCQ = Ambulatory Self Confidence Questionnaire; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D= Hospital Anxiety and Depression Scale – Depression; CFS = Clinical Frail Scale; TUG (sec) = Timed Up and Go (seconds); B = Regression co-efficient; S.E = Standard Error; Wald = Wald statistic; df = degrees of freedom; Sig = Significance level; Exp(B) = Odds ratio; C.I. = Confidence Interval

Table 3.7 shows the multivariate binary logistic regression analysis with TUG included. This model shows TUG to be non-significant (p 0.189). Frailty (p <0.001) and self-efficacy (p 0.011) were both significantly associated with community ambulation.

Table 3.8 shows the multivariate binary logistic regression analysis with gait speed included. This model shows gait speed to be non-significant (p 0.622). Frailty (p <0.001) and self-efficacy (p 0.021) were both significantly associated with community ambulation.

Table 3.8 Multivariate binary logistic regression model including CFS and gait speed

		B	S.E.	Wald	df	Sig.	OR	95% C.I.for OR Lower	Upper
Step 1[a]	Age (years)	.013	.045	.085	1	.770	1.013	.928	1.106
	Sex	-.503	.602	.697	1	.404	.605	.186	1.969
	Lives alone	.381	.523	.530	1	.467	1.463	.525	4.078
	Co-morbidities	.055	.097	.318	1	.573	1.056	.874	1.276
	TMT A (sec)	-.003	.005	.386	1	.534	.997	.988	1.006
	M/S gait speed (10MT)	-.555	1.125	.244	1	.622	.574	.063	5.208
	ASCQ	.020	.009	5.322	1	0.021	1.020	1.003	1.037
	HADS A	-.004	.066	.004	1	.952	.996	.874	1.135
	HADS D	.061	.091	.454	1	.501	1.063	.890	1.270
	CFS	-1.884	.418	20.320	1	<0.001	.152	.067	.345
	Constant	5.611	4.605	1.485	1	.223	273.525		

TMT-A = Trail Making Test A; M/S gait speed (10MWT) = metres per second gait speed (10 meter walk test); ASCQ = Ambulatory Self Confidence Questionnaire; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D= Hospital Anxiety and Depression Scale – Depression; CFS = Clinical Frail Scale; B = Regression co-efficient; S.E = Standard Error; Wald = Wald statistic; df = degrees of freedom; Sig = Significance level; Exp(B) = Odds ratio; C.I. = Confidence Interval

Due to frailty being so strongly associated with the outcome, it was not possible to look at the contributions of physical factors, cognition and mood given our sample size. A secondary model without CFS was also performed to look at these factors in more detail. Table 3.9 shows the model with TUG included. It is noted once CFS is removed, functional mobility, measured using TUG (p 0.334), cognition measured by TMT-A (p 0.196) and mood measured by HADS-A (p 0.869) and HADS-D (p 0.769) remain non-significant.

Secondary analysis excluding CFS and including gait speed shows that gait speed is significantly associated with community ambulation (p 0.030). This model also shows that cognition measured by TMT-A (p 0.287) and mood measured by HADS-A (p 0.904) and HADS-D (p 0.757) remain non-significant. Table 3.10 shows the final model with gait speed included.

Table 3.9 Multivariate binary logistic regression model excluding CFS and including TUG

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Age (years)	-.026	.037	.495	1	.482	.975	.907	1.047
	Sex	.101	.511	.039	1	.843	1.106	.406	3.011
	Lives alone	.437	.450	.943	1	.331	1.548	.641	3.740
	Co-morbidities	.006	.077	.006	1	.938	1.006	.865	1.170
	TMT A (sec)	-.005	.004	1.673	1	.196	.995	.987	1.003
	ASCQ	.034	.007	20.295	1	.000	1.034	1.019	1.049
	HADS A	.009	.057	.027	1	.869	1.010	.902	1.130
	HADS D	.023	.080	.087	1	.769	1.024	.876	1.197
	TUG	-.024	.025	.932	1	.334	.976	.930	1.025
	Constant	-1.633	3.540	.213	1	.645	.195		

TMT-A = Trail Making Test A; ASCQ = Ambulatory Self Confidence Questionnaire; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D= Hospital Anxiety and Depression Scale – Depression; TUG (sec) = Timed Up and Go (seconds); B = Regression co-efficient; S.E = Standard Error; Wald = Wald statistic; df = degrees of freedom; Sig = Significance level; Exp(B) = Odds ratio; C.I. = Confidence Interval

Table 3.10 Final model: Multivariate binary logistic regression model for community ambulation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
Step 1[a]	Age (years)	-.011	.037	.086	1	.769	.989	.920	1.064
	Sex	.030	.517	.003	1	.953	1.031	.374	2.839
	Lives alone	.439	.454	.934	1	.334	1.551	.637	3.777
	Co-morbidities	.024	.079	.093	1	.760	1.024	.877	1.197
	TMT A (sec)	-.004	.004	1.134	1	.287	.996	.988	1.004
	M/S gait speed (10MT)	1.843	.852	4.682	1	.030	6.314	1.190	33.511
	ASCQ	.031	.007	17.104	1	.000	1.031	1.016	1.046
	HADS A	.007	.058	.014	1	.904	1.007	.899	1.128
	HADS D	.025	.081	.095	1	.757	1.025	.875	1.202
	Constant	-4.409	3.577	1.519	1	.218	.012		

TMT-A = Trail Making Test A; M/S gait speed (10MWT) = metres per second gait speed (10 meter walk test); ASCQ = Ambulatory Self Confidence Questionnaire; HADS-A = Hospital Anxiety and Depression Scale – Anxiety; HADS-D= Hospital Anxiety and Depression Scale – Depression; B = Regression co-efficient; S.E = Standard Error; Wald = Wald statistic; df = degrees of freedom; Sig = Significance level; Exp(B) = Odds ratio; C.I. = Confidence Interval

3.8 Summary of Results

The results of this study suggest that a number of factors were associated with community ambulation however frailty (CFS), self-efficacy (ASCQ) and gait speed (m/sec) were the only three variables found to be independently associated with community ambulation in a community dwelling older adult population attending a day hospital for rehabilitation due to a decline in their health or functional ability. These results will be discussed in Chapter 5 – Discussion.

CHAPTER 4: PHOTOVOICE SUBSTUDY Examining the factors associated with community ambulation in an elderly day hospital population.

This chapter describes the methodology and presents the results of the Photovoice substudy, the qualitative component of this study.

4.1 Aim of Study

The aim of this substudy was to develop a greater understanding of the variables associated with an older person's ability to walk outdoors in their community by exploring their perceptions and experiences employing the use of Photovoice methodology.

4.2 Study Design

The research methodology guiding this study was Photovoice methodology based on the community based participatory research described by Wang and Burris (1997). Photovoice methodology is a qualitative research technique. It involves providing participants with cameras, giving them the opportunity to identify and photographically record their views, experiences and perceptions of their community both from a personal and environmental aspect. These photographs are then reflected on and discussed during focus groups. To ensure transparency in this qualitative study the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Appendix 33) were used throughout the design, analysis and reporting of this study (Tong et al., 2007).

4.3 Setting

Focus group discussions took place in the Physiotherapy department of St James's Hospital, Dublin. Two focus group discussions were conducted, the first in June 2018, the second in December 2018 to allow for seasonal comparison.

4.4 Substudy Participant Recruitment

Participants were recruited from patients attending the Robert Mayne Day Hospital (RMDH) at St James's Hospital, Dublin and had already participated in the main study (refer to Chapter 2).

Recruitment was completed over a two week time period in the summer (21st May, 2018 - 1st June, 2018) and in the winter (15th October – 30th October, 2018). Participants who completed the main study as described in Chapter 2 and met the Photovoice inclusion criteria were approached by the lead researcher (BC) during their attendance at the RMDH. The participant was invited to participate in the Photovoice substudy and provided with the Participant Information Leaflet (Appendix 34). One week later, the lead researcher (BC) met the participant in the RMDH, discussed the Participant Information Leaflet, answered questions and gained informed consent (Appendix 35). All participants were known to the lead researcher (BC) as they had completed the main study. All participants were advised this substudy was being conducted as part of a research Masters.

4.4.1 Inclusion Criteria

- Currently attending RMDH and have participated in the main study.
- Over 65 years.
- Community dwelling.
- Able to walk outdoors with or without an assistive device.
- No visual or fine motor limitations that would preclude using a camera.
- Able to provide informed consent.
- Able to attend two sessions: an information session and focus group discussion.

4.4.2 Exclusion Criteria

- Medically unstable.
- Inability to understand and follow verbal or written instruction due to vision, communication difficulty or cognition.

4.5 Sample Size

In estimating sample size for this Photovoice Study, sample size in qualitative research was reviewed. In Photovoice methodology particularly in relation to older adults, sample size varied greatly ranging from seventeen (Rush et al., 2012) to sixty six participants (Chaudhury et al., 2012). Fusch and Ness (2015) reported that the sample size for focus groups can vary between six and twelve participants, to allow everyone to speak, yet allow for diverse views and discussions. Taking into account Photovoice methodology, engagement of individuals in a group setting and with consideration of data saturation, an estimated total sample size of sixteen participants was established. In view of the study topic, community ambulation and in consideration of seasonal differences, two groups were planned – one in the summer and one in the winter with a planned sample of eight participants in each group.

4.6 Procedure and Data Collection

Three researchers were involved in the Photovoice substudy. The lead researcher (BC) and study supervisor (FH) were female physiotherapists with vast experience working with an older adult population and have been involved in previous service improvement and research studies with older adult populations. The research assistant (SK) was a female, student physiotherapist who had previously completed student placements in an older adult setting and was supervised by the lead researcher.

Photovoice methodology dictates three main stages: Information Session, Photography and Photograph Selection, Focus Group (Wang and Burris,1997; Chaudhury et al., 2012; Belon et al., 2014). These stages are detailed below.

Stage 1: Information Session

Following recruitment, each participant was invited to attend an information and training session led by the lead researcher (BC) which lasted approximately 30 minutes. This was completed in the RMDH Physiotherapy department. Due to the logistics of participants attending RMDH on different days, five of the participants received their training on an individual basis with the remaining three participants

attending as a group. No family members or carers were present for the information sessions.

Each participant received a participant package (Appendix 36) which included:

- General information on the study detailing information about types of photographs to be taken, a suggested number of photographs, safety instructions, instructions detailing privacy and confidentiality, information on what to document in their journal and the lead researcher's (BC) contact details.
- One single use camera (Boots Pharmacy, Single Use Camera with flash, 27 exposures (Appendix 37) with clear written instructions on how to use the disposable camera.
- Sample photographs with written explanations. To illustrate examples of a perceived barrier or facilitator to outdoor walking, two generic, sample photographs taken by the lead researcher were included. An explanation of what the photograph was of, what it meant to the individual and whether it was viewed as a barrier or facilitator to outdoor walking was documented.
- A journal for the participant to document what they photographed, what the photograph meant to the participant and whether it represented a barrier or facilitator to walking outdoors. Participants were encouraged to complete the journal, but failing that each photograph would be discussed individually.

During this session, the lead researcher (BC) discussed each element of the participant package and answered questions. The lead researcher (BC) then demonstrated how to use the disposable camera. Each participant had an opportunity to practice using the disposable camera until they were comfortable and confident using it.

Stage 2: Photography and Photograph Selection

Participants were given a defined time period of one week to take photographs and were asked to bring the camera and completed journal back on their next visit to RMDH. All participants were offered a stamped addressed envelope, however, no one availed of this option.

Participants were asked to take photographs of personal, environmental or social aspects of their community, which they felt acted as a barrier or a facilitator to allow them to leave their house to go walking (maximum sixteen photographs). They were instructed not to take photographs of other people in order to respect their privacy and confidentiality. Participants were encouraged only to take photographs that they were comfortable taking and to avoid putting themselves at any risk. They were advised that a family member, carer or friend could assist them taking the photographs.

Once the camera was returned, the researcher arranged for the development of the films within each disposable camera, requesting that photographs be issued on a CD (as opposed to hard copy photographs) for ease of electronic display for the focus group.

Once the photographs were available, the lead researcher (BC) met with the individual again in the RMDH and viewed, discussed and selected a number of photographs for use in the focus group (Appendix 38). Each participant was asked to select up to four photographs – two that best represented barriers to walking outdoors in community and two that best represented facilitators. Photographs deemed unusable owing to blurring, were replaced with participant selected stock images from the internet. Although this approach was not documented in previous Photovoice studies, it was considered a reasonable decision as it is the context of the image and not the image itself that tells the participant's story and ensured inclusivity of the participants. The chosen photographs were produced in A4 laminated format and a Microsoft PowerPoint presentation was also used to display the photographs (Appendix 39). These images formed the basis for the focus group discussion.

Stage 3: Focus Group

Participants were invited back to attend a focus group discussion at which the photographs formed the basis for facilitated discussion. While the content of interviews was unique to participants a topic guide was devised by the lead researcher (BC) to guide the focus group discussion (Appendix 40). This topic guide was based on both the study's research question and findings from previous

qualitative research, allowing participants the platform to provide their views on the barriers and facilitators to being community ambulant.

Participants were first asked about the features of the photographs which they viewed as a barrier or challenge to being community ambulant and to describe how that made them feel: “What features in the photograph act as a barrier to outdoor walking?” The focus then moved onto the features of the photographs which represented facilitators or enablers to being ambulant in the community: “What features in the photograph act as a facilitator to outdoor walking? Further questions addressed falls, fear of falling and how that impacted on their ability to go outdoors: “Do you think you have a fear of falling and how does this impact your ability to go outdoors?” Finally the group discussed what they felt their family’s concerns were about them having a fall when outdoors: “Do you think your spouse/family are concerned about you falling down when you are outdoors?”

The two focus groups took place in the Physiotherapy Department of St James’s Hospital. These discussions were facilitated by the lead researcher (BC) and were audio recorded using a dictaphone. A research assistant (SK) was present to assist with the electronic display. The study supervisor (FH) was present as transcriber and both transcriber (FH) and facilitator (BC) completing observational notes during and after the focus group discussions. The focus groups were transcribed verbatim by a transcription company.

4.7 Ethical Considerations

An amendment to the ethics application (Appendix 41) of the Community Ambulation Study (as described in Chapter 2), to conduct a Photovoice substudy was submitted and approved by the the St James’s Hospital/Adelaide and Meath Hospital, incorporating the National’s Children Hospital Research Ethics Committee on the 14th March, 2018 (Appendix 42). All eligible participants were provided with a participant information leaflet (Appendix 34) by the lead researcher (BC), who discussed the study with the participant and answered any questions. Participants who agreed to take part were asked to complete a written consent form (Appendix 35). Participants were informed that their participation in the study was completely voluntary, that they could withdraw at any stage and it would not

affect their current or future hospital treatment. Participants were asked not to take photographs of other people in order to respect their privacy and confidentiality. Participants agreed that information shared by other participants within the focus group discussions must remain confidential. The camera's film was developed and photographs were issued on a CD. No identifying participant information was documented on the camera processing form; the name used was that of the lead researcher (BC). Photographs were uploaded to a computer file and stored under the subject number on the hard drive of a password protected computer.

All participants consented to the focus group discussion being audio recorded to allow it to be transcribed. Participants were informed of their right to review transcripts. There was no identifiable information on the transcripts and participants were informed that all information received from them would remain confidential. All transcripts were coded with Participant 1, 2, 3 etc. A spreadsheet, which detailed the codes relating to each participant's details was established, should any participant later wish to withdraw their information from the study. This spreadsheet and transcripts were stored on a password protected, encrypted computer. All consent forms, CD's, printed and laminated photographs and other written documentations detailing information about the photographs was stored in a locked cabinet in a swipe access building. Data collection and storage was carried out in accordance with GDPR recommendations (European Commission, 2018). For the purposes of data analysis an external validator had access to the two transcripts but not the audio recordings. These transcripts were saved on an encrypted USB stick which was issued to the external validator from the lead researcher and was returned following completion of the analysis.

4.8 Data Analysis

The audio recordings from the focus groups were transcribed verbatim by a transcription company. Each participant was assigned a code (P1, P2 etc.) to ensure anonymity. Transcripts were analysed by the lead researcher (BC) using thematic analysis and the analysis was verified by an external validator (SC). The external validator was a Clinical Specialist Physiotherapist, who was not directly involved in the study but had previous experience with qualitative research following her own MSc work.

Thematic analysis is a widely used method of analysis in qualitative research, which identifies patterns or themes across a dataset. A six step process for conducting thematic analysis as described by Braun and Clarke (2006) was used in this substudy and the data interpreted in relation to the research question.

Step 1: Familiarising yourself with the data

The lead researcher (BC) had conducted both of the focus groups, listened to the recordings and through reading and re-reading the transcripts line by line, became very familiar with the dataset. Initial ideas were noted.

Step 2: Generating initial codes

Once familiar with the data set, the lead researcher (BC) identified emerging concepts and initial codes were generated.

Step 3: Searching for themes

These codes were then collated into potential themes and all data was gathered relating to each potential theme.

Step 4: Reviewing themes

This stage involved the lead researcher (BC) reviewing the coded data for each theme and ensuring the data reflected the theme.

Step 5: Defining and naming themes

Ongoing analysis to refine the specific themes and potential subthemes were identified within the data. Each theme was then named.

Step 6: Producing the report

The final step involved production of a report, analysing and discussing specific extracts relating to the themes and the research question.

The external validator (SC) completed the first three steps of the process described for both transcripts. Regular meetings took place between the external validator (SC) and lead researcher (BC) to compare, discuss and review all codes and themes. Any disagreements on codes, themes or subthemes between BC and SC resulted in further review and discussion before reaching agreement on themes and sub themes. The point of data saturation was believed to be reached

when no new information, themes or subthemes were observed (Guest et al., 2006; Fusch and Ness, 2015).

4.9 Results

4.9.1 Description of Photovoice Substudy Participants

Twenty two participants were deemed suitable for inclusion and information was provided to twenty participants with eight consenting to partake in the substudy. Two focus groups were completed with eight participants involved, four participants in each group. The summer focus group took place on the 28th June 2018, lasting 106 minutes and the winter focus group was conducted on 4th December 2018, lasting 70 minutes. The age range was from 72 to 88 years with a mean age of 78.8 years. Five of the eight participants were females and three were male. Six participants lived alone and five of the eight participants used a walking aid. Only one participant reported having a fall in the past six months. The mean gait speed for the total sample was 0.85m/secs and the mean self-efficacy score, measured using the ASCQ, was 133.3. The mean frailty score measured using the CFS was 4.4 for the total eight participants. Participant information for the summer and winter groups are presented in Table 4.1.

Table 4.1: Photovoice participant information

Participant	Gender	Age (Yrs)	Living status	Walking Aid Outdoors	No. of Falls in past 6/12	Gait Speed (m/sec)	ASCQ	CFS
SUMMER FOCUS GROUP (n=4)								
1	M	84	Alone	Walking stick	0	1.24	200	4
2	M	82	Alone	Rollator frame	0	0.94	128	4
3	F	72	Alone	Unaided	0	1.25	172	4
4	F	88	Alone	Rollator frame	0	0.47	95	5
WINTER FOCUS GROUP (n=4)								
5	M	72	Spouse	Walking stick	0	0.60	137	5
6	F	77	Alone	Unaided	0	0.82	127	5
7	F	71	Partner	Unaided	0	1.09	63	4
8	F	84	Alone	Rollator Frame	1	0.38	144	4

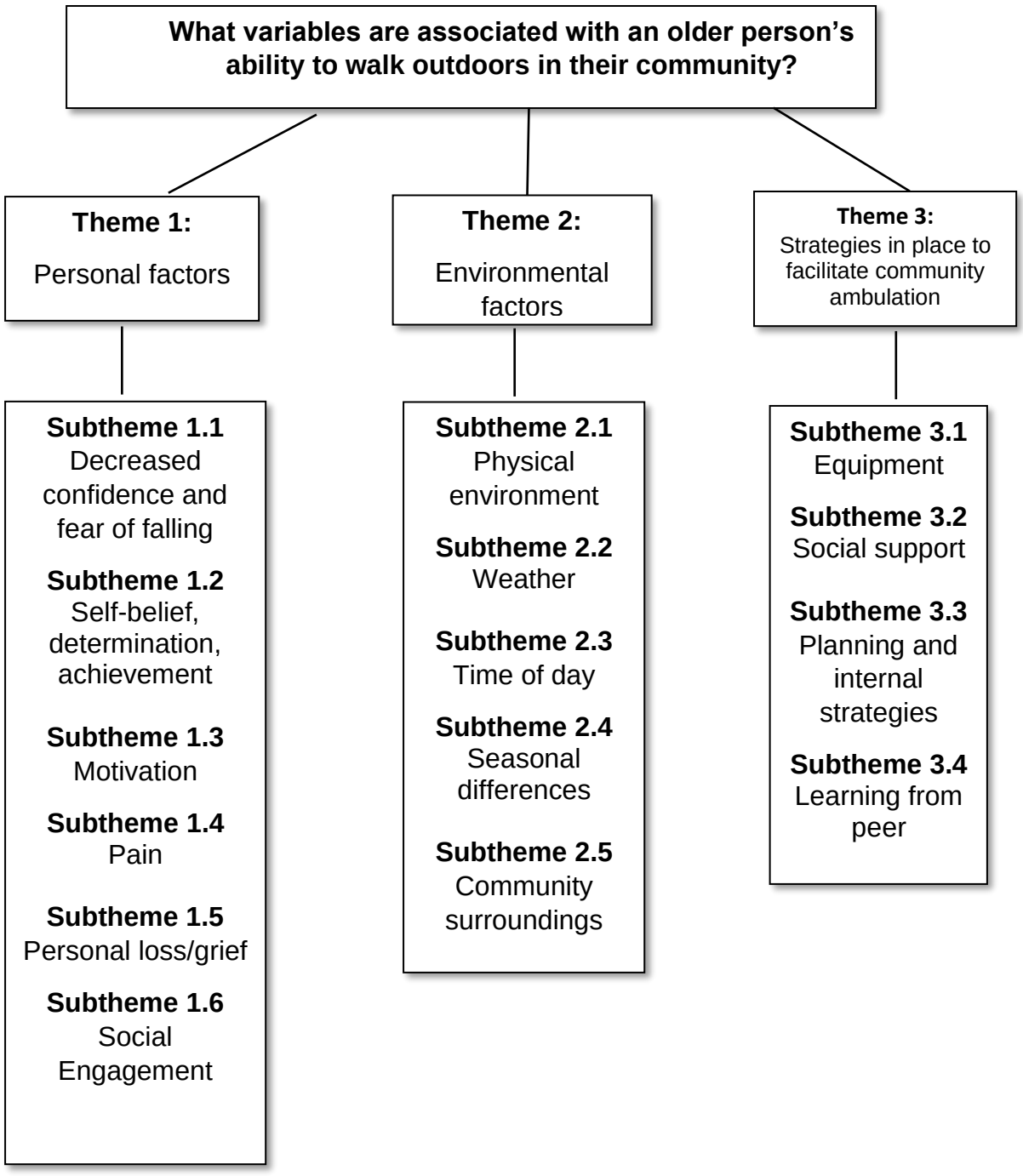
F = Female; M = Male; Yrs = Years Old; m/sec = metres per second; ASCQ = Ambulatory Self Confidence Questionnaire; CFS = Clinical Frail Scale

4.9.2 Themes and Subthemes Derived from the Focus Group Discussions

Three key themes were identified and developed through analysis. These key themes represented personal factors, environmental factors and strategies in place to facilitate community ambulation, with each theme having a number of sub themes. Figure 4.1 provides a visual representation of the these themes and their associated subthemes.

Firstly, the participants explored the personal factors associated with their ability to walk outdoors in their community describing the impact of confidence, fear of falling, self-belief and motivation. This theme also addressed the impact of personal physical factors, such as pain and the sense of personal loss and grief in their change of physical ability and the associated impact on social participation. Social engagement was discussed as an important facilitator in community ambulation. Secondly, theme 2 explored the environmental factors that pose difficulties to an older person achieving community ambulation, with participants discussing the barriers caused by the physical environment, the pros and cons of the weather, changing seasons and the time of day. The negative impact of antisocial behaviour was addressed. Finally the strategies an older person has in place to facilitate going out in community were discussed. These involved the importance of specific equipment and support, together with an individual's self-assessment of the task, always planning and strategising to facilitate their community ambulation.

Figure 4.1 Three key themes identified from focus groups



4.9.3 Theme 1: Personal Factors

Subtheme 1.1 Decreased confidence and fear of falling

All participants reported decreased confidence, anxiety or expressed concerns about fear of falling as limiting factors in their ability both in the house and getting out in community.

> P4 *"I actually think it's confidence. That you need to be and you are able to get yourself together to say I'm going out…then I kind of thought gosh, am I going to be able. If I could just get enough confidence, I wouldn't mind going out morning or evening"*
>
> P3 *"so going back, I had a heart attack bringing my granddaughter to school. So that fear kind of stays with you, you know, like if you are on your own and something happens, what do you do?"*
>
> P7 *"your confidence is gone"*

Participants reported that the fear of falling made them very nervous, was life-consuming and self-limiting.

> P4 "*you see I'm not walking out much at all. I have an awful fear, dreadful fear. I've a fear of going out and falling. I am so careful, I think I'm too careful, I'm going around the house and I'm watching every little bit and I'm holding tables and everything else, just in case I fall, But sure I've never fallen. I never fell…but I am very, very nervous, yeah I have a fear of falling, of course you could be thinking of falling and no one around to help you"*
>
> P5 *"there's not much you can do about it, if the fear is there, the fear of falling is there. It scares you, it scares you stiff"*
>
> P6 *"but I'm afraid of my life of the stairs. If I go up, I need somebody walking behind me."*
>
> P8 *"after a fall outside, that does put the fear into you now"*

Subtheme 1.2 Self-belief, determination, achievement

Although all participants had reported a fear of going out in the community which can be self-consuming and self-limiting, determination and self-belief were also reported and the feelings of achievement once they had completed a task.

> P4 "*I have a fear of falling, the day I walked up with my friend, who is 91, to the shopping centre, I was so happy when I came home, I was absolutely thrilled. I rang everyone and told them I'd walked up to the shopping centre."*
>
> P8 *"The kids are saying, Nan sit down and we'll do it, no, just let me do the things. Because I feel if you get into that you're sitting back mentally and everything else, you're not alert, you know that way. So I prefer to do my own thing. You could go down very quickly if you give in doing things"*

Subtheme 1.3 Motivation

Self-motivation, particularly lack of motivation or laziness was reported as a barrier to getting out in community. Three participants highlighted the television as a barrier to getting out.

> P1 *"the television, if I lie on the couch which I do and there's a cowboy on or sports on I won't go out, the TV holds me yeah"*
>
> P5 *"the television, that doesn't make you go out"*
>
> P6 *"oh yes the kettle and the television go on together, that's it"*
>
> However, one participant reported the television did not impact on her as she had a strategy in place.
>
> P8 *"I don't put it on early in the morning because it would slow me up. I wouldn't do anything you know that way"*

The feeling of laziness was mentioned by one participant.

> P3 *"I think with myself, I often think I am just being a bit lazy, I'd have every intention….. It's getting moving; ah I'll sit in the chair"*

External motivation in the form of family and friends was noted to act as a facilitator to getting out in the community.

> P1 *"the motivator for me would be my daughter"*

> P4 *"but I said I'm after telling her I'll go , I'll have to go, I got ready, I was ready when she came down"*

Positive feedback from family members provides encouragement to get out and improves confidence.

> P3 *"he'll say fair play to you…that makes me feel good, for someone to tell you that you are doing well"*

A number of participants reported the benefits of external motivators such as a pedometer as a motivator to move and be more active as they had a goal or a target to attain.

> P6 *"when you get up in the morning I put it (pedometer) on me and I have to walk to add up my steps. I'd have to go out and walk down the back of the garden, walk down and back, go out the front, go out to the bin and all like that and it's adding up. Otherwise I'd be just sitting there maybe waiting for someone to come in"*

Another participant reported completing tasks such as a trip to the supermarket will get him out and increase his activity levels.

> P5 *"you go to the supermarket and you don't realise when you're walking around the supermarket up and down the aisle the number of steps you do"*

Subtheme 1.4 Pain

One participant reported pain as a limiting factor both within the house and in her ability to go outdoors walking.

> P4 *"The problem with going up the stairs because I have dreadful arthritis in my two knees so I just come down in the morning and go up in the evening. If I need anything my son will go up for me, but I would love to be able to say tomorrow I can take that wheeler and go out. But then the time comes and I won't go out"*

Subtheme 1.5 Personal loss/grief

Participants reflected on the difference in their functional ability and social participation pre and post illness or hospital admission. They discussed their sense of loss and grief of their changed ability and how a period of illness or hospitalisation impacted hugely on their community ambulation.

> P4 *"normally I would cross the road, oh yes, before I went into hospital, I wouldn't cross the road now, I'd be terrified"*

One participant reported not wishing to meet people and discuss her illness following her discharge home from hospital. This impacted on her ability to go out on her own, take certain routes and go to certain local shops, in order to avoid meeting people.

> P3 *"I really don't want to discuss it, it gives you a headache when you are trying to get over it. I go out with my daughter and I go to a shopping centre."*

Subtheme 1.6 Social engagement

The majority of participants reported the positives of getting out in their community either walking or getting collected as it enabled them to meet and interact with others and have a chat. This social interaction was viewed as a support and facilitator to getting out and about.

> P8 *"if you get a good sunny day, you aim towards the shops and you meet neighbours you haven't seen in while and have a chat with them"*

> P7 *"I'd be yapping all day and I love that, in the morning time, you'll meet people coming from mass and you'd bump into them…. And we'd go in and sit down and have a chat"*

Two participants also mentioned planned community social events which enabled them to interact socially with others.

> P2 *"I'm supposed to be going to the Laytown races, the Liberties coach taking us off"*

P8 *"we were all collected and brought up for our dinner, a bit of entertainment and that as well"*

One participant continued to partake in his hobby attending bowls regularly, enjoying the interaction and social engagement.

P1 *"I have a great bit of a skit with the other teams, you know and your own team, it's social, yeah"*

One participant however reported the feeling of isolation in his own home.

P2 *"I very seldom bring anyone in. Now and again someone might call but a lot of them are only looking for a lend of this and that."* When asked if he goes out to the shops he answered *"myself, yeah, it's only down the road."*

4.9.4 Theme 2: Environmental Factors

Subtheme 2.1 Physical environment

All participants reported the physical environment as a barrier to getting outdoors walking in community.

Participants cited the footpaths as being a major challenge in outdoor mobility, reporting a number of issues with the paths including uneven, cracked footpaths to be challenging when out walking.

P6 *"your toe would get caught in the cracks or something like that"*

P8 *"certainly that would stop me going out, with the way the pathways are, you'd always be afraid your toe is going to get caught"*

Footpaths blocked by cars parking on them, cause an issue especially for those people using walkers or wheelchairs to mobilise.

P1 *"I think cars parked on the path, people with trolleys have to get off onto the road and you don't know what's going up and down the road"*

P7 *"the cars parking on the path, it is a killer"*

P8 *"I think it is, people in wheelchairs, people with prams"*

P5 *"when I'm going down in the wheelchair, I come across that regularly and I flip. You have to drive out on the road. On one or two occasions if I could have got into the driveway I'd have knocked on the door"*

Leaves on the paths creating an unsafe, slippery environment was highlighted as an issue and creating a risk of falling.

P2 *"paths are getting full of leaves, a drop of rain and they are slippery on the feet, every bit as bad as ice. You could go sliding on them."*

P6 *"leaves are deadly, you'd break, deadly"*

P8 *"slide on them if you're not careful"*

Participants reported dogs on leads or dog excrement on the path as an issue.

P2 *" when you see a dog on a lead and you are walking along, you want to keep near the wall as the dogs always run on the inside of you for some reason… the dog runs, the yoke gets wrapped around your legs… well that's you on the ground if you are tripped up"*

A number of participants specifically mentioned dustbins and rubbish blocking the way, with rubbish falling out on path.

P2 *"people leave their dust bins out, the tops do be open, they are spilling on the footpath"*

Subtheme 2.2 Weather

The weather was reported as both a barrier and facilitator to going out in community. Bad weather namely rain, wind and ice were reported as a challenge and a barrier to going outdoors for all the participants.

P2 *"the bad weather is number one. If it is raining that would stop me going out in the wet"*

P8 *"I don't like the wind either"*

P7 *"it can take your breath away and you're trying to push against it like that"*

One participant reported the fear of falling in poor weather conditions.

P1 *"the only fear I have is in the ice, I fell on the ice and hit my head off the ground, so I still have a kind a fear about falling on the back of my head"*

In contrast, participants reported good weather as a facilitator to getting out in their community.

P8 *"the sun, that's lovely, it would encourage you, yes. In the winter time you won't see as many (people), they're all in a hurry trying to get home. It's lovely, it lovely in the sun"*

P7 "you mightn't see people for a while and then when the weather's good, it's great, isn't it"

P2 *"a reasonably good day that it wasn't too sunny that you'd get sun stroke but it's not raining"*

Subtheme 2.3 Time of day

Participants reported that the time of day would affect their ability to get out in community. The majority of participants mainly preferred to go out earlier in the day before the shops became too crowded or busy, before it gets dark particularly in winter time or antisocial behaviour became an issue.

P1 *"I wouldn't like a big crowd say like going down Henry Street or somewhere like that... you want to be in there at half nine in the morning before they get out"*

P8 *"Whatever I do early in the morning kind of you know before lunch as then you're back in before it begins to get dark"*

P2 *"Messers (people), you know around the place at night"*

P4 *"oh no, I wouldn't go out at night time now, definitely not, I wouldn't, no, I wouldn't"*

P1 *"Well up to 7pm alright but I wouldn't go out say at 10pm, because I'd be afraid of someone having a go at me"*

One participant reported they would go out any time of the day.

P7 “*Well I would go any time you know, but I make sure to go to the crossing because the school is down there and like it gets busy with children coming from school”*

Subtheme 2.4 Seasonal differences

Seasonal differences also impacted participants’ ability to leave their house. The long, bright evenings and good weather were reported as facilitators.

P7 *“bright nights and all, it’s great”*

P3 *“summer evenings now when it’s nice, I’d go to bingo. You know up to half ten, it’s still bright”*

In contrast the dark winter nights and leaves or ice on the footpaths were observed as challenges and barriers to getting out in community.

P6 *“Oh if it’s dark and no lights on, I wouldn’t attempt to walk out, you’d be sitting on your backside in the next minute”*

P8 “leaves falling… in the winter time”

Subtheme 2.5 Community surroundings

Participants reported differences in neighbourhoods and communities affecting their ability and motivation to go out. Issues included antisocial behaviour, community amenities, distance to local shops as opposed to city centre and transport network.

One participants reported difficult neighbours and antisocial behaviour as an issue however it was a motivator to get out of his house.

P2 *“I prefer to go out because if you’re in the house there would be a knock on the door every minute, somebody looking for the lend of €2 or ah I’d go up the road, there’s a little shop there, sit down in there and maybe buy a cup of coffee. I’d sooner sit there half the day than be down in the house”*

Other participants reported crime or antisocial behaviour to impact their ability to get out in community.

P1 "I'd be afraid of someone having a go at me"

P3 "oh well the areas are very bad, parts are very bad, you know the drugs it's everywhere. But now I've never been affected"

Participants discussed their proximity to local shops, access to city centre and their preferences for shopping. The majority of participants reported their preference at staying in their local community to go shopping rather than going into the city centre.

P5 *" everything is very handy for me, more or less across the road, I seldom go into town, I don't understand why anybody goes into town because no matter where you are living there's a shopping centre.*

P1 *"I've no problems going to the shopping centre but I certainly wouldn't go into town"*

P4 *"Oh god I wouldn't go into that (busy environments), oh lord no, I couldn't go into anything like that now"*

P7 "*yeah I'm only up the road from the shops as well"*

On discussing public transport, one participant reported that the bus he used to take into the city centre was taken away and as it was further to walk to the next bus stop, he no longer goes into the city.

P1 *"My wife and myself, we used to have a 16A bus but that's taken off now and you have to walk down a good bit to get a bus into town."*

4.9.5 Theme 3: Strategies in Place to Facilitate Community Ambulation

Subtheme 3.1 Equipment

Participants reported they used modifications such as handrails or ramps at steps or accessing shops to assist them when they were out in community.

P2 *"if there's a railing it's okay"*

P4 *"I have them up (hand grips), I have two at the back door, they are fabulous, I'm using them"*

Knowing the location of seats or rest areas was a strategy used by a number of participants when out walking.

> P4 *"my friend is lovely, and we did walk over, we sat on the seat on the way over, there's two seats and we sat on one for maybe 10minutes. And then we headed on over through the rest of the park over to the shopping centre"*

> P5 *"that's the green in front of my house, the far side of that there's seats, I'd walk over there with the young fella, I sit in the seat, the young fella will be playing around there not a bother"*

A number of participants reported using an outdoor walker rather than walking sticks encouraged outdoor mobility.

> P4 *"Oh I brought the walker, I wouldn't be able to walk without the walker"*

> P8 *"If I had the rollator, I'd be a little more steady then with the stick, I bring the walker and I can sit down you know, going into the shops"*

Use of disabled parking badge enabled some participants to out as it allowed them to either drive or get a lift, park in a accessible location and go shopping or complete other social engagement.

> P5 *"there's four wheelchair spaces, right outside the shop door"*

Subtheme 3.2 Social support

Participants reported support from either family or friends enabled them to be ambulant in community.

> P4 *"I can kind of hold on and there's someone with me then for when I go to the steps"*

> *P2 "I go to the shops, it's only down the road, but I have helpers you see, she comes on a Tuesday if I want like a large bottle of 7UP, they are very heavy to carry, heavy stuff she would bring up for me"*

> P3 *"Oh my youngest daughter, she takes no prisoners, oh she is, she's a big motivator"*

P7 *"I like to meet them, and we go into Tesco and I often sit, they have seats in there and I often sat down and had a chat you know"*

P6 *"you'd be lost without your family really wouldn't you"*

P5 *"the local, I walk over there on a Friday evening"*

Subtheme 3.3 Planning and Internal strategies

All participants reported having internal strategies in place and have figured out and planned the best way for them to complete a task and adapted their mobility which enables them to keep going out and about in community.

P2 *"You have to be real careful and go a lot easier you know.. I discovered the safest way is in them, going down steps or walking on the leaves is to take short steps or walking on the leaves is to take short steps because if you try and go in a hurry and take long steps you are more likely to fall"*

P4 *"sometimes people don't realise you can't walk fast anymore and that's the end of it. I don't even try to walk fast now, I just take my time"*

The majority of participants reported using the pedestrian crossing to cross the road however there was varying reports on the time available to cross the road.

P2 *"crossing the road … and the lights there and there's only four seconds, I can't get off the* footpath *in four seconds. And the red light is up already"*

P3 *"I haven't been up that way in ages, but I thought all the lights had changed, you'd be waiting about three minutes, once changes, oh plenty of time, I wouldn't have to rush across."*

On discussing what strategies participants used if they fell, everyone reported they would attempt to get up.

P2 *"I'd have to lie there for a few minutes so you get a rest and get your breath back, then make an effort to get up"*

One participant reported having a pendant alarm which she would use.

P5 *"but now with these things on your wrist (pendant alarm) it's very handy if you press them, my granddaughter came with her friend to lift me up"*

Subtheme 3.4 Learning from peers

All the participants reported the benefits of talking and learning from each other.

> P3 *"Talking is good, I think this, I don't know about the rest of you but I think this is great"*
>
> P6 *"and we learn from each other"*
>
> P7 *"and it's nice to hear what other people have to say as well isn't it"*

4.10 Summary

Eight participants attending the day hospital for rehabilitation due to a change or decline in their function, participated in this qualitative Photovoice substudy. Three key themes were identified, personal factors, environmental factors and strategies in place to facilitate community ambulation. Within the personal and environmental factors there were both barriers and facilitators identified to an older person's ability to ambulate in community. The findings of this substudy will be discussed together with the main study results in Chapter 5, Discussion.

CHAPTER 5: DISCUSSION

5.1 Introduction

This mixed methods study examined the factors that affect community ambulation in community dwelling older adults attending a day hospital. The main study was a quantitative study to examine the factors that affect community ambulation in community dwelling older adults attending a day hospital. In addition a qualitative substudy was also completed, to develop a greater understanding of the variables associated with an older person's ability to walk outdoors in their community by exploring their perceptions and experiences employing the use of Photovoice methodology.

The main findings of the quantitative study were that frailty and self-efficacy were the only two variables found to be independently associated with community ambulation in a community dwelling older adult population who were attending a rehabilitation day hospital due to a change or decline in their health or functional ability. On secondary analysis, excluding frailty, due to its strong association with the outcome, gait speed was found to be independently associated with community ambulation in this study population and more important than both cognitive and emotional factors in an older adult's ability to partake in community ambulation.

The qualitative Photovoice substudy was a novel approach and to the best of the lead researcher's (BC) knowledge, the first to study this population in Ireland. Photovoice methodology was a complementary methodology to the quantitative study. It facilitated older adults to record and discuss their views and perceptions of community ambulation gaining valuable participant insight and knowledge into the factors that impact on their ability to ambulate in the community. It identified three key themes involved in an older adults ability to ambulate in community; personal factors, environmental factors and strategies in place to facilitate community ambulation. Within the personal and environmental factors there were both barriers and facilitators identified to an older person's ability to ambulate in community.

In this chapter the study findings of the main quantitative study and the qualitative Photovoice substudy, will be discussed in the context of current literature.

5.2 Discussion of Findings in the Context of the Current Literature

5.2.1 Community Ambulation

In this study, Community Ambulation was defined as the ability to independently walk outdoors in the community, negotiating varying terrains and environmental situations for the purposes of shopping, social and recreation (Lord et al., 2004). In this study 55.3% of participants were classified as independent community ambulators. This was based on participants being classified into one of four levels of community ambulation following completion of the Community Ambulation Questionnaire (CAQ). In this study those participants categorised into Level 3 and Level 4 were deemed to be independent community walkers (n=89, 55.3%) with the remaining participants who were categorised into Level 1 and Level 2 deemed to be non-community walkers (n=72, 44.7%). Prevalence of independent community ambulation in this study population is most likely slightly less than 55.3% due to all eligible participants not participating in the study. On non-participant analysis and comparison with the study group, it was noted while similar in both age and gender, the non-participant group had a median TUG that was 2.36 seconds slower than the study sample (p 0.01), therefore true prevalence is likely to be somewhat less than 55.3%.

The classification of community ambulation used in this study was that developed by Lord et al. (2004) for use in the stroke population, which was used in a number of subsequent stroke studies (van de Port et al., 2008; Bijleveld-Uitman et al., 2013, Durcan et al., 2016). However these studies in the stroke population dichotomised participants into one of two groups with only those in Level 4 being deemed community walkers with participants in the other three levels classified as non-community walkers. They reported a large variation in independent community ambulation at 61% (Lord et al., 2004), 74% (van de Port et al., 2008), 79% (Bijleveld-Uitman et al., 2013) and 58% (Durcan et al., 2016). It is difficult to directly compare the results of these studies with this current study due to variations in study populations and participant characteristics. These research studies all investigated stroke populations with an average age of between 58 and 68 years while this was a study of community dwelling older adults with a median age of 83 years.

Elbers et al. (2013) used an alternative method to categorise 153 patients with Parkinson's Disease into community and non-community walkers. They used items from the Nottingham Extended Activities of Daily Living Index (NEADL) and reported 46% (n=70) of participants were classified as community walkers. Due to the pathology of Parkinson's Disease and possible gait disorders associated with Parkinson's Disease such as fluctuations in gait during on and off periods or freezing episodes when turning or in environments with obstacles, it is difficult to directly compare their results to the findings of this study.

In comparison the Hoffer Classification previously used by Perry et al. (1995) categorised participants into one of six categories. This classification has been used for the stroke population and has not been used previously in community dwelling older adults. If dichotomised into non-community and community walker, this classification reports 64% (n=103) of participants are community ambulant which is higher than as reported on the CAQ categorisation.

5.2.2 Frailty

The main finding of this study, was that frailty as measured by the CFS, was found to be independently associated with independent community ambulation ($p<0.001$) in community dwelling older adults attending a day hospital following a change or decline in their health or function. The mean frailty score for the total study population of 161 participants was 4 (SD 2). Once dichotomised and analysis completed it was found that less frail participants were more likely to be independently community ambulant with a median CFS score of 3 (SD 1) compared to the non-community ambulant group whose median CFS score was 5 (SD 1). Those participants who were independent community ambulators were less frail, younger and walked faster in comparison to those participants who were non-community ambulant. The current study results are reflected in the literature as it is widely accepted that with increasing age, the prevalence of frailty increases (Rockwood et al., 2011) and gait speed decreases (Studenski et al., 2011).

Frailty has been associated with both reduced life space mobility, the area an individual moves through over a defined period of time, and reduced decision making around community mobility (Portegijs et al., 2016). Their study investigated 753 older adults living in community as part of the longitudinal 'Life-space mobility

in old age' (LIPSE) study. The participants mean age was 80.4 years (SD 4.1) and 64% were female. Following completion of a number of life space mobility and frailty assessments, they reported that 53% of their study population had no frailty, 43% were described as pre frail and 4% frail. On analysis their study showed life space mobility was more limited in pre frail and frail community dwelling older adults ($p<0.0001$). These are similar results to the findings in the current study, which found that those participants who were frailer were more likely to be non-community ambulators.

5.2.3 Gait Speed

A key finding of this study was that gait speed as measured by the 10MWT, was found to be independently associated with independent community ambulation (p 0.03) in community dwelling older adults attending a day hospital following a change or decline in their health or function. The mean gait speed for the total study population of 161 participants was 0.78 m/sec (SD 0.33). Once dichotomised and analysis completed it was found that the mean gait speed for the independent community walker group was 0.92 m/sec (SD 0.33) compared to 0.61 m/sec (SD 0.24) in the non-community walker group. This concludes that those participants who are able to walk faster are more likely to be community ambulant. It is important to note the difference in mean gait speed between the two groups is substantial (0.31m/sec), over three times the minimal clinical important difference for gait speed in older adults (Perera et al., 2006). Clinically, this study highlights the need to consider more targeted rehabilitation towards those patients with a gait speed greater than 0.61m/sec but less than 0.92m/sec in order to maintain their community ambulation. This current study did not specifically examine the difference between the non-community ambulation group (CAQ 2) and the limited community ambulator group (CAQ 3) and at what point the participant changed from a community ambulator to no community ambulant. This is area which could be further investigated in future studies.

Previous literature reports, gait speed has been used as a proxy measure of community ambulation in the absence of appropriate measures and the literature has considered gait speed as a global marker or 'sixth vital sign' and a strong indicator of function, independence and heath related risk in older adults (Fritz and

Lusardi, 2009; Middleton et al., 2015). Gait speed values for older adult populations vary greatly both within healthy, community dwelling populations and those in clinical settings. . Bohannon (1997) has presented normative reference data for adult walking speeds in each decade from 20 through to 70 years. They reported that women in their seventies mean gait speed was 1.27m/sec as compared to 1.33m/sec for men in their seventies. Subsequently, Steffen et al. (2002) concurred with these values, concluding that women in their seventies mean gait speed was 1.33m/sec as compared to 1.38m/sec for men in their seventies. Both these studies document much higher gait speeds than the current study, which may be explained by two points. Firstly by the healthy nature of their study populations as compared to this study whose cohort were attending a hospital outpatient department and second, the median age of this study was 83 (IRQ 9) with those in the community ambulator group median age 82 (IRQ 9), while the previous studies reported gait speed for populations in their seventies.

More recently, Bohannon and Andrews (2011) completed a meta-analysis to describe normal gait speed for healthy individuals. They reviewed forty-one articles when combined, provided data from 23,111 subjects and presented the data for both age and gender. They reported mean gait speed of 0.94 m/sec for women aged 80 to 99 years and 0.97m/sec for men aged 80 to 99 years. Other studies of older adults have recorded slower gait speeds for healthy community dwelling older adults. Lord et al. (2010) reported a mean gait speed of 0.79 m/sec for their study population with a mean age of 75.8 years compared to Peters et al. (2013) who reported a mean gait speed of 0.96 m/sec in his study cohort which had a mean age of 84.3 years. All these studies show considerable variation in gait speed for healthy community dwelling adults and hence it is difficult to compare them to the findings of this current study, which investigated community dwelling older adults attending a day hospital for change or decline in their health or function.

In contrast, Peel et al. (2013) completed a systematic review of an older patient cohort in both acute and outpatient clinical settings. Following a review of 48 studies providing data from 7000 participants, they concluded that gait speed in acute care settings was 0.46m/sec which was significantly slower than the gait speed recorded at outpatient clinics of 0.74m/sec. It is not clear however if those assessed in the outpatient setting were independently community ambulant. This

score however does correspond with this current study as the mean gait speed was recorded at 0.78 m/sec (SD 0.33), for the total study population of 161 participants.

This current study highlights the association between gait speed and community ambulation, showing it to be more relevant to community ambulation than other functional measures such as TUG as discussed in section 5.2.4.

5.2.4 Functional Mobility and Falls

Functional mobility and falls risk measured by the Timed Up and Go (TUG) was found to have a statistically significant difference on bivariate analysis ($p < 0.001$), however once adjusted in multivariate analysis TUG was found not to be independently associated with independent community ambulation (p 0.334). The median TUG score in this study for the total study population was 16.6 seconds indicating falls risk, however once dichotomised and compared across the two groups it is observed that the independent community ambulator groups median TUG score was faster at 13.8 seconds compared to 21.7 seconds for the non-community ambulator group. Those participants who look less time to complete the TUG were more likely to be independently community ambulant. Although TUG cut off values vary in the literature it is agreed that a faster time indicates a better functional performance and a score of greater than 13.5 seconds identifying community dwelling older adults at increased risk of falls (Shumway-Cook et al., 2000). This therefore placed the non-community ambulators at a significantly higher risk of falls and may somewhat explain their inability to independently walk in community. However, on review of the median number of falls, there was no difference across the two groups and only a slight difference in the reported number of falls in the past six months across the two groups, 55.6% of non-community ambulators reporting falls as compared to 52.8% of community walkers. This may be explained by older adults limiting their community ambulation as they become more frail and less likely to fall. This suggests that a multifactorial assessment is required to identify falls risk in community dwelling older adults as opposed to reliance on one specific outcome measure such as the TUG. The findings of this study hence support a recent study by Barry et al. (2014) who reported that the TUG is not a significant predictor of falls (p 0.05) and should

not be used in isolation to identify falls risk in community dwelling older adults. The findings of this study demonstrated that the TUG is not independently associated with community ambulation, suggesting that gait speed as measured by the 10MWT is a more relevant measure to determine community ambulation than the TUG and should be considered in the clinical setting.

Fear of falling was highlighted by participants both in the CAQ and the Photovoice substudy as a barrier to community ambulation. Participants cited fear of falling indoors on stairs as well as outdoors on steps or uneven, cracked footpaths as a barrier to getting outdoors walking. The fear of falls was linked with task avoidance and behavioural changes, with participants reporting having equipment, such as rails or walking aids available and also strategies in place to reduce the risk of falling. Strategies include being more careful, changing walking pattern, use of pendant alarms and ways to deal with a fall if occurred. This corresponds with research from Rush et al. (2012) who following a Photovoice study of older adults view of risk, reported that although risk is avoided in specific situations, older adults judge the risk and employ adaptive risk taking approaches to deal with it.

5.2.5 Self-efficacy

A second key finding of this study was that self-efficacy, as measured using the Ambulatory Self Confidence Questionnaire (ASCQ), was found to independently associated with independent community ambulation ($p < 0.001$) in community dwelling older adults attending a day hospital. The mean score on the ASCQ for the independent community walker group was 155.6 as compared to 99.9 in the non-community walker group. These scores were out of a maximum of 220 and although no specific cut off values are documented in the literature it is well established that the higher the score the more confidence the individual is at completing the specific tasks (Asano et al., 2007). The non-community ambulator group had much lower levels of reported self-efficacy as compared to their community ambulator group.

The results of this study concur with previous research in the area, which identified balance self-efficacy as a significant factor in an older person's ability to undertake community ambulation. Lord et al. (2010) reported that self-efficacy was more important than executive function for community ambulation in a healthy

population of community dwelling older adults. Similarly, White et al. (2009) reported a correlation between self-efficacy and activity levels following the investigation of 321 community dwelling adults. Although the mean age was lower at 63.8 years, as compared to this study where the median age was 83 years old, it highlights the importance of assessing and addressing self-efficacy in the ageing population as self-efficacy has been shown to be a strong predictor of functional performance and health behaviours including physical activity (Stutts, 2002) and studies suggest that older adults limit or change their outdoor walking habits based on their belief in their ability to undertake and complete the task (Mullen et al., 2012).

This study was a cross sectional design therefore we cannot determine when the change in the participant's self-efficacy actually occurred, whether it was pre or post a decline in their community ambulation. However, the Photovoice substudy supports the findings from the main quantitative study, highlighting the importance of self-efficacy in relation to community ambulation, as all the participants voiced decreased self-confidence, anxiety and fear as personal limiting factors to community ambulation however in contrast highlighted their self-belief and determination as faciliatory in achieving their goals**.**

These findings are reflected in other populations and community ambulation studies such as the hip fracture and stroke populations. A self-reported lack of confidence whilst walking in community settings was highlighted in older adult population following hip fracture (Taylor et al., 2010). Similarly, in a more recent study in the stroke population, reported self-efficacy was independently associated with community ambulation in community dwelling stroke patients (Durcan et al., 2016).

5.2.6 Personal Factors

A number of personal factors were analysed in this study to determine their association with community ambulation. On bivariate comparison analysis, it is noted there was a statistically significant difference in a number of the personal factors. Living with someone other than spouse and using no assistive device indoors or outdoors were associated with independent community ambulation.

Although not statistically different on analysis, the community ambulator group were noted to be younger and more likely to live alone. There were lower levels of co morbidities and polypharmacy in the community ambulant group as opposed to those who were not able to independently ambulate in community. The median number of medications for the non-ambulator group was eight compared to seven in the community ambulator group. In contrast, findings from The Irish Longitudinal Study on Ageing (TILDA) reported the average number of medications taken by the over 65 years age group was 3.4 compared to 3.9 in the over 70 years age group (Richardson et al., 2015). This may be explained by differences in study populations, both in characteristics and sample size. TILDA is a large scale study of 8504 community dwelling Irish people as they grow older whereas this is a small study of older adult who are attending a day hospital due to changes or decline in their health or function.

The qualitative study, Photovoice substudy provided valuable insights into the personal factors reported by the participants with respect to what posed as a barrier or facilitator to being community ambulant. Personal factors such as lack of confidence, fear of falling, regret, self-belief and motivation were all cited as personal traits which influenced their ability to community ambulate. All participants reported decreased confidence going outdoors or expressed concerns about fear of falling when outdoors. This is supported in the literature as it is well documented that fear of going outdoors is common in older adults with an increased risk of developing further difficulties in walking. The fear of going outdoors can be multi factorial; fear of falling, health-related issues both physical (pain, strength, gait speed) and psychological (fear, depression) and environmental factors can all impact on the ability of an older adult to get outdoors (Rantakokko et al., 2009). In contrast, some participants expressed the sense of achievement once they had gone out in the community and the need for self-belief and determination in order to achieve this. This correlates with a key finding in the main study, which highlighted self-efficacy as being independently associated with community ambulation ($p < 0.001$).

5.2.7 Cognition and Executive Function

The median score on the MMSE for the total study population (n=161) was 27 with an interquartile range of 5. When dichotomised into two groups it was noted that the MMSE was one point higher in non-community ambulator group a median value of 27 (5) as compared to the community ambulator were the median MMSE score was 26 (4). There was no significant difference between the two groups on bivariate comparison analysis (p = 0.610). Based on the literature and cut off scores both groups scored in the normal range as Cullen et al. (2005) recommended a cut off below 23 for optimal screening of cognitive impairment in an Irish community setting. Previous studies have demonstrated a link between cognitive impairment and increased falls in community dwelling older adult populations (Delbaere et al., 2012). More recently, Quach et al. (2019) reported mild cognitive impairment was associated with a 77% greater rate of falls ($p < 0.05$) following a study of 430 community dwelling older adults. In this current study, it is noted that cognitive scores as per the MMSE were in the normal range and the number of falls reported in the past six months was low at a median of one in both groups. It is noted that neither MMSE nor falls were significantly associated with community ambulation in this study.

Executive function (EF) was measured using the Trail Making Test A and B (TMT A and B). Trail Making Test A assesses visual search and motor speed skills and TMT B assesses higher level cognitive skills such as mental flexibility. The literature suggests that Delta TMT (TMT B – TMT A) is a more accurate measure of EF to control for effects of psychomotor functioning, visual scanning and processing speed (Poranen-Clark et al., 2018). In this study, only TMT A showed a significant difference (p 0.003) between non-community and community ambulator groups on bivariate analysis, however, it was not independently associated with community ambulation on multivariate analysis (p 0.287). This may be explained by two factors, firstly, EF had the most amount of missing data, with 6% of EF data missing (152/161). Secondly the sample size may have been an issue as with the inclusion of three other variables this may have led to possible study underpowering. This is an area that could be investigated further, possibly considering other measures of executive function.

There was a large spread of scores in both groups with the median time for the community ambulators 73.5 seconds as compared to the median time for the non-

community ambulators at 91.7 seconds indicating those participants with better EF were more likely to be community ambulators. These are slower scores than those reported by Lord et al. (2010) when they investigated 113 healthy community dwelling older adults with a mean age of 75.8 years (SD 7.3). Their study reported mean TMT-A scores as 50.3 seconds (SD 21.3) for their cohort of community ambulant older adults however the main difference was in the study population. Lord et al. (2010) studied healthy community dwelling older adults whereas this current study was investigating community dwelling older adults attending a day hospital for change or decline in their health or function. They concluded that in their study although EF made an important contribution in factor analysis, self-efficacy contributed much more to the variance. Previous research in the InCHIANTI Study highlighted a link between low gait speed and poor EF however they did not investigate an association with community ambulation (Ble et al., 2005). More recent research does report a link between EF and life space mobility with those presenting with better EF having better life space mobility (Poranen-Clark et al., 2018).

5.2.8 Anxiety and Depression

In this study, both anxiety and depression as measured by the Hospital Anxiety and Depression Scale (HADS) showed a significant difference (HADS-A p 0.038; HADS-D p 0.01) between non-community and community ambulator groups however when entered into multivariate analysis and adjusted for other variables they were found not to be independently associated with community ambulation (HADS-A p 0.904; HADS-D p 0.757). Both anxiety and depression scores were lower in the community ambulator group as compared to the non-community ambulator group. The non-community ambulator group scored higher on the anxiety section of the Hospital Anxiety and Depression Scale (HADS), with a median score of 6 as compared to a median score of 4 for the independent community walker group. The independent community walker group had a median score of 3 on the depression section of the HADS compared to a median score of 4.5 for the non-community walker group. Although there was a statistical difference between groups, both groups had relatively low median scores on each of the scales indicating low levels of anxiety and depression in this study population. This population would be determined as normal as a recommended

score of 0 - 7 is regarded as normal for either subscale, 8 - 10 being suggestive of the presence of the state and a score of 11 or higher indicating probable presence of a mood disorder (Zigmond and Snaith,1983).

These results correspond with Lord et al's (2010) study findings. They reported scores of anxiety and depression in a cohort of 113 community dwelling older adults to be within normal limits, with no direct relationship between these variables and community ambulation. They did however hypothesise if they had completed a subgroup analysis of those participants who had reported falls they may have found anxiety and depression to be a factor. This is supported more recently by research that reported a link between anxiety and depression being more prevalent in those individuals with fear of falling and in turn fear related activity avoidance (Hull et al., 2013; Briggs et al., 2018).

5.2.9 Environmental Factors

The use of Photovoice and focus group discussions provided valuable insights into participants' views and perceptions of how the environment impacts their ability to partake in community ambulation. Both environmental barriers and facilitators to community ambulation, in terms of the physical environment, community surroundings and seasonal/weather differences were identified by participants' photographs and discussed at length within the focus groups.

5.2.9 (i) Physical environment

All participants photographed aspects of the physical environment as barriers to community ambulation, identifying both the physical condition and the accessibility of the footpaths as issues. They noted issues such as uneven and cracked paths that were challenging and a barrier to walking but also the accessibility of the footpaths, often blocked by cars or dustbins which caused difficulty in negotiating the path with the potential to have to step down onto the road which brings another level of hazard from traffic. This is reflected in a Canadian study which used Photovoice Methodology to investigate how a community environment shapes physical activity (Belon et al., 2014). Their study identified four environment types; physical, sociocultural, economic and political environments with the majority of

themes linked to the physical environment (56.6%). Participants described both the issues with availability, accessibility and poor physical condition of the footpath as barriers to physical activity. These are similar findings reported in a number of other studies in this area (Lockett et al., 2005; Chaudhury et al., 2012). Perceived physical environmental barriers to outdoors mobility have also been associated with loneliness among community dwelling older adults (Rantakokko et al., 2014).

Awareness of these environmental factors are important for clinicians and it is reasonable to suggest targeting them in rehabilitation, exposing older adults to differing and challenges environments, completing task specific practice such as walking on grass and uneven pavements.

5.2.9 (ii) Community surroundings (sociocultural environments)

Participants in this study photographed and discussed aspects of their neighbourhood and community which they perceived to impact or encourage them to be community ambulant. Barriers included the walking distance to local bus stops together with the negative aspects of antisocial behaviour and crime. Participants in this study highlighted the fear of going out, especially at night due to antisocial behaviour. These findings are similar to previous qualitative work by Chaudhury et al. (2012) who investigated older adults' perceptions and barriers to community ambulation. They highlighted the theme of safety and security in terms of neighbourhood atmosphere with their study participants reporting feeling unsafe and the problems of crime, graffiti and vandalism particularly in higher density areas. In contrast facilitators to community ambulation was proximity to local community amenities and distance to local shops. One participant photographed his local green space in front of his house as a facilitator to getting out in community. This correlates with previous studies in this area. Eronen et al. (2014) reported the close proximity of outdoor recreational area as facilitators for community dwelling older adults to go out for a walk. Following a Photovoice study of older adults perceptions of an age friendly community, Novek and Menec (2014), reported that participants photographed outdoor spaces such as walking trails and parks, highlighting the positive impact of the surrounding community in encouraging community ambulation.

5.2.9 (iii) Weather, seasonal differences and time of day

Weather and seasonality was discussed frequently throughout the focus groups with a large number of photographs taken of weather conditions. All participants reported the weather as a major factor in their ability to community ambulate with good weather cited as a facilitator to getting out in community, however in contrast bad weather as a barrier to getting out. Poor weather conditions namely rain, wind and low temperatures, particularly in autumn and winter brought restrictions in participant's ability to get outdoors, with leaves and ice on the footpaths being reported as the two biggest challenges. This is reflected in a previous Photovoice study by Lockett et al. (2005) however in contrast Rantakokko et al. (2014) reported it may not just be winter conditions that restrict outdoor participation, in some world locations hot summer conditions may be viewed as a barrier.

Time of day was also mentioned as a factor in community ambulation. It was discussed in relation to busyness, getting out to the shops before they became overcrowded; seasonality, with participants stating the long summer evenings a facilitator and thirdly in relation to antisocial behaviour as discussed above. In clinical practice, older adult patients report managing their community ambulation by avoiding notably busy times, for example, going out in the morning when shops are less busy and managing their community activity around school start and finishing times when there are higher volumes of people and traffic. These clinical accounts from patients are reflected both in the Photovoice substudy and the literature. Lamont et al. (2012) completed a qualitative study on community walking in people with Parkinson's Disease. Environmental factors were cited as barriers to community walking with participants reporting a dislike for crowded environments.

5.2.10 Strategies in Place to Facilitate Community Ambulation

The qualitative study detailed how the participants strategise managing themselves during community ambulation through a number of methods as detailed below.

5.2.10 (i) Social support

Participants in the study valued the support and encouragement provided to them by family and friends to getting out in community but also the majority of participants reporting the positives of social engagement when out in the shops or in the park as a facilitator to getting out in community. These findings are reflected in other research studies which report low levels of social interaction and engagement are linked to lower levels of mobility and lower life space mobility (Rosso et al., 2013). Interestingly, Gardner (2014) detailed loneliness as a facilitator to leaving the house, whereby social engagement acted as a facilitator to community ambulation. Loneliness was a term not specifically mentioned in this current study. Six out of the eight participants in the Photovoice substudy lived alone, all completed community ambulation at varying levels and similar to what Gardner (2014) found, all reported social influences and engagement as a facilitator in community ambulation. The findings from the current study suggest that clinicians are centrally placed to consider loneliness during clinical assessment and discuss the role and benefits of social interaction and participation with older adults, encouraging engagement in non-clinical community based groups and activities. This is reflected in the literature with recent studies highlighted the potential benefits of social prescribing, which may allow the social needs of an older person to be met (Ward et al., 2019).

5.2.10 (ii) Planning, internal strategies and equipment

All participants detailed a range of internal strategies they employed for coping with community ambulation as a form of self-management in order to maintain their independence. They reported being careful of steps and leaves, planning journey to suit time of day, busyness of shops, and adapting their mobility style or using equipment to facilitate getting out of the house initially for example rails at the door and then using mobility aids such as walker. This is reflected in a study completed by Gardner (2014) who following an ethnographic study of six individuals with a mean age of 82.5 years, reported that due to the complexity and challenging process that is community ambulation, older adults maintained ambulation through utilising a range of individualised strategies. The use of pedestrian crossings was mentioned as a strategy to crossing the road however

one participant did mention the time allocated to cross the road was insufficient. This corresponds with the findings from a Photovoice study of older adults examining environmental influences of walking in Ottawa, Canada. Lockett et al. (2005) reported participants revealed traffic and the associated hazards as a key barrier to community ambulation. Their study cited insufficient time to cross roads and failure of drivers to stop at crossings as a key barrier to community ambulation. A more recent study investigating 355 community dwelling older adults residing in an Irish urban area concurred with their findings. They reported that the standard time allocated at Dublin pedestrian crossings was insufficient for an ageing population (Romero-Ortuno et al., 2009).

5.3 Strengths of the Study

This is the first study to examine the factors associated with community ambulation in an older adult population attending a day hospital. This mixed methods study allowed for a novel insight into community ambulation in this population. It had a good balance of both clinical and self-reported measures, accounting for both the participant's physical and personal factors as well as the impact of the environment.

The quantitative study had minimal missing data (6.2%) with 151 cases from a total of 161 included in the final multivariate binary logistic regression model. No outliers were excluded for several reasons. Firstly, this was a small sample size. Secondly, as this study was to examine the factors associated with an older adult's ability to ambulate in community, to exclude outliers which may resulted in the exclusion of frailer participants. Finally, the statistical analysis used in this study was multivariate binary logistical regression analysis which is robust in deviations to normality assumptions.

Photovoice methodology was a novel approach and to the best of the lead researcher's (BC) knowledge, the first to study this population in Ireland. Photovoice methodology was a complementary methodology to the quantitative study. It facilitated older adults to record and discuss their views and perceptions of community ambulation gaining valuable participant insight and knowledge into the factors that impact on their ability to ambulate in the community. It was also noted the participant information sessions worked better when provided as a group

as opposed to on an individual basis, due to the generation of group discussion about community ambulation and peer learning.

Research transparency was ensured throughout the study. Bias was minimised as much as possible, through robust methodology and the use of standardised assessments and instructions. Both the quantitative and qualitative study methodology and reporting of findings adhered to the STROBE and COREQ guidelines respectively.

5.4 Limitations of the Study

This study was conducted in an urban hospital so caution is recommended in the generalisation of these findings to rural based, outpatient rehabilitation services due to differences in urban and rural communities. All of the physical performance tests of walking balance, gait speed and endurance were conducted in a clinical setting under controlled environmental conditions with no assessment of dual tasking, therefore may not truly reflect walking in the community environment.

Following an extensive literature search, no specific community ambulation questionnaire was identified for use with a community dwelling older adult population hence the Community Ambulation Questionnaire (CAQ) was utilised. The CAQ was developed for use in the stroke population and to date has not been adapted for use in other populations. Although this questionnaire suited the aims of this study it has not been validated in this study population.

A gatekeeper was used to limit bias, however this still may have been a potential issue as once the patient was suitable for inclusion, the participant was invited and provided with the study information leaflet by either the gatekeeper or the lead researcher. Assessor bias cannot be ruled out as all assessments were completed by the lead researcher.

Qualitative research bias in terms of sample size and researcher reflexivity cannot be ruled out. The Photovoice substudy did not reach its planned sample size however the lead researcher (BC) and the external validator (SC) concluded that data saturation was achieved and there was no further data to be gained from further focus groups. The lead researcher (BC) was a physiotherapist, working in the clinical setting to which all substudy participants were aware. The findings of

this study may be influenced by the lead researcher's background, however transparency was ensured throughout the study with adherence to the COREQ guidelines.

The planned sample size was reported as 160 participants, based on Peduzzi et al. (1996) calculation of ten observations per variable. Sixteen variables were initially planned, however following the pilot study, three additional variables were added (WAQ, Hoffer and 2MWT), however the sample size was not adjusted and this could be considered as a limitation. The potential impact of this possible under powering was that potentially important associations may have been missed such as the association between EF and community ambulation in this population.

The lead researcher (BC) had a full clinical caseload while carrying out this research and it was not possible to approach all eligible patients to participate. Analysis of participants compared to non-participants showed them to be similar in terms of age and gender but non-participants had TUG scores 2.36 seconds slower than the participants. The true prevalence of Community Ambulation is therefore likely lower than what this study found.

5.5 Implications for Clinical Practice

This cross sectional study identified the associations between an individual's physical ability, psychological well-being and participation in community ambulation and highlights the importance of completing an holistic assessment of this population, taking all these factors into account. Although it is reasonable to consider them in clinical practice, as was the cross sectional nature of this study, it does not indicate if rehabilitation would improve them and if so, what type and frequency of rehabilitation would be required.

This study suggested that gait speed as measured by the 10MWT is a more relevant measure to determine community ambulation than the TUG and should be considered in the clinical setting.

The Photovoice substudy highlights the unique characteristics of the older adult population and identifies a number of points which have implications in clinical practice. Firstly, the Photovoice substudy supports the quantitative findings of the association between self-efficacy and independent community ambulation and it is

reasonable to state that this should be addressed in the clinical setting. Secondly, the importance of the environment in an older adult's ability to ambulate in the community. It is reasonable that differing and challenging external environments should be addressed during treatment sessions taking into account seasonal differences. Recent studies have proposed that treatment programmes should include individualised self-management techniques through goal setting relating to life purpose (Alimujiang et al., 2019) and encouragement of practice of tasks. Finally, the role of support namely family, friends, formal carers and peer support to allow an older adult to maintain their community ambulation. This suggests the consideration of community-based groups/networks and the possible role for social prescribing for this population.

5.6 Recommendations for Future Research

Following this study, there are a number of recommendations for future research in the area of community ambulation in the older adult population. Firstly the development of a validated outcome measure of community ambulation for the use in an older adult population, consisting of physical performance measures such as gait speed, endurance and walking balance together with the more personal factors such as self-efficacy, fear of falling and executive function, in the context of the changing and challenging physical environment.

This study highlighted the differences between the difference levels of community ambulation using the CAQ. Further observational research to examine the differences between non-community ambulators as categorised in CAQ level 2 and limited community ambulators as categorised in CAQ level 3 to determine at the point of change between the two groups.

Completion of a study following community dwelling older adult patients through their multi-disciplinary team outpatient rehabilitation journey, assessing at their initial contact and again on discharge to determine any change in their level of community ambulation. A prospective experimental study, ideally randomised and controlled to identify key treatment approaches in order to maintain or return older adults to community ambulation. Examples of programmes such as 'Walk with me', a peer led intervention programme for inactive community dwelling older

adults (Tully et al., 2019), or ‘Get out of the house’, a programme encouraging individuals post stroke to get outdoors walking (Logan et al., 2014).

This current study highlighted that EF was not independently associated with community ambulation however due to the limitations of this study as considered in Section 5.4, this variable could be examined further in the community ambulation of older adults attending a day hospital with possible consideration of other measures of executive function.

This study was completed in an urban setting therefore it would be appropriate to complete a comparison study of the factors associated with community ambulation in community dwelling older adults residing in a rural setting.

5.7 Conclusion

Life expectancy has significantly increased due to multiple factors including advances in healthcare, hygiene, nutrition and education. It is essential with this increased life expectancy, older adults maintain a healthy lifestyle, social participation and quality of life and independent ambulation is key to achieving this. As the population ages, it is important that healthcare professionals develop a knowledge and understanding of how to respond to and anticipate the changing needs of an ageing population. The evidence suggests that ageing is a complex process associated with an accumulation of deficits which may lead to frailty, sarcopenia, falls, functional decline and disability.

This mixed methods study demonstrates the complexity and multifactorial nature of independent community ambulation and underscores the need for a broader, holistic approach to the assessment and treatment of community dwelling older adults. This aligns with the philosophy of the day hospital which advocates a multidisciplinary approach to patient care, utilising comprehensive geriatric assessment, identifying limitations and planning evidence based care programmes, designed to improve the functional ability and health outcomes in this population. To achieve optimal outcomes in future practice, this study highlights the importance of addressing self-efficacy in tandem with the individual's physical needs and should feature in the design and implementation of care programmes. Additional insights from the Photovoice substudy highlight the importance of personal and social factors as well as environmental challenges to achieving community ambulation. The role of the physiotherapist is central to this approach in partnering with the multidisciplinary team and the engagement of external agencies. Together they ensure that community dwelling older adults can achieve optimal levels of health and quality of life allowing them to live independently and successfully within age friendly communities.

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APPENDIX 1 STROBE Checklist

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses

1

Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

APPENDIX 2 Participant Invitation

St James's Hospital, James's Street, Dublin 8
Tel: 01 410 3000

Invitation to participate in a Physiotherapy Research Study in the Robert Mayne Day Hospital (RMDH), St James's Hospital.

'Examining the factors associated with community ambulation in an elderly day hospital population.'

I would like to invite you to participate in this study which will be carried out in the Robert Mayne Day Hospital. This research is being carried out by Senior Physiotherapist, Bronagh Conroy, as part of her Masters Degree, through the Royal College of Surgeons in Ireland. I have attached an information leaflet explaining the research study.

Please take the time to read the attached information leaflet carefully. If you have any questions about the research study or if there is anything that is not clear, please feel free to contact Bronagh Conroy to discuss your questions. Bronagh will approach you at your next visit and if you are agreeable to participate she will take consent and proceed with assessment.

Thank you for taking the time to read this information and consider taking part in this valuable research.

Contact Details:

Bronagh Conroy
Senior Physiotherapist
Robert Mayne Day Hospital
Tel: 01 4162611

APPENDIX 3 Participant Information Leaflet

Version 1, 28th June 2017

PARTICIPANT INFORMATION LEAFLET

'Examining the factors associated with community ambulation in an elderly day hospital population.'

NAME OF PRINCIPAL INVESTIGATOR: Ms Bronagh Conroy SJH,
NAME OF CO-INVESTIGATORS: Prof Frances Horgan RCSI, Dr Cunningham SJH, Ms Niamh Murphy SJH
DEPARTMENT: Physiotherapy Department, Robert Mayne Day Hospital (RMDH)

You are being invited to participate in a research study. Thank you for taking time to read this.

WHAT IS THE PURPOSE OF THE STUDY?

The study aims to develop a greater understanding of the factors that impact on an older persons ability to walk outdoors in their community.

WHY HAVE I BEEN CHOSEN TO PARTAKE IN THIS STUDY?

You are living at home and attending the Robert Mayne Day Hospital (RMDH) at St James's Hospital.

WHAT WILL HAPPEN IF I VOLUNTEER TO PARTICIPATE?

After consenting to participate in this study, we will conduct a short interview to gain specific information about you, your mobility and falls history as part of your routine initial physiotherapy assessment. We will ask you to complete a number of walking tests. You will be asked to complete a timed pen and paper task which will look at your planning and visual scanning abilities. Finally, you will be asked to complete 2 short questionnaires about yourself and your mobility confidence. Testing should take approximately 60 minutes. Following your assessment, your treatment will be planned as per normal procedure.

ARE THERE ANY RISKS INVOLVED IN PARTICIPATING?

The risks are negligible as the physical tests are routinely done by physiotherapist, and the other assessments are questionnaires. You may be slightly tired following testing, but a rest period will be provided during tests if necessary to allow for recovery. While some of the questions in the questionnaires may be sensitive, you will not be required to answer any questions you do not wish to.

ARE THERE ANY BENIFITS INVOLVED IN PARTICIPATING?
You will be contributing to our research in determining the factors associated with an older person's ability to walk outdoors and we hope to identify the best assessment to determine these factors. This will influence our future assessments and management plans for all patients attending the RMDH and the wider physiotherapy department. Your involvement in this study may also get you thinking about your community mobility.

WHAT HAPPENS IF I DO NOT AGREE TO PARTICIPATE?
Participation in this study is voluntary and you can choose not to consent or withdraw consent and stop participating at any time.

WILL MY PARTICIPATION OR WITHDRAWAL HAVE ANY IMPACT ON MY ROUTINE CARE?
If you decide not to take part it will not influence your hospital treatment in any way.

WILL MY PARTICIPATION BE CONFIDENTIAL?
Yes, all the information you provide and any information we obtain from your medical record will be confidential. All your information will be kept anonymously and any results that are presented will be averages rather than individual results that could identify you. You will be assigned a number and only this will be used on any paperwork.

INDEMNITY
This is provided by St James's Hospital.

WHO IS ORGANISING AND FUNDING THIS RESEARCH?
Bronagh Conroy, Senior Physiotherapist is conducting this research as part of her Research Masters.

HAS THIS STUDY REVIEWED BY AN ETHICS COMMITTEE? Yes

WHAT IF I HAVE ANY QUESTIONS?
If you have any questions related to any aspect of the study you may contact the researcher. It is important that you feel that all your questions have been answered.

CONTACT DETAILS
Name: Ms Bronagh Conroy, Senior Physiotherapist, Robert Mayne Day Hospital, St James's Hospital
Phone: 01 4162611

APPENDIX 4 Ethics Application

STANDARD APPLICATION FORM

For the Ethical Review of Health-Related Research Studies, which are not Clinical Trials of Medicinal Products For Human Use as defined in S.I. 190/2004

DO NOT COMPLETE THIS APPLICATION FORM
IF YOUR STUDY IS A CLINICAL TRIAL OF A MEDICINAL PRODUCT

Title of Study: Examining the variables associated with community ambulation in an elderly day hospital population.

Application Version No: 1

Application Date: 28/06/17

This Application Form is divided into Sections.

Sections A, B, C, D, E, J, K, L are Mandatory

Sections F, G, H, and I are optional. Please delete Sections F, G, H, and I if these sections do not apply to the application being submitted for review.

IMPORTANT NOTE: It is imperative that the Standard Application Form is not completed if there is any possibility that the study for review is a clinical trial of medicinal product as defined by Statutory Instrument 190/2004.

IMPORTANT NOTE: Please refer to **Section I** within the form before any attempt to complete the Standard Application Form. **Section I** is designed to assist applicants in ascertaining if their research study is in fact a clinical trial of a medicinal product.

IMPORTANT NOTE: This application form permits the applicant to delete individual questions within each section depending on their response to the preceding questions. Please respond to each question carefully and refer to the accompanying *Guidance Manual* for more in-depth advice prior to deleting any question.

SECTION A GENERAL INFORMATION

SECTION A IS MANDATORY

A1 Title of the Research Study:
Examining the variables associated with community ambulation in an elderly day hospital population.

A2 (a) Is this a multi-site study? No

If you chose 'yes' please delete questions A2 (e) and (f), If you chose 'no' please delete Questions A2 (b) (c) and (d)

A2 (e) If no, please name the principal investigator with overall responsibility for the conduct of this single-site study.

Title: Ms **Name:** Bronagh Conroy
Qualifications: BSc Physiotherapy
Position: Senior Physiotherapist
Department: Physiotherapy, Robert Mayne Day Hospital (RMDH)
Organisation: St James's Hospital
Address: James's Street, Dublin 8
Tel: 01 4162611 **E-mail**: bconroy@stjames.ie

A2 (f) For single-site studies, please name the only site where this study will take place.
St James's Hospital

A3. Details of Co-investigators:

Name of Site (if applicable): St James's Hospital
Title: Prof **Name**: Frances Horgan
Qualifications: PhD
Position: Associate Professor
Department: School of Physiotherapy
Organisation: Royal College of Surgeons in Ireland (RCSI)
Address: 123 St Stephen's Green, Dublin 2
Tel: 01 4022472 **E-mail**: fhorgan@rcsi.ie
Role in Research: Supervision

Name of Site (if applicable): St James's Hospital
Title: Dr **Name**: Conal Cunningham
Qualifications: MD
Position: Geriatrician
Department: Medicine for the Elderly
Organisation: St James's Hospital
Address: St James's Hospital, Dublin 8
Tel: 01 4162616 **E-mail**: ccunningham@stjames.ie
Role in Research: Supervision

Name of Site (if applicable): St James's Hospital
Title: Ms **Name**: Niamh Murphy
Qualifications: MSc Exercise Physiology, BSc Physio, Higher Dip Healthcare Management, MISCP
Position: Physiotherapy Manager, SCOPE Management Team
Department: Physiotherapy

Organisation: St James's Hospital
Address: St James's Hospital, Dublin 8
Tel: 01 4162486 **E-mail**: Nimurphy@stjames.ie
Role in Research: Supervision

A4. Lead contact person who is to receive correspondence in relation to this application or be contacted with queries about this application.

Name: Bronagh Conroy **Position:** Senior Physiotherapist, RMDH
Organisation: St James's Hospital
Address for Correspondence: Physio Department, St James's Hospital, Dublin 8
Tel (work): 01 4162611 **Tel (mob.):** 085 1253369 **E-mail:** bconroy@stjames.ie

A5 (a) Is this study being undertaken as part of an academic qualification?
Yes

If answer is No, please delete remaining questions in Section A

A5 (b) If yes, please complete the following:
Student Name(s): Bronagh Conroy
Academic Course: Research Masters
Academic Institution: Royal College of Surgeons in Ireland (RSCI)

A5 (c) Academic Supervisor(s):

Title: Prof **Name**: Frances Horgan
Qualifications: PhD
Position: Associate Professor
Department: School of Physiotherapy
Organisation: Royal College of Surgeons in Ireland (RCSI)
Address: 123 St Stephen's Green, Dublin 2
Tel: 01 4022472 **E-mail**: fhorgan@rcsi.ie

SECTION B STUDY DESCRIPTORS

SECTION B IS MANDATORY

B1. What is the anticipated start date of this study?
August 2017

B2. What is the anticipated duration of this study?
Data collection: 8-9months.
2 years in total to include data analysis and research paper written.

B3. Please provide a brief lay (plain English) description of the study. Please ensure the language used in your answer is at a level suitable for use in a research participant information leaflet.

This study aims to explore the factors that are associated with an older adults ability to mobilise outdoors in community. The study will be completed in a day hospital setting - the participants are living at home and attending a day hospital on a weekly basis for

a period of multidisciplinary team rehabilitation due to a change or decline in their health. Following invitation, provision of a patient information leaflet and gaining consent, the senior physiotherapist will complete a series of pen and paper tasks, questionnaire and physical tests. Information gathered will be analysed and a research paper written up. We hope to identify the best assessment to determine the factors associated with an older person's ability to mobilsie outdoors. This will influence our future assessments and management plans for all patients attending the RMDH and the wider physiotherapy department.

B4. Provide brief information on the study background.

In older adults the ability to mobilise independently is a basic and extremely important aspect of daily life, assisting with maintenance of a healthy lifestyle and a good quality of life (Asano et al, 2007). Difficulty with mobility, specifically outdoor community ambulation is a common problem and often stated as a major goal of those attending a day hospital for rehabilitation.

Community ambulation has been defined as 'independent mobility outside the home, which includes the ability to confidently negotiate uneven terrain, private venues, shopping centers and other public venues (Lord et al, 2004).' It is a complex task requiring the ability to adapt and change gait to suit a wide range of terrains and conditions, often whilst carrying out additional tasks such as carrying a load, changing directions, negotiating obstacles or engaging in social interactions (Shumway-Cook et al, 2002).

Walking distance and speed are two parameters with direct relevance to a person's ability to walk in community, however these parameters vary widely (Salbach et al 2014). Lord et al 2010 indicated that factors beyond motor control contribute to independent community ambulation in the older adult. They reported that self-efficacy was more relevant than executive function to performance in a healthy community dwelling older population. Depression has also been linked to activity avoidance in community dwelling older people, with anxiety a significant factor in falls related psychological concerns and mobility (Hull et al, 2013). This suggests that gait speed and endurance should not be considered in isolation as predictors of community ambulation in the older adult.

Due to the complexity of the task of ambulating outdoors in community, it is likely that a number of factors including physical and personal are involved in a person's ability to participate in community ambulation. This study will aim to explore and examine the different variables and the association of these multiple variables with community ambulation in community dwelling older adults who are attending a day hospital due to a change/decline in their health. All participants are living at home and have been referred to the day hospital for a weekly multidisciplinary team rehabilitation programme following a change/decline in their health.

B5. List the study aims and objectives.

Aims

- To examine the association of multiple variables with community ambulation in community dwelling older adults attending a day hospital.

Objectives

- To determine the prevalence of independent community ambulation in a day hospital group.
- To examine whether personal factors are significantly associated with community ambulation in an elderly population who are attending a day hospital.
- To examine whether impairments in gait speed/endurance, walking balance, anxiety, depression, self-efficacy and executive function are associated with

reduced ability to mobilise in the community

- To determine which variables are independently associated with community ambulation.

B6. List the study endpoints / measurable outcomes (if applicable).

Assessments completed, data analysed and research paper written up.

B7. Provide information on the study design.

Cross sectional study design with measurements taken at one single point – the initial physiotherapy assessment.

B8. Provide information on the study methodology.

Cross sectional study design. Patients attending the RMDH will be invited to participate in the study. Following informed, written consent the participant will be invited to complete a series of pen and paper tests, questionnaires and physical tests as part of their initial physiotherapy assessment. These tests will focus on multiple aspects of community ambulation. Basic demographic information, medications, co morbidities, mobility status falls history and MMSE will also be obtained from the participant, their Electronic Patient Record (EPR) or their medical chart.
Prior to testing, a pilot study will be conducted to establish the most appropriate outcomes measures for gait and self-efficacy in this patient group and also to inform the length of time required for and any difficulties with their administration. Standardised instructions will be provided for each of the outcome measures and they will be administered by the research physiotherapist Bronagh Conroy.

B9. Provide information on the statistical approach to be used in the analysis of your results (if appropriate) / source of any statistical advice.

Data will be analysed using SPSS (Statistical Package for the Social Sciences). Descriptive statistics will be used to describe the characteristics of the participants and their levels of community ambulation, using parametric and nonparametric methods as appropriate. Data will be presented using a variety of tables and graphs. Pearson correlation co-efficients (or Spearman's Rank co-efficients for non-parametic data) will be used to explore associations between the variables and community ambulation. Multiple linear regression will be used to examine what proportion of the variability in community ambulation can be explained by the variable factors.

B10 (a) Please justify the proposed sample size and provide details of its calculation (including minimum clinically important difference).

Planned sample size is 160 participants. This was calculated on the basis of 10 observations per variable (Peduzzi et al 1996). It is estimated that 20 participants will be recruited and assessed per month, over 8-9 months generating a sample of 160 - 180

B10 (b) Where sample size calculation is impossible (e.g. it is a pilot study and previous studies cannot be used to provide the required estimates) then please explain why the sample size to be used has been chosen.

N/A

B11. How many research participants are to be recruited in total?

We aim to include 160 – 180 participants.

B12 (a) How many research participants are to be recruited in each study group (where applicable)? Please complete the following table (where applicable).

Name of Study Group:	**Name of Study Group:**	**Name of Study Group:**	**Name of Study Group:**	**Name of Study Group:**
Community Ambulation	Answer	Answer	Answer	Answer
Number of Participants in this Study Group:	**Number of Participants in this Study Group:**	**Number of Participants in this Study Group:**	**Number of Participants in this Study Group:**	**Number of Participants in this Study Group:**
160 - 180	Answer	Answer	Answer	Answer

B12 (b) Please provide details on the method of randomisation (where applicable).

N/A

B13. How many research participants are to be recruited at each study site (where applicable)? Please complete the following table.

Site:	**Number of Research Participants at this site:**
St James's hospital	160 -180

SECTION C STUDY PARTICIPANTS

SECTION C IS MANDATORY

SECTION C1 PARTICIPANTS – SELECTION AND RECRUITMENT

C1.1 How will the participants in the study be selected?
The participants will be selected from patients attending the RMDH. Following their initial medical assessment on week 1 of attendance to RMDH, the patient's medical record will be screened by the principal investigator (BC) and gatekeeper (Clinical Nurse Manager, RMDH). If the patient is suitable for inclusion they will be invited to participate and given the patient information leaflet by the gatekeeper.

C1.2 How will the participants in the study be recruited?
On attendance for their physiotherapy assessment the following week (week 2), the researcher will approach the invited patient and inform them of the study asking them to read the patient information leaflet and take informed consent. The researcher will then proceed to complete the pen and paper tasks and physical tests as part of their initial assessment.

C1.3 What are the inclusion criteria for research participants?(Please justify, where necessary)

1. > 65 years
2. Community-dwelling
3. Attending RMDH
4. Able to ambulate at least 10ms with or without an assistive device
5. Able to give informed written consent

C1.4 What are the exclusion criteria for research participants? (Please justify, where necessary)

1. Inability to complete the pen and paper tests and questionnaires secondary to communication difficulties or cognition

2. Medically unstable (significant cardiac condition)

1.5 Will any participants recruited to this research study be simultaneously involved in any other research project?

Not to my knowledge

SECTION C2 PARTICIPANTS – INFORMED CONSENT

C2.1 (a) Will informed consent be obtained? Yes

C2.1 (b) If no, please justify. You must provide a full and detailed explanation as to why informed consent will not be obtained.

N/A

C2.1 (c) If yes, please outline the consent process in full. (How will consent be obtained, when, by whom and from whom etc.)

On the patient's attendance to RMDH on week 2, the lead investigator, Bronagh Conroy will approach the patient, inform the patients again of the study, answer any questions and take informed written consent.

C2.2 (a) Will participants be informed of their right to refuse to participate and their right to withdraw from this research study?

Yes

C2.2 (b) If no, please justify.

N/A

C2.3 (a) Will there be a time interval between giving information and seeking consent? Yes

C2.3 (b) If yes, please elaborate.

Participants will be provided with information on the study at least 1 week prior to giving consent.

C2.3 (c) If no, please justify and explain why an instantaneous decision is reasonable having regard to the rights of the prospective research participants and the risks of the study.

N/A

SECTION C3 ADULT PARTICIPANTS - CAPACITY

C3.1 (a) Will all adult research participants have the capacity to give informed consent? YES

If answer is Yes, please delete remaining questions in Section C3

C4.1 (a) Will any research participants be under the age of 18 i.e. Children? No

If answer is No, please delete remaining questions in Section C4

SECTION C5 PARTICIPANTS - CHECKLIST

C5.1 Please confirm if persons from any of the following groups will participate in this study. This is a quick checklist to assist research ethics committee members and to identify whether study participants include persons from vulnerable groups and to establish what special arrangements, if any, have been made to deal with issues of consent. It is recognised that not all group In this listing will automatically be vulnerable or lacking in capacity Please refer to the HSE's National Consent Policy, particularly Part 3, Section 5.

Committees are particularly interested to know if persons in any of these groups are being targeted for inclusion, as per the inclusion criteria.

(a) Healthy Volunteers No

(b) Patients Yes

- ☐ **Unconscious patients** No
- ☐ **Current psychiatric in-patients** No
- ☐ **Patients in an emergency medical setting** No

(c) Relatives / Carers of patients No

(d) Persons in dependent or unequal relationships No

- ☐ **Students** No
- ☐ **Employees / staff members** No
- ☐ **Persons in residential care** No
- ☐ **Persons highly dependent on medical care** No

(e) Intellectually impaired persons No

(f) Persons with a life-limiting condition No
(Please refer to guidance manual for definition)

(g) Persons with an acquired brain injury Yes

C5.2 If yes to any of the above, please comment on the vulnerability of the research participants, and outline the special arrangements in recognition of this vulnerability (if any).

Patients following TIA or stroke may be attending the RMDH and could be recruited for this study if they meet the inclusion criteria. Only those able to provide informed consent will be included.

C5.3 Please comment on whether women of child-bearing potential, breastfeeding mothers, or pregnant women will be included or excluded in this research study.

Excluded

SECTION D RESEARCH PROCEDURES

SECTION D IS MANDATORY

D1 (a) What activities, procedures or interventions (if any) are research participants asked to undergo or engage in for the purposes of this research study?

Participants will be asked to complete pen and paper tasks and physical assessments as part of their initial Physiotherapy Assessment (approx. 60minutes).

D1 (b) What other activities (if any) are taking place for the purposes of this research study e.g. chart review, sample analysis etc?

Demographic information (age, gender, marital status, use of assistive device, number of medications, number of co morbidities, MMSE and history of falls in the past six months) will also be gathered by the researcher and may be taken from the medical chart or Electronic Patient Record (EPR).

D2. Please provide details below of any potential harm that may result from any of the activities, procedures, interventions or other activities listed above.

We do not anticipate any potential harm caused by participation in this study as the physical tests are routinely performed by the physiotherapist, and the other assessments are questionnaires. The patient may be slightly tired following testing, but a rest period will be provided during tests if necessary to allow for recovery. Some of the questions in the questionnaires may be sensitive however the patient is not required to answer any questions they do not wish to.

If a falls risk is detected or any other issues arise, the medical team will be notified immediately.

D3. What is the potential benefit that may occur as a result of this study?

We hope to identify the best assessment to determine an older person's ability to walk outdoors in community. These findings would influence future assessments and management plans for those patients attending the RMDH and the wider physiotherapy department

D4 (a) Will the study involve the withholding of treatment?

No

D4 (b) Will there be any harms that could result from

No

withholding treatment?

D4 (c) If yes, please elaborate.

N/A

D5 (a) How will the health of participants be monitored during the study, and who will be responsible for this?

Participants will continue to receive usual, individualised physiotherapy care post assessment. If anything is highlighted during assessment, onward referral to the appropriate therapies/Dr would take place as per usual care/procedure.

D5 (b) How will the health of participants be monitored after the study, and who will be responsible for this?

N/A Participants will continue to be seen and complete individualised, goal orientated physiotherapy rehabilitation in RMDH as per usual care.

D6 (a) Will the interventions provided during the study be available if needed after the termination of the study? Non-applicable

D6 (b) If yes, please state the intervention you are referring to and state who will bear the cost of provision of this intervention?

N/A

D7. Please comment on how individual results will be managed.

Completed data collection sheets and consent forms will be gathered by the researcher (BC) and stored securely in a locked drawer in the Physiotherapy office of the RMDH, St James's Hospital. Data from these hard copies will be converted to electronic data and stored on Excel spread sheets. Electronic data from the patients EPR form will be collected and transferred onto Excel spreadsheets. The computers are password protected.

D8. Please comment on how aggregated study results will be made available.

N/A

D9. Will the research participant's general practitioner be informed that the research participant is taking part in the study (if appropriate)

No

D10. Will the research participant's hospital consultant be informed that the research participant is taking part in the study (if appropriate)?

Yes

SECTION E DATA PROTECTION

SECTION E IS MANDATORY

SECTION E1 DATA PROCESSING - CONSENT

E1.1 (a) Will consent be sought for the processing of data? Yes

E1.1 (b) If no, please elaborate. N/A

SECTION E2 DATA PROCESSING - GENERAL

E2.1 Who will have access to the data which is collected?
The principle and co investigators: BC, FH and CC

E2.2 What media of data will be collected?
Written data in the form of data collection forms will be collected as hard copies and then converted into electronic data and stored in Excel spreadsheets. Other data from the patients EPR form will be collected and transferred onto Excel spreadsheets.

E2.3 (a) Would you class the data collected in this study as anonymous, irrevocably anonymised, pseudonymised, coded or identifiable data?
Anonymous

E2.3 (b) If 'coded', please confirm who will retain the 'key' to re -identify the data? N/A

E2.4 Where will data which is collected be stored?
Completed data collection sheets and consent forms will be gathered by the investigator and stored securely in a locked drawer in the Physiotherapy office of the RMDH, SJH. Data from these hard copies will be converted to electronic data and stored on Excel spread sheets. The computers area password protected.

E2.5 Please comment on security measures which have been put in place to ensure the security of collected data.
The drawer for holding hard copy data will be locked. Computers are password protected and the folder containing the data electronically will also be password protected.

E2.6 (a) Will data collected be at any stage leaving the site(s) of origin?
No

E2.6 (b) If yes, please elaborate. N/A

E2.7 Where will data analysis take place and who will perform data analysis (if known)?
The majority of the data analysis will take place in the Physiotherapy Department or RMDH in St James's Hospital. Some data analysis may be completed in the RCSI Physiotherapy Department. This will be done by the lead investigator or co-investigators. The data file will be encrypted and will contain anonymous and non-identifiable data.

E2.8 (a) After data analysis has taken place, will data be destroyed or retained?
Retained for 5years

E2.8 (b) Please elaborate.
Data will be retained in a locked drawer or on a password protected computer as appropriate for 5 years.

E2.8 (c) If destroyed, how, when and by whom will it be destroyed?

N/A

E2.8 (d) If retained, for how long, for what purpose, and where will it be retained?

Data will be retained securely in the Physiotherapy Department in St James's Hospital for two years. Data may be used in related research and in future publications

E2.9 Please comment on the confidentiality of collected data.

Identifiable data will not be disclosed to third parties.

E2.10 (a) Will any of the interview data collected consist of audio recordings / video recordings? No

E2.10 (b) If yes, will participants be given the opportunity to review and amend transcripts of the tapes?

N/A

E2.11 (a) Will any of the study data collected consist of photographs/ videos

NO

SECTION E3 ACCESS TO HEALTH CARE RECORDS

E3.1 (a) Does the study involve access to healthcare records (hard copy / electronic)? Yes

If answer is No, please delete remaining questions in Section E3

E3.1 (b) If yes, please elaborate.

Patients will be recruited at the RMDH in SJH. RMDH records are paperless and completed on electronic patient record (EPR). Details may need to be verified from both their EPR record and medical chart.

E3.1 (c) Who will access these healthcare records?

The lead investigator

E3.1 (d) Will consent be sought from patients for research team members to access their healthcare records? Yes

If answer is Yes, please delete remaining questions in Section E3

SECTION J INDEMNITY

SECTION J IS MANDATORY

J1 Please confirm and provide evidence that appropriate insurance/indemnity is in place for this research study at each site. Yes, as an employee of SJH

J2 Please confirm and provide evidence that appropriate

insurance/indemnity is in place for this research study for each investigator.

Yes, all the research team members have appropriate indemnity from SJH and RCSI.

J3.1 Please give the name and address of the organisation / or individual legally responsible for this research study?

SJH – the study participants are attending the RMDH.

J3.2 Where an organisation is legally responsible, please specify if this organisation is:

A pharmaceutical company Yes / No
A medical device company Yes / No
A university Yes / No
A registered charity Yes / No
Other Yes / No **If yes, please specify;** St James's Hospital

J3.3 Please confirm and provide evidence of any specific additional insurance / indemnity arrangements which have been put in place, if any, by this organisation / or individual for this research study?

RCSI researchers are indemnified from RCSI

SECTION K COST AND RESOURCE IMPLICATIONS AND FUNDING

SECTION K IS MANDATORY

K1.1 Please provide details of all cost / resource implications related to this study (e.g. staff time, office use, telephone / printing costs etc.)

No. All study materials will be produced in SJH.

K2.1 (a) Is funding in place to conduct this study?

No

K2.1 (b) If no, has funding been sought to conduct this study? From where? Please elaborate. No

K2.1(e) Is the study funded by a 'for profit' organisation? No

K2.2 (a) Do any conflicts of interest exist in relation to funding or potential funding? No

K2.2 (b) If yes, please elaborate.

N/A

K3.1 (a) Will any payments (monetary or otherwise) be made to investigators?

No

K3.1 (b) If yes, please provide details of payments (including amount).

N/A

K4.1 (a) Will any payments / reimbursements (monetary or otherwise) be made to participants? No

K4.1 (b) If yes, please provide details of payments / reimbursements (including amount). N/A

SECTION L ETHICAL ISSUES

SECTION L IS MANDATORY

L1 (a) Does this project raise any additional ethical issues? No

If answer is No, please delete remaining questions in Section L.

APPENDIX 5 Ethics Approval Letter

THIS NOTEPAPER MUST NOT BE USED FOR PRESCRIPTIONS OR INVOICING PURPOSES

SJH/AMNCH Research Ethics Committee Secretariat
Claire Hartin Ph: 4142199
email: claire.hartin@amnch.ie

THE ADELAIDE & MEATH HOSPITAL, DUBLIN
INCORPORATING
THE NATIONAL CHILDREN'S HOSPITAL

TALLAGHT, DUBLIN 24, IRELAND
TELEPHONE +353 1 4142000

Ms. Bronagh Conroy
Senior Physiotherapist
St. James's Hospital
James's Street
Dublin 8

30th June 2017

Re: Examining the variables associated with community ambulation in an elderly day hospital population.

REC Reference: 2017-06 Chairman's Action (17)
(Please quote reference on all correspondence)

Dear Ms. Conroy,

The REC is in receipt of your recent application to SJH/AMNCH Research Ethics Committee in which you queried ethical approval for the above named study.

The Chairman, Dr. Peter Lavin, on behalf of the Research Ethics Committee, has reviewed your correspondence and considers this to be an audit review with no ethical issues.

Yours sincerely,

Claire Hartin
Secretary
SJH/AMNCH Research Ethics Committee

The SJH/AMNCH Joint Research and Ethics Committee operates in compliance with and is constituted in accordance with the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004 & ICH GCP guidelines.

NSV Code: WPA 00486

APPENDIX 6 Ethics Amendment Letter

8th December 2017

Dear Mr Lavin,

Re: REC Reference: 2017-06 Chairman's Action (17), request for two amendments

Title: Examining the variables associated with community ambulation in an elderly day hospital population.

I wish to submit two amendments, under the areas 'Selection and Recruitment of Participants' and 'Informed Consent'.

1. Selection and Recruitment of Participants

C1.1 How will the participants in the study be selected?

We wish to include the medical registrar in the recruitment process. The amended wording is as follows;

Proposed Amendment (in bold): The participants will be selected from patients attending the Robert Mayne Day Hospital (RMDH). Following their initial medical assessment on Week 1 of attendance to RMDH, the patient's medical record will be screened by the principal investigator (BC) and **gatekeeper (Clinical Nurse Manager or Registrar, RMDH).** If the patient is suitable for inclusion they will be invited to participate **either on Week 1 or Week 2 of attendance to RMDH.** They will be provided with the patient information leaflet **by either the gatekeepers or the principal investigator.**

2. Informed Consent

C2.3 Will there be a time interval between giving information and seeking consent?

We would like to submit the following amendment so that patients can be approached at Week 1 or 2 of attendance.

Proposed Amendment wording: Participants will be invited and provided with study information on either Week 1 or Week 2 of attendance. If invitation and information is to be provided on Week 2 (day of Physiotherapy Assessment), participants will be approached on their arrival, invited to participate and provided with the information. They will be given sufficient time to read material prior to proceeding with consent.

Thank you for taking the time to review these amendments.

Kind regards

Bronagh Conroy, Senior Physiotherapist, St James's Hospital Tel. 01 416 2611

APPENDIX 7 Amendment Approval Letter

THIS NOTEPAPER MUST NOT BE USED FOR PRESCRIPTIONS OR INVOICING PURPOSES

SJH/AMNCH Research Ethics Committee Secretariat
Claire Hartin Ph: 4142199
email: claire.hartin@amnch.ie

THE ADELAIDE & MEATH HOSPITAL, DUBLIN
INCORPORATING
THE NATIONAL CHILDREN'S HOSPITAL

TALLAGHT, DUBLIN 24, IRELAND
TELEPHONE +353 1 4142000

Ms. Bronagh Conroy
Senior Physiotherapist
St. James's Hospital
James's Street
Dublin 8

11th December 2017

Re: Examining the variables associated with community ambulation in an elderly day hospital population.

REC Reference: 2017-12 List 45 (12)
(Please quote reference on all correspondence)

Dear Ms. Conroy,

Thank you for your recent correspondence to SJH/AMNCH Research Ethics Committee in which you submitted an amendment in relation to the above referenced study.

The Chairman, Dr. Peter Lavin, on behalf of the Research Ethics Committee, has reviewed this request and grants permission for this amendment.

Yours sincerely,

Claire Hartin
Secretary, SJH/AMNCH Research Ethics Committee

The SJH/AMNCH Joint Research and Ethics Committee operates in compliance with and is constituted in accordance with the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004 & ICH GCP guidelines.

NSV Code: W7A 1W8R

APPENDIX 8 RCSI Ethics Approval Letter

Royal College of Surgeons in Ireland
The Research Ethics Committee
121 St. Stephens Green, Dublin 2, Ireland.
Tel: +353 1 4022205 Email: recadmin@rcsi.ie

Dr David Smith, Acting Chair
Dr Niamh Clarke, Convenor

29th January 2018

Ms Bronagh Conroy
Physiotherapy, RMDH,
St James's Hospital,
James's Street,
Dublin 8

Ethics Reference No:	REC1513 (accepted from SJH/AMNCH REC Tallaght Hospital)
Project Title:	Examining the variables associated with community ambulation in an elderly day hospital population.
Researchers Name (PI & Lead Applicant):	Ms Bronagh Conroy (St James's Hospital)
Other Individuals Involved:	Prof. Frances Horgan (RCSI, Department of Physiotherapy), Dr Dr Conal Cunningham and Ms Niamh Murphy (both from St James's Hospital)

Dear Ms Conroy,
Thank you for your Research Ethics Committee (REC) application. The RCSI HREC accepts the ethical approval granted by SJH/AMNCH REC Tallaght Hospital for the research study (details above) submitted by Ms Conroy.

This letter provides approval for data collection for the time requested in your application and for an additional 6 months. This is to allow for any unexpected delays in proceeding with data collection. Therefore this research ethics approval will expire on **1st February 2020.**

Where data collection is necessary beyond this point, approval for an extension must be sought from the Research Ethics Committee.

This ethical approval is given on the understanding that:

- All personnel listed in the approved application have read, understand and are thoroughly familiar with all aspects of the study.
- Any significant change which occurs in connection with this study and/or which may alter its ethical consideration must be reported to the REC, and an ethical amendment submitted where appropriate.
- **A final report will be submitted to the REC upon completion of the project.**

We wish you all the best with your research.

Yours sincerely,

Niamh Clarke

PP Dr Niamh Clarke (Convenor)
Dr David Smith (Acting Chair)

APPENDIX 9 Consent Form

ST. JAMES'S HOSPITAL
DUBLIN . IRELAND

Version 1, 28th June 2017

PATIENT CONSENT FORM

STUDY TITLE: Examining the factors associated with community ambulation in an elderly day hospital population.

PLEASE TICK YOUR RESPONSE IN THE APPROPRIATE BOX

- I have read and understood the Participant Information YES □ NO □
- I have had the opportunity to ask questions and discuss the study YES □ NO □
- I have received satisfactory answers to all my questions YES □ NO □
- I have received enough information about this study YES □ NO □
- I understand that I am free to withdraw from the study at any time without giving a reason and without this affecting my future medical care YES □ NO □
- I give permission for the researchers to look at my medical record YES □ NO □
- I give permission for information collected about me to be stored or electronically processed for the purpose of scientific research YES □ NO □
- I agree to take part in the study YES □ NO □

Participant's Signature: _____

Date: _____

Participant's Name in print: _____

Investigator's Signature: _____

Date: _____

Investigator's Name in print: _____

APPENDIX 10 Data Collection Sheet

Data Collection Form

Subject Number: _____ **Date of testing:** _____

D.O.B:_____ **Age:** _____ **MMSE:** _____

Male ☐ **Female** ☐

Marital Status: _____ **Living status:** _____

Use of assistive device: Yes ☐ No ☐ **If yes**, Indoors: _____ Outdoors: _____

Have you fallen in the past six months? Yes ☐ No ☐ If yes how often? _____

Medications: ☐ **Polypharmacy:** Yes ☐ No ☐

_____
_____
_____
_____

Co-morbidities: ☐

_____
_____
_____
_____

Outcome measures

MEASURE	SCORE
Community Ambulation Questionnaire	
Walking Ability Questionnaire	
Trail Making Test A and B	
Timed up and go (secs)	
Gait Speed (10MWT) (m/s)	
Gait endurance (2MWT)	
Amb Self Confidence Questionnaire (ASCQ)	
Hospital Anxiety and Depression Scale	
Clinical Frailty Scale	
Hoffer Classification	
Clinical Assessment of ambulation	

APPENDIX 11 Community Ambulation Questionnaire (Lord et al., 2004)

Community ambulation questionnaire

1. **How important is it for you to be able to get out of the home?**

Not important ☐ Mildly important ☐ Important ☐ Very important ☐ Essential ☐

2. **Which places outside the home did you like to get to before your stroke? (Please list a maximum of 3 types of places, in order of preference)**

_____

3**. Are you able to get out and about, by yourself, without physical assistance or supervision from anyone?**

Outdoors (eg, as far as the letterbox) but no farther ☐ (go to question 5)

Yes ☐ (Give up to 3 examples.) No ☐ (Go to question 5.)

_____

4. **Do you require special equipment to achieve this? (If yes, please state type of equipment, for example, wheelchair, scooter, type of walking aid.)**

_____

5**. Does the assistance you require to get out and about cause any problems to you or your carers? (If yes, please identify.)**

_____

_

6. **Do you have any other comments you would like to make regarding getting out of the home?**

_____

_

Based on the answers supplied, subjects are classified as

i) Unable to walk outside
ii) Can walk outside e.g. as far as the car/post box without assistance or supervision
iii) Can walk in immediate environment
iv) Can walk to shops/friends houses or activities in community

APPENDIX 12 Modified Community Ambulation Questionnaire

October 2017

Community ambulation questionnaire

1. **How important is it for you to be able to get out of the home?**

Not important ☐ Mildly important ☐ Important ☐ Very important ☐ Essential ☐

2. **Which places outside the home do you like to go to? (Please list a maximum of 3 types of places, in order of preference)**

3**. Are you able to get out and about, by yourself, without physical assistance or supervision from anyone?**

Outdoors (eg, garden, driveway, gate, footpath) but no farther ☐ (Go to question 5)

Yes ☐ (Give up to 3 examples.)

No ☐ (Go to question 5)

---

4. **Do you require special equipment to achieve this? (If yes, please state type of equipment eg, wheelchair, scooter, type of walking aid.)**

5**. Does the assistance you require to get out and about cause any problems to you or your carers? (If yes, please identify.)**

---

6. **Do you have any other comments you would like to make regarding getting out of the home? (eg environmental, personal etc.)**

Based on the answers supplied, subjects are classified as

i) Unable to walk outside
ii) Can walk outside e.g. as far as the front gate, footpath, in garden without assistance or supervision
iii) Can walk in immediate environment
iv) Can walk in wider community

Definitions for RMDH patients:
(i) Unable to walk outside: indoors in house only

(ii) Walk within house boundary i.e. garden, drive, gate, to footpath

(iii) Immediate environment: local shop, post office, hairdressers

(iv) Wider community: into city centre, using bus to outside local area e.g. into town, another town, city

APPENDIX 13 Walking Ability Questionnaire (Perry et al., 1995)

The Walking Ability Questionnaire

NAME: _____ RLAH#: _____ AGE: _____ SEX: ____ ONSET: ____
ADDRESS: _____ DIAGNOSIS: _____
TELEPHONE: _____ DATE ADMINISTERED ____ HEIGHT _ WEIGHT _____

I. MOBILITY AIDS

Wheelchair use
- ☐ None
- ☐ Sometimes
- ☐ Always

Walking Aids Use
- ☐ Straight cane
- ☐ Quad cane
- ☐ Walk cane
- ☐ Forearm crutch
- ☐ Walker (wheeled)
- ☐ Walker (pick-up)
- ☐ Other

Orthoses Use
AFO: R ☐ L ☐
Sometimes ☐ Always ☐
Sometimes ☐ Always ☐

II. EVALUATION

	Flexor Control	Extensor Control	Proprio-ception
HIP			
KNEE			
ANKLE			

III. CURRENT CUSTOMARY MODE OF MOBILITY

AREA	N/A	W/C	WALK				Comments
			Unable	Assist	Standby	Indep	
HOME							
Bathroom							
Kitchen							
Bedroom							
Entering and exiting home							
Stairs with rails							
Stairs without rails							
Curbs							
Rough uneven ground, grass, carpet, etc.							
COMMUNITY							
Appointments (Dr, Dentist)							
Church							
Grocery Store							
Neighbourhood							
Shopping center							
Uncrowded times/areas							
Unlimited							
Recreation							
Visiting friend							
Restaurant							
Vacation/trips							
Other							
Unlimited							

1. How often do you leave your home? _____
   Is this MORE OFTEN, LESS OFTEN, or the SAME as before your injury? (circle one)
2. We are developing a research program to improve walking ability. If we feel that this program would be helpful to you, are you interested in coming in for an evaluation?
   Yes ☐ No ☐

Physiological Ambulator ☐ Limited Household ☐ Unlimited Household ☐
Most Limited Community ☐ Least Limited Community ☐ Community ☐

APPENDIX 14 Modified Walking Ability Questionnaire used in this study

Walking Ability Questionnaire

1. MOBILITY AIDS

Walking Aids Use

W/S ☐ E/C ☐ RZF ☐ ZF ☐ 3WRZF ☐ 4WRZF ☐ Other ☐

Wheelchair use

Never ☐ Sometimes ☐ Always ☐

2. CURERNT CUSTOMARY MODE OF MOBILITY

				WALK			
AREA	**N/A**	**W/C 1**	**UNABLE 0**	**ASSIST 2**	**S/VISON 3**	**INDEP 4**	**COMMENT**
HOME							
Bathroom							
Kitchen							
Bedroom							
Entering & exiting house							
Stairs with rails							
Stairs without rails							
Curbs							
Rough uneven ground. Grass. Carpet etc.							
COMMUNITY							
Appointments (Dr, Dentist)							
Church							
Grocery Store							
Neighbourhood							
Shopping Centre							
• Uncrowded times/areas							
• Unlimited							
Recreation							
• Visiting friend							
• Restaurant							
• Vacation/trip							
• Other							
• Unlimited							
TOTAL SCORE							

For purpose of this study:
Supervision: standby supervision
Assist: hands on help
Grocery Store: local shop
Shopping Centre: Unlimited: Crowded times or areas eg Saturday afternoon
Recreation: Other eg theatre, concert, cinema, gym,
Recreation: Unlimited: travel

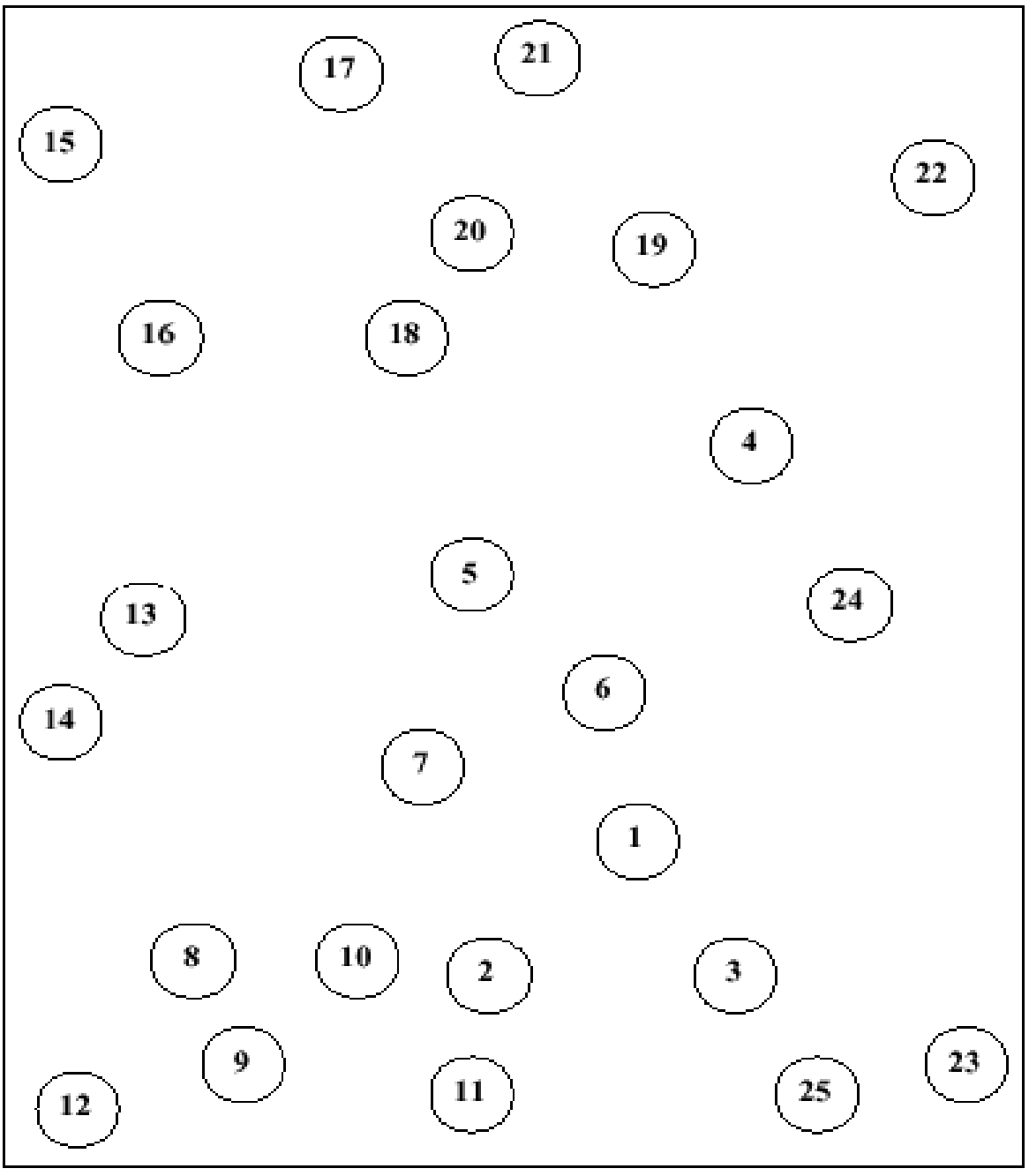
APPENDIX 15 Hoffer Classification

Modified Functional Walking Categories (Hoffer 1973, Perry et al 1995)
Physiological walker
Walks for exercise only either at home or in parallel bars during physical therapy.
Uses a wheelchair for both bathroom and bedroom mobility.
Limited household walker
Relies on walking to some extent for home activities.
Requires assistance for some walking activities, uses a wheelchair, or is unable to perform others.
If a wheelchair is needed for either bedroom or bathroom mobility, the other activity can be performed with supervision only.
Unlimited household walker
Able to use walking for all household activities without any reliance on a wheelchair.
Can perform bathroom mobility without assistance (may need supervision).
If supervision is required for both bedroom and bathroom mobility, then can enter/exit the home without a wheelchair.
Encounters difficulty with stairs and uneven terrain.
Needs at least supervision for both entering/exiting the house and managing curbs.
Most-limited community walker
Independent (without supervision) in either entering/exiting the home or managing curbs.
Can manage both entering/exiting the home and curbs without assistance.
Requires some assistance in both local store and uncrowded shopping centers.
Least-limited community walker
Can perform all moderate community activities without use of wheelchair.
Needs at least some assistance with a crowded shopping center.
Can perform without assistance (but may need supervision) in one of the following: local stores or uncrowded shopping centers.
Community walker
Independent in all home and moderate community activities.
Can accept uneven terrain.
Can negotiate a crowded shopping center with supervision only.

- *Patients in each higher category performed all activities of previous group together with the additional level of challenge listed.*

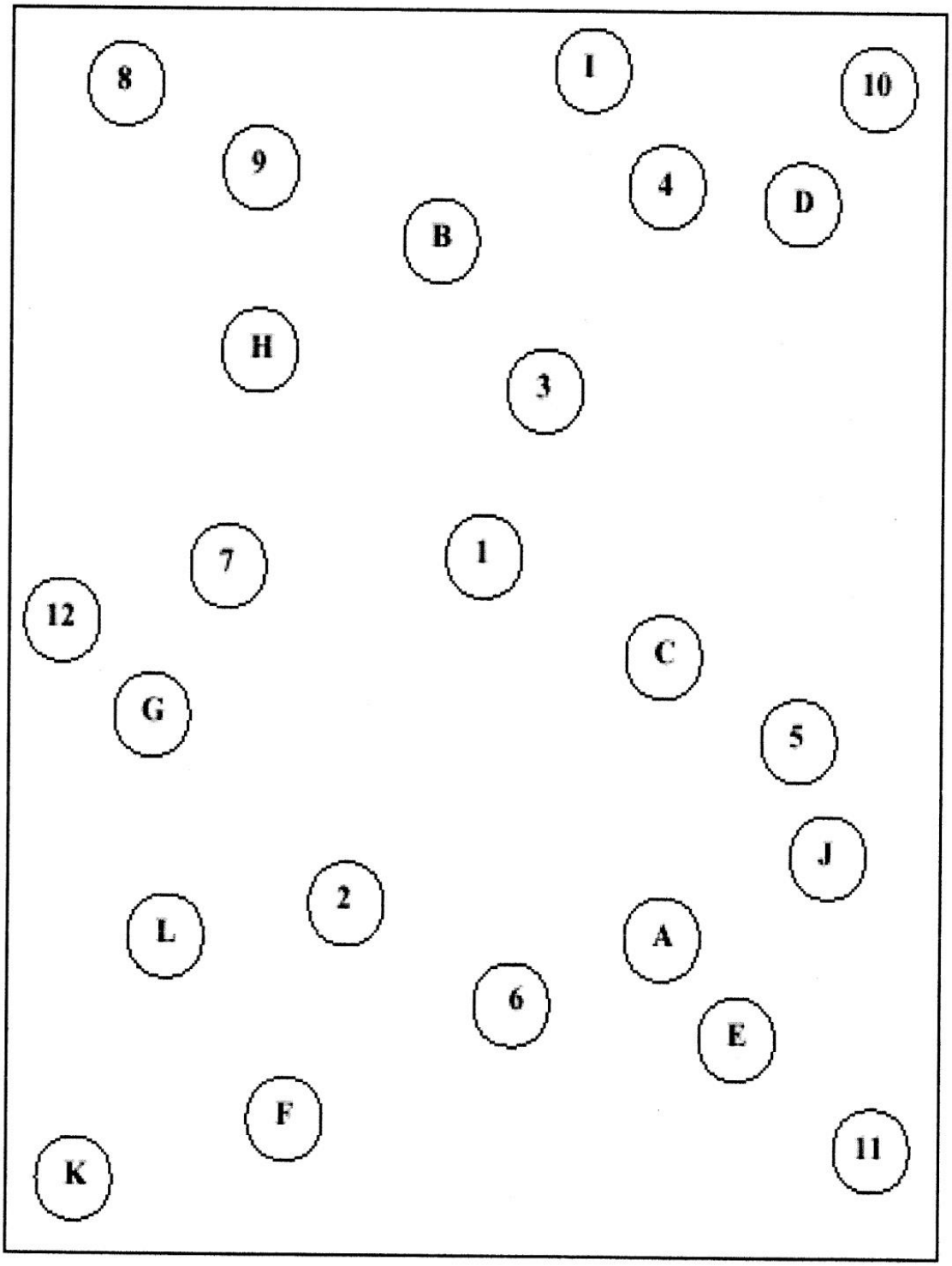
APPENDIX 16 Trail Making Test A and B

Trail Making Test Part A



Trail Making Test Part B

Patient's Name: _____ Date: _____



APPENDIX 17 Trail Making Test Normative Data (Tombaugh, 2004)

Age group 65–69 (*n* = 97)					
Education 0–12 years (*n* = 65)					
Age	67.04 (1.63)	67.00	65–69		
Education	10.87 (1.71)	12.00	5–12		
Gender	1.62 (0.49)				
Trail A (s)	39.14 (11.84)	39.00	17–71	.48	.16
Trail B (s)	91.32 (28.89)	86.00	49–190	1.23	2.12
Education 12+ years (*n* = 32)					
Age	67.22 (1.43)	67.00	65–69		
Education	15.91 (1.87)	16.00	13–21		
Gender	1.58 (0.50)				
Trail A (s)	33.84 (6.69)	32.00	23–47	.55	−.67
Trial B (s)	67.12 (9.31)	68.00	48–84	−.41	−.64
Age group 70–74 (*n* = 106)					
Education 0–12 years (*n* = 76)					
Age	71.99 (1.40)	72.00	70–74		
Education	10.50 (1.72)	11.00	6–12		
Gender	1.45 (0.50)				
Trail A (s)	42.47 (15.15)	38.00	20–89	1.47	2.51
Trail B (s)	109.95 (35.15)	101.00	45–190	.59	−.61
Education 12+ years (*n* = 30)					
Age	72.07 (1.60)	72.00	70–74		
Education	15.43 (2.21)	15.00	13–22		
Gender	1.47 (0.51)				
Trail A (s)	40.13 (14.48)	36.00	26–75	1.52	1.49
Trail B (s)	86.27 (24.07)	83.50	55–159	.97	1.26
Age group 75–79 (*n* = 108)					
Education 0–12 years (*n* = 74)					
Age	77.32 (1.35)	78.00	75–79		
Education	10.80 (1.50)	11.50	6–12		
Gender	1.58 (0.50)				
Trail A (s)	50.81 (17.44)	50.00	25–109	1.11	1.56
Trail B (s)	130.61 (45.74)	120.00	57–274	.75	.31
Education 12+ years (*n* = 34)					
Age	77.21 (1.49)	77.00	75–79		
Education	15.29 (1.80)	15.00	13–18		
Gender	1.53 (0.51)				
Trail A (s)	41.74 (15.32)	40.00	19–75	.57	−.27
Trail B (s)	100.68 (44.16)	87.00	53–207	.85	−.21
Age group 80–84 (*n* = 118)					
Education 0–12 years (*n* = 84)					
Age	81.94 (1.41)	82.00	80–84		
Education	10.48 (1.54)	11.00	7–12		
Gender	1.52 (0.50)				
Trail A (s)	58.19 (23.31)	52.50	25–116	.84	.11
Trail B (s)	152.74 (65.68)	139.50	55–315	.81	−.06
Education 12+ years (*n* = 34)					
Age	81.56 (1.52)	81.00	80–84		

Education	15.50 (2.54)	16.00	13–25		
Gender	1.41 (0.50)				
Trail A (s)	55.32 (21.28)	48.00	29–105	1.30	.91
Trail B (s)	132.15 (42.95)	128.00	67–249	1.42	1.85
Age group 85–89 (*n* = 29)					
Education 0–12 years (*n* = 16)					
Age	86.38 (1.50)	86.00	85–89		
Education	9.88 (1.96)	10.50	6–12		
Gender	1.69 (0.48)				
Trail A (s)	57.56 (21.54)	54.50	36–120	1.75	3.87
Trail B (s)	167.69 (78.50)	142.50	83–366	1.26	1.50
Education 12+ years (*n* = 13)					
Age	86.31 (1.65)	86.00	85–89		
Education	16.23 (2.45)	16.00	13–22		
Gender	1.62 (0.51)				
Trail A (s)	63.46 (29.22)	53.00	35–127	1.60	1.82
Trail B (s)	140.54 (75.38)	121.00	63–308	1.24	.77

APPENDIX 18 Timed Up and Go

Timed Up and Go (TUG) Test[1,2]

1. Equipment: arm chair, tape measure, tape, stop watch.

2. Begin the test with the subject sitting correctly in a chair with arms, the subject's back should resting on the back of the chair. The chair should be stableand positioned such that it will not move when the subject moves from sitting to standing.

3. Place a piece of tape or other marker on the floor 3 meters away from the chair so that it is easily seen by the subject.

4. Instructions : "On the word *GO* you will stand up, walk to the line on the floor, turn around and walk back to the chair and sit down. Walk at your regular pace.

5. Start timing on the word "*GO*" and stop timing when the subject is seated again correctly in the chair with their back resting on the back of the chair.

6. The subject wears their regular footwear, may use any gait aid that they normally use during ambulation, but may not be assisted by another person. There is no time limit. They may stop and rest (but not sit down) if they need to.

7. Normal healthy elderly usually complete the task in ten seconds or less. Very frail or weak elderly with poor mobility may take 2 minutes or more.

8. The subject should be given a practice trial that is not timed before testing.

9. Results correlate with gait speed, balance, functional level,the ability to go out, and can follow change over time.

10. Interpretation $\leq$ 10 seconds = normal

$\leq$ 20 seconds = good mobility, can go out alone, mobile without a gait aid.

< 30 seconds = problems, cannot go outside alone, requires a gait aid.

A score of more than or equal to fourteen seconds has been shown to indicate high risk of falls.

1. Podsiadlo D, Richardson S. *The Time "Up & Go": A Test of Basic Functional Mobility for Frail Elderly Persons.* Journal of the American Geriatrics Society 1991; 39(2): 142-148
2. Shumway - Cook A, Brauer S, Woollacott M. *Predicting the Probability for Falls in Community-Dwelling Older Adults Using the Timed Up & Go Test.* *Physical Therapy 2000 Vol 80(9): 896-903.*
Saskatoon Falls Prevention Consortium, Falls Screening and Referral Algorithm, TUG, Saskatoon Falls Prevention consortium, June, 2005

APPENDIX 19 Ten Metre Walk Test

Timed 10-Meter Walk Test

General Information:

Individual walks without assistance 10 meters (32.8 feet) and the time is measured for the intermediate 6 meters (19.7 feet) to allow for acceleration and deceleration

- start timing when the toes of the leading foot crosses the 2-meter mark
- stop timing when the toes of the leading foot crosses the 8-meter mark
- assistive devices can be used but should be kept consistent and documented from test to test
- if physical assistance is required to walk, this should not be performed

can be performed at preferred walking speed or fastest speed possible

- documentation should include the speed tested (preferred vs. fast)

collect three trials and calculate the average of the three trials

Set-up (derived from the reference articles):

- measure and mark a 10-meter walkway
- add a mark at 2-meters
- add a mark at 8-meters

Patient Instructions (derived from the reference articles):

- Normal comfortable speed: *"I will say ready, set, go. When I say go, walk at your normal comfortable speed until I say stop"*

- Maximum speed trials: *"I will say ready, set, go. When I say go, walk as fast as you safely can until I say stop"*

APPENDIX 20 Ten Metre Walk Test Normative Data (Bohannon, 1997)

Table 4. Mean (X) and standard deviation (s) of comfortable and maximum gait speed presented by sex and decade of age

	Comfortable gait speed (cm/s)				Maximum gait speed (cm/s)			
	Actual		Height-normalized[a]		Actual		Height-normalized[a]	
Sex/decade	X	s	X	s	X	s	X	s
Men								
20s	139.3	15.3	0.788	0.093	253.3	29.1	1.431	0.162
30s	145.8	9.4	0.828	0.052	245.6	31.5	1.396	0.177
40s	146.2	16.4	0.829	0.090	246.2	36.3	1.395	0.197
50s	139.3	22.9	0.794	0.119	206.9	44.8	1.182	0.259
60s	135.9	20.5	0.777	0.116	193.3	36.4	1.104	0.198
70s	133.0	19.6	0.762	0.105	207.9	36.3	1.192	0.201
Women								
20s	140.7	17.5	0.856	0.098	246.7	25.3	1.502	0.142
30s	141.5	12.7	0.864	0.087	234.2	34.4	1.428	0.206
40s	139.1	15.8	0.856	0.098	212.3	27.5	1.304	0.160
50s	139.5	15.1	0.863	0.104	201.0	25.8	1.243	0.158
60s	129.6	21.3	0.808	0.131	177.4	25.4	1.107	0.157
70s	127.2	21.1	0.807	0.131	174.9	28.1	1.110	0.176

[a] actual speed (cm/s)/height (cm).

APPENDIX 21 Two Minute Walk Test

2 Minute Walk Test Instructions

General Information:

individual walks without assistance for 2 minutes and the distance is measured
- start timing when the individual is instructed to “Go”
- stop timing at 2 minutes
- assistive devices can be used but should be kept consistent and documented from test to test
- if physical assistance is required to walk, this should not be performed
- a measuring wheel is helpful to determine distance walked

should be performed at the fastest speed possible

Set-up and equipment:

ensure the hallway free of obstacles
stopwatch

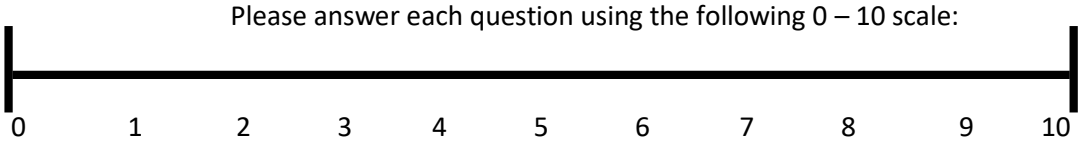
Patient Instructions (derived from references below):

“Cover as much ground as possible over 2 minutes. Walk continuously if possible, but do not be concerned if you need to slow down or stop to rest. The goal is to feel at the end of the test that more ground could not have been covered in the 2 minutes.”

APPENDIX 22 Ambulatory Self Confidence Questionnaire (Asano et al., 2007)

This questionnaire measures how confident you are in your ability to walk. If you normally walk with a walker or cane, assume you have your walking aid with you when answering each question. Please answer all items. If activities do not apply to you please guess how you would feel to perform the activity.

Please answer each question using the following 0 – 10 scale:



0 1 2 3 4 5 6 7 8 9 10

Not at all Confident — Completely Confident

On a scale of 0 – 10, **how confident are you that you are able to…**

_____a. step *up* onto a curb?
_____b. step *down* off a curb?
_____c. walk *up* a ramp (mild incline)?
_____d. walk *down* a ramp (mild incline)?
_____e. walk *up* a flight of stairs (4 steps or more) with a handrail?
_____f. walk *down* a flight of stairs (4 steps or more) with a handrail?
_____g. cross a street *with* a timed cross walk (walk signal)?
_____h. cross a street *without* a timed cross walk (walk signal)?
_____i. walk on an uneven sidewalk?
_____j. walk on grass?
_____k. walk on slippery ground: for example icy or wet surfaces?
_____l. walk in the dark or at night when it is difficult to see your feet?
_____m. walk through a crowded place: for example a busy street?
_____n. walk and talk to a companion at the same time?
_____o. carry small items while walking: for example a carton of milk?
_____p. stop walking suddenly to avoid an oncoming vehicle?
_____q. use an escalator ?
_____r. use a moving sidewalk (one at an airport)?
_____s. walk on a moving bus?
_____t. walk from one room to another in your home?
_____u. walk a short distance without stopping: for example from your home to a car?
_____v. walk a long distance without stopping: for example from your home to a bus stop?

APPENDIX 23 Permission to use ASCQ

RE: The Ambulatory Self Confidence Questionnaire - ASCQ

Miller, William [bill.miller@ubc.ca]
Sent:15 October 2017 06:04
To: Conroy, Bronagh (physiotherapy)
Cc: Bartz-McCormick, Naomi [naomi.bartz-mccormick@ubc.ca]

Bronagh
Thanks for letting me know about your impending study. I look forward to hearing the results of your work.

I have no updates to report at this time but I will keep you informed if more data comes in.

Thank you
Bill

William C. Miller, PhD, FCAOT
Associate Dean, Health Professions
Faculty of Medicine, University of British Columbia
327 - 2194 Health Sciences Mall
Woodward Instructional Resource Centre (IRC)
Vancouver, BC Canada V6T 1Z3
Phone 604 827-1347 | bill.miller@ubc.ca|
http://millerresearch.osot.ubc.ca/

-----Original Message-----
From: Conroy, Bronagh (physiotherapy) [mailto:BConroy@STJAMES.IE]
Sent: Saturday, October 14, 2017 4:03 AM
To: Miller, William <bill.miller@ubc.ca>
Subject: The Ambulatory Self Confidence Questionnaire - ASCQ

Dear Bill,
I am a Physiotherapist working in a large teaching hospital in Dublin, Ireland. I have commenced my Research Masters in the Royal College of Surgeons (RCSI) in Dublin.

Following a literature search I have decided to use the ASCQ in my research as it is capturing the information I require from my patient group.

On reading your manual I noted that you wish to compile data of usage hence I am letting you know of my intention of use but also giving my consent for you to inform me of any updates involving the ASCQ. I look forward to hearing of any updates.

Kind regards

Bronagh Conroy

Senior Physiotherapist

Day Hospital - Medicine for the Elderly Directorate

St James's Hospital

Dublin 8

Ireland

APPENDIX 24 Hospital Anxiety and Depression Scale (HADS)

Chart 1 – Hospital Anxiety and Depression Scale

This questionnaire will help your physician to know how you are feeling. Read every sentence. Place an "X" on the answer that best describes how you have been feeling during the LAST WEEK. You do not have to think too much to answer. In this questionnaire, spontaneous answers are more important.

A 1) I feel tense or wound up:
- 3 ( ) Most of the time
- 2 ( ) A lot of the time
- 1 ( ) From time to time
- 0 ( ) Not at all

D 2) I still enjoy the things I used to enjoy
- 0 ( ) Definitely as much
- 1 ( ) Not quite so much
- 2 ( ) Only a little
- 3 ( ) Hardly at all

A 3) I get a sort of frightened feeling as if something awful is about to happen
- 3 ( ) Very definitely and quite badly
- 2 ( ) Yes, but not too badly
- 1 ( ) A little, but it doesn't worry me
- 0 ( ) Not at all

D 4) I can laugh and see the funny side of things
- 0 ( ) As much as I always could
- 1 ( ) Not quite as much now
- 2 ( ) Definitely not so much now
- 3 ( ) Not at all

A 5) Worrying thought goes through my mind
- 3 ( ) A great deal of the time
- 2 ( ) A lot of the time
- 1 ( ) From time to time but not too often
- 0 ( ) Only occasionally

D 6) I feel cheerful
- 3 ( ) Not at all
- 2 ( ) Not often
- 1 ( ) Sometimes
- 0 ( ) Most of the time

A 7) I can seat at ease and feel relaxed
- 0 ( ) Definitely
- 1 ( ) Usually
- 2 ( ) Not often
- 3 ( ) Not at all

D 8) I feel as I am slowed down
- 3 ( ) Nearly all the time
- 2 ( ) Very often
- 1 ( ) Sometimes
- 0 ( ) Not at all

A 9) I get a sort of frightened feeling like butterflies in the stomach
- 0 ( ) Not at all
- 1 ( ) Occasionally
- 2 ( ) Quite often
- 3 ( ) Very often

D 10) I have lost interest in my appearance
- 3 ( ) Definitely
- 2 ( ) I don't take so much care as I should
- 1 ( ) I may not take quite as much care
- 0 ( ) I take just as much care as ever

A 11) I feel restless, as if I had to be on the move
- 3 ( ) Very much indeed
- 2 ( ) Quite a lot
- 1 ( ) Not very much
- 0 ( ) Not at all

D 12) I look forward with enjoyment to things
- 0 ( ) As much as I ever did
- 1 ( ) Rather less than I used to
- 2 ( ) Definitely less than I used to
- 3 ( ) Hardly at all

A 13) I get sudden feeling of panic
- 3 ( ) Very often indeed
- 2 ( ) Quite often
- 1 ( ) Not very often
- 0 ( ) Not at all

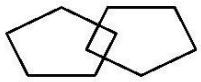
D 14) I can enjoy a good TV or radio program or book
- 0 ( ) Often
- 1 ( ) Sometimes
- 2 ( ) Not often
- 3 ( ) Very seldom

APPENDIX 25 Mini Mental State Examination (MMSE)

Mini-Mental State Examination (MMSE)

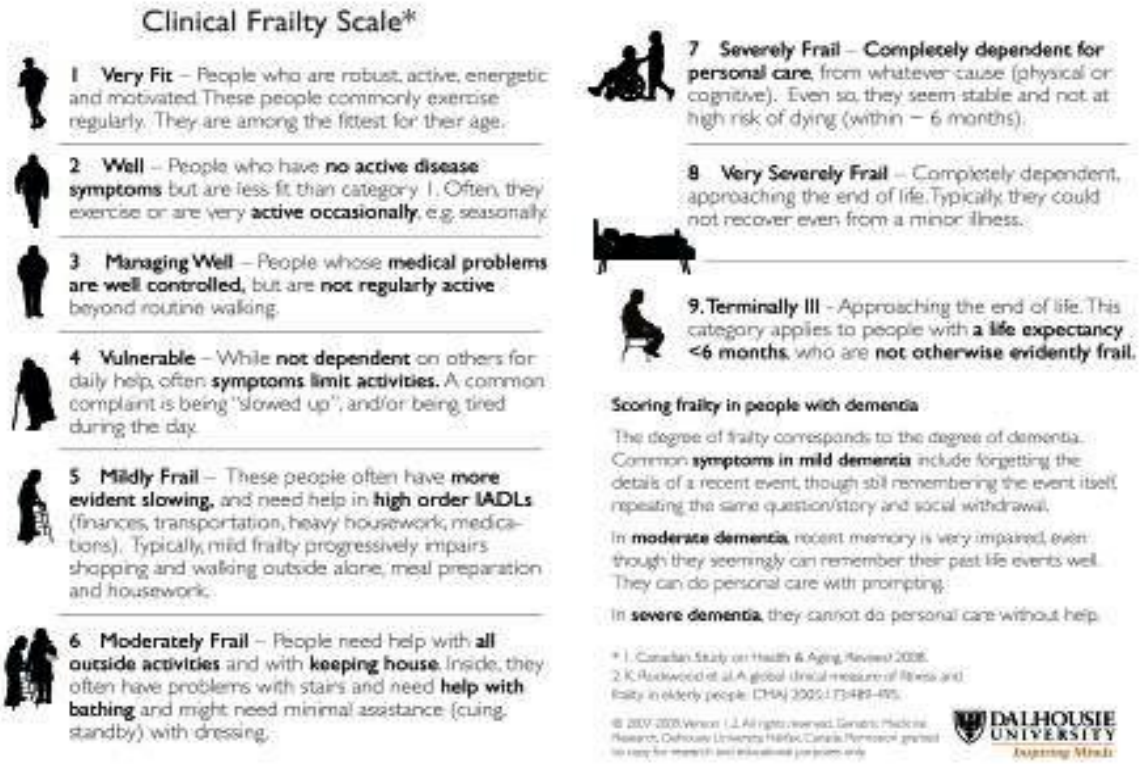
Patient's Name: _____ Date: _____

***Instructions:* Ask the questions in the order listed. Score one point for each correct response within each question or activity.**

Maximum Score	Patient's Score	Questions
5		"What is the year? Season? Date? Day of the week? Month?"
5		"Where are we now: State? County? Town/city? Hospital? Floor?"
3		The examiner names three unrelated objects clearly and slowly, then asks the patient to name all three of them. The patient's response is used for scoring. The examiner repeats them until patient learns all of them, if possible. Number of trials: _____
5		"I would like you to count backward from 100 by sevens." (93, 86, 79, 72, 65, …) Stop after five answers. Alternative: "Spell WORLD backwards." (D-L-R-O-W)
3		"Earlier I told you the names of three things. Can you tell me what those were?"
2		Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them.
1		"Repeat the phrase: 'No ifs, ands, or buts.'"
3		"Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.)
1		"Please read this and do what it says." (Written instruction is "Close your eyes.")
1		"Make up and write a sentence about anything." (This sentence must contain a noun and a verb.)
1		"Please copy this picture." (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect.) 
30		TOTAL

(Adapted from Rovner & Folstein, 1987)

APPENDIX 26 Clinical Frail Scale (CFS)



Clinical Frailty Scale*

1 **Very Fit** – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.

2 **Well** – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.

3 **Managing Well** – People whose **medical problems are well controlled,** but are **not regularly active** beyond routine walking.

4 **Vulnerable** – While **not dependent** on others for daily help, often **symptoms limit activities.** A common complaint is being "slowed up", and/or being tired during the day.

5 **Mildly Frail** – These people often have **more evident slowing,** and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.

6 **Moderately Frail** – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.

7 **Severely Frail** – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).

8 **Very Severely Frail** – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.

9. **Terminally Ill** - Approaching the end of life. This category applies to people with **a life expectancy <6 months**, who are **not otherwise evidently frail.**

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging, Revised 2008.
2. K. Rockwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

DALHOUSIE UNIVERSITY
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APPENDIX 27 Activities-specific Balance Confidence Scale (ABC)

The Activities-specific Balance Confidence (ABC) Scale*

Instructions to Participants:
For each of the following, please indicate your level of confidence in doing the activity without losing your balance or becoming unsteady from choosing one of the percentage points on the scale form 0% to 100%. If you do not currently do the activity in question, try and imagine how confident you would be if you had to do the activity. If you normally use a walking aid to do the activity or hold onto someone, rate your confidence as it you were using these supports. If you have any questions about answering any of these items, please ask the administrator.

The Activities-specific Balance Confidence (ABC) Scale*

For each of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale:

0% 10 20 30 40 50 60 70 80 90 100%
no confidence completely confident

"How confident are you that you will not lose your balance or become unsteady when you…

1. …walk around the house? ____%
2. …walk up or down stairs? ____%
3. …bend over and pick up a slipper from the front of a closet floor ____%
4. …reach for a small can off a shelf at eye level? ____%
5. …stand on your tiptoes and reach for something above your head? ____%
6. …stand on a chair and reach for something? ____%
7. …sweep the floor? ____%
8. …walk outside the house to a car parked in the driveway? ____%
9. …get into or out of a car? ____%
10. …walk across a parking lot to the mall? ____%
11. …walk up or down a ramp? ____%
12. …walk in a crowded mall where people rapidly walk past you? ____%
13. …are bumped into by people as you walk through the mall?____%
14. … step onto or off an escalator while you are holding onto a railing? ____%
15. … step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing? ____%
16. …walk outside on icy sidewalks? ____%

*Powell, LE & Myers AM. The Activities-specific Balance Confidence (ABC) Scale. *J Gerontol Med Sci* 1995; 50(1): M28-34

APPENDIX 28 Non Participant Analysis

	Assessed (N=161)	Not assessed (N=230)	p value
Age, years, (Median)	83	83	0.09
Gender, n (%)			
Male	58 (36)	89 (38.7)	
Female	103 (64)	141 (61.3)	0.59
TUG (secs), Median	16.64	19	0.01

APPENDIX 29 Normality Tests - One-Sample Kolmogorov Smirnov Test

		Age (years)	No. of Falls in Past 6/12	No of Meds
N		161	161	161
Normal Parameters[a,b]	Mean	81.60	1.05	7.65
	Std. Deviation	6.442	1.687	3.699
Most Extreme Differences	Absolute	.102	.307	.103
	Positive	.057	.307	.103
	Negative	-.102	-.267	-.055
Test Statistic		.102	.307	.103
Asymp. Sig. (2-tailed)		.000[c]	.000[c]	.000[c]

		Co-morbidities	MMSE	TMT A (sec)	TUG (sec)
N		161	157	152	160
Normal Parameters[a,b]	Mean	6.43	26.18	95.507	20.0092
	Std. Deviation	2.970	3.267	62.5910	11.33909
Most Extreme Differences	Absolute	.114	.145	.181	.153
	Positive	.114	.121	.181	.153
	Negative	-.057	-.145	-.139	-.132
Test Statistic		.114	.145	.181	.153
Asymp. Sig. (2-tailed)		.000[c]	.000[c]	.000[c]	.000[c]

		10MWT (sec)	M/S gait speed (10MT)	2MWT (m)	ASCQ
N		160	160	156	159
Normal Parameters[a,b]	Mean	9.7255	.7815	74.2021	131.11
	Std. Deviation	7.07588	.32836	32.46715	47.238
Most Extreme Differences	Absolute	.201	.070	.071	.056
	Positive	.185	.070	.071	.039
	Negative	-.201	-.038	-.032	-.056
Test Statistic		.201	.070	.071	.056
Asymp. Sig. (2-tailed)		.000[c]	.054[c]	.050[c]	.200[c,d]

		HADS A	HADS D	CFS	TMT B (sec)
N		159	159	161	152
Normal Parameters[a,b]	Mean	6.35	4.90	4.27	228.130
	Std. Deviation	4.744	3.637	1.224	79.2258
Most Extreme Differences	Absolute	.127	.151	.197	.240
	Positive	.127	.151	.136	.182
	Negative	-.091	-.110	-.197	-.240
Test Statistic		.127	.151	.197	.240
Asymp. Sig. (2-tailed)		.000[c]	.000[c]	.000[c]	.000[c]

		TMT B - TMT A	A+D
N		152	159
Normal Parameters[a,b]	Mean	132.623	11.2453
	Std. Deviation	67.9546	7.51936
Most Extreme Differences	Absolute	.088	.133
	Positive	.061	.133
	Negative	-.088	-.084
Test Statistic		.088	.133
Asymp. Sig. (2-tailed)		.006[c]	.000[c]

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

APPENDIX 30 Locations participants frequented

Location	Frequency
Local Shops/Shopping Centre	58
Parks	29
Family/friend's house	20
Church	19
Restaurants/Café/Pub	16
Into town (city centre)	15
Locations outside Dublin	7
Golf club	5
Day centre	5
Hairdressers	5
GP	4
Post office	4
Library	3
Bowls club	3
Pharmacy	2
Cinema	2
Concert hall	2
Sporting match as spectator	2
Theatre	1
Museum	1
Gym	1
Bingo	1
Betting outlet	1

APPENDIX 31 Spearman's rho Correlation

			Hoffer	CAQ	WAQ
Spearman's rho	Hoffer	Correlation Coefficient	1.000	.856**	.865**
		Sig. (2-tailed)	.	.000	.000
		N	161	161	161
	CAQ	Correlation Coefficient	.856**	1.000	.845**
		Sig. (2-tailed)	.000	.	.000
		N	161	161	161
	WAQ	Correlation Coefficient	.865**	.845**	1.000
		Sig. (2-tailed)	.000	.000	.

APPENIDIX 32 Correlations between variables

			TUG (sec)	10MWT (sec)
Spearman's rho	TUG (sec)	Correlation Coefficient	1.000	.889**
		Sig. (2-tailed)	.	.000
		N	160	160
	10MWT (sec)	Correlation Coefficient	.889**	1.000
		Sig. (2-tailed)	.000	.
		N	160	160
	M/S gait speed (10MT)	Correlation Coefficient	-.889**	-1.000**
		Sig. (2-tailed)	.000	.
		N	160	160
	2MWT (m)	Correlation Coefficient	-.814**	-.872**
		Sig. (2-tailed)	.000	.000
		N	156	156
	CFS	Correlation Coefficient	.623**	.641**
		Sig. (2-tailed)	.000	.000
		N	160	160

			M/S gait speed (10MT)	2MWT (m)
Spearman's rho	TUG (sec)	Correlation Coefficient	-.889**	-.814**
		Sig. (2-tailed)	.000	.000
		N	160	156
	10MWT (sec)	Correlation Coefficient	-1.000**	-.872**
		Sig. (2-tailed)	.	.000
		N	160	156
	M/S gait speed (10MT)	Correlation Coefficient	1.000	.872**
		Sig. (2-tailed)	.	.000
		N	160	156
	2MWT (m)	Correlation Coefficient	.872**	1.000
		Sig. (2-tailed)	.000	.
		N	156	156
	CFS	Correlation Coefficient	-.641**	-.646**
		Sig. (2-tailed)	.000	.000
		N	160	156

			CFS
Spearman's rho	TUG (sec)	Correlation Coefficient	.623**
		Sig. (2-tailed)	.000
		N	160
	10MWT (sec)	Correlation Coefficient	.641**
		Sig. (2-tailed)	.000
		N	160
	M/S gait speed (10MT)	Correlation Coefficient	-.641**
		Sig. (2-tailed)	.000
		N	160
	2MWT (m)	Correlation Coefficient	-.646**
		Sig. (2-tailed)	.000
		N	156
	CFS	Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	161

APPENDIX 33 COREQ Checklist

COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the inter view or focus group?	
Duration	21	What was the duration of the inter views or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

APPENDIX 34 Photovoice Substudy: Participant Information Leaflet

Version 2, March 2018

PARTICIPANT INFORMATION LEAFLET

'Examining the factors associated with community ambulation in an elderly day hospital population.'

NAME OF PRINCIPAL INVESTIGATOR: Ms Bronagh Conroy, St James's Hospital (SJH)
NAME OF CO-INVESTIGATORS: Prof Frances Horgan RCSI, Dr Cunningham SJH, Ms Niamh Murphy SJH
DEPARTMENT: Physiotherapy Department, Robert Mayne Day Hospital (RMDH)

You are being invited to participate in a research study. Thank you for taking time to read this.

WHAT IS THE PURPOSE OF THE STUDY?
The study aims to develop a greater understanding of the factors that impact on an older persons ability to walk outdoors in their community. There are two parts to this study:
Part A: an individual assessment as part of your routine physiotherapy assessment.
Part B: Photovoice substudy. This will allow you to share your experience through the use of photographs and group discussion.
You can participate in both Part A and B **or Part A only.

WHY HAVE I BEEN CHOSEN TO PARTAKE IN THIS STUDY?
You are living at home and attending the Robert Mayne Day Hospital (RMDH) at St James's Hospital.

WHAT WILL HAPPEN IF I VOLUNTEER TO PARTICIPATE?
Part A: After consenting to participate in this study, we will conduct a short interview to gain specific information about you, your mobility and falls history as part of your routine initial physiotherapy assessment. We will ask you to complete a number of walking tests. You will be asked to complete a timed pen and paper task which will look at your planning and visual scanning abilities. Finally, you will be asked to complete 2 short questionnaires about yourself and your mobility confidence. Testing should take approximately 60 minutes. Following your assessment, your treatment will be planned as per normal procedure.

Part B: After consenting to participate in this part of study, you will be invited to attend a one hour group information session (1:1 session can be facilitated). You will be provided with a disposal camera. You will have two weeks to take photographs of environmental or social aspects in your community which act as a barrier or facilitator to getting outdoors walking (max 16 photographs). A stamped addressed envelope will be provided to return the camera. The researcher will develop the photos. You will be invited back to attend an in-depth group interview one week later. You will be asked to pick up to four photographs – two that best represented barriers to being mobile outside the home and two that best represented facilitators. These photographs will be displayed and will form the basis for group discussion. This may last up to two hours.

ARE THERE ANY RISKS INVOLVED IN PARTICIPATING?

Part A: The risks are negligible as the physical tests are routinely done by physiotherapist, and the other assessments are questionnaires. You may be slightly tired following testing, but a rest period will be provided during tests if necessary to allow for recovery. While some of the questions in the questionnaires may be sensitive, you will not be required to answer any questions you do not wish to.

Part B: We ask you only to take photographs of what you feel comfortable taking and not to put yourself at risk. You may have a family member/friend with you to help you take the photographs.

ARE THERE ANY BENIFITS INVOLVED IN PARTICIPATING?

You will be contributing to our research in determining the factors associated with an older person's ability to walk outdoors and we hope to identify the best assessment to determine these factors. This will influence our future assessments and management plans for all patients attending the RMDH and the wider physiotherapy department. Your involvement in this study may also get you thinking about your community mobility.

WHAT HAPPENS IF I DO NOT AGREE TO PARTICIPATE?

Participation in this study is voluntary and you can choose not to consent or withdraw consent and stop participating at any time.

WILL MY PARTICIPATION OR WITHDRAWAL HAVE ANY IMPACT ON MY ROUTINE CARE?

If you decide not to take part it will not influence your hospital treatment in any way.

WILL MY PARTICIPATION BE CONFIDENTIAL?

Yes, all the information you provide and any information we obtain from your medical record will be confidential. All your information will be kept anonymously and any results that are presented will be averages rather than individual results that could identify you. You will be assigned a number and only this will be used on any paperwork.

If you participate in the Photovoice Substudy you will be required to sign a confidentiality form regarding information shared by other participants within the interview group.

INDEMNITY
This is provided by St James's Hospital.

WHO IS ORGANISING AND FUNDING THIS RESEARCH?
Bronagh Conroy, Senior Physiotherapist is conducting this research as part of her Research Masters.

HAS THIS STUDY REVIEWED BY AN ETHICS COMMITTEE? Yes

WHAT IF I HAVE ANY QUESTIONS?
If you have any questions related to any aspect of the study you may contact the researcher. It is important that you feel that all your questions have been answered.

CONTACT DETAILS:
Name: Ms Bronagh Conroy, Senior Physiotherapist, Robert Mayne Day Hospital, St James's Hospital
Phone: 01 4162611

APPENDIX 35 Photovoice Substudy: Consent Form

Version 2, March 2018

CONSENT FORM

STUDY TITLE: Examining the factors associated with community ambulation in an elderly day hospital population.

PLEASE TICK YOUR RESPONSE IN THE APPROPRIATE BOX

- I have read and understood the Participant Information
  YES □ NO □

- I have had the opportunity to ask questions and discuss the study
  YES □ NO □

- I have received satisfactory answers to all my questions
  YES □ NO □

- I have received enough information about this study
  YES □ NO □

- I understand that I am free to withdraw from the study at any time without giving a reason and without affecting my medical care
  YES □ NO □

- I give permission for the researchers to look at my medical record
  YES □ NO □

- I give permission for information collected about me to be stored or electronically processed for the purpose of scientific research
  YES □ NO □

- I agree to take part in the ambulation study
  YES □ NO □

- I agree to take part in the Photovoice study
  YES □ NO □

- I have been advised that I can see the Photovoice study focus group transcript and make changes to it
  YES □ NO □

Participant's Signature: _____

Date: _____

Participant's Name in print: _____

Investigator's Signature: _____

Date: _____

Investigator's Name in print: _____

APPENDIX 36 Photovoice Substudy: Participant Information Package

Community Ambulation Photovoice Study

Information

- We would like you to take photographs of features, places, things or situations that you see as a facilitator/enabler or barrier/hindrance to getting outdoors walking.

- We would like you to take a minimum of 6 and a maximum of 16 photographs.

- Do not put yourself at risk. Only take photographs of what you feel comfortable taking.

- You may have a family member/friend with you to help you take the photographs.

- Do not take photographs of other people in order to respect their privacy and confidentiality.

- When you get home, fill out your journal about what photos you have taken.

    - What the photography was off?
    - What is means to you?
    - Does it represent a facilitator or a barrier to walking outside?

  Don't worry if you are unable to fill out all off the information, complete what you can.

Please contact me if you have any questions

Name: Ms Bronagh Conroy, Senior Physiotherapist, Robert Mayne Day Hospital, St James's Hospital
Phone: 01 4162611

Camera Functions

Front of camera

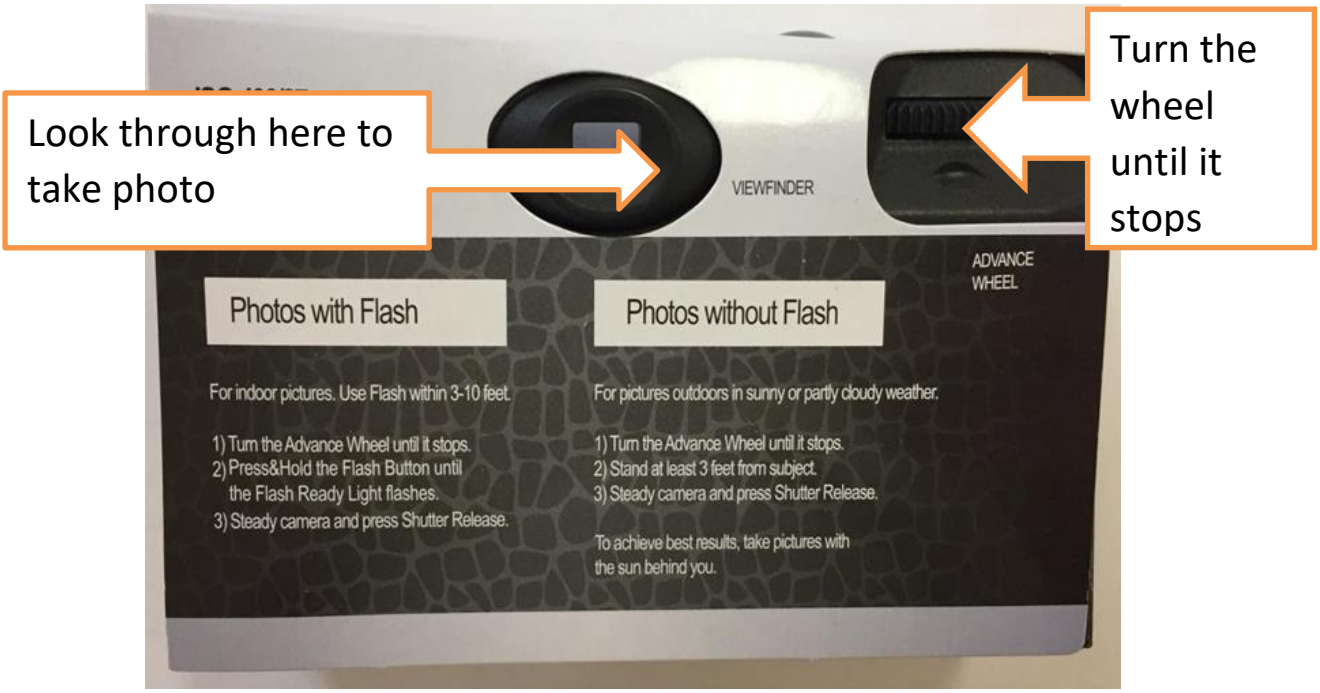
Hold this button down until the red light flashes to turn on the flash

Top of camera

This red light will flash when the flash is ready

Press this button to take photo

Back of camera



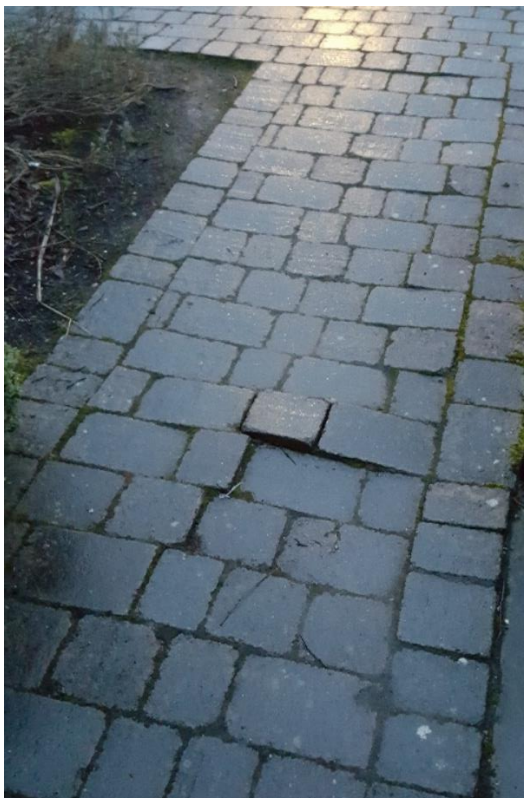
To take a photo <u>outside</u> without a flash

1. Turn the wheel until it stops
2. Look through the viewfinder to see the photo you are taking
3. Press the button on top to take the photo

To take a photo <u>inside</u> with a flash

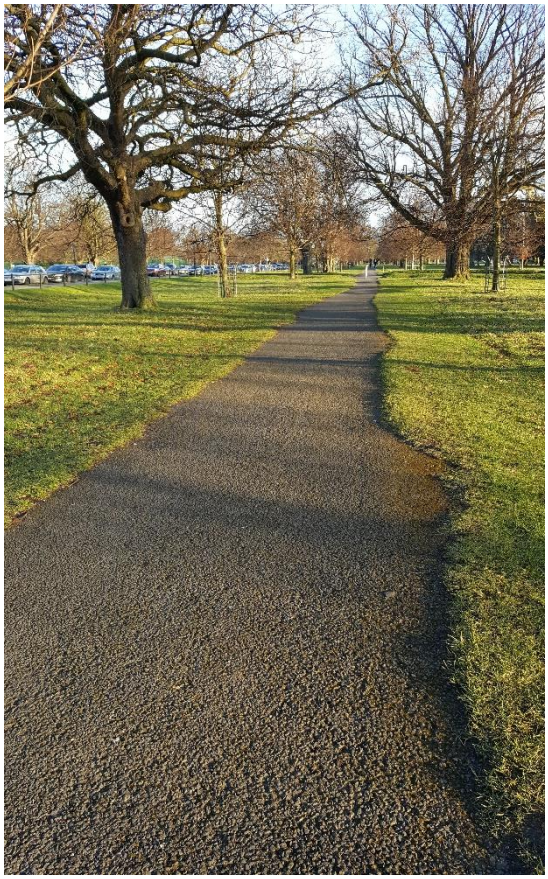
1. Turn the wheel until it stops
2. Press and hold the flash button on the front of the camera until the red light flashes
3. Look through the viewfinder to see the photo you are taking
4. Press the button on top to take the photo

Here is a Sample Photograph and Journal Entry



What is the photograph off?	What the photograph means to you.	Does it represent a barrier or a facilitator to walking outside?
The path in my estate	It makes me fearful and annoyed as I am afraid of tripping on it. I know it's there, so I often take a different route to avoid it. I have to be really careful. I don't like uneven ground.	**Barrier** ☐ **Facilitator** ☐

Here is a Sample Photograph and Journal Entry



What is the photograph off?	What the photograph means to you.	Does it represent a barrier or a facilitator to walking outside?
The park close to my house	Getting out and enjoying a walk. It's a safe, clear path away from traffic. It's also sunny and I love to get out in the good weather.	**Barrier** ☐ **Facilitator** ☐

How to return your camera?

Once you have taken the photographs, please return the camera and journal to Bronagh Conroy at your next attendance or place in the stamped address envelope provided and post it. Once I receive the camera I will develop the photographs and have them ready for the group discussion.

Please return your camera and journal by:

_____

I**n-depth discussion planned for**:

_____

Your Photograph Journal

What is the photograph off?	What the photograph means to you?	Does it represent a facilitator or a barrier to walking outside?
		Facilitator ☐ **Barrier** ☐
		Facilitator ☐ **Barrier** ☐
		Facilitator ☐ **Barrier** ☐
		Facilitator ☐ **Barrier** ☐

APPENDIX 37 Single use Camera

APPENDIX 38 Photograph Discussion with Lead Researcher

Discussion notes with Researcher

Thoughts on facilitators - things that enable or encourage you to walk outside:

Thoughts on Barriers - things that hinder or stop you from walking outside:

Name of family member/friend that may help you take the photographs:

APPENDIX 39 Summer focus group photographs

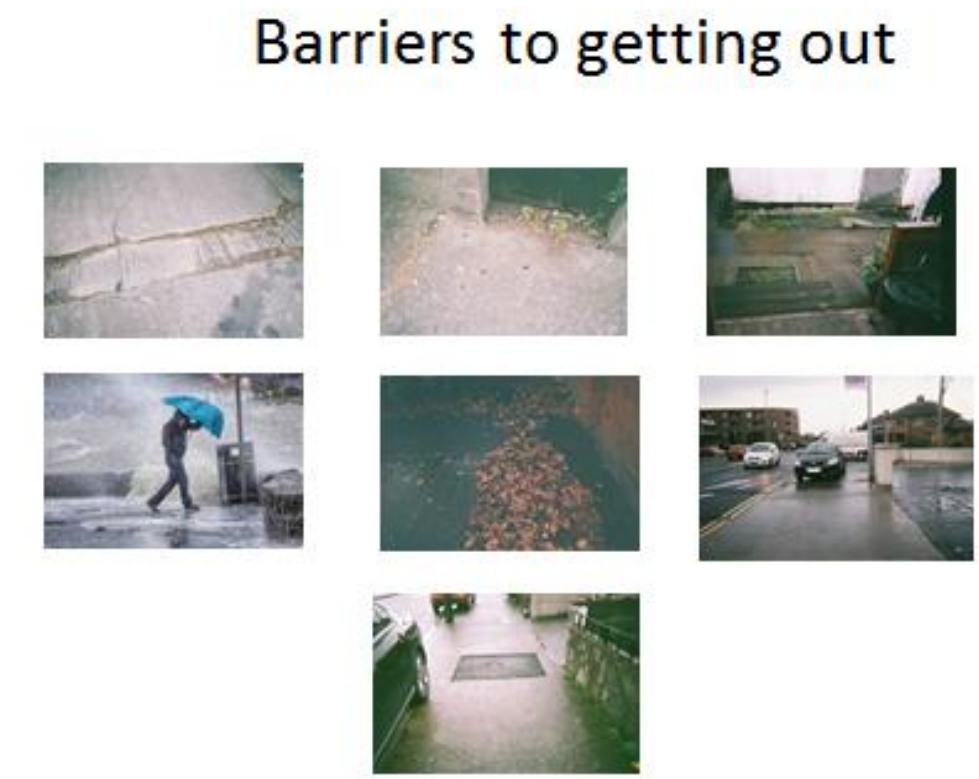
Barrier




Facilitators




Winter focus group photographs



APPENDIX 40 Topic Guide

ST. JAMES'S HOSPITAL

James's St. Dublin 8. Ireland.
Tel (+353-1) 410 3000

Topic Guide

(Version 1 Date: 5th March 2018)

Study title: Examining the factors associated with community ambulation in an elderly day hospital population.

Interviewer: Ms Bronagh Conroy, Senior Physiotherapist

Confirm consent. Turn on Dictaphone and confirm start. Record start time.

Pre-amble – Older patients have reported difficulties getting outdoors walking. We are here today to discuss what enables or hinders you to get outdoors walking. We will use the photographs displayed to assist out discussion.

Themes to be explored /open questions

1. What features in the photograph acts as a barrier to outdoor walking?
2. Describe how this makes you feel.
3. What features in the photograph acts as a facilitator to outdoor walking?
4. Describe how this assists you to get outdoors walking.
5. Do you think you have a fear of falling? Please describe.
6. How does this impact your ability to go outdoors?
7. Do you think your spouse/family are concerned about you falling down when you are outdoors?

Thank you and confirm close interview, record time
Any questions or concerns

APPENDIX 41 Ethics Amendment Letter - Photovoice Substudy

ST. JAMES'S HOSPITAL
James's St. Dublin 8. Ireland.
Tel (+353-1) 410 3000

5th March, 2018

Chairperson,
Tallaght Hospital / St. James's Hospital Joint
Research Ethics Committee,
Tallaght Hospital,
Tallaght,
Dublin 24

Ethics Committee Reference Number: Original: 2017-06 Chairman's Action (17)

Principal Investigators: Ms Bronagh Conroy, Dr Frances Horgan, Dr Conal Cunningham, Ms Niamh Murphy

Title of Study: Examining the variables associated with community ambulation in an elderly day hospital population.

Dear Chairperson

I would like to make an amendment to the above-named application, adding a Sub study which will employ the use of Photovoice methodology. Photovoice involves participants sharing their experience through the use of photographs and group discussion. Participants will be provided with cameras, allowing them to identify and record barriers and facilitators to their community ambulation. These photographs will be used to facilitate in-depth group interviews. We plan to include approximately 16 patients, who are currently attending or recently discharged from the Robert Mayne Day Hospital (RMDH) and have participated in the main community ambulation study (Appendix 1).

I wish to make changes to the Patient Information Leaflet and Consent Form to include the option to be in the Photovoice study (See attached documents Appendices 2 and 3).

I would like to request two amendments affecting the Patient Information Leaflet and Consent form.

Patient Information Leaflet: There are four proposed changes under the headings

- Purpose of the study.
- What will happen if I volunteer to participate?
- Are there any risks involved in participating?
- Will my participation be confidential?

Consent Form: One additional change requesting consent to participate in the Photovoice Study.

Those agreeing to be in the Photovoice study, will be invited to attend a training/information session where a brief orientation and participant pack will be provided (Appendix 4).

Participants will be asked to take photographs over an agreed timeframe and will then be invited back to the RMDH to attend an in-depth group interview at which the photographs will form the basis for facilitated discussion.

The group interviews will take place at a time and location convenient to participants. Interviews will be audio-recorded with the permission of participants using a Dictaphone. Audio-recordings of in-depth interviews with be transcribed verbatim and identifying details will be removed. Transcripts will be qualitatively analysed using thematic analysis by two researchers. Participants will be informed that they have the right, should they wish, to review and edit the transcripts in which they are involved.

While the content of interviews will be unique to participants I have enclosed a sample schedule of questions (Appendix 5) that are likely to be used as prompts by the researcher.

Please don't hesitate to contact me if you require further information.

Yours sincerely,

Bronagh Conroy
Senior Physiotherapist in Medicine for the Elderly

Enclosed documents
Appendix 1: V1 Photovoice proposal
Appendix 2: V2 Participant Information Leaflet
Appendix 3: V2 Consent form
Appendix 4: V1 Photovoice participant information pack
Appendix 5: V1 Interview themes

APPENDIX 42 Ethics Approval Letter Photovoice Substudy

THIS NOTEPAPER MUST NOT BE USED FOR PRESCRIPTIONS OR INVOICING PURPOSES

SJH/AMNCH Research Ethics Committee Secretariat
Claire Hartin Ph: 4142199
email: claire.hartin@amnch.ie

THE ADELAIDE & MEATH HOSPITAL, DUBLIN
INCORPORATING
THE NATIONAL CHILDREN'S HOSPITAL

TALLAGHT, DUBLIN 24, IRELAND
TELEPHONE +353 1 4142000

Ms. Bronagh Conroy
Senior Physiotherapist
St. James's Hospital
James's Street
Dublin 8

14th March 2018

Re: Examining the factors associated with community ambulation in an elderly day hospital population

REC Reference: 2018-03 List 9 (3)
(Please quote reference on all correspondence)

Dear Ms. Conway

Thank you for your recent correspondence to SJH/AMNCH Research Ethics Committee in which you requested an amendment in relation to the above referenced study.

The Chairman, Prof. Richard Deane, on behalf of the Research Ethics Committee, has reviewed this request and grants permission for this amendment.

Yours sincerely,

Claire Hartin
Secretary
SJH/AMNCH Research Ethics Committee

The SJH/AMNCH Joint Research and Ethics Committee operates in compliance with and is constituted in accordance with the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004 & ICH GCP guidelines.

NSV Code: WPA 00106