Exercise Beliefs In Elderly Nursing Home Residents: A Cross-Sectional, Case Control Study

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EXERCISE BELIEFS IN ELDERLY NURSING HOME RESIDENTS: A CROSS-SECTIONAL, CASE CONTROL STUDY

Sinéad Byrne, BSc (Physio)

A dissertation submitted in partial fulfillment of the requirements for the degree of
MSc in Neurology and Gerontology

School of Physiotherapy,
Faculty of Medicine and Health Sciences,
Royal College of Surgeons in Ireland.

September 2016

Supervisor: Dr. Frances Horgan
DECLARATION

I declare that this thesis, which I submit to RCSI for examination in consideration of the award of MSc in Neurology and Gerontology, 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.

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SUMMARY

Introduction

The number of Irish older adults receiving long term care is steadily growing in line with increased life expectancy. Nursing home residents are typically sedentary, leading to poor health and functional outcomes in this population. There is a lack of research concerning the exercise beliefs of this inactive subgroup of the older adult population.

Aims and Objectives

The primary aim of this study was to examine the hypothesis that older adults in a nursing home have poor outcome expectations for exercise, and reduced self-efficacy for exercise, when compared to older adults residing in the community. A secondary aim was to assess if an association exists between these exercise beliefs and the participants’ functional scores, number of comorbidities and psychological health.

Methods

A cross sectional, case control study design was employed, using a sample of convenience. Twenty two nursing home residents, and twenty active retirement group members (≥65 years) living independently in the community completed a written survey. Exercise beliefs were measured using the Outcome Expectations
for Exercise Scale (OEE), and the Self-Efficacy for Exercise Scale (SEE). Secondary outcome measures were the Barthel Index of Activities of Daily Living (BI), number of comorbidities, and the Geriatric Depression Scale-15 (GDS-15).

Results

The groups were significantly different in terms of age (p=0.03), number of comorbidities (p=<0.01), BI scores (p=<0.01) and GDS-15 scores (p=0.03), with nursing home participants demonstrating older age, a greater number of comorbidities, lower levels of independent function and increased presence of depressive symptoms compared to community dwelling counterparts. Self-efficacy for exercise was significantly lower amongst nursing home residents than community dwelling older adults (p=<0.01). No significant difference was found in outcome expectations for exercise between the groups (p=0.78). GDS-15 score was the only factor independently associated with either outcome expectations or self-efficacy for exercise.

Conclusion

Self-efficacy for exercise is lower amongst nursing home residents than in community dwelling older adults. Both groups demonstrate high outcome expectations for exercise. The presence of depressive symptoms is significantly associated with lower self-efficacy and outcome expectations for exercise. It is evident that the presence of depressive symptoms may represent a significant
barrier to participation in physical activity for older adults both in nursing homes and in the community.

**Implication of Findings**

This research provides the clinician with greater insight into the exercise beliefs of older adults in Irish nursing homes, and the factors associated with these beliefs. Clinically, these results support the need for the provision of education to older adults in nursing homes regarding the psychological benefits of exercise, and highlights the need for the appropriate diagnosis and treatment of depressive symptoms in this population.
ACKNOWLEDGEMENTS

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I would like to thank the members of the Carlow, Graiguecullen, Bagenalstown and Myshall Active Retirement Groups for allowing me to visit and speak with them during their monthly meetings, and also for their participation in this research.

Finally, I would like to extend my thanks to my family and friends, for their constant support, encouragement, patience, and editing skills.
INTRODUCTION

The average life expectancy of the Irish older adult is continuously increasing with advances in science and public policy. It is estimated that by 2041 the population of adults over 65 years of age will reach 1.3 – 1.4 million people; representing 20-25% of the total Irish population (Department of Health, 2013). This increased population of older adults places a high demand on the provision of health care services. In response to this increased demand, emphasis is being placed on the prevention of chronic illnesses in Irish older adults (Department of Health and Children, 2008). Partaking in regular physical activity has been linked to the prevention of many chronic illnesses in older adults (Nelson et al, 2007; Vogel et al, 2009; Taylor, 2014). As such, the active promotion of regular physical activity amongst ageing adults is a rising priority.

Currently, 6% of Irish adults over 65 years of age are residing in nursing homes (Central Statistics Office, 2012). This figure is likely to grow in line with increased life expectancy. Nursing home residents are largely inactive and can spend up to 92% of their waking hours lying or sitting (den Ouden et al, 2015). These low levels of physical activity suggest significant barriers to participation in exercise amongst this subgroup of older adults. Older adults’ beliefs about physical activity have a significant impact upon their actual exercise behaviour (Ruppar and Schneider, 2007), thus poor exercise beliefs may present a potential barrier to exercise participation in this group of older adults.
Bandura’s social learning theory (Bandura, 1977; Bandura, 1982; Bandura, 1986; cited in Grembowski et al, 1993) postulates that health behaviour is a function of two main beliefs: outcome expectations and self-efficacy for the behaviour in question. Both outcome expectations for exercise and self-efficacy for exercise are strong determinants of physical activity uptake and maintenance among older adults (Burton et al, 1999; Resnick, 2002; Warner et al, 2011). Previous research has consistently demonstrated that outcome expectations for exercise, and self-efficacy for exercise, are low amongst older adults (Carroll 1995; Conn, 1998; Clark 1999; Resnick et al, 2000b, Resnick 2001), however, no previous research has been identified which explores potential differences in these exercise beliefs between older adults residing in nursing homes, and those who reside independently in the community.

This current study aims to identify if a difference exists in outcome expectations for exercise, and self-efficacy for exercise, between older adults residing in nursing homes, and older adults in the community. It also aims to determine if any association is present between these exercise beliefs and the participants’ functional ability, health status and psychological wellbeing. If a better understanding of these exercise beliefs and their contributory factors is gained, this will allow for the development of specifically targeted exercise interventions for older adults in long term care, with the aim of maximising health and quality of life in this subgroup of older adults.
1.1 Introduction

The population of older adults in Ireland has recently increased dramatically. In the 2011 Irish census approximately 535,000 people over 65 years of age were resident in Ireland; an increase of 14.4% from the previous five years (Department of Health, 2013). Ageing is associated with an increased risk of developing many chronic health conditions such as cardiovascular disease, obesity, type II diabetes mellitus and some cancers (American College of Sports Medicine, 2009). As the population of older adults in Ireland continues to grow, it is advisable to identify and promote successful strategies to reduce this health burden, and encourage a healthier model of ageing, ensuring that quality of life accompanies quantity of years.

1.2 Older Adults and Exercise

Successful ageing is the model of healthier ageing most frequently referred to in research (Hung et al, 2010). Successful ageing is a multidimensional concept involving not only the biomedical aspect of avoidance of disease and disability, but also the maintenance of cognitive and physical function, and the capacity to actively partake in life and social activities (Rowe and Khan, 1997).

The prescription of physical activity (PA) for older patients is the main non-pharmaceutical course of action recommended for older adults in the active promotion of successful ageing (Vogel et al, 2009). Exercise has been extensively documented to provide substantial physical and psychological benefits for ageing adults, both in the community and in long term care institutions. Recent review
articles conclude that regular exercise reduces the incidence of type II diabetes mellitus, coronary heart disease, stroke, mortality rates in cancer (especially breast and colon cancer), and all-cause mortality rates, as well as significantly lowering lipid profiles, and improving body composition (Vogel et al., 2009; Taylor, 2014). Physical activity is also linked to reduced risk of developing Alzheimer’s disease and Dementia (Vogel et al., 2009), depression and anxiety, peripheral vascular disease, osteoporosis, osteoarthritis, chronic obstructive pulmonary disease, back pain and constipation (Nelson et al., 2007). The Irish Longitudinal Study on Ageing (TILDA) has shown that Irish adults reporting higher PA levels are more likely to partake in social activities, report a higher self-rating of health and quality of life, and have lower loneliness scores (Donoghue et al., 2016). A correlation has also been observed between higher PA levels in Irish adults and less disability in activities of daily living (ADL’s), lower body mass index (BMI), less anxiety and greater cognitive ability (Donoghue et al., 2016).

Similar effects of exercise can be observed even amongst frail older adults. The effects of exercise specifically in frail older adults have been examined in a systematic review (de Labra et al., 2015). Trials assessing frail older adults, and including an explicit definition of the term “frail” were included. Nine papers met the inclusion criteria. Participants were community dwelling older adults, residents of long term care facilities, and patients of acute and rehabilitation hospitals. Interventions included aerobic and resistance training, balance exercises and exercises based on strength training protocols. Papers were randomised controlled trials (RCTs) comparing exercise interventions to either no treatment, or low-level home based exercise programmes. Significant variance in effect sizes was observed, possibly attributable to heterogeneity of the interventions utilised, and differing
durations of PA programmes. However, positive effects of PA were established for falls, mobility, muscle strength, functional ability and frailty scores in frail older adults.

Current Irish guidelines recommend older adults partake in 150 minutes of moderate intensity exercise weekly (Department of Health and Children/Health Service Executive, 2009). This is concurrent with international guidelines from the American College of Sports Medicine stating that older adults should participate in 30 minutes of moderate intensity PA five days per week (Nelson et al, 2007). However, older adults rarely meet these guidelines, and are reportedly the least physically active age group (American College of Sports Medicine, 2009). TILDA reports that Irish adults are less likely to report high levels of PA as they get older, with 42% of Irish men, and 59% of Irish women over 75 years reporting low levels of PA (Donoghue et al, 2016). A sharp decline in PA levels of Irish older adults is noted with ageing, particularly amongst females, as 31% of Irish women aged 50-64 reported high levels of PA, compared to just 11% of Irish women aged 75 years and older (Donoghue et al, 2016). This pattern of decreasing PA in older adults is commonplace in industrialised countries. In Western European countries only 20% of adults over 75 years achieve the recommended 150 minutes of PA weekly (Bayingana et al, 2006). A cross-sectional study of 409 Scottish adults over 65 years (58% aged 65 – 74 years, 42% aged 75 – 84 years) revealed that despite high levels of knowledge of the health benefits of PA, PA levels remained low, with 32% of participants reporting no leisure time PA, while 53% participated in less than two hours weekly (Crombie et al, 2004).
Decreased PA levels with older age may be associated with increased levels of obesity. TILDA demonstrates that 36% of Irish adults over 50 are clinically obese (BMI ≥ 30), and a further 43% are classified as overweight (BMI 25 – 29.99), while just 16% of Irish men, and 26% of Irish women over 50 years have a normal BMI (Leahy et al, 2014).

1.3 Physical Activity in Nursing Home Residents

Nursing home (NH) residents account for 6% of adults over 65 years in Ireland (Central Statistics Office, 2012). This percentage increases with age, with 12% of Irish people aged 80 – 84 years, and 25% of Irish people aged 85 and over residing in NH’s (Centre for Ageing Research and Development in Ireland, 2011). As the population increases, demand for long-term care (LTC) services will grow, leading this figure to increase (Crocker et al, 2013). Nursing home residents make up the most dependent and disabled subset of older adults (Fried et al, 2004). Residents of LTC are inactive for the majority of their time and have low levels of interaction with staff (Holthe et al, 2007). The considerable health benefits of exercise for this subpopulation of older adults are extensively documented. A Cochrane Review (Crocker et al, 2013) identified 67 RCT’s investigating PA for residents of LTC. Trials were conducted in various locations worldwide, including America, South-America, Asia, Australasia and Europe, however, no Irish trials were detected. Trials were heterogeneous in terms of interventions applied and outcome measures utilised. Interventions included strength retraining, cardiovascular exercises, balance training, whole body vibration, Tai Chi, indoor gardening, dancing and seated exercises, among others. These interventions enhanced performance of ADL’s with statistically
significant random-effects estimates as measured by the Barthel Index of Activities of Daily Living (BI), and the Rivermead Mobility Index. A beneficial effect of PA was observed for strength, flexibility and balance. Meta-analysis of 25 papers in this study showed that rehabilitation does not increase mortality risk in residents of LTC (p=0.5). The prevalence of other adverse effects of rehabilitation, such as falls or musculoskeletal injury, could not be assessed as little evidence was reported. Most included studies demonstrated uncertain or high risk of bias, contributing to possible over-estimation of the positive effects of exercise.

1.3.1 Benefits of Exercise for Nursing Home Residents

Exercise programmes may demonstrate positive effects on strength and function in NH residents. An RCT examined the effects of three different training programmes versus a control group in 224 institutionalised older adults (mean age 81.7 years) in the Netherlands (Paw et al, 2006). Progressive resistance training was compared to functional skills training, a combination of both exercise programmes, and a control group attending a “placebo” intervention consisting of an education session. Programmes were delivered by trained physical therapists twice weekly over 24 weeks. A significant improvement in reaction time, hand-eye coordination, flexibility of the hip and spine, sit-to-stand and putting on and off a coat were demonstrated in both the functional skills training group and the combination group, compared to controls. No effect was noted for ADL-disability, however, this was assessed using an unstandardised ADL assessment. Use of a standardised, validated assessment tool may have demonstrated carryover of the above functional improvements to the ADL measurement.
An adapted Tai Chi programme and cognition-action programme (an exercise intervention conducted alongside education, aiming to introduce meaning to exercises by establishing links to everyday activities) have both shown improved maintenance of ADL components when compared to a control group receiving usual care in an RCT involving 160 institutionalised adults (aged ≥65 years) in France (Dechamps et al, 2010). Benefits were noted in elements of ADL including ability to walk, continence and nutrition, as well as a statistically significant improvement in Neuropsychiatric Inventory scores.

Further RCT’s have established the benefits of exercise for function in older adults residing in LTC. Resistance training has led to increases in functional scores (Lorenz et al, 2012), increased eccentric and concentric power of the knee extensors, improved gait velocity and sit-to-stand ability (Hruda et al, 2003), when compared to control groups receiving usual care.

Fear of falling decreases following exercise interventions in long term care as demonstrated by Gusi et al (2012). This RCT of 40 older adults (≥65 years) residing in a Spanish NH compared a balance training protocol to standard NH care. Following 12 weeks, statistically significant improvements were reported in fear of falling, as measured using the Falls Efficacy Scale International Questionnaire; dynamic balance, measured onsite using the Biodex Balance System; and isometric strength of the knee flexors and extensors. Schoenfelder and Rubenstein (2004) also established a reduction in fear of falling and improved balance following a three month programme of ankle strengthening exercises and walking compared to a control group receiving no intervention. Groups were non-randomly allocated. The observed treatment effect remained significant at three month follow-up.
The number of fall occurrences may also decrease following PA intervention. An eight week training programme incorporating light to moderate intensity resistance exercises demonstrated a reduction in number of fall occurrences in forty NH residents aged 90 to 97 (Serra-Rexach et al, 2011). The RCT compared the training protocol to a control group receiving mobility exercises and education. The mean group number of falls were 1.2 falls less per participant in the intervention group following treatment, although a baseline measurement of falls was not provided. Lower limb strength also improved, with a significant increase in one repetition maximum (1RM) in the intervention group.

Sleeping patterns of NH residents may improve following PA interventions. Richards et al (2011) compared four randomised groups for sleeping outcomes; high intensity resistance training combined with walking (exercise), social activity, a combination of social activity and exercise, and a control group receiving no additional treatment. Sleeping was measured using a portable polysomnography system. One hundred and sixty five residents of nursing homes and assisted living facilities completed the study. The exercise and social activity group showed the greatest effects for total nocturnal sleep time, however, clinically significant increases in total sleep time were noted for exercise as a sole intervention. An increase of ≥60 minutes of total nocturnal sleep time was observed in 46.3% of exercise and social activities group participants.

Exercise training has been linked to decreased urinary incontinence in an RCT of 107 NH residents (Ouslander et al, 2005). Training included prompted voiding alongside individualised functional endurance and strength training exercises four times daily, five days a week, for eight weeks. A 34% reduction in frequency of urinary incontinence was reported.
A qualitative exploration of a six month exercise programme for older NH residents in London demonstrated mainly positive experiences (Stathi and Simey, 2007). Seven residents aged 86 – 99 years reported improved quality of life following the intervention. Enhanced mobility, decreased fear of falling, and a sense of achievement were identified. The exercise programme was viewed as an opportunity to meet others, to be more active and to do something for themselves.

Though interventions assessed are heterogeneous in nature, different outcome measures utilised, and results are varied throughout the literature, a strong trend of positive outcomes of PA for older adults in NH’s is apparent.

1.3.2 Poor Physical Activity Levels in Nursing Home Residents

In spite of this evidence, NH residents typically engage in low levels of PA when compared to their community dwelling peers (Weeks et al, 2008). Nursing home residents can spend 89 – 92% of their waking hours in sitting or lying positions, according to an observational study of 723 NH residents in the Netherlands (den Ouden et al, 2015). Observations were carried out at random times between the waking hours of seven a.m. to eleven p.m. In comparison, time spent mobilising ranged from only 10% to 19% of observed time, demonstrating a high level of inactivity in this large sample of residents. A further observational study examining PA levels of 95 NH residents using time-sampled observations and Caltrac motion sensors reported that ambulatory residents spent 83.4% of their time lying or sitting (MacRae et al, 1996). Gaugler and Kane’s (2005) year-long observational study involving interview based assessments of 605 residents of assisted living facilities and 610 NH residents identified less frequent activity participation in NH residents.
These low levels of activity demonstrated a further decline over a six month period. A further cross-sectional, interview based study examined PA levels of 175 NH residents with an average of 2.9 (±1.62) comorbidities, using the Physical Activity Questionnaire (Lee et al, 2005). Activity items recorded in the scale have a corresponding intensity (kcal) to measure energy expenditure. Nursing home residents’ average levels of PA in terms of daily energy expenditure was very low. Participants demonstrated a mean PA level of 851.84kcal, while normative data for community dwelling men and women are 2129.6kcal and 1934.5kcal respectively.

Weeks et al (2008) examined PA levels of NH residents compared to community dwelling elderly subjects in a cross-sectional quantitative analysis. Seventeen community dwelling older adults and seven NH residents participated in a face-to-face interview. Profile questions included number of days per week each subject participated in vigorous/moderate/light activity of at least 20 minutes, and how many days per week they participated in sedentary activities. Seniors in the community participated in vigorous activity a mean of 4 days per week. No NH residents reported participation in any vigorous activity. Nursing home residents also participated in sedentary activities 5.3 days per week, compared to just 3.5 days per week reported by community dwelling seniors. In spite of the small sample size, this study reflects the trend of low PA levels of NH residents compared to community dwelling older adults noted throughout the literature.

Low levels of PA engagement in LTC settings suggest significant underlying barriers to participation in NHs (Benjamin et al, 2014). A review of the literature incorporating 18 studies, examined barriers to PA in residents of long term care facilities (Benjamin et al, 2014). Factors limiting participation in regular PA include poor health status, lack of energy, and physical limitations such as hemiparesis or
limited mobility. Use of sedative medications in NHs was identified as decreasing interest and ability to participate. Nursing home residents reported feeling that exercise was “too risky” due to fear of falling, or poor balance and eyesight; demonstrating poor outcome expectations, and low self-efficacy for exercise (Benjamin et al, 2014). Benjamin et al (2011) conducted focus groups incorporating NH residents, significant others and staff members, detecting differing perspectives of the barriers to PA in LTC institutions. Three themes were identified; inadequate support was available, daily routines were pervasive with little time remaining for PA, and the physical environment often limited PA participation. Environmental restrictions included narrow corridors or doorways, no parallel bars, and no room for exercise classes. When personal care activities conflicted with planned PA programmes residents typically chose personal care over PA. An examination of Canadian NH administrators’ perspectives regarding PA noted that despite positive personal views regarding the value of PA for residents, significant constraints were identified in relation to staffing and funding (Benjamin et al, 2009). A high level of dependency among residents resulted in more assistance being required to transport residents to activities and to participate in PA, while appropriate staffing levels were not available to provide this. Inadequate time was available for staff to incorporate PA into the resident’s daily care; staff might wheel residents to the dining room for meals, rather than assisting them to walk, in order to manage time demands. Cutbacks to funding had also resulted in loss of physiotherapy, occupational therapy and recreational staff.

A further qualitative study of frail older adults identified family members as a barrier to exercise. Participants reported that family members would actively
discourage participation in PA (Broderick et al, 2015). This was attributed to a desire to protect or look after them.

A lack of perceived benefits of PA also reduces participation in NH PA programmes (Chen, 2010). This qualitative study of 90 NH residents in Taiwan reported direct quotes from participants such as “I have many health problems, so I need more rest which is good for me,” demonstrating poor knowledge of the health benefits of exercise, and poor outcome expectations for exercise.

1.4 Exercise Beliefs

Older adults’ beliefs about exercise, and interpretations of their current exercise activities, influence exercise behaviour (Ruppar and Schneider, 2007). The theory of planned behaviour postulates that performance of a behaviour is regulated by three main constructs; one’s attitude towards the behaviour, subjective norms (one’s perception that people to whom one identifies or admires would approve or disapprove of the behaviour), and perceived control over the behaviour (Conn et al, 2003). This theory was tested in relation to PA in a sample of 225 community dwelling older women (≥65 years). A Likert scale was produced to measure agreement with statements relating to exercise beliefs, following preliminary qualitative interviews with 30 community dwelling older women. Physical activity levels were measured on the Baecke Physical Activity Scale. Both perceived control beliefs (p=<0.001) and behavioural beliefs (p=0.006) were significant predictors of both exercise behaviour and exercise intention in this population (Conn et al, 2003).

Poor exercise beliefs amongst older adults have previously been identified. A qualitative study of 90 NH residents in Taiwan found that a major barrier to PA was
an insufficient level of understanding of the benefits of PA, and poor exercise beliefs (Chen, 2010). Participants reported working hard for most of their lives, and now it was their time to rest. Others believed “when you grow older, your health also becomes worse. It is a natural process and nothing can change it,” and “I don’t think physical activity is worthwhile.”

An RCT investigating PA in 224 Dutch older adults residing in LTC (mean age 81.7 years) recognised poor compliance to the exercise intervention as a major limitation (Paw et al, 2006). Poor exercise beliefs were recorded as a contributory factor. Most participants reported never having exercised prior to the intervention, and maintained a belief that older people should “be careful and take it easy.”

1.4.1 Outcome Expectations for Exercise

According to Bandura’s social learning theory (Bandura, 1977; Bandura, 1982; Bandura, 1986; cited in Grembowski et al, 1993), health behaviour is a function of two main beliefs: outcome expectations and self-efficacy. Outcome expectations are the belief that completing a specific action will result in the achievement of a planned goal (Hall et al, 2012). Bandura’s social cognitive theory (Bandura 1997; cited in Chen, 2010) asserts that the expected outcome of an activity will have a significant influence on the likelihood that one will act on that outcome. The work of Resnick et al (2000a) supports this theory. Elderly residents (n=175) of a continuing care retirement community completed the Outcome Expectations for Exercise Scale, and the Yale Physical Activity Survey indicating exercise behaviour. Outcome expectations were significantly correlated to exercise behaviour, with a beta value of .51 (p=0.022).
Outcome expectations are a major determinant of the initial uptake of PA in older adults. An extensive study interviewed 2,507 older adults (aged ≥65), randomly selected medicare beneficiaries in Maryland, USA, at three time points over a four year period (Burton et al., 1999). Statistical regression concluded that belief in the importance of PA for one’s health was a significant determinant of exercise initiation (p=<0.001), alongside current health status and age.

Outcome expectations for exercise may change with advancing age. Qualitative interviews with 29 frail older Irish adults noted that although the majority associate exercise with positive health outcomes, many believed it would now have no effect on them personally due to age, medical conditions, or current levels of ability (Broderick et al., 2015).

1.4.2 Self-Efficacy for Exercise

Self-efficacy refers to one’s belief in one’s ability to effectively carry out a specific behaviour (Bandura, 1997). Self-efficacy has been recognised as an important factor in motivating older adults to participate in PA (Schutzer and Graves, 2004). Interviews of 77 older adults attending a geriatric rehabilitation programme in America revealed self-efficacy as a primary motivator for participating in rehabilitation (Resnick, 2002). When participants believed they were capable of performing an activity, they were motivated to carry out that activity. Conversely, if participants did not believe that they could carry out an activity, they did not participate in it.

Higher self-efficacy was a significant predictor (p=<0.001) of exercise activity amongst 309 German older adults with at least two comorbidities, when
accompanied by good social support (Warner et al., 2011). Participants were interviewed and completed questionnaires at three time points, at three month intervals. Participants with high self-efficacy were less likely to be active if they had poor social support, while those with low self-efficacy were less likely to be active, even if they had good social support, showing that both factors are important predictors of PA behaviour amongst German older adults.

Self-efficacy was significantly related to exercise behaviour (p=<0.05) in an RCT providing a PA intervention, while measuring self-efficacy and control beliefs both during and after the intervention (Neupert et al., 2009). Participants were 110 adults (≥60 years). The intervention consisted of home exercise programmes conducted three times per week, while two sessions included an education session utilising cognitive strategies to improve positive attitudes towards PA. Participants with higher self-efficacy following the intervention had increased involvement in exercise at three and six month follow-up. Shin et al. (2006) investigated exercise beliefs among 154 Korean women (mean age 64.6 years), both in the community and in LTC, diagnosed with osteoarthritis or osteoporosis. Exercise self-efficacy was the only independent variable which significantly influenced commitment to a plan for exercise amongst both diagnoses, accounting for 27% of variance in commitment amongst osteoporosis patients, and 53% of variance amongst those with osteoarthritis (p=<0.001).

Both self-efficacy and outcome expectations are directly related to the exercise behaviour of older adults residing in a retirement community (Resnick and D’Adamo, 2011). A sample of 163 American adults (mean age 86.6 years) were interviewed. Only 55% of participants performed PA regularly, despite having access to a wellness centre with exercise facilities. Self-efficacy expectations and
negative outcome expectations for exercise were the only variables found to directly influence levels of PA (p=<0.05). Participants with higher self-efficacy expectations, and weaker negative outcome expectations, were more likely to exercise frequently.

1.5 Changing Exercise Beliefs through Intervention

A major benefit of understanding these exercise beliefs is that they can be influenced in practice, in order to promote favourable changes in health behaviour (Bandura, 1984). A critical review of 29 RCT’s and quasi-experimental studies providing a PA intervention for adults over 50 years suggests the use of cognitive behavioural strategies to alter outcome expectations and self-efficacy expectations are more effective than health education or instruction alone in improving adherence to an exercise programme (King et al, 1998).

Education, and positive experiences of exercise have a positive effect on exercise beliefs. Twenty three adults (mean age 67 years) with chronic arthritic knee pain were interviewed before and after an education and exercise based rehabilitation programme (Hurley et al, 2010). Negative outcome expectations for exercise decreased following the intervention, positive outcome expectations were developed (e.g. exercise can reduce symptoms), and self-efficacy for exercise improved.

Exercise beliefs may be effectively influenced in a NH setting. Fourteen English NH residents aged 86 – 99 years participated in a six month falls-prevention exercise programme, partaking in qualitative interviews at baseline and post-intervention (Stathis and Simey, 2007). Initial expectations of exercise at baseline were conservative, with statements such as “I am too old to really think that it (exercise) is going to do something extraordinary for me” recorded. Many participants requested
the opinion of a trusted doctor or significant other before agreeing to partake in PA, due to fear that exercise might be harmful. Exercise beliefs improved following the six month intervention. Interview based assessments demonstrated increased enthusiasm towards PA, feelings of accomplishment, improved mobility, decreased fear of falling, and increased quality of life, all of which were attributed by participants to the exercise programme.

Exercise beliefs of older adults with dementia may also be influenced through intervention. Eight elderly nursing home residents with a diagnosis of mild – moderate dementia undertook a ten week supervised high-intensity exercise programme, completing semi-structured interviews following the intervention (Olsen et al, 2015). Self-efficacy increased following the PA intervention; participants reported feeling empowered in their everyday lives.

Grembowsk et al (1993) advise that a goal of primary care preventive services for older adults is to increase self-efficacy in order to promote behaviour change and thus reduce health risk. However, improving self-efficacy and outcome expectations to modify health behaviours is only an appropriate approach if the target population have lower self-efficacy and outcome expectations than those not at risk (Grembowski et al, 1993). No previous research has been identified which documents the outcome expectations for exercise and self-efficacy of elderly NH residents compared to those of CD older adults. It is prudent to establish if elderly NH residents’ outcome expectations and self-efficacy for exercise differ from those of older adults in the community in order to establish whether cognitive behavioural strategies are an appropriate method of treatment in this vulnerable population.
1.6 Conclusion

Despite extensive benefits of PA for the older adult, this population remains largely inactive. Exercise beliefs, including outcome expectations for exercise and self-efficacy for exercise, are significant predictors of exercise behaviour. Older adults demonstrate poor exercise beliefs, however, no previous literature has examined whether these beliefs differ between older adults residing in NH’s, who are typically less active and more dependent, and older adults in the community. This paper firstly aims to examine the exercise beliefs of a sample of older adults residing in a NH and a further sample living in the community, to determine if there is a significant difference between the two. Secondly, it aims to determine if any association exists between these beliefs and participants’ functional scores, number of comorbidities and psychological health.
CHAPTER 2 – METHODOLOGY

2.1 Aim of Study

The aim of this study was to examine the hypothesis that older adults in a nursing home setting have poor outcome expectations for exercise, and reduced self-efficacy for exercise, when compared to older adults in the community. This study also aimed to assess the association between outcome expectations and self-efficacy for exercise with participant’s functional scores, number of co-morbidities, and psychological health.

The objectives of this study were:

- To compare the Outcome Expectations for Exercise Scale (OEE) scores, and the Self-Efficacy for Exercise Scale (SEE) scores between a group of older adults residing in a nursing home, and a second group of community dwelling older adults.

- To collect information regarding participants’ medical history, functional status, and psychological well-being, and to analyse the data obtained in order to determine whether an association exists between these factors and the above exercise beliefs.
2.2 Study Design

An observational, cross-sectional, case control study design was employed, utilising questionnaires which were self-administered in the community setting, or administered by an interviewer in the NH setting. This study design enabled the researcher to capture the exercise beliefs of a group of older adults at one point in time, allowing a comparison between older adults residing in a NH and CD older adults, in order to analyse for potential correlation between residential status and exercise beliefs.

2.3 Subjects

2.3.1 Subject Recruitment

Recruitment of NH participants was by convenience sampling of residents of the NH where the Principal Investigator (PI) is employed. Residents received physiotherapy treatment on a weekly basis. Staff nurses of the NH provided a list of residents who fit the inclusion criteria for the study. Residents who met the inclusion / exclusion criteria were approached by gatekeeper nurses and invited to participate in the study. Recruitment took place from 15 November 2015 to 20 December 2015.

2.3.2 Inclusion Criteria

- Participants were aged 65 years or older. This age range is generally accepted in developed countries as the definition of an older adult (World Health Organisation (WHO), 2009).
• Participants resided in a nursing home for long term care.

• Participants maintained the capacity to independently consent to participation, as determined by staff nurses of the nursing home, who are familiar with all residents.

• Participants were English speaking, as they were required to complete English surveys, assisted by an English speaking interviewer.

2.3.3 Exclusion Criteria

• Residents with a documented diagnosis of Alzheimer’s Disease or Dementia.

• Residents who were unable to provide informed consent, as determined by staff nurses of the nursing home.

• Residents with a diagnosis of aphasia or receptive aphasia.

• Residents who were receiving palliative care.

2.4 Recruitment of Community Dwelling Control Subjects

Community dwelling older adults were recruited through convenience sampling of local Active Retirement Groups (ARGs) in the Carlow area. The PI visited local ARGs during their monthly meetings, inviting members to participate in the study. Recruitment took place from 01 November 2015 through to 31 January 2016.
2.4.1 Inclusion Criteria

- Aged 65 years or older.
- Living in the community setting.
- Able to provide written informed consent.
- Participants were English speaking.

2.4.2 Exclusion Criteria

- Aged under 65 years.
- Unable to provide written informed consent.
- Resident in a nursing home.

2.5 Sample Size

Sample size was calculated using Conroy’s sample size guide (2004) to compare the mean of two groups. The primary outcome measure (OEE) is scored from one to five; therefore it was decided that one is the smallest difference between the groups that would be of interest. The smallest significant difference was divided by the standard deviation (highest typical value minus lowest typical value, divided by four) to define the standard deviation units. Using Conroy’s guide, for 90% power, a sample size of 21 participants for each group was required. Allowing an additional 10% to account for potential return of unusable questionnaires, a sample size of 24 participants was sought for each group.
2.6 Ethical Considerations

An application for ethical approval was submitted to the Royal College of Surgeons in Ireland’s Research Ethics Committee on the 24th August 2015 (Appendix 1). Approval was granted on 22nd October 2015 (Appendix 2). Recruitment commenced on the 1st November 2015. Permission was granted from the Matron of the NH in question to conduct the study on-site (Appendix 3).

Nursing home residents are a vulnerable population. It is a policy of the NH in question to allow residents to make independent decisions where possible. Although the majority of NH residents in Ireland have some level of cognitive impairment, most are well able to communicate their wishes (Cahill and Diaz, 2012). Hellström et al (2007) argue that as cognitively impaired older adults are able to communicate their thoughts and insights, it may be unethical to exclude them from research on the sole basis of their impairment. Therefore, rather than excluding residents with mild cognitive impairment, thus creating a population unrepresentative of NH residents, nursing staff who are familiar with the residents identified those who they believed did not maintain the capacity to consent to the study. These residents were then excluded.

Nursing home participants were provided with a Participant Information Leaflet (PIL) (Appendix 4) by the gatekeepers. The aims and objectives of the research were explained at this time. Any questions were answered. Residents were ensured that their participation was voluntary, and that they may withdraw from the study at any time with no consequences to their future care in the NH. The PI then contacted the next of kin (NOK) of these residents by phone. The NOK were informed about the study, any questions were answered, and a separate
information leaflet (Appendix 5) was posted to the NOK. The NOK were encouraged to speak to the residents about the study in order to ascertain if any concerns were present. Signed, informed consent (Appendix 6) was obtained from the participants a week later, by the PI. In any case where a participant was unable to provide signed consent, the NOK was contacted and asked to sign as proxy.

The aims and objectives of the study were explained to community dwelling older adults by the PI during their monthly Active Retirement Group (ARG) meeting. Any questions or queries were answered at this time. Any members who wished to participate in the study were provided with a participation pack to take home and complete at their leisure. The participation pack contained a PIL (Appendix 7) and an Informed Consent form (Appendix 8), which participants were asked to complete and return to the PI in the included stamped, addressed envelope.

No identifiable information was included in the data collection forms. Every participant was assigned a Unique Identification Number (UIN). A master sheet recording participant’s names and UIN was encrypted and stored on the RCSI:V secure folder, accessible only to the PI and the research supervisor (Dr. Frances Horgan). Hard copies of all data collection forms were scanned to electronic format, and hard copies were then destroyed. Data was then electronically transferred to the PI’s unique project folder in the RCSI:V secure drive. Where data analysis had to be carried out away from the main server for practical reasons, an encrypted USB key was utilised to ensure data security. The storage and use of participant data was carried out in adherence with the Data Protection Acts (1988 & 2003, cited in Sheikh, 2008), and in accordance with the Royal College of Surgeons in Ireland’s (RCSI) Data Protection Policy Guidelines.
Data will be stored for a period of five years, in accordance with these guidelines.

In order to minimise the burden on NH participants, some information (the participant’s age, medical diagnosis, co-morbidities, and their BI functional scores) were obtained from the participant’s nursing files in the NH by the PI. The NH participants were informed of this in the information leaflet, and written consent was provided. Rest periods were provided when completing questionnaires if requested. In total the completion of the questionnaires took between 15 and 20 minutes for each NH participant.

A short screening scale for depression, the Geriatric Depression Scale (GDS-15, Appendix 9) was included in the questionnaires to assess psychological well-being. This is a screening scale and does not provide a diagnosis of depression, however, a score of greater than five warrants a medical review (Marc et al, 2008). If a NH participant scored highly in the GDS-15, and had no previous diagnosis of depression, the PI contacted the participant’s General Practitioner (GP) directly to inform them of these results. Participants in the community dwelling group who scored highly in the GDS-15 were contacted directly by the PI to inform them of this outcome. If the participant wished, the PI then contacted their GP directly also.
2.7 Procedure

A staff nurse of Hillview Nursing Home in Carlow, who was familiar with the LTC residents of the NH, assessed all residents for inclusion / exclusion criteria. The list of residents who fit the inclusion / exclusion criteria was re-assessed by two further staff nurses, to ensure agreement that all included residents maintained the capacity to consent to participation. No disagreement occurred. All residents who fit the inclusion / exclusion criteria were approached by one of two gatekeeper nurses and invited to participate in the study. Participant Information Leaflets were provided. Gatekeeper nurses provided a list of residents who demonstrated interest in participating to the PI, who then contacted the NOK of these residents by phone. The NOK were informed about the study, and a participation leaflet was posted to them. The NOK were encouraged to speak to the resident about the study, to ensure all concerns were voiced and responded to. Following a period of a week to allow for reflection, the PI approached these residents to gain signed consent. In the cases where a participant was unable to provide written consent, the NOK were again contacted, and asked to be present to sign as proxy. Those residents who agreed to participate were invited to complete the questionnaires with the assistance of the PI. The primary outcome measures were designed to be self-completed questionnaires, however, in order to improve participation among NH residents it is advised that an interviewer should carry out the assessments (Mody et al, 2008). This allowed for issues such as hearing/visual dysfunction, cognitive or emotional decline, low motivation or inability to concentrate, poor manual dexterity or fatigue. The PI remained impartial throughout the completion of the questionnaires, offering no opinions to the participants. Demographic
information, medical diagnoses, and BI functional scores were obtained directly from the participants' nursing charts by the PI.

In order to access older adults in the community the PI contacted the chairpersons of four local ARGs, phone numbers of which were available publicly. The PI requested permission to attend the monthly meeting of the ARG in order to recruit participants for the research study. On attending the ARG meetings the PI informed group members about the study, and answered any questions which arose during the course of the meeting. Members who demonstrated an interest in participating were provided with a participation pack containing a PIL, Informed Consent Form, copies of all questionnaires, and a stamped, addressed envelope which participants used to return the completed contents of the pack to the PI. Contact details for the PI and the research supervisor were also included. Participation packs were numbered in order to assess response rates.

2.8 Outcome Measures

2.8.1 Demographics

Demographic information was collected including age, gender, living arrangements, self-rated health, and medical conditions. This information was collected from both the NH (Appendix 10) and the community dwelling (Appendix 11) groups.
2.8.2 Outcome Expectations for Exercise Scale (OEE)

The OEE (Appendix 12) is a five-point Likert scale which measures the participant’s agreement with nine different statements regarding the benefits of exercise. The OEE was scored from one to five by assigning a numerical rating to each of the five responses (strongly agree = five points, strongly disagree = one point etc.). The numerical ratings were summed and divided by the number of responses to get an average score. A score of one represents poor outcome expectations for exercise, and a score of five signifies strong outcome expectations (Resnick et al, 2000a). This scale has been demonstrated to be reliable and valid as a self-completed questionnaire in adults over 65 years of age, residents of a retirement community (Resnick et al, 2000a), and minority older adults (Resnick et al, 2004). It has also demonstrated excellent internal consistency with an alpha coefficient of 0.89 (Resnick et al, 2000a).

2.8.3 Self-Efficacy for Exercise Scale (SEE)

The SEE (Appendix 13) is a nine item scale which measures the participant’s levels of confidence to exercise under different circumstances (e.g. bad weather, pain, boredom). Participants scored their confidence to exercise under each condition on a 10 point scale measuring from zero (not confident) to 10 (very confident). The scale was scored by summing the numerical responses, to gain an overall score ranging from zero (not confident) to 90 (very confident). No cut-off score has currently been established for this scale. The SEE has been shown to be both reliable and valid in older adults with a mean age of 85 years, and residents of a retirement community. It has also demonstrated excellent internal
consistency, with an alpha coefficient of 0.92 (Resnick and Jenkins, 2000). Efficacy expectations are also shown to be significantly related to exercise activity (Resnick et al, 2004).

2.8.4 The Barthel Index of Activities of Daily Living (BI)

The BI (Appendix 14) is an ordinal scale used to assess participant’s functional status. Ten items are assessed including basic activities of daily living and mobility. Items are rated according to whether the participant can perform the activity independently, if they require assistance, or are dependent. Scores range from zero to 100, with higher scores reflecting greater independence. The BI has shown excellent inter-rater reliability in a cohort of 121 stroke patients (Hsueh et al, 2001). Acceptable inter-rater reliability has also been demonstrated between trained nurses and non-clinical assessors in a sample of 94 elderly patients (Richards et al, 2000). Internal consistency of the BI has been shown to be excellent (Hsueh et al, 2001; Hsueh et al, 2002), while concurrent validity and responsiveness were also demonstrated to be high (Hsueh et al, 2002). Details of BI scores were sought from nursing staff for NH participants. Community dwelling participants were asked to complete the BI independently. A self-report questionnaire version of the BI has been demonstrated to be both reliable and practical (Gompertz et al, 1994).

2.8.5 The Geriatric Depression Scale (GDS-15)

Psychological well-being was assessed using the GDS-15 (Appendix 9). The GDS-15 is a 15 item scale measuring participant’s depression and suicide
ideation in older adults (Cheng et al., 2010). Questions require dichotomous yes/no responses. Ten items on the scale are indicative of depression when answered positively; the remaining five questions indicate depressive symptoms when answered negatively. The scale is scored from zero to 15 by scoring one point for each response indicating depression. The optimal cut-off for the GDS-15 in detecting depression is a score of seven (Cheng et al., 2010). The GDS-15 has been proven to be reliable and valid across age, gender and illness status (Nyunt et al., 2009), while also demonstrating high internal consistency with an alpha coefficient of 0.80 (D’Ath et al., 1994). In a sample of 150 older adults (≥60 years) who undertook the GDS-15, and were subsequently evaluated by a blinded psychiatrist, the GDS-15 was shown to be a useful clinical tool for detecting depression and suicide ideation (Cheng et al., 2010).

2.9 Statistical Methods

Statistical Package for the Social Sciences (SPSS) version 22.0 was used for statistical analysis of the data. All data was tested for normality using the Shapiro-Wilk test as the sample size was less than 50. Descriptive statistics were generated to describe demographic data and the results of outcome measures. These were presented as mean, standard deviation and confidence intervals for parametric data, and median and interquartile range for non-parametric data. Differences between the groups in the primary outcome measures were tested for statistical significance using the independent samples T-test for parametric data, or the Wilcoxon sum-rank test for non-parametric data.
Association between the primary outcome measures and age, number of co-morbidities, functional status and psychological well-being was assessed using univariable linear regression, with the p-value for statistical significance set to p=<0.15. A multivariable linear regression model was then utilised to analyse for independent association between the primary outcome measures and the independent variables which demonstrated association in the univariable regression. The level of statistical significance for multivariable linear regression was set at p=<0.05. The results will be presented in Chapter Three.
CHAPTER 3 – RESULTS

3.1 Introduction

This study aimed to profile the outcome expectations for exercise and the self-efficacy for exercise of older adults in a nursing home setting and in the community. It was hypothesised that older adults residing in a NH would have poor outcome expectations for exercise, and reduced self-efficacy for exercise when compared to CD older adults. Additionally, the study aimed to determine if any association existed between outcome expectations and self-efficacy for exercise and participants’ functional scores, psychological health, and number of co-morbidities.

3.2 Participant Flow

3.2.1 Nursing Home Participant Flow

Recruitment of NH participants took place from November to December 2015. Fifty six adults were resident in the NH at the time of recruitment. Of these, 27 were excluded as they did not fulfil the inclusion and/or exclusion criteria. One resident was excluded as the PI was unable to make contact with next of kin, one passed away prior to completion of the outcome measures, whilst five residents refused to participate (outlined in Figure 3.1). All NH participants required assistance to complete the questionnaires; this was provided by the PI.
Figure 3.1: Flow diagram of Nursing Home participants through the study (N=56)
3.2.2 Community Dwelling Participant Flow

Recruitment of community dwelling (CD) participants took place from November 2015 to January 2016. The PI visited four local ARG’s and 54 participation packs were taken by group members. Of these, 23 packs were returned. Three packs were returned uncompleted. Therefore, twenty responses were included in the final sample. This represented a response rate of 37%.

3.3 Participant Demographic Details

Demographic details of the participants are displayed in Table 3.1. Twenty-two NH residents (59% female, n = 13) and twenty CD older adults (40% female, n = 8) participated in the study. The mean age of the NH participants was 80.23 years (±8.1), while the mean age of the CD sample was 74.6 years (±7.57). The Shapiro-Wilk test for data normality showed that age data were parametric in nature. The independent samples t test was therefore used to identify differences between the groups. The mean difference in age between the groups was 5.63 years (95% CI 0.72 – 10.53), with older ages in the NH group. This difference was statistically significant (t(40) = 2.32, p = 0.03). Of the CD group, 12 (60%) reported living with their partner or spouse, while eight (40%) reported living alone. The median number of comorbidities identified in the NH group was 5.91 (IRQ 2). In the CD group the median number of comorbidities reported was 1.55 (IQR 3). The Shapiro-Wilk test demonstrated that these data were non-parametric in nature. The non-parametric Wilcoxon Sum Rank test determined a significant difference in the number of comorbidities between the groups (p = <0.01), with a significantly higher number of comorbidities present amongst the NH residents.
3.4 Medical History

Community dwelling participants reported a significantly lower number of medical comorbidities than was recorded in the NH group (p=<0.01, Figure 3.2). The number of comorbidities in the CD group ranged from zero to four, with five participants in this group (25%) reporting no medical conditions past or present. In the NH group the number of comorbidities ranged from three to nine, with three participants recording nine co-morbidities (13.64%). The nature of comorbidities recorded were varied between the groups (Table 3.2). The common medical conditions recorded across the groups are detailed in Appendix 15.

<table>
<thead>
<tr>
<th>Table 3.1 Participant Demographic Details</th>
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<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Gender (n)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Age (Mean ± SD)</td>
</tr>
<tr>
<td>Living Arrangements</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>No. of Comorbidities (Median, IQR)</td>
</tr>
</tbody>
</table>

SD = Standard Deviation, IQR = Interquartile Range, * = Statistically significant
Figure 3.2 Number of co-morbidities amongst nursing home and community dwelling participants.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Nursing Home N (%)</th>
<th>Community Dwelling N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac</td>
<td>14 (63.6%)</td>
<td>7 (35%)</td>
</tr>
<tr>
<td>Neurological</td>
<td>11 (50%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Orthopaedic</td>
<td>3 (13.6%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Cancer</td>
<td>4 (18.2%)</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Rheumatological</td>
<td>9 (40.9%)</td>
<td>5 (25%)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>5 (22.7%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Urological</td>
<td>8 (36.4%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Vestibular</td>
<td>4 (18.2%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Osteoporosis/Osteopenia</td>
<td>3 (13.6%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>6 (27.3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Vascular</td>
<td>1 (4.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>10 (45.5%)</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Ocular</td>
<td>2 (9.1%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Psychological</td>
<td>12 (54.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Other</td>
<td>15 (68.2%)</td>
<td>9 (45%)</td>
</tr>
</tbody>
</table>
3.5 Results of Outcome Measures

3.5.1 Outcome Expectations for Exercise Scale

Both the NH and the CD group scored highly in the OEE, demonstrating high outcome expectations for exercise across the groups, with higher overall scores noted amongst CD participants (Figure 3.3). The median score recorded in the NH group was 4.17 (IQR 1.73), out of a possible total of five, while the median score in the CD group was higher at 4.39 (IQR 1.22). The Shapiro-Wilks test for data normality demonstrated that data were non-parametric in nature (p=<0.05). The non-parametric Wilcoxon-Sum Rank test was therefore utilised to determine if a statistically significant difference existed between the groups. Results of tests for significance demonstrated that no statistically significant difference was present in OEE scores between the groups (p=0.78).

Figure 3.3 Outcome Expectations for Exercise Scale scores amongst nursing home and community dwelling participants.
3.5.2 Self-Efficacy for Exercise Scale

Self-efficacy for Exercise Scale scores were higher amongst CD older adults than in NH residents, suggesting a higher self-efficacy for exercise amongst older adults living in the community. One CD participant did not complete the SEE, therefore a total of 19 CD SEE scores were included in the analysis. The mean score obtained in the SEE amongst CD participants was 52.74 (SD 18.71, Figure 3.4), out of a possible total of 90. The mean score recorded amongst NH participants was 29.96 (SD 19.48, Figure 3.5). The Shapiro-Wilks test for data normality determined that data were parametric in nature. The independent samples t test was utilised to determine if a significant difference existed between the groups. Tests indicated that the mean difference between the groups in SEE scores was -22.78 (95% CI -34.89 – -10.67) with higher scores in the CD group. This difference was shown to be statistically significant (t (39) = -3.80, p=<0.01).

Figure 3.4 Self-Efficacy for Exercise Scale scores amongst nursing home participants (N=22)
3.5.3 Barthel Index of Activities of Daily Living

The BI demonstrated a significant difference in levels of function between the groups (Figure 3.6). The median score recorded from the NH group was 60 (IQR 51.3) while the median of the CD group was 100 (IQR 5). Data were non-parametric in nature as per the Shapiro-Wilks test for normality. The Wilcoxon sum-rank test identified a statistically significant difference in BI scores between the groups (p=<0.01), showing significantly higher levels of independent function amongst CD participants.
Figure 3.6 Barthel Index of Activities of Daily Living Scores amongst nursing home and community dwelling participants.

3.5.4 The Geriatric Depression Scale (GDS-15)

The median GDS-15 score in the NH group was 4.0 (IQR 4.5), out of a possible total of 15, while the median score for CD participants was 2.1 (IQR 3.0). Data were non-parametric as determined by the Shapiro-Wilk test. Scores recorded in the GDS-15 also differed significantly between NH and CD participants. The non-parametric Wilcoxon-sum rank test showed a significant difference in scores between the groups (p=0.03) with lower depression scores observed amongst CD participants (Figure 3.7).
Figure 3.7 Geriatric Depression Screening Scale scores amongst nursing home and community dwelling participants.

### 3.6 Association Between Outcome Variables

A secondary aim of this study was to determine if any association existed between OEE scores, SEE scores and participants’ functional scores and psychological health as measured by the BI, and the GDS-15 respectively, and the participants’ number of comorbidities. Post hoc testing was also carried out to determine if any significant correlation was observed between OEE and SEE scores, and to ascertain if an association was present between these primary outcome variables and age, or gender.
3.6.1 Outcome Expectations for Exercise Scale Univariable Linear Regression Analysis

In order to determine if an association was present between OEE scores as a dependent variable, and BI scores, GDS-15 scores, and number of comorbidities as independent variables, a univariable linear regression analysis was undertaken. Univariable linear regression analysis of OEE scores and BI scores demonstrated that a one point increase in BI scores was associated with a 0.01 point increase in OEE scores in this sample. This association was significant with a p-value of 0.04. A one point increase in GDS-15 score was significantly associated with a 0.11 point reduction in OEE scores in this sample (p=0.006). A significant association between number of comorbidities and OEE score was also established, with an increase of one comorbidity being associated with a 0.09 point decrease in OEE score (p=0.08). Post hoc analysis of OEE score association with age and gender concluded that no statistically significant association was present between these variables, with p-values of 0.47, and 0.5 respectively. These results are presented in Table 3.3. Scatter plots representing the relationship between OEE scores and these independent variables are presented in Appendix 16.
3.6.2 Outcome Expectations for Exercise Scale Multivariable Linear Regression Analysis

Taking the independent variables which were significantly associated with OEE scores in the above univariable regression, a multivariable linear regression analysis was conducted to determine which of these variables were independently associated with OEE scores in the current sample. P-values for statistical significance were set at p=<0.05. With OEE scores as the dependent variable and BI scores, GDS-15 scores and number of comorbidities entered as independent variables, BI scores (p=0.44) and number of comorbidities (p=0.74) showed no statistically significant independent association with OEE scores. However, GDS-15 scores retained statistical significance, indicating that an increase of one point in the GDS-15 scale was associated with a decrease of 0.09 points in the OEE (p=0.04, 95% CI -0.18 – -0.004). These results are presented in Table 3.4.
3.6.3 Self-Efficacy for Exercise Scale Univariable Linear Regression Analysis

A further univariable linear regression analysis was carried out to identify the presence of any association between SEE scores and independent variables in the current sample. Univariable linear regression determined that a one point increase in BI score was associated with a 0.37 point increase in SEE scores. This association was statistically significant with a p value of 0.001. An increase of one point in the GDS-15 was associated with a decrease of 3.51 points in the SEE (p=0.001), while one additional co-morbidity was associated with a decrease of 3.8 points in the SEE (p=0.002). Post hoc analysis of SEE score association with age and gender identified no significant associations between these variables, with p-values of 0.71, and 0.39 respectively. These results are presented in Table 3.5. Scatter plots representing the relationship between SEE scores and these independent variables are presented in Appendix 17.
The three independent variables which were found to be significantly associated with SEE scores in the above univariable regression were then entered into a multivariable linear regression model. P-values for statistical significance were set to p=<0.05. BI scores (p=0.15) and number of co-morbidities (p=0.22) showed no statistically significant independent association with SEE scores in this sample. GDS-15 scores, however, retained statistical significance in this model (p=0.03). An increase of one point in the GDS-15 was independently associated with a reduction of 2.31 points in the SEE (95% CI -4.36 – -0.26). These results are presented in Table 3.6.

### Table 3.5 Self-Efficacy for Exercise Scale Univariable Linear Regression Results

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Beta Co-Efficient</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barthel Index of Activities of Daily Living</td>
<td>0.37</td>
<td>0.001*</td>
</tr>
<tr>
<td>Geriatric Depression Scale 15</td>
<td>-3.51</td>
<td>0.001*</td>
</tr>
<tr>
<td>Number of Comorbidities</td>
<td>-3.79</td>
<td>0.002*</td>
</tr>
<tr>
<td>Participant Age</td>
<td>-0.16</td>
<td>0.71</td>
</tr>
<tr>
<td>Participant Gender</td>
<td>-6.08</td>
<td>0.39</td>
</tr>
</tbody>
</table>

* = Statistically Significant

### 3.6.4 Self-Efficacy for Exercise Scale Multivariable Linear Regression Analysis

The three independent variables which were found to be significantly associated with SEE scores in the above univariable regression were then entered into a multivariable linear regression model. P-values for statistical significance were set to p=<0.05. BI scores (p=0.15) and number of co-morbidities (p=0.22) showed no statistically significant independent association with SEE scores in this sample. GDS-15 scores, however, retained statistical significance in this model (p=0.03). An increase of one point in the GDS-15 was independently associated with a reduction of 2.31 points in the SEE (95% CI -4.36 – -0.26). These results are presented in Table 3.6.
Table 3.6 Self-Efficacy for Exercise Scale Multivariable Linear Regression Results

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Beta Co-Efficient</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barthel Index of Activities of Daily Living</td>
<td>0.184</td>
<td>0.146</td>
<td>[-0.07 - 0.44]</td>
</tr>
<tr>
<td>Geriatric Depression Scale 15</td>
<td>-2.308</td>
<td>0.028*</td>
<td>[-4.36 - -0.26]</td>
</tr>
<tr>
<td>Number of Comorbidities</td>
<td>-1.65</td>
<td>0.222</td>
<td>[-4.34 - 1.04]</td>
</tr>
</tbody>
</table>

CI = Confidence Interval, * = Statistically Significant

3.6.5 Correlation Between Outcome Expectations for Exercise Scale and Self-Efficacy for Exercise Scale Scores

As the OEE scores recorded in this study were non-parametric (p=<0.05), Spearman’s rank correlation co-efficient was utilised to determine correlation between OEE scores and SEE scores in this sample. A weak linear correlation was observed between OEE scores and SEE scores, demonstrating a statistically weak link between higher self-efficacy for exercise and higher outcome expectations for exercise (Spearman’s rho 0.43, p=<0.01), see Figure 3.8.
Figure 3.8 Outcome Expectations for Exercise Scale scores VS Self-Efficacy for Exercise Scale scores across the groups.

3.7 Summary

The main results of this study suggest that there was no significant difference in outcome expectations for exercise between NH residents and CD older adults. However, CD older adults had significantly higher self-efficacy for exercise than NH residents in the current sample. Functional ability, number of comorbidities and psychological health were found to be associated with both outcome expectations for exercise and self-efficacy for exercise. Psychological health, as measured by the GDS-15, was the only factor found to be independently associated with OEE and SEE scores in this sample. These results will be discussed further in Chapter 4.
CHAPTER 4 – DISCUSSION

4.1 Introduction

The aim of this current study was to examine the hypothesis that older adults in a NH setting have poor outcome expectations for exercise, and reduced self-efficacy for exercise, when compared to older adults in the community. It also aimed to assess the association between outcome expectations and self-efficacy for exercise with participant’s functional scores, number of comorbidities, and psychological health. The main findings from this study were that self-efficacy for exercise is significantly higher amongst CD older adults than among older adults residing in a NH. However, no significant difference existed in outcome expectations for exercise between these two groups. The participants’ number of comorbidities, level of independent functioning, and depressive symptoms were associated with both outcome expectations and self-efficacy for exercise. The key finding of this study was that GDS-15 scores were independently associated with both outcome expectations and self-efficacy for exercise in this population. Those who scored highly in the GDS-15, indicating greater depressive symptoms, were more likely to have poor outcome expectations, and low self-efficacy for exercise, independent of other variables.

4.2 Participant Demographics Review

The mean age of the NH participants was 80.23 years (±8.1), while the mean age of the CD sample was 74.6 years (±7.57). The mean age of the overall sample in the current study was 77.55 years (±8.26) with a range of 65 – 96 years.
Participants were 50% female. A higher percentage of female participants was present in the NH group (59%), than the CD group (40%). This sample was younger than the populations presented in Resnick and Jenkins (2000) and Resnick *et al.* (2000a) in which the primary outcome measures were validated. A smaller percentage of females were included in the current sample than in these papers in which participants were 82% and 78% female respectively. Of the CD sample in the current study, 40% lived alone, whilst 60% lived with their spouse or partner. The median number of comorbidities in the NH group were 5.5 (IQR 2), and in the CD group were 1 (IQR 3), whilst the median GDS-15 score of the CD group was 1.5 (IQR 3), and in the NH group was 4 (IQR 4.5), indicating that participants overall were not depressed.

The sample size in the current study is small in comparison to previous literature regarding self-efficacy and outcome expectations in the older population. The desired sample size was not achieved, with only 20 participants included in the CD group despite a desired sample size of 21. The required NH group sample size was exceeded by one participant. The sample in the present study was a heterogenous group of older adults. Groups differed significantly in terms of age, level of function, number of comorbidities, and depression scores.

### 4.3 Outcome Expectations for Exercise

Evidence consistently suggests that age influences outcome expectations for exercise, with higher age associated with poor outcome expectations for exercise among CD older adults and older adults residing in continuing care retirement communities (Carroll 1995; Conn, 1998; Clark 1999; Resnick *et al.*, 2000b). No
previous research has been identified which examined whether these beliefs differ between CD older adults and older adults residing in NH’s. Both groups in the current study scored highly in the OEE scale with a median score of 4.17 (IQR 1.73) in the NH group, and 4.39 (IQR 1.22) in the CD group, out of a possible total of five points. These scores are higher than those noted in previous literature utilising the OEE scale in older populations. Resnick et al (2000a) recorded a mean OEE score of 3.4 (± 0.82) in a sample of 175 residents of a continuing care retirement community in America. These participants were, however, older than the current sample, with a mean age of 85 (±5.7) years, and contained a higher proportion of females (78%). Previous literature has not examined whether gender significantly affects outcome expectations, however, in the current sample, post hoc testing identified no significant difference in OEE scores between genders across both groups (p=1.00). The CD group were on average 10 years younger than the sample presented by Resnick et al (2000a). The CD group were all members of their local ARG, indicating that they were potentially a more active and involved subgroup of older adults in the community, which may contribute to higher SEE scores. This group was also highly functional, with a median self-reported BI score of 100 (IQR 5), out of a possible total of 100. Level of function and age were both associated with OEE scores on univariable analysis, therefore together they may have contributed to higher outcome expectations for exercise in this group.

The included sample of NH residents received continuous physiotherapy input as part of their standard care. Physiotherapy input included exercise classes and individualised exercise programmes in conjunction with education about the
benefits of exercise. This factor may have contributed to higher outcome expectations for exercise in this sample.

As both groups scored highly in the OEE scale, no significant difference existed in outcome expectations for exercise between CD older adults and NH residents in this sample.

4.4 Self-Efficacy for Exercise

Previous literature consistently describes lower levels of self-efficacy for exercise associated with increased age (Carroll 1995; Conn, 1998; Clark 1999; Resnick et al., 2000b, Resnick 2001). No existing research has been identified which examined the difference in self-efficacy for exercise between older adults residing in a NH and CD older adults. The SEE scores recorded in this study were relatively low across both groups. The mean score amongst CD participants was 52.74 (± 18.71), whilst the mean score recorded amongst NH participants was 29.96 (± 19.48) out of a possible total of 90. This is in line with scores recorded by Resnick and Jenkins (2000) during testing of the psychometric properties of the SEE, where 187 older adults residing in a continuing care retirement community in America achieved a mean SEE scale score of 49.5 (±29.7). Older adults residing in a NH demonstrated significantly lower self-efficacy for exercise than CD older adults in this study. The following sections will discuss the variables which have contributed to this difference in self-efficacy.
4.5 Factors Influencing Exercise Beliefs

4.5.1 Association between Age and Self-Efficacy and Outcome Expectations for Exercise

The current study demonstrated no independent association between age and either self-efficacy for exercise or outcome expectations for exercise. Age accounted for only 0.4% of the variance in SEE scores, and 1.3% of the variance in OEE scores in the current sample. This is in contrast to existing literature which has consistently linked advancing age to decreased self-efficacy for exercise and outcome expectations for exercise in CD older adults and older adults residing in continuing care retirement communities (Carroll 1995; Conn, 1998; Clark 1999; Resnick et al, 2000b; Resnick 2001). The age range included in this study was similar to those in previous papers, including only older adults (≥65 years). Only Clark (1999) examined a wider age bracket, including adults ≥55 years. However, all of the aforementioned studies contained substantially larger sample sizes (range 133 – 771 participants). A significant independent association may not have been apparent in this smaller sample size.

4.5.2 Physical Function Association with Self-Efficacy and Outcome Expectations for Exercise

Participants’ level of function as measured by the BI was not independently associated with either self-efficacy or outcome expectations for exercise in the current sample. Scores in the BI accounted for 24.1% of the variance in SEE scores, and 9.9% of the variance in OEE scores, however, when combined with the number of comorbidities and GDS-15 scores in the multivariable analysis
these values were insignificant. Similarly, the number of comorbidities of each participant also demonstrated no independent association with either outcome. The participants’ number of comorbidities accounted for 21.6% of the variance in SEE scores, and 7.3% of the variance in OEE scores achieved, but again this demonstrated no significance in the multivariable regression equation. Again, this is in contrast to previous findings, which attest that physical health status is a significant indicator of older adults’ self-efficacy for exercise and outcome expectations for exercise (Grembowski et al., 1993; Clark, 1999; Resnick et al., 2000b; Resnick, 2001). These previous papers involved far larger sample sizes than the current study, ranging from 175 – 2,524 participants, thus increasing their power to find a significant difference. However, these papers utilised different, often self-developed, unstandardised measures of self-efficacy and outcome expectations (Grembowski et al., 1993; Clark, 1999), along with varying measurements of physical health and activity, such as the Quality of Wellbeing Scale (Grembowski et al., 1993), the 12-Item Short-Form Health Survey (Resnick et al., 2000b; Resnick, 2001), and general interview based questions regarding levels of PA (Clark, 1999). The use of the validated and reliable BI and number of diagnosed comorbidities, along with validated measures of self-efficacy and outcome expectations, increases the reproducibility and validity of the current study. The range of BI scores in the current sample was wide, ranging from 10, indicative of almost total dependence, to 100, indicating full independence. The number of diagnosed comorbidities ranged from zero to nine, again a wide range. Both BI scores and number of comorbidities demonstrated significant difference between the NH and CD groups in this study; NH residents presented with lower BI scores, and a higher number of comorbidities than the CD group, highlighting
the significance of the range of scores achieved. The finding of no association between these physical health factors and exercise beliefs is significant when such a large range of physical health statuses were included in the analysis. This finding is in agreement with Conn (1998), who demonstrated that participants’ health status had no direct effect on either outcome expectancy or self-efficacy in a sample of 147 CD older adults (≥65 years of age). Conn (1998) did however report an indirect effect of health status on self-efficacy for exercise; through barriers associated with decreased function. As health status decreased, barriers to exercise increased, which indirectly caused a reduction in self-efficacy for exercise. This indirect effect may be responsible for the relationship reported in previous literature between physical health status and exercise beliefs. A path analysis such as that utilised by Conn (1998) examining both direct and indirect effects on outcome variables may be useful for future research, in order to clarify the relationship between these variables.

In taking a closer look at the medical conditions recorded in the current sample (Appendix 15) it is worth noting that no CD participant recorded any neurological conditions (eg stroke, Parkinson’s Disease), or a diagnosis of chronic obstructive pulmonary disease (COPD), any of which may severely limit mobility or exercise participation. Eleven out of 22 (50%) NH participants recorded these neurological conditions, and a further five (22.7%) had a diagnosis of COPD. Only 10% of CD participants reported a diagnosis of osteoarthritis (OA), compared to 36.4% of NH participants. OA may cause significant pain and disability (Hunter and Eckstein, 2009) thus potentially limiting exercise participation. Older adults have been shown to demonstrate negative views of exercise for painful conditions, associating exercise with increased pain and potential acceleration of joint
damage (Hurley et al, 2010). If participants feel that their exercise participation is limited through significant pain or disability, this will likely have a direct effect on exercise self-efficacy. Thus, though the number of comorbidities recorded did not demonstrate significant association with exercise beliefs in the current study, the type of comorbidities reported may account for some of the variance in self-efficacy for exercise between the NH and CD groups. Future research should take this into account during analysis.

4.5.3 Psychological Health Association with Self-Efficacy and Outcome Expectations for Exercise

The current study found that psychological health, as measured by the GDS-15, was significantly independently associated with both self-efficacy for exercise and outcome expectations for exercise. A participant who scored highly on the GDS-15, indicating greater depressive symptoms, was more likely to demonstrate low self-efficacy, and poor outcome expectations for exercise, irrespective of their place of residence, age or physical health status. This is consistent with existing literature which has established strong links between mental health and self-efficacy for exercise, and outcome expectations for exercise in both younger samples (Gecht et al, 1996; Perkins and Jenkins, 1998; Kangas et al, 2015), and in older adult populations (Kurlowicz, 1998; Resnick et al, 2000b, Resnick, 2001). Despite evidence to show that exercise beliefs may improve following exercise based interventions in a non-depressed population (Hurley et al, 2010), the presence of depressive symptoms may mitigate this response to exercise. Singh et al (1997) conducted an RCT examining the effects of a 10-week
progressive resistance training programme on depressive symptoms and self-efficacy in a sample of 32 subjects, aged 60 – 84 and living in the community. Older adults with depressive symptoms showed no increase in self-efficacy following the intervention, despite partaking in regular PA and recording significant improvements in physical capacity. This is in line with the findings of the current study, which demonstrate that self-efficacy is associated with depressive symptoms irrespective of level of independent functioning.

Participation in regular PA has been shown to be an effective therapy in the treatment of depression (Babyak et al, 2000; Dunn et al, 2005; Blumenthal et al, 2007; Mota-Pereira et al, 2011). This treatment effect carries over to the older adult population (Mather et al, 2002). In spite of the various benefits of PA, previous research has established that adults presenting with depressive symptoms have lower levels of exercise participation than adults with less depressive symptoms (Patten et al, 2009). A lack of PA may also contribute to increased depressive symptoms in older adults (Lampinen et al, 2000). This close association between PA levels and depressive symptoms can be clearly observed in an Irish setting. TILDA reports that Irish adults with low levels of PA are more than twice as likely to report clinically relevant depressive symptoms compared to adults with higher PA levels (Donoghue et al, 2016).

If a lack of PA contributes to depressive symptoms, and the presence of depressive symptoms leads to a reduction in self-efficacy for exercise and actual PA levels, this presents a cycle of physical inactivity and depression, which represents a challenge to healthcare providers. The provision of education to patients about the myriad benefits of exercise may be a potential solution to this problem.
The primary care provider, usually the patient’s general practitioner (GP), is an important influence in the health and lifestyle choices of older adults, both NH residents and CD older adults. Stathi and Simey (2007), in a qualitative analysis of 14 elderly NH residents participating in an exercise intervention, identified the importance of the opinion of a GP prior to participation in an exercise programme. Participants originally reported fear that exercise might be harmful, however, they merely sought the opinion of a trusted GP to quell these fears, and were happy to participate once they had spoken with their GP. Craft and Perna (2004) recommend that primary care providers routinely provide education and recommendations for PA to all patients with depressive symptoms in order to maximise the uptake of regular PA, aiming to increase exercise self-efficacy and manage the symptoms of depression.
4.6 Limitations of the Study

There were several limitations of the current study which are outlined below. These should be taken into account when considering the external validity of the findings.

- The cross-sectional design of this study did not allow for any investigation into causal relationships between any of the variables and self-efficacy or outcome expectations for exercise.

- The small sample size of the current study was a limitation, as it limits the external validity and generalisability of the findings to the wider older adult community. Despite a large attendance of CD elders at the ARG meetings attended by the PI, only 54 participation packs were taken by group members. Of these 54 packs, only 20 completed packs were returned in the prepaid addressed envelopes. Previous research involving ARG’s in Ireland yielded a response rate of 62% (Ní Léime et al, 2012). The response rate for this study was low in comparison at 37%. A greater sample size would increase the validity of the results in the current study, and may also increase the significance of findings in the multivariable regression analysis, as a smaller sample size limits the use of this regression model.

- This was a single-centre study, where participants were residents of a single nursing home. The prevailing beliefs or atmosphere of the nursing home, and
education and therapy time provided to residents, may not reflect those of other nursing homes. Therefore the results may not be applicable to other nursing home settings.

- The sampling method used in this study was not a random sampling method, however, inclusion and exclusion criteria were minimised in an effort to increase the generalisability of the population studied.

- Exercise self-efficacy and outcome expectations for exercise were measured in this study, but not actual time spent in PA. Due to the design of the study it is not possible to conclude what effect the variables had on actual levels of PA.

- Fear of falling was not assessed in this current study. Fear of falling, or a history of falls, may be a significant factor associated with self-efficacy and outcome expectations for exercise. Due to the design of the study it was not possible to investigate this association.

- The use of self-administered questionnaires for CD participants, including reporting of BI scores and number of comorbidities present, may have resulted in reporting bias.
• A gatekeeper was used to limit selection bias in this study, however, the Principal Investigator was a therapist known to the NH residents. Therefore, residents may have felt more disposed to participate in the study.

• The Principal Investigator who assisted NH residents in completing the questionnaires in an interview format, was a therapist known to the NH participants. This may have contributed to reporting bias if NH participants felt the need to impress, or avoid disappointing their therapist with poor answers.

• The Self-Efficacy for Exercise Scale utilised in this study proved difficult for older adults with cognitive deficits to comprehend, and required a large amount of assistance from the PI. It is unsure what level of confidence participants with cognitive deficits had in providing their final answers for this scale. No scale currently exists which has been validated for measuring exercise self-efficacy in a cognitively challenged population. The use of such a measure would improve the validity of future research in this area.
4.7 Recommendations for Future Research

Following on from this study there are a number of recommendations for future research in the area of exercise beliefs amongst older adults in nursing homes.

- A larger scale study, with a prospective cohort design should be employed in order to assess the predictive nature of independent variables on self-efficacy and outcome expectations for exercise. A multi-centre study should be undertaken in order to increase the external validity of the findings. A larger sample size would also increase the power of the multivariable regression analysis.

- A standardised measure of physical activity should be included in future research in order to measure association between exercise beliefs and actual exercise activity.

- Future research should aim to develop validated outcome measures to assess self-efficacy for exercise and outcome expectations for exercise in a cognitively impaired population.

- Future research should examine the association between specific co-morbidities such as cardiovascular accident, Parkinson’s Disease, or amputation with self-efficacy and outcome expectations for exercise, as these comorbidities have the potential to affect one’s exercise ability.
• Future research should aim to conduct a path analysis statistics model, in order to determine both direct and indirect effects of the independent variables on participants’ self-efficacy and outcome expectations for exercise.

• Research is needed to determine the feasibility of a GP referral scheme and education programme on exercise participation, depressive symptoms, self-efficacy, and outcome expectations for exercise.

• The use of qualitative methods in future research may be useful to further explore the reasons for low self-efficacy for exercise in this population.
CONCLUSION

As the population of older adults in Ireland continues to grow, there has been increased focus on the provision of health services and preventive care for older adults. Participation in regular physical activity presents a myriad of health and functional benefits for older adults, however, older adults continue to demonstrate poor levels of physical activity despite this evidence. Older adults in nursing homes typically conduct a sedentary lifestyle, putting them at a higher mortality risk. The findings of this study offer an insight into the exercise beliefs of this subset of the older adult population, allowing for exercise interventions to be more specifically targeted towards this group.

The majority of participants presented with a high level of outcome expectations for exercise, demonstrating that older adults, both in the nursing home and in the community, were well educated about the potential general benefits of participating in regular exercise. However, participants’ self-efficacy for participating in physical activity was lower than expected, particularly amongst nursing home participants who demonstrated significantly lower self-efficacy for exercise than their community dwelling counterparts. The participants’ level of function, number of medical comorbidities, and depressive symptoms all demonstrated minor association with these exercise beliefs. However, psychological health, as measured by the Geriatric Depression Scale-15, was the only variable which was independently associated with both outcome expectations and self-efficacy for exercise. Thus the presence of depressive
symptoms is associated with poor exercise beliefs irrespective of the participants’ age, gender, living arrangements, level of function, or number of comorbidities. Though self-efficacy for exercise was found to be significantly lower amongst nursing home residents, efficacy scores demonstrated no association with living arrangements across the groups, thus this difference in efficacy is likely to be as a result of greater levels of depression amongst nursing home residents, rather than place of residence, poor levels of function or high numbers of medical comorbidities.

Clinically, these findings highlight the need for multi-disciplinary management of depressive symptoms in older adults, along with the provision of comprehensive education regarding the vast benefits of exercise for older adults, with a focus on the benefits of exercise for psychological health. While the limitations of this study are acknowledged, this evidence highlights the important role that psychological health plays in older adults’ exercise beliefs, and thus the initiation and maintenance of regular physical activity. There is a need for increased emphasis on the provision of education from health professionals regarding physical activity as an intervention for depression. This may encourage greater participation in physical activity amongst older adults in nursing homes, which could lead to increased self-efficacy along with psychological and functional health benefits in this population.

WORD COUNT: 13,311
REFERENCES


Gaugler JE, Kane RA (2005) Activity outcomes for assisted living residents compared to nursing home residents: findings from a longitudinal study. *Activities, Adaptation and Aging*; 29(3): 33 – 58


<table>
<thead>
<tr>
<th><strong>SECTON A GENERAL INFORMATION</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I</strong></td>
<td><strong>Title of Study</strong></td>
</tr>
<tr>
<td></td>
<td>Exercise Beliefs in Elderly Nursing Home Residents: A Cross-Sectional, Case Control Study.</td>
</tr>
<tr>
<td><strong>II</strong></td>
<td><strong>Application Version No</strong></td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>III</strong></td>
<td><strong>Application Date</strong></td>
</tr>
<tr>
<td></td>
<td>25/08/2015</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>A1</strong></th>
<th><strong>Title of the Research Study</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exercise Beliefs in Elderly Nursing Home Residents: A Cross-Sectional, Case Control Study.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>A2(a)</strong></th>
<th><strong>Is this a multi-site study</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>A2(e)</strong></th>
<th><strong>If no, please name the principal investigator with overall responsibility for the conduct of this single-site study.</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title</strong></td>
<td>Ms.</td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td>Sinéad Byrne</td>
</tr>
<tr>
<td><strong>Qualifications</strong></td>
<td>BSc Physiotherapy</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td>Physiotherapist, MSc Student</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td>Physiotherapy</td>
</tr>
<tr>
<td><strong>Organisation</strong></td>
<td>Hillview Nursing Home, Tullow Road, Carlow</td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>49 Monacurragh, Black Bog Road, Carlow</td>
</tr>
<tr>
<td><strong>Telephone</strong></td>
<td>085 7826525</td>
</tr>
<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:sineadvbyrne@rcsi.ie">sineadvbyrne@rcsi.ie</a></td>
</tr>
</tbody>
</table>

**A2(f)** For single-site studies, please name the only site where this study will take place

<table>
<thead>
<tr>
<th><strong>A3</strong></th>
<th><strong>Details of Co-investigators:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Co-Investigator</strong></td>
<td>Hillview Nursing Home, Tullow Road, Carlow</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Name of site (if applicable)</strong></th>
<th><strong>Title</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dr.</td>
</tr>
<tr>
<td><strong>Name</strong></td>
<td>Frances Horgan</td>
</tr>
<tr>
<td><strong>Qualifications</strong></td>
<td>PhD</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td>Senior Lecturer in Physiotherapy</td>
</tr>
<tr>
<td><strong>Department</strong></td>
<td>Physiotherapy</td>
</tr>
<tr>
<td><strong>Organisation</strong></td>
<td>Royal College of Surgeons in Ireland</td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>123 St Stephen’s Green</td>
</tr>
<tr>
<td><strong>Telephone</strong></td>
<td>01 402 2472</td>
</tr>
<tr>
<td><strong>Email</strong></td>
<td><a href="mailto:fhorgan@rcsi.ie">fhorgan@rcsi.ie</a></td>
</tr>
<tr>
<td><strong>Role in Research e.g. statistical / data / laboratory analysis</strong></td>
<td>Supervisor</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th><strong>A4</strong></th>
<th><strong>Name</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sinéad Byrne</td>
</tr>
<tr>
<td><strong>Position</strong></td>
<td>Physiotherapist, MSc Student</td>
</tr>
<tr>
<td><strong>Organisation</strong></td>
<td>Hillview Nursing Home, Tullow Road, Carlow</td>
</tr>
<tr>
<td><strong>Address for Correspondence</strong></td>
<td>49 Monacurragh, Black Bog Road, Carlow</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Tel. (Work)</td>
<td>085 7826525</td>
</tr>
<tr>
<td>Tel. (Mob)</td>
<td>085 7826525</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:sineadvbyrne@rcsi.ie">sineadvbyrne@rcsi.ie</a></td>
</tr>
</tbody>
</table>

**A5(a)**

Is this study being undertaken as part of an academic qualification?

Yes

**A5(b)**

If yes, please complete the following

**Student**

Student Name: Sinéad Byrne

Academic Course: MSc Neurology and Gerontology

Academic Institution: Royal College of Surgeons in Ireland

**A5(c)**

Academic Supervisor(s):

**Academic Supervisor**

Name: Dr. Frances Horgan

Qualifications: PhD, MSc (Research), MSc (LMD), BSc (Physio), Dip Stats, Dip Health Econ

Position: Senior Lecturer in Physiotherapy

Department: Physiotherapy

Organisation: Royal College of Surgeons in Ireland

Address: 123 St. Stephen's Green, Dublin

Telephone: 01 4022472

Email: fhorgan@rcsi.ie

**SECTION B STUDY DESCRIPTORS**

<table>
<thead>
<tr>
<th><strong>B1</strong></th>
<th>What is the anticipated start date of this study?</th>
<th><strong>Checklist Info</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What is the anticipated start date of this study?</td>
<td>01/10/2015</td>
</tr>
</tbody>
</table>

| **B2** | What is the anticipated duration of this study? | 8 months (October 2015-June 2016) |
This study will examine differences in exercise beliefs between older adults in residential care, and community dwelling older adults. This will be an observational study; no treatment will be provided or withheld as part of the investigation. Outcomes will be measured using the Outcome Expectations for Exercise Scale, and the Self-Efficacy for Exercise Scale. Nursing home residents and community dwelling older adults will be asked to participate. Participants will also be asked to provide information regarding their age, gender, medical conditions, functional ability, and psychological well-being. Standardized scales will be used to assess functional status and psychological well-being. Demographic data will also be collected using two demographic data collection forms. The findings will then be examined to determine if there is a link between any of the above factors and outcome expectations for exercise, or self-efficacy for exercise.

The population of older adults in Ireland is set to reach 1.4 million by 2041 (McGill, 2010). The health benefits of exercise, both physical and psychological, for this older population have been extensively documented. Unfortunately, only a minority of older adults meet the recommended exercise guidelines with a systematic review by Sun et al (2013) indicating that between 2-12% of older adults worldwide meet the World Health Organisations guidelines for Physical activity. Nursing Home residents, accounting for 6% of the population of adults over 65 years in Ireland (Central Statistics Office, 2012), make up the most disabled and dependent subset of older adults (Fried et al, 2004). Studies have demonstrated that nursing home residents typically engage in low levels of exercise (MacRae et al, 1996; Lee et al, 2005; Weeks et al, 2008). This sedentary lifestyle may lead to further deconditioning, and is associated with increased risk of morbidity and mortality (Lim et al, 2007; Kalinowski et al, 2012). Health professionals must encourage the uptake and maintenance of exercise in this vulnerable population. In attempting to adjust exercise behaviours, cognitive variables are especially targeted, as they are more amenable to change than other variables such as age or income (Brown, 2005). Outcome expectations and self-efficacy have been shown to play important roles in the initiation and maintenance of exercise in older adults (Resnick and Spellbring, 2000). A major benefit of understanding these exercise beliefs is that they can be increased in practice, in order to promote favourable changes in health behaviour (Bandura, 1984). However, improving self-efficacy and outcome expectations to modify health behaviours is only an appropriate strategy if the target population have lower self-efficacy and outcome expectations than those not at risk. No previous research documents the outcome expectations and self-efficacy of elderly nursing home residents for exercise. It is necessary to establish if elderly nursing home residents’ exercise beliefs differ from those of older adults in the community, in order to establish whether cognitive behavioural strategies are an appropriate method of treatment in this vulnerable population.
| B5 | List the study aims and objectives | Aims: To examine if older adults in a nursing home setting have different outcome expectations for exercise, and self-efficacy to exercise, when compared to older adults in the community. - To determine if any correlation exists between outcome expectations and self-efficacy for exercise and participants' functional scores and psychological health. Objectives: - to compare the Outcome Expectations for Exercise Scale (OEE) scores, and the Self-Efficacy to Exercise Scale (SEE) scores between a group of older adults residing in a nursing home, and a group of community dwelling older adults. - to assess if any correlation exists between outcome expectations and self-efficacy for exercise with participants’ functional scores (measured using the Barthel Index of Activities of Daily Living) and psychological health (measured with the Geriatric Depression Screening Scale (GDS-15)). |
| B6 | List the study endpoints / measurable outcomes (if applicable) | To describe differences in exercise beliefs (outcome expectations for exercise, and self-efficacy to exercise) between older adults residing in a nursing home, and community dwelling older adults. To establish if there is any relationship between these exercise beliefs and health status, functional status and psychological well-being. |
| B7 | Provide information on the study design | An observational, cross-sectional, case control study design will be employed, utilising questionnaires which may be self-administered or administered by an interviewer, as appropriate. |
Recruitment will be by convenience sampling of residents of the nursing home where the primary investigator (PI) is employed, and local active retirement groups in Carlow, to access older adults in the community as a case control group. Inclusion Criteria: participants must be 65 years of age or older and either resident in a nursing home or living in the community. Exclusion criteria: A documented diagnosis of Alzheimer’s disease or dementia, aphasia or receptive aphasia, and those receiving palliative care. Also excluded will be nursing home residents without a formal diagnosis of Alzheimer’s disease or dementia, but whom nursing staff identify as lacking the capacity to consent or participate in the study. The Outcome Expectations for Exercise Scale and the Self-Efficacy for Exercise Scale are the primary outcome measures. Both have been shown to be reliable and valid in older adult populations (Resnick et al, 2000; Resnick & Jenkins, 2000). The Barthel Index of Activities of Daily Living, and the Geriatric Depression Scale will also be assessed. Nursing Home residents will take part in an interview based assessment on-site in the nursing home, to allow for potential poor ability to self-complete the questionnaires (Mody et al, 2008). Two key gatekeepers (Staff Nurses) from the nursing home will approach residents to participate in the study, providing them with information leaflets. A week later, to allow for questions, informed consent will be obtained. If a resident is unable to provide signed consent, verbal consent will be witnessed and signed by nursing staff. Community dwelling older adults will be accessed through local active retirement groups. The PI will attend local active retirement group meetings to provide information about the study. Information leaflets will be provided to group members. Those members who wish to participate will be provided with a participation pack, containing a consent form, copies of the questionnaires, contact details of researchers and a stamped addressed envelope. Participants may then complete the questionnaires in their own time and return them to the researcher by post. Participants will be informed that the PI will also be present at the next group meeting, where any further questions can be answered, and packs can be returned in person if desired. Packs will be coded according to the group they are distributed to in order to measure non-response, and each will have a unique identification.

The two-sample T-test will be used to compare the difference between the means of the two groups for statistical significance in the primary outcome measures. Spearman’s Rank Correlation Co-efficient will then be utilised to measure the correlation between outcome scores, and health and functional status, and psychological well-being, assuming that these variables are non-linear in nature.
B10(a) Please justify the proposed sample size and provide details of its calculation (including minimum clinically important difference)

Sample size has been calculated using Conroy’s sample size guide (2004) to compare the mean of two groups. As the primary outcome measure (the Outcome Expectations for Exercise Scale) is scored from one to five, it was decided that one is the smallest difference between the groups that would be of interest. The smallest significant difference was divided by the standard deviation (highest typical value minus the lowest typical value, divided by four) to define the standard deviation units. Using Conroy’s guide, for 90% power, a sample size of 21 participants for each group will be required. Allowing an extra 10% to account for potential return of unusable questionnaires, or non-response, a sample size of 24 participants in each group will be sought.

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?

48

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

<table>
<thead>
<tr>
<th>Study Group</th>
<th>Name of Study Group</th>
<th>Number of Participants in this Study Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Home Residents</td>
<td>Nursing Home Residents</td>
<td>24</td>
</tr>
<tr>
<td>Community Dwelling Older Adults</td>
<td>Community Dwelling Older Adults</td>
<td>24</td>
</tr>
</tbody>
</table>
Please provide details on the method of randomisation (where applicable)  
N/A

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

<table>
<thead>
<tr>
<th>Study Site</th>
<th>Number of Research Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Hillview Nursing Home, Tullow Road, Carlow</td>
<td>24</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Study Site 2</th>
<th>Number of Research Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Community (Active Retirement Group meeting places)</td>
<td>24</td>
</tr>
</tbody>
</table>

SECTION C STUDY PARTICIPANTS

C1 PARTICIPANTS – SELECTION AND RECRUITMENT

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

Recruitment will be by convenience sampling of residents of the nursing home where the primary investigator is employed, and members of eight local active retirement groups (or less if required numbers have been recruited). In the nursing home, staff nurses will provide a list of residents who they believe maintain the capacity to consent. Two gatekeeper nurses will approach these residents to inform them of the study, and to provide information leaflets to those who demonstrate interest in participating.

C1.2 How will the participants in the study be recruited

In the nursing home, two gatekeepers (staff nurses) will approach residents who maintain the capacity to consent, to inform them of the study. Those residents who demonstrate interest in taking part will be provided with information leaflets and their names recorded. The PI will then take this list of names and contact the next of kin (NOK) of these residents to inform them of the research being carried out, and that their relative has been asked to participate. The NOK will be informed that...
### C1.3 What are the inclusion criteria for research participants? (Please justify, where necessary)

To be included in this study participants must be over the age of 65, and be either resident in a nursing home or living in the community. Participants must also retain the capacity to consent to, and to participate in, this study, as determined by Staff Nurses of the Nursing Home. Justification: Although the majority of nursing home residents in Ireland have some level of cognitive impairment, most are well able to communicate their wishes (Cahill and Diaz, 2012). Therefore, rather than excluding residents with mild cognitive impairment (which would create a population unrepresentative of nursing home residents), nursing staff who are familiar with the residents will identify those who they believe have the capacity to consent to the study.

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

Exclusion criteria include; A documented diagnosis of Alzheimer’s disease or dementia, those with aphasia or receptive aphasia, and those receiving palliative care. Also excluded will be nursing home residents without a formal diagnosis of Alzheimer’s disease or dementia, but whom nursing staff identify as lacking the capacity to consent or participate in this study. Justification: Although the majority of nursing home residents in Ireland have some level of cognitive impairment, most are well able to communicate their wishes (Cahill and Diaz, 2012). Therefore, rather than excluding residents with mild cognitive impairment (which would create a population unrepresentative of nursing home residents), nursing staff who are familiar with the residents will be asked to identify those who they feel do not have the capacity to consent, or to participate in the study. These residents will then be excluded.

### C1.5 Will any participants recruited to this research study be simultaneously involved in any other research project

Not to my knowledge

### C2 PARTICIPANTS – INFORMED CONSENT

<table>
<thead>
<tr>
<th>C2.1(a)</th>
<th>Will informed consent be obtained</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C2.1(b)</td>
<td>If no, please justify. You must provide a full and detailed explanation as to why informed consent will not be obtained</td>
<td>N/A</td>
</tr>
</tbody>
</table>
### C2.1(c)

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

Gatekeeper nurses will provide PIL’s to residents who demonstrate interest in participating in the study. The PI will contact the NOK of these residents and provide them with a PIL also. NOK will be asked to discuss the research with the residents. Contact details will be provided for the PI in case any questions should arise. A week later, the PI will approach these residents to obtain informed consent. If a resident is unable to provide written consent the NOK will be contacted and asked to be present to sign as proxy. In the community, the PI will attend the monthly meeting of the local active retirement groups to introduce the research. Members will have the opportunity to ask questions of the PI. If members wish to participate they will be provided with a participation pack containing the PIL and the informed consent form, which they may take home, to be signed at the participants’ leisure. Contact details for the researchers will be provided in case any questions should arise.

### 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

A week will be allowed in the nursing home between providing information leaflets and acquiring informed consent. This time will be allowed in order for the participants to ask questions if necessary and to consider their response. Also to allow the NOK time to communicate with the resident in order to ensure full understanding, and to ensure that residents do not feel under pressure to consent to participate in the study. In the community, participants will be provided with the consent form to bring home with them along with the questionnaires to be completed. These forms can then be completed and returned at the participants’ leisure, using a stamped addressed envelope which will be provided. Or they can return their pack, and ask any further questions if necessary at the following group meeting where the PI will again be present.

### 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

### C3 ADULT PARTICIPANTS (AGED 18 OR OVER) - CAPACITY

#### C3.1(a)

Will all adult research participants have the capacity to give informed consent

Yes

### C4 PARTICIPANTS UNDER THE AGE OF 18

#### C4.1(a)

Will any research participants be under the age of 18 i.e. Children

No
**C5 PARTICIPANTS - CHECKLIST**

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 groups 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.

<table>
<thead>
<tr>
<th>C5.1(a)</th>
<th>Healthy Volunteers</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>C5.1(b)</td>
<td>Patients</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Unconscious patients</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Current psychiatric in-patients</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Patients in an emergency medical setting</td>
<td>No</td>
</tr>
<tr>
<td>C5.1(c)</td>
<td>Relatives / Carers of patients</td>
<td>No</td>
</tr>
<tr>
<td>C5.1(d)</td>
<td>Persons in dependent or unequal relationships</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Students</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Employees / staff members</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>• Persons in residential care</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>• Persons highly dependent on medical care</td>
<td>No</td>
</tr>
<tr>
<td>C5.1(e)</td>
<td>Intellectually impaired persons</td>
<td>No</td>
</tr>
<tr>
<td>C5.1(f)</td>
<td>Persons with a life-limiting condition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Please refer to guidance manual for definition)</td>
<td>Yes</td>
</tr>
<tr>
<td>C5.1(g)</td>
<td>Persons with an acquired brain injury</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**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)

*Nursing staff from the nursing home involved will be familiar with all potential study participants. Prior to approaching any nursing home resident, staff nurses will advise whether each individual has the capacity to consent. Any resident whom staff nurses deem are unable to provide consent will be excluded from the study. Some Nursing Home residents may have life-limiting conditions such as cancer or congestive heart failure. Residents may also have acquired brain injury such as stroke. Care will be taken to ensure that only residents who retain the capacity to independently consent to this study will be included. The PI will assist all nursing home residents with the completion of the questionnaires. If necessary, extra time and care will be taken to ensure clear understanding of the questions and responses.*

**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

*Participants will be 65 years of age or older, therefore none of these groups will be included.*
<table>
<thead>
<tr>
<th>Section</th>
<th>Question</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1(a)</td>
<td>What activities, procedures or interventions (if any) are research participants asked to undergo or engage in for the purposes of this research study</td>
<td>Participants will be required to complete and return questionnaires. An “interviewer” (the PI) will assist nursing home residents to complete these questionnaires. Community dwelling adults will have the opportunity to ask questions of the PI before completing the questionnaires. Community dwelling adults will be provided with the questionnaires to take home with them, along with a stamped addressed envelope to return the questionnaires to the researchers. Contact details for the researchers will be provided in case of questions. Questionnaires may also be returned to the PI in person at the next meeting of the local active retirement group where the PI will be present for any further questions. Nursing home residents will be required to complete three questionnaires, as some information may be collected (with permission obtained in the patient consent form) from medical notes in the nursing home, while community dwelling adults will be asked to complete four questionnaires.</td>
</tr>
<tr>
<td>D1(b)</td>
<td>What other activities (if any) are taking place for the purposes of this research study e.g. chart review, sample analysis etc?</td>
<td>N/A</td>
</tr>
<tr>
<td>D2</td>
<td>Please provide details below of any potential harm that may result from any of the activities, procedures, interventions or other activities listed above</td>
<td>There should be no risks involved in filling out these questionnaires.</td>
</tr>
<tr>
<td>D3</td>
<td>What is the potential benefit that may occur as a result of this study</td>
<td>By completing these questionnaires participants are helping health professionals to better understand the feelings and beliefs about exercise, in order to develop appropriate strategies to facilitate greater participation in exercise in the future.</td>
</tr>
<tr>
<td>D4(a)</td>
<td>Will the study involve the withholding of treatment</td>
<td>No</td>
</tr>
<tr>
<td>D4(b)</td>
<td>Will there be any harms that could result from withholding treatment</td>
<td>No</td>
</tr>
<tr>
<td>D4(c)</td>
<td>If yes, please elaborate</td>
<td>N/A</td>
</tr>
<tr>
<td>D5(a)</td>
<td>How will the health of participants be monitored during the study, and who will be responsible for this</td>
<td>No intervention is being undertaken in this study, so standard care will continue in the case of nursing home residents. Nursing staff will be responsible for monitoring the health of the participants. There are no physical risks involved in participation in this study. The PI is employed in Hillview Nursing Home as a Physiotherapist. The PI will continue to provide Physiotherapy treatment to the Nursing Home residents throughout the course of the study.</td>
</tr>
<tr>
<td>D5(b)</td>
<td>How will the health of participants be monitored after the study, and who will be responsible for this</td>
<td>The PI is employed in Hillview Nursing Home as a Physiotherapist. The PI will continue to provide Physiotherapy treatment to the Nursing Home residents following on from the study. Standard Nursing care will also continue in Hillview Nursing Home.</td>
</tr>
<tr>
<td>D6(a)</td>
<td>Will the interventions provided during the study be available if needed after the termination of the study? Yes / No / Non-applicable</td>
<td>Non-applicable</td>
</tr>
</tbody>
</table>
If yes, please state the intervention you are referring to and state who will bear the cost of provision of this intervention. N/A

Please comment on how individual results will be managed. The primary outcome measures utilised in this study are unlikely to have individual meaning for participants. However, a short screening tool for depression will also be utilised. This is a screening tool and does not provide a diagnosis. However, it is recommended that participants who score highly should be referred to a doctor for full assessment. All questionnaires and participant consent forms will be coded with a unique identification number (UIN) to allow identification. Community dwelling participants will be informed that a screening tool for depression is included in the questionnaires, and that should they require a medical review the PI will contact them directly and advise them to contact their GP. The PI will also offer to contact the GP directly. In the case of Nursing Home residents the PI will directly contact the patient's GP if a medical review is necessary.

Please comment on how aggregated study results will be made available. Aggregated study results will be submitted as a final thesis as part of the requirements for an MSc in Neurology and Gerontology, provided by the Royal College of Surgeons in Ireland.

Will the research participant's general practitioner be informed that the research participant is taking part in the study (if appropriate)? Non-applicable

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

SECTION E DATA PROTECTION

E1 DATA PROCESSING - CONSENT
E1(a) Will consent be sought for the processing of data. Yes
E1(b) If no, please elaborate

E2 DATA PROCESSING - GENERAL
E2.1 Who will have access to the data which is collected. The primary investigator (Sinéad Byrne) and the research supervisor (Dr. Frances Horgan).
E2.2 What media of data will be collected. Data will be collected in hard copy (questionnaires), which will then be transferred to Microsoft Excel. Hard copies will then be destroyed.
E2.3(a) Would you class the data collected in this study as anonymous, irrevocably anonymised, pseudonymised, coded or identifiable data? Coded
<table>
<thead>
<tr>
<th>E2.3(b)</th>
<th>If 'coded', please confirm who will retain the 'key' to re-identify the data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E2.4</strong></td>
<td>Where will data which is collected be stored</td>
</tr>
<tr>
<td><strong>E2.5</strong></td>
<td>Please comment on security measures which have been put in place to ensure the security of collected data</td>
</tr>
<tr>
<td><strong>E2.6(a)</strong></td>
<td>Will data collected be at any stage leaving the site(s) of origin</td>
</tr>
<tr>
<td><strong>E2.6(b)</strong></td>
<td>If yes, please elaborate</td>
</tr>
<tr>
<td><strong>E2.7</strong></td>
<td>Where will data analysis take place and who will perform data analysis (if known)</td>
</tr>
<tr>
<td><strong>E2.8(a)</strong></td>
<td>After data analysis has taken place, will data be destroyed or retained</td>
</tr>
<tr>
<td><strong>E2.8(b)</strong></td>
<td>Please elaborate</td>
</tr>
<tr>
<td><strong>E2.8(c)</strong></td>
<td>If destroyed, how, when and by whom will it be destroyed</td>
</tr>
<tr>
<td><strong>E2.8(d)</strong></td>
<td>If retained, for how long, for what purpose, and where will it be retained</td>
</tr>
<tr>
<td><strong>E2.9</strong></td>
<td>Please comment on the confidentiality of collected data</td>
</tr>
<tr>
<td><strong>E2.10(a)</strong></td>
<td>Will any of the interview data collected consist of audio recordings / video recordings</td>
</tr>
<tr>
<td><strong>E2.10(b)</strong></td>
<td>If yes, will participants be given the opportunity to review and amend transcripts of the tapes</td>
</tr>
<tr>
<td><strong>E2.11(a)</strong></td>
<td>Will any of the study data collected consist of photographs / video recordings</td>
</tr>
</tbody>
</table>

The master sheet recording the participant’s name and unique identification code will be encrypted and stored within the PI’s unique project folder, in RCSI:V drive. This will be stored for a period of five years and then destroyed. The PI, Sinéad Byrne, and the supervisor, Dr. Frances Horgan, will retain the "key" to re-identify the data.

Data will be electronically transferred to the research supervisor (Dr. Frances Horgan) to store in the PI's unique project folder in RCSI:V drive. Hard copies will be destroyed.

Collected data will be stored in the RCSI secure folder to be issued after REC approval. Hard copies of data will be destroyed by confidential shredding. The "key" for identifying data (a master sheet recording the participant's name and unique identification code), will be encrypted, and stored in the RCSI:V drive. All data will be destroyed after five years in accordance with RCSI's Data Protection Policy Guidelines.

Data will be transferred to the RCSI secure server folder for safe storage. The primary investigator will also need to access the data away from RCSI, as the MSc is a part time course. The PI will use an encrypted USB key to allow this.

Data analysis will take place in the Royal College of Surgeons main campus. The primary investigator will perform the data analysis.

Data will be retained for 5 years in accordance with RCSI's Data Protection Policy, and then destroyed.

Hard copies of all data will be scanned / transcribed to electronic format. The hard copies will then be immediately destroyed by the PI (Sinéad Byrne) by confidential shredding.

Data will be retained for 5 years in accordance with RCSI's Data Protection Policy Guidelines. It will be retained in the RCSI secure folder.

All data obtained from the questionnaires will be anonymised. To maintain anonymity and confidentiality, a unique identification number (UIN) will be used for each participant. A master sheet recording the names and related UIN will be encrypted and stored in the PI's unique project folder in the RCSI:V drive, to be issued after REC approval. The master sheet, along with all other data will be destroyed after five years, in accordance with RCSI's Data Protection Policy Guidelines.

Data will be retained for 5 years in accordance with RCSI's Data Protection Policy Guidelines.

No

N/A

No
<table>
<thead>
<tr>
<th>E2.11(b)</th>
<th>If yes, please elaborate</th>
<th>N/A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>E3 ACCESS TO HEALTHCARE RECORDS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E3.1(a)</td>
<td>Does the study involve access to healthcare records (hard copy / electronic)</td>
<td>Yes</td>
</tr>
<tr>
<td>E3.1(b)</td>
<td>If yes, please elaborate</td>
<td>In order to reduce the burden on participants, some information will be obtained from patient folders in the nursing home. This information will include the participant’s age, medical diagnosis and co-morbidities, and their Barthel index functional scores. The nursing home participants will be informed of this in their participant information leaflet, and will be asked to provide written consent.</td>
</tr>
<tr>
<td>E3.1(c)</td>
<td>Who will access these healthcare records</td>
<td>The primary investigator (Síneád Byrne) will access these records.</td>
</tr>
<tr>
<td>E3.1(d)</td>
<td>Will consent be sought from patients for research team members to access their healthcare records</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**SECTION F HUMAN BIOLOGICAL MATERIAL**

| F1 | Does this study involve human biological material | No |

**SECTION G RADIATION**

| G1 | Does this study/trial involve exposure to radiation | No |

**SECTION H MEDICAL DEVICES**

| H1(a) | Is the focus of this study/trial to investigate/evaluate a medical device | No |

**SECTION I MEDICINAL PRODUCTS / COSMETICS / FOOD AND FOODSTUFFS**

| I1.1(a) | Does this study involve a medicinal product | No |

**SECTION J INDEMNITY AND INSURANCE**

| J1 | Please confirm and provide evidence that appropriate insurance/indemnity is in place for this research study at each site | Hillview Nursing Home carries Nursing Home insurance, under which employees and residents are insured. The active retirement groups in the community do not carry insurance, however, as no intervention is being provided, this should not be an issue. The primary investigator (Síneád Byrne) carries Personal Indemnity Insurance from AIG insurance group. |
| J2 | Please confirm and provide evidence that appropriate insurance/indemnity is in place for this research study for each investigator | The primary investigator (Síneád Byrne) carries Personal Indemnity Insurance from AIG insurance group. |
### J3.1
Please give the name and address of the organisation / or individual legally responsible for this research study

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinéad Byrne</td>
<td>49 Monacurragh, Black Bog Road, Carlow Town, Co. Carlow</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Organisation Type</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>A pharmaceutical company</td>
<td>No</td>
</tr>
<tr>
<td>A medical device company</td>
<td>No</td>
</tr>
<tr>
<td>A university</td>
<td>No</td>
</tr>
<tr>
<td>A registered charity</td>
<td>No</td>
</tr>
<tr>
<td>Other</td>
<td>No</td>
</tr>
<tr>
<td>If yes, please specify</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### 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

| Evidence Provided | N/A |

### SECTION K COST AND RESOURCE IMPLICATIONS, FUNDING AND PAYMENTS

#### K1 COST AND RESOURCE IMPLICATIONS

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

Photocopying costs are estimated at approximately €60, while postage stamps should amount to approximately €30, and envelopes totalling €10. Therefore monetary costs should amount to approximately €100 in total. The primary investigator will be required to attend potentially up to twenty active retirement group meetings in order to achieve the desired sample size (two visits to each local group), totalling approximately forty hours of time including travel. The interview based nursing home assessments are timed to take approximately 10 minutes to administer, however, 15 minutes have been allowed for each interview in case of delay; this is estimated to require approximately six and a half hours of time.

#### K2 FUNDING

**Is funding in place to conduct this study**

| Response | No |

**If no, has funding been sought to conduct this study? From where? Please elaborate**

**Funding has not been sought to conduct this study**

**If yes, please state the source of funding (industry, grant or other), the name of the funder, the amount of funding and duration of funding:**

<table>
<thead>
<tr>
<th>Source of funding (industry, grant or other)</th>
<th>Amount of Funding</th>
<th>Duration of Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Please provide additional details in relation to management of funds**

| Details Provided | N/A |

**Is the study funded by a ‘for profit’ organisation**

| Response | No |

99
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 PAYMENTS TO INVESTIGATORS
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 PAYMENTS TO PARTICIPANTS
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 (including amount)
N/A

SECTION L ADDITIONAL ETHICAL ISSUES
L1(a) Does this project raise any additional ethical issues
Yes
L1(b) If yes, please identify any particular additional ethical issues that this project raises and discuss how you have addressed them.
Nursing home residents are a vulnerable population, and may feel pressurised to participate in the study, or worry that their care may be affected. The resident’s next of kin (NOK) will be contacted and advised that the study is being carried out. The NOK will be provided with an information leaflet, and will be asked to talk to the resident about the study, and encourage them to raise any concerns they may have. The PIL will inform both residents and NOK that future care provided in the nursing home will not be affected by a decision either to take part, or not to take part, in the study. Contact details will be provided so that both residents and NOK may contact the researchers if questions should arise. A week will be allowed between providing PIL’s and approaching residents to gain informed consent. If a resident is unable to provide written consent, NOK will again be contacted, and asked to be present to sign as proxy.

DOCUMENT LIST

VIEW AN APPLICATION: Human Research

CHECKLIST
REC #:
Item Selection Docs
Participant consent form(s) Yes Consent Form Community Dwelling.pdf Consent Form Nursing Home_8200748.pdf
<table>
<thead>
<tr>
<th>Information Type</th>
<th>Yes/Not/Applicable</th>
<th>Relevant Files</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant information sheet(s)</td>
<td>Yes</td>
<td>V1-PILNextofKin.pdf, V2-PILCommunityDwelling.pdf, V2-PILNursingHome.pdf</td>
</tr>
<tr>
<td>GP/consultant information sheet(s)</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Questionnaire(s) - please indicate in the document if this is the finalised version.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outcome Expectations for Exercise</td>
<td>Yes</td>
<td>Scale.pdf, Barthel Index (Self-completed)_2278136.pdf, V1-DemographicDataSheet-CommunityDwelingparticipants_2088009.pdf, V1-DemographicDataSheet-NursingHome_5627263.pdf, Self-efficacy to exercise scale.pdf, Geriatric Depression Screening Scale.pdf</td>
</tr>
<tr>
<td>Lead applicant's CV</td>
<td>Yes</td>
<td>Curriculum Vitae.pdf</td>
</tr>
<tr>
<td>Interview theme sheet</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Copy of manufacturer's indemnity</td>
<td>Not Applicable</td>
<td></td>
</tr>
<tr>
<td>Copy of Irish Medicine's Board approval</td>
<td>Not Applicable</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2 - Letter of ethical approval

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

22nd October 2015

Ms Sinead Byrne
RCSI School of Physiotherapy,
123 St. Stephens Green
Dublin 2

<table>
<thead>
<tr>
<th>Ethics Reference No:</th>
<th>REC 1111</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Title:</td>
<td>Exercise Beliefs in Elderly Nursing Home Residents: A Cross-Sectional, Case Control Study.</td>
</tr>
<tr>
<td>Researchers Name (lead applicant):</td>
<td>Ms Sinead Byrne (RCSI School of Physiotherapy)</td>
</tr>
<tr>
<td>Principal investigator on the project (PI):</td>
<td>Dr Frances Horgan (RCSI School of Physiotherapy)</td>
</tr>
</tbody>
</table>

Dear Ms Byrne,

Thank you for your Research Ethics Committee (REC) application. We are pleased to advise that ethical approval has been granted by the committee for this study.

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 22nd December 2016.

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 immediately to the REC, and an ethical amendment submitted where appropriate.
- Please submit a final report to the REC upon completion of your project.

We wish you all the best with your research.

Yours sincerely,

[Signature]

PP Dr. Niamh Clarke (Convenor)
Dr David Smith (Acting Chair)
Appendix 3 – Letter of Permission from Hillview Nursing Home

HILLVIEW NURSING HOME

Tullow Road, Carlow
hillviewnursinghome@eircom.net

Tel: (059) 91 39407
Fax: (059) 91 39409

Date: 21st August 2015
Re: Sinead Byrne

To whom it may concern,
Sinead works in Hillview Nursing Home two days per week as a physiotherapist.
On behalf of our residents I give Sinead permission to carry out research relevant to her profession.

Sincerely,

[Signature]
Catherine O’Byrne
Director of Nursing

Registered in Ireland Company No. 356208
Appendix 4 – Nursing Home Participant Information Leaflet

School of Physiotherapy
Royal College of Surgeons in Ireland (RCSI)
123 St. Stephen’s Green, Dublin 2

Participant Information Leaflet (Nursing Home Participants)

<table>
<thead>
<tr>
<th>Study Title: Exercise beliefs in Elderly Nursing Home Residents: A Cross-Sectional, Case Control Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator: Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow</td>
</tr>
<tr>
<td>Phone Number: 089 4396566</td>
</tr>
<tr>
<td>E-mail: <a href="mailto:sineadvbyrne@rcsi.ie">sineadvbyrne@rcsi.ie</a></td>
</tr>
<tr>
<td>Supervisor</td>
</tr>
<tr>
<td>Name: Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.</td>
</tr>
<tr>
<td>Phone Number: 01 402 2472</td>
</tr>
<tr>
<td>E-mail: <a href="mailto:fhorgan@rcsi.ie">fhorgan@rcsi.ie</a></td>
</tr>
</tbody>
</table>

You are being invited to take part in a research study carried out by Sinéad Byrne, a Masters student in the School of Physiotherapy in RCSI, in association with Dr. Frances Horgan. Sinéad Byrne is a physiotherapist, currently providing physiotherapy treatment in Hillview Nursing Home two days each week. Before you decide whether or not you wish to take part, you should read the information provided below carefully. You should clearly understand the risks and benefits of taking part in this study so that you can make a decision that is right for you. This process is known as ‘Informed Consent’. You do not have to take part in this study. You can change your mind about taking part at any time. Even if the study has started, you may still opt out without giving a reason. Your decision either way will not affect the future care provided to you in Hillview Nursing Home.
**Why is this study being done?**

This study aims to explore the feelings of older adults towards exercise. Current research shows that most older adults in Ireland do not do enough exercise. By taking part in this study you are helping the medical community to better understand the feelings and beliefs of people about exercise, in the hope that we may facilitate greater participation in exercise in the future.

**Who is organising and funding this study?**

This research is being undertaken by Sinéad Byrne, the Physiotherapist in Hillview Nursing Home, and Masters Student at RCSI. No funding has been provided for this research.

**Am I eligible to take part in this study?**

To take part in this study you must be aged 65 years or older, and living in a Nursing Home.

**What does this study involve?**

This study involves three questionnaires, which will take approximately 15 minutes to complete altogether. You will also be asked to sign a consent form to participate in the study. The questionnaires ask about your beliefs and feelings regarding exercise. A screening scale for depression is also included.

**What will happen to me if I agree to take part?**

Your participation is entirely voluntary. If you initially decide to take part you can subsequently change your mind without difficulty. Your decision to take part, or not to take part, will not affect the future care provided to you in Hillview Nursing Home.

You will be asked to answer three questionnaires, taking approximately 15 minutes. The principal investigator, Sinéad Byrne, will give you help if needed to read, understand and complete these questionnaires.

The researchers will also require access to some information from your nursing charts; your age, medical conditions, and level of independence. No identifying information will be taken.

The questionnaires include a short screening scale for depression. If this scale indicates that you should be reviewed by your doctor, your GP will be contacted and advised of this.

**What are the benefits?**

It is hoped that the information you provide will help us to facilitate increased participation in exercise in the future, in order to maximise health benefits for older adults.
What are the risks?

There are no physical risks involved.

Is this study confidential?

All data obtained from the questionnaires will be anonymised. To maintain anonymity and confidentiality, a unique identification number (UIN) will be used for each participant. Hard copies of the questionnaires will be scanned and then destroyed. All computerised data collected will be encrypted and stored securely in the RCSI:V drive, accessible only to the researchers. All data will be destroyed after five years, in accordance with RCSI’s Data Protection Policy Guidelines. The data collected during the course of this study will be analysed and may be published as part of the study in a scientific journal. The collected data will be confidential and participants will not be identifiable.

Where can I get more information?

If you need any further information now or at any time in the future, please contact:

Name: Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow
Phone No: 089 4396566
E-mail address: sineadvbyrne@rcsi.ie

Name: Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.
Phone No: 01 402 2472
E-mail address: fhorgan@rcsi.ie
Appendix 5 – Information Leaflet for Next of Kin

Royal College of Surgeons in Ireland (RCSI)
School of Physiotherapy
123 St. Stephen’s Green, Dublin 2

Participant Information Leaflet (Next of Kin)

Study Title: Exercise Beliefs in Elderly Nursing Home Residents: A Cross Sectional, Case Control Study

Principal Investigator: Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow
Phone Number: 089 4396566
E-mail: sineadvbyrne@rcsi.ie

Supervisor
Name: Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.
Phone Number: 01 402 2472
E-mail: fhorgan@rcsi.ie

I am writing to you in relation to a research study currently being undertaken in Hillview Nursing Home, Carlow. ________________ is being invited to take part in a research study carried out by Sinéad Byrne, a Masters student in the School of Physiotherapy in RCSI, in association with Dr. Frances Horgan. Sinéad Byrne is a physiotherapist, currently providing physiotherapy treatment in Hillview Nursing Home two days each week. The following leaflet will provide information regarding the study. We will be asking ________________ to provide informed consent before he/she takes part in this study. We also wish for you, as ________________’s next of kin, to understand the details of this research. We would ask that you discuss this study with ________________ over the next week. If either of you have any questions regarding the study, please feel free to contact Sinéad using the details provided above. It is our hope that both ________________ and you will fully understand the process before he / she consents / declines to participate. Please read the information provided below carefully. ________________ does not have to take part in this study. He / she can change his / her mind about taking part at any time. Even if the study has started, he / she may still opt out without giving a reason. ________________’s decision either way will not affect the future care provided to him / her in Hillview Nursing Home.
Why is this study being done?

This study aims to explore the feelings of older adults towards exercise. Current research shows that most older adults in Ireland do not do enough exercise. This study aims to help the medical community to better understand the feelings and beliefs of people about exercise, in the hope that we may facilitate greater participation in exercise in the future.

Who is organising and funding this study?

This research is being undertaken by Sinéad Byrne, the Physiotherapist in Hillview Nursing Home, and Masters Student at RCSI. No funding has been provided for this research.

Am I eligible to take part in this study?

Participants in this study must be aged 65 years or older, and living in a Nursing Home.

What does this study involve?

This study involves three questionnaires, which will take approximately 15 minutes to complete altogether. Participants will also be asked to sign a consent form to participate in the study. The questionnaires ask about the participant’s beliefs and feelings regarding exercise. A screening scale for depression is also included.

What will happen to those who agree to take part?

Participation in this study is entirely voluntary. If someone initially decides to take part they can subsequently change their mind without difficulty. A decision to take part, or not to take part, will not affect the future care provided to residents of Hillview Nursing Home.

Participants will be asked to answer three questionnaires, taking approximately 15 minutes. The principal investigator, Sinéad Byrne, will give help if needed to read, understand and complete these questionnaires.

The researchers will also require access to some information from the nursing charts; participant’s age, medical conditions, and level of independence. No identifying information will be taken.

The questionnaires include a short screening scale for depression. If this scale indicates that the participant should require a medical review, their GP will be contacted and advised of this.
What are the benefits?

It is hoped that the information provided will help us to facilitate increased participation in exercise in the future, in order to maximise health benefits for older adults.

What are the risks?

There are no physical risks involved.

Will it cost anything to take part?

The only cost in completing this study will be time.

Is this study confidential?

All data obtained from the questionnaires will be anonymised. To maintain anonymity and confidentiality, a unique identification number (UIN) will be used for each participant. Hard copies of the questionnaires will be scanned and then destroyed. All computerised data collected will be encrypted and stored securely in the RCSI:V drive, accessible only to the researchers. All data will be destroyed after five years, in accordance with RCSI’s Data Protection Policy Guidelines. The data collected during the course of this study will be analysed and may be published as part of the study in a scientific journal. The collected data will be confidential and participants will not be identifiable.

Where can I get further information?

If you need any further information now or at any time in the future, please contact:

Name: Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow
Phone No: 089 4396566
E-mail address: sineadv Byrne@rcsi.ie

Name: Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.
Phone No: 01 402 2472
E-mail address: fhorgan@rcsi.ie
Appendix 6 – Nursing Home Participants Signed Informed Consent

School of Physiotherapy
Royal College of Surgeons in Ireland (RCSI)
123 St. Stephen’s Green, Dublin 2

PARTICIPANT CONSENT FORM

Title of Study: Exercise Beliefs in Elderly Nursing Home Residents: A Cross Sectional, Case Control Study

Lead Researcher: Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow
Phone No: 089 4396566
E-mail Address: sineadv Byrne@rcsi.ie

Supervisor: Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.
Phone No: 01 402 2472
E-mail: fhorgan@rcsi.ie

<table>
<thead>
<tr>
<th>I confirm that I have read and understood the information leaflet about this research project. The information has been fully explained to me, and I have been able to ask questions, all of which have been answered to my satisfaction.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I understand that I do not have to take part in this research study, and that I can opt out at any time. I understand that I do not have to provide a reason for opting out, and I understand that opting out will not affect my future medical care.</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
</tr>
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</table>

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<thead>
<tr>
<th>I am aware of the potential risks and benefits of participating in this research study</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>-----------------------------------------------------------------</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td>I give permission for researchers to look at my nursing charts to get information</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I have been assured that information about me will be kept private and confidential in a key locked cabinet, in the RCSI secure server folder, or on an encrypted USB key</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I have been given a copy of the information leaflet, and this completed consent form for my own records.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td><strong>Storage and future use of information:</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>I give my permission for information collected about me to be stored or electronically processed for the purpose of scientific research and to be used in related studies or other studies in the future but only if the research is approved by a Research Ethics Committee.</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

**Participant Name (Block Capitals):**
__________________________________________________________

**Participant Signature:** ___________________________ **Date:** ________________

*To be completed by the principal investigator or her nominee*

I, the undersigned, have taken the time to fully explain to the above participant the nature and purpose of this study in a manner that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them.

**Name and Qualifications (Block Capitals):**
_________________________________________________________________

**Signature:** ___________________________ **Date:** ________________
Appendix 7 – Community Dwelling Participant Information Leaflet

School of Physiotherapy
Royal College of Surgeons in Ireland (RCSI)
123 St. Stephen’s Green, Dublin 2

Participant Information Leaflet (Community Dwelling Participants)

Study Title: Exercise Beliefs in Elderly Nursing Home Residents: A Cross Sectional, Case Control Study

Principal Investigator: Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow
Phone Number: 089 4396566
E-mail: sineadvbyrne@rcsi.ie

Supervisor
Name: Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.
Phone Number: 01 402 2472
E-mail: fhorgan@rcsi.ie

You are being invited to take part in a research study carried out by Sinéad Byrne, a Masters student in the School of Physiotherapy in RCSI, in association with Dr. Frances Horgan. Before you decide whether or not you wish to take part, you should read the information provided below carefully. You should clearly understand the risks and benefits of taking part in this study so that you can make a decision that is right for you. This process is known as ‘Informed Consent’. You do not have to take part in this study. You can change your mind about taking part at any time. Even if the study has started, you may still opt out without giving a reason.

Why is this study being done?

This study aims to explore the feelings of older adults towards exercise. Current research shows that most older adults in Ireland do not do enough exercise. By taking part in this study you are helping the medical community to better understand the feelings and beliefs of people about exercise, in the hope that we may facilitate greater participation in exercise in the future.
Who is organising and funding this study?

This research is being undertaken by Sinead Byrne, the Physiotherapist in Hillview Nursing Home, and Masters Student at RCSI. No funding has been provided for this research.

Am I eligible to take part in this study?

To take part in this study you must be aged 65 years or older, and living at home.

What does this study involve?

This study involves five questionnaires, which will take approximately 15 minutes to complete altogether. You will also be asked to sign a consent form to participate in the study. The questionnaires ask about your beliefs and feelings regarding exercise, and your current level of independence in your daily activities. A screening scale for depression is also included. You will also be asked to provide some demographic information such as your gender, age, living situation and details of any medical conditions. You may take these questionnaires home with you to complete at your leisure. You will be provided with phone numbers to contact in case of any questions. These questionnaires may be returned via post or in person at your next Active Retirement Group meeting.

What will happen to me if I agree to take part?

Your participation is entirely voluntary. If you initially decide to take part you can subsequently change your mind without difficulty.

If you agree to participate in this study you will be provided with a participation pack containing a consent form, the five questionnaires, and a stamped, addressed envelope. Contact details for the researchers will be included in this pack in case any questions should arise. You may complete the questionnaires and return them to the researchers via post. Alternatively, the Principal Investigator, Sinead Byrne, will also be present at your next Active Retirement Group meeting, where you can ask any further questions you may have, and return the questionnaires in person if you so wish.

The questionnaires include a short screening scale for depression. If this scale indicates that you should visit your doctor you will be contacted by the primary investigator in person and advised of this. If you so wish, the primary investigator will contact your GP for you.
What are the benefits?

It is hoped that the information you provide will help us to facilitate increased participation in exercise in the future, in order to maximise health benefits for older adults.

What are the risks?

There are no physical risks involved.

Will it cost me anything to take part?

The only cost to you in completing this study will be your time.

Is this study confidential?

All data obtained from the questionnaires will be anonymised. To maintain anonymity and confidentiality, a unique identification number (UIN) will be used for each participant. Hard copies of the questionnaires will be scanned and then destroyed. All computerised data collected will be encrypted and stored securely in the RCSI:V drive, accessible only to the researchers. All data will be destroyed after five years, in accordance with RCSI’s Data Protection Policy Guidelines. The data collected during the course of this study will be analysed and may be published as part of the study in a scientific journal. The collected data will be confidential and participants will not be identifiable.

Where can I get further information?

If you need any further information now or at any time in the future, please contact:

Name: Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow
Phone No: 089 4396566
E-mail address: sineadvbyrne@rcsi.ie

Name: Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.
Phone No: 01 402 2472
E-mail address: fhorgan@rcsi.ie
Appendix 8 – Community Dwelling Participants Signed Informed Consent

School of Physiotherapy  
Royal College of Surgeons in Ireland (RCSI)  
123 St. Stephen’s Green, Dublin 2  

PARTICIPANT CONSENT FORM

**Title of Study:** Exercise Beliefs in Elderly Nursing Home Residents: A Cross Sectional, Case Control Study

**Lead Researcher:** Sinéad Byrne, Chartered Physiotherapist, Hillview Nursing Home, Tullow Road, Carlow  
**Phone No:** 089 4396566  
**E-mail Address:** sineadvbyrne@rcsi.ie

**Supervisor:** Dr. Frances Horgan, Senior Lecturer, School of Physiotherapy, RCSI.  
**Phone No:** 01 402 2472  
**E-mail:** fhorgan@rcsi.ie

<table>
<thead>
<tr>
<th>Statement</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>I confirm that I have read and understood the information leaflet about this research project. The information has been fully explained to me, and I have been able to ask questions, all of which have been answered to my satisfaction.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I understand that I do not have to take part in this research study, and that I can opt out at any time. I understand that I do not have to provide a reason for opting out, and I understand that opting out will not affect my future medical care.</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I am aware of the potential risks and benefits of participating in this research study</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
I have been assured that information about me will be kept private and confidential in the RCSI secure server folder, or on an encrypted USB key | Yes | No
--- | ---
I have been given a copy of the information leaflet, and this completed consent form for my own records. | Yes | No
--- | ---
Storage and future use of information: I give my permission for information collected about me to be stored or electronically processed for the purpose of scientific research and to be used in related studies or other studies in the future but only if the research is approved by a Research Ethics Committee. | Yes | No
--- | ---

**Participant Name (Block Capitals):**

_____________________________________________________

Participant Signature: ____________________________  Date: ________________

---

**To be completed by the principal investigator or her nominee**

I, the undersigned, have taken the time to fully explain to the above participant the nature and purpose of this study in a manner that they could understand. I have explained the risks involved as well as the possible benefits. I have invited them to ask questions on any aspect of the study that concerned them.

**Name and Qualifications (Block Capitals):**

____________________________________________________________________

Signature: ____________________________  Date: ____________________________

---
Appendix 9 – Geriatric Depression Scale-15

Please answer the following questions honestly, choosing the best answer for how you felt over the past week. Circle your answer.

1. Are you basically satisfied with your life? YES / NO
2. Have you dropped many of your activities and interests? YES / NO
3. Do you feel that your life is empty? YES / NO
4. Do you often get bored? YES / NO
5. Are you in good spirits most of the time? YES / NO
6. Are you afraid that something bad is going to happen to you? YES / NO
7. Do you feel happy most of the time? YES / NO
8. Do you often feel helpless? YES / NO
9. Do you prefer to stay at home, rather than going out and doing new things? YES / NO
10. Do you feel you have more problems with memory than most? YES / NO
11. Do you think it is wonderful to be alive right now? YES / NO
12. Do you feel pretty worthless the way you are now? YES / NO
13. Do you feel full of energy? YES / NO
14. Do you feel that your situation is hopeless? YES / NO
15. Do you think that most people are better off than you are? YES / NO
Appendix 10 – Nursing Home Participant Demographic Information Collection Sheet

Data Collection Sheet for Nursing Home Participants (Demographic information, Barthel Index of Functional Activities score, and medical history)

Age: ________________________________
Gender: ______________________________

Barthel Index of Activities of Daily Living:

FEEDING:  0 = Unable
          5 = Needs help cutting, spreading butter etc., or requires modified diet.
          10 = Independent

BATHING:  0 = Dependent
           5 = Independent (or in shower)

GROOMING:  0 = Needs help with personal care
           5 = Independent face / hair / teeth / shaving (implements provided)

DRESSING:  0 = Dependent
           5 = Needs help, but can do about half unaided
           10 = Independent (including buttons, zips, laces)

BOWELS:   0 = Incontinent (or needs to be given enemas)
           5 = Occasional Accident
           10 = Continent
BLADDER: 0 = Incontinent, or catheterized and unable to manage alone
5 = Occasional Accident
10 = Continent

TOILET USE: 0 = Dependent
5 = Needs some help, but can do something alone
10 = Independent (on and off, dressing, wiping)

TRANSFERS: 0 = Unable, no sitting balance
5 = Major help (1 or 2 people, physical) can sit
10 = Minor help (verbal or physical)
15 = Independent

MOBILITY: 0 = Immobile (or <50 yards)
5 = Wheelchair independent, including corners, >50 yards
10 = Walks with help of one person (verbal or physical) > 50 yards
15 = Independent (but may use any aid) >50 yards

STAIRS: 0 = Unable
5 = Needs help (verbal, physical, carrying aid)
10 = Independent

TOTAL SCORE (0 – 100)

Medical conditions (diagnosed in medical notes):
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
Appendix 11 – Community Dwelling Participant Demographic Information Collection Sheet

Demographic Data Collection Questionnaire

Please provide the following information about yourself:

Age: ____________________________

Male/Female: _____________________

Please tick the appropriate box:

Do you live:
- Alone □
- With your spouse / partner □
- With your child / children □
- With another family member □
- In assisted living □

How would you rate your health:
- Excellent □
- Very Good □
- Good □
- Poor □
- Very Poor □

Please advise of any medical conditions which you have been diagnosed with:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Appendix 12 – Outcome Expectations for Exercise Scale

Please indicate the extent to which you agree / disagree with the following statements by placing an “X” in the appropriate box. Please note that there are no right or wrong answers, and no trick questions. We would simply like to know how you feel about exercise.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise makes me feel better physically</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise makes my mood better in general</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise helps me feel less tired</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise makes my muscles stronger</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise is an activity I enjoy doing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise gives me a sense of personal accomplishment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise makes me more alert mentally</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise improves my endurance in performing my daily activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise helps to strengthen my bones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 13 – Self-Efficacy for Exercise Scale

We would like to know how confident you feel that you could exercise for twenty minutes, three times a week, under the following different conditions. Please indicate your level of confidence by circling the appropriate number. Please note that there is no right or wrong answers, and no trick questions, we simply wish to know how you personally feel.

How confident are you right now that you could exercise three times per week, for 20 minutes if:

<table>
<thead>
<tr>
<th></th>
<th>Not Confident</th>
<th>Very Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The weather was bothering you</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>2. You were bored by the programme or activity</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>3. You felt pain when exercising</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>4. You had to exercise alone</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>5. You did not enjoy it</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>6. You were too busy with other activities</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>7. You felt tired</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>8. You felt stressed</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
<tr>
<td>9. You felt depressed</td>
<td>0 1 2 3 4 5 6 7 8 9 10</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 14 – Barthel Index of Activities of Daily Living (Self-completed version)

Please indicate if you require assistance with any of the following tasks by placing a tick in the appropriate box:

1. **Eating:**
   - I do not need assistance to eat
   - I require some assistance to eat (eg. cutting, spreading butter)
   - I am unable to eat without assistance

2. **Bathing:**
   - I can bathe (or shower) without assistance
   - I require assistance to bathe

3. **Grooming:**
   - I do not require any assistance to wash myself, brush teeth, shave, or do my hair
   - I require assistance to wash myself, brush teeth, shave, or do my hair

4. **Dressing:**
   - I do not need assistance to dress myself
   - I require some assistance to dress myself but can do about half myself
   - I am unable to dress myself without assistance
5. Bowels:  
- I have no trouble with my bowel movements  
- I have occasional accidents with my bowels  
- I am unable to control my bowel movements

6. Bladder:  
- I have no trouble with my bladder movements  
- I have occasional accidents with my bladder  
- I am unable to control my bladder movements, or currently have a catheter

7. Toilet use:  
- I can use the toilet independently  
- I require some assistance to use the toilet (getting on/off, dressing, wiping)  
- I am unable to use the toilet without assistance
8. Transfers:  
- I can move from my bed to a chair and back without assistance ☐
- I require a small amount of help to move my from my bed to a chair and back ☐
- I require physical help from one or two people to move from my bed to a chair and back ☐
- I find it difficult to sit upright without losing my balance ☐

9. Mobility:  
- I can walk on a level surface without any assistance (use of a walking stick or frame is acceptable) ☐
- I require assistance of one person to walk on a level surface ☐
- I use a wheelchair to mobilise, but I can use the wheelchair without any assistance ☐

10. Stairs:  
- I can climb and descend stairs without any assistance ☐
- I need help to use the stairs ☐
- I am unable to use the stairs ☐
Appendix 15 – Common Medical Conditions Recorded Across the Groups

Common Medical Conditions Recorded

<table>
<thead>
<tr>
<th>Condition</th>
<th>Nursing Home N (%)</th>
<th>Community Dwelling N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebrovascular Accident</td>
<td>6 (27.3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Parkinson’s Disease</td>
<td>5 (22.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Congestive Cardiac Failure</td>
<td>0 (0%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>9 (40.9%)</td>
<td>6 (30%)</td>
</tr>
<tr>
<td>Ischaemic Heart Disease</td>
<td>3 (13.6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>3 (13.6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Cancer</td>
<td>4 (18.2%)</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>Osteoarthritis</td>
<td>8 (36.4%)</td>
<td>2 (10%)</td>
</tr>
<tr>
<td>COPD</td>
<td>5 (22.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Depression</td>
<td>10 (45.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Total Hip Replacement</td>
<td>2 (9.1%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Diabetes</td>
<td>6 (27.3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Osteoporosis/Osteopenia</td>
<td>3 (13.6%)</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Hiatus Hernia</td>
<td>5 (22.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Amputation</td>
<td>1 (4.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>1 (4.5%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Vertigo</td>
<td>4 (18.2%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

COPD = Chronic Obstructive Pulmonary Disease
Appendix 16 – Outcome Expectations for Exercise Scale scores association with independent variables - Graphs

Outcome Expectations for Exercise Scale Scores VS Barthel Index of Activities of Daily Living Scores across groups.

Outcome Expectations for Exercise Scale scores VS Geriatric Depression Scale 15 scores across groups.
Outcome Expectations for Exercise Scale scores VS participant age across groups.

Outcome Expectations for Exercise Scale scores VS number of comorbidities recorded across the groups.
Appendix 17 – Self-Efficacy for Exercise Scale scores association with independent variables - Graphs

Self-Efficacy for Exercise Scale scores VS Barthel Index of Activities of Daily Living scores across the groups.

Self-Efficacy for Exercise Scale scores VS Geriatric Depression Scale 15 scores across the groups.
Self-Efficacy for Exercise Scale scores VS participant age across the groups.

Self-Efficacy for Exercise Scale scores VS number of comorbidities recorded across the groups.