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**Evaluation of the Warrington Falls Management
and Prevention Service**

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Executive summary

Introduction

Over 400,000 older people in England attend accident and emergency departments following a fall, and up to 14,000 people a year die in the UK as a result of an osteoporotic hip fracture. For older people, falling adversely impacts on their morbidity and mortality and there are a number of significant negative physical, social and psychological consequences following a fall, including self-imposed restricted mobility, fall phobia and fractures.

Standard Six of the National Service Framework for older people, states that providers of health and social care must work together to reduce the number of falls occurring within the elderly population. In addition, older people who have fallen should receive effective treatment and rehabilitation and have access to a specialist falls service. Therefore, developing effective community-based falls prevention programmes has become a priority for Primary Care Trusts.

Study design and methodology

The study aimed to assess the extent to which the Warrington Falls Management and Prevention Service achieved its stated objectives. In particular, the study focused on changes in functional performance and mobility levels among clients as a result of taking part in an exercise programme, clients' awareness of the multi-factorial risks associated with falls, and the extent to which social isolation of the elderly was addressed by the service.

The following outcome measures were used:

- falls accident data from two care homes in Warrington;
- identification of a falls problem assessment;
- quantitative falls risk assessment scores;
- improvements in functional assessment scores including timed up and go, functional reach and visual analogue measurements taken pre- and post-exercise programme;
- experience of the service from the perspective of service users;
- the extent to which the service conforms to current guidelines.

Findings

Interrogation of the accident books from both the nursing home and the retirement village showed falls incidence as highest in the morning (between 6.45 and 9am) and early evening (between 6.30 and 9.30pm). Falls occurred mostly in the bedroom or living room area.

Data collected by the Warrington Falls Management and Prevention Service from 121 persons referred to the service between 22 January 2004 and 6 December 2004, shows that of these, one third (40, 33%) had experienced between two and five falls in the previous 12 months, 36 (29%) stated they had fallen 'several', 'numerous' or an 'unknown' number of times, 23 (19%) had experienced one fall, 15 (12%) had not experienced any falls at all, five (4%) had experienced 10 or more falls, and two (2%) had experienced 6-9 falls.

The data collected by the Warrington Falls Management and Prevention Service also shows some of the consequences of falling for those who experienced one or more falls in the previous 12 months, as well as whether or not individuals were frightened of falling.

- Twenty-six individuals (25%) said that they had suffered a broken bone as a result of a fall whilst 78 individuals (75%) said that they had not.
- Twenty-five individuals (25%) said that they were able to get up by themselves after falling, whilst 74 individuals (75%) said they required assistance to help them up after having a fall.
- Eighty-nine individuals (87%) said that they were frightened of falling, whilst 13 (13%) said that they were not.

Those who took part in a 16 week exercise programme provided by the Warrington Falls Management and Prevention Service, completed functional assessment measures pre- and post-intervention.

- 17 (74%) participants reduced the time it took to complete the 'timed up and go' assessment, while 6 (26%) completed the task in a longer period of time.
- 17 (74%) participants increased 'functional reach', while 3 (13%) remained constant and 3 (13%) participants' decreased between pre- and post-intervention measurements.
- 11 participants' (55%) visual analogue scores had reduced (indicating a reduction in anxiety) when measured post-intervention, while 4 participants'

scores (20%) remained constant (indicating no change in anxiety regarding falls) and 5 participants' scores (25%) increased (indicating a higher level of anxiety).

In total, 19 participants completed all three functional assessment tests, of these, ten participants (53%) improved in both the timed up and go, and the functional reach test. However, despite making these improvements, only five participants (27%) improved in all three tests which included the measure of fear of falling.

Users comments regarding the WFMPs in the focus groups were overwhelmingly positive, particularly in relation to its perceived role in improving mobility and fitness, helping to reduce falls, reducing anxiety regarding falls and reducing social isolation. Other themes that emerged included the perceived role that medication plays in contributing to falls, and whether or not people would be able to sustain the levels of fitness they had attained as a result of the WFMPs by exercising at home.

Conclusion

The findings from this study show a reduction in self-reported falls and an increase in physical function for many clients. Taking part in the Warrington Falls Management and Prevention Service relieved social isolation and improved social inclusion for many clients. Strategies for surviving a fall were successfully taught to clients, who stated that as a result of this, they felt less anxious about falls and falling.

Findings from this study show that that the Warrington Falls Management and Prevention Service is underpinned by the standards set out by the National Service Framework (NSF) and recommendations made by the National Institute for Clinical Excellence (NICE).

The findings from this study also indicate that implementation issues are inherent in setting up a falls prevention service. A key factor in the success of the programme is its capacity to engage members of the target group. A critical factor in successfully engaging this client group is the ease of access to appropriate community facilities. Thus, transport is a crucial factor in facilitating attendance. Other practical issues include finding and retaining appropriate accommodation in which to run sessions, this is also important to recruiting and retaining service users.

The establishment of a falls register to monitor the incidence of falls in Warrington would be an important development in being able to assess the impact of local interventions.

Chapter 1

Introduction

1.1 Background

Over 400,000 older people in England attend accident and emergency departments following a fall, and up to 14,000 people a year die in the UK as a result of an osteoporotic hip fracture (Department of Health [DoH], 2001; Legge, 2003). For older people, falling adversely impacts on their morbidity and mortality and there are a number of significant negative physical, social and psychological consequences following a fall, including self-imposed restricted mobility, fall phobia and fractures (DoH, 2001).

Hip fractures are the most common serious injury related to falls. In 2001, this cost the NHS approximately £1.7 billion per annum (DoH, 2001). The UK population is ageing and therefore the cost of falls incurred by the NHS is expected to escalate. Based on current trends, the incidence of hip fractures resulting from a fall may rise to 120,000 per annum by 2015 (Department of Trade and Industry [DTI], 1999). Community studies have estimated that about half of people aged 85 years and over will fall at least once a year and the incidence is rising (Health Promotion England, 2001a; DoH, 2001). Falls and hip fracture can also have a detrimental impact on function, quality of life and change in residential status, for example, up to 50% of older people who have a hip fracture are subsequently unable to live independently (Davidson, Merrilees, Wilkinson, Mckie, & Gilchrist, 2001; Hannan et al., 2001; Van Balen et al., 2001).

Standard Six of the National Service Framework (NSF) for older people (DoH, 2001) states that providers of health and social care must work together to reduce the number of falls occurring within the elderly population. In addition, older people who have fallen should receive effective treatment and rehabilitation and have access to a specialist falls service. Therefore, developing effective community-based falls prevention programmes has become a priority for Primary Care Trusts (PCTs).

1.2 Falls among older people in Warrington

In 2002 North Cheshire was ranked third highest in England for emergency admissions to hospital of people aged over 75 (Directorate of Health Improvement, Warrington PCT, 2002). Data also indicate that in 2002 Warrington had a rate of 35 per 1000 population for hospital admissions of people aged 75 years or over, due to

hypothermia or injury as a result of a fall. This rate placed Warrington second highest in England, well above the national average of 23 hospital admissions per 1000 population of persons aged 75 or over as a result of a fall. This rate of falls is expected to increase even further, with a 14% increase in the population aged over 65 years predicted by 2010 (Directorate of Health Improvement, Warrington PCT, 2002).

A challenge facing the implementation of a community-based falls prevention programme in Warrington is the low levels of physical activity currently reported among residents. People aged over 65 years living in Warrington have been found to lead relatively sedentary lives, with 75% of this group taking little or no regular exercise (Directorate of Health Improvement, Warrington PCT, 2002).

1.3 Risk factors for falling

Risk factors for falling are classified as intrinsic or extrinsic. Intrinsic factors are internal to the individual. Increased age, a history of falls, impaired balance, poor muscle strength and slow walking speed are examples of intrinsic risk factors (Davis, Ross, Nevitt, & Wasnich, 1999; Mustard & Mayer, 1997). Other intrinsic risk factors include age-related physiologic changes and chronic conditions of various body systems, particularly cardiovascular, neurological, musculoskeletal and urologic conditions (Edwards & Lee, 1998; Tinetti & Williams, 1998). Gait and balance impairments are strong predictors of falling, and evidence suggests walking velocity is slower for older adults who fall than for older non-fallers (Cho & Kamen, 1998; Davis et al., 1999; Edwards & Lee, 1998). Acute health status changes also put older adults at risk of falling (Kuehn & Sendelweck, 1995), as does adverse reactions to medications (Leipzig, Cumming & Tinetti, 1999; Mustard & Meyer, 1997).

In addition to being a consequence of falling, fear of falling has been identified as a risk factor for falling (Baloh, Jacobson, Enrietto, Corona, & Honrubia, 1998). There is evidence that suggests falls efficacy, the confidence that an individual has to do daily activities without falling, is an important factor to consider in fall prevention efforts (Tinetti, Richman, & Powell, 1990).

Extrinsic risk factors for falling are those environmental hazards that increase the chances of falling such as the presence of throw rugs, low lighting, slippery floors and unsafe footwear. The way that older persons function in, and interact with, their environment also affects their safety. One study suggested that those who are

distracted by doing a familiar, manual task along with functional manoeuvres (such as carrying a glass of water while walking) are more likely to fall (Lundin-Olsson, Nyberg, & Gustafson, 1998).

1.4 Preventing falls

It is widely acknowledged that multi-factorial interventions which include components in exercise, education about risk factors, home safety checks and medication reviews, are the most effective in preventing falls in older people (Gillespie et al., 2001). The American Geriatric Society, British Geriatric Society and American Academy of Orthopaedic Surgeons Panel on Falls Prevention (2001) state that multi-disciplinary, multi-factorial interventions should include advice, education and, where necessary, training with interventions, including exercise, treatment and medication modification, as well as a review of environmental hazards. However, although a multi-faceted approach in preventing falls in older people is considered to be the most effective, the optimal type, duration and intensity of intervention remains unclear. Indeed the Department of Health (2003, p. 20) noted that:

We found that there is not one model service, approach or structure for effective work to implement the NSF [National Service Framework] Standard for Falls, but core principles (that can frame local variation in design and implementation) and essential structures to support services – such as effective IT networks and administrative back up – are ingredients and determinants of success.

1.5 The Warrington Falls Management and Prevention Service

The Warrington Falls Management and Prevention Service (WFMPs) was developed in order to address the issue of falls among older people in the eight inner wards of Warrington in Cheshire. Since its original inception, the WFMPs has been rolled out to cover the entire Warrington area. The development of the service is part of a commitment by Warrington Primary Care Trust (PCT) to reduce the incidence of falls within the elderly population and is consistent with NSF requirements regarding falls among the elderly.

The WFMPs is able to provide information about the prevention of falling and highlight the risk factors to service users. The service is delivered by a multi-disciplinary team and provides support in falls prevention through a number of different activities listed below.

- Assessment of level of falls risk.
- 'Sit to get fit', a chair-based exercise class to music, to help strengthen muscles and help to make everyday activities easier.

-
- ‘Stall the fall’, an exercise class to improve balance and co-ordination and prevent further falls, which includes survival on the floor work.
 - Information on the risk factors associated with falls so that individuals can reduce their own risk.
 - Home safety checks to ensure homes are free from falls hazards.
 - Provision of hip protectors to protect the hip from breaking in the event of a fall.

Older people (aged 65 or over) can be referred to the WFMPs if they are identified as being ‘at risk’ of falls as per the identification of a falls problem assessment form (Appendix 1). A wide range of health professionals from health and community services can refer clients to the WFMPs using this assessment form. These include GPs, practice nurses, community nurses, physiotherapists, podiatrists, occupational therapists, hospital nurses, hospital therapists, hospital consultants, social workers, support workers, and the community alarm project worker. Two voluntary agencies (Age Concern Warrington and the Citizens Advice Bureau [CAB]) can also refer clients to the service, as well as older people themselves being able to self-refer.

Persons who are identified as being at moderate to high risk of falls after initial assessment are required to complete a comprehensive falls risk assessment with a member of the WFMPs team. This is to determine the risk of falling and appropriate intervention, and is conducted using the falls risk level assessment form (Appendix 2). Depending on the outcome of this assessment there are a number of interventions that clients are invited to take part in to reduce their own risk of falling.

The WFMPs objectives, as stated in the original proposal are:

- to reduce the incidence of injurious falls;
- to increase functional performance and mobility levels;
- to heighten awareness of the multi-factorial risks associated with falls;
- to influence the compliance of wearing hip protectors;
- to plan and teach personal survival strategies for surviving a fall;
- to relieve social isolation and promote social inclusion.

1.6 Aims and objectives of the study

This study is an evaluation of the WFMPs. It aims to assess the extent to which the service achieved its stated objectives. Specifically, the purpose of the study was to:

- describe service activity;
- examine the physical, social and psychological outcomes for clients who have used the service;
- present the views of clients who have used the service;
- examine the extent to which the WFMPs conform to current guidelines;
- examine the practical aspects of implementing a falls service.

Chapter 2

Literature review

2.1 Falls and older people

Numerous definitions of a 'fall' have been used by different researchers. However, for the purpose of this literature review, Buchner et al.'s (1993, p. 301) definition of a fall will be used: 'unintentionally coming to rest on the ground, floor, or other lower level'. Since 1993 several falls studies have used this definition of a fall, including Campbell et al.'s (1997) randomised trial of a community-based falls prevention programme.

Between 1995 and 1997 approximately 609,000 falls occurred among women, and 189,000 among men aged 65 years or older in the UK (Health Promotion England, 2001a). These figures equate to a considerable risk of falling. Within a twelve month period approximately one third of people aged over 65 will have at least one fall (Tinetti et al., 1994; Woolf & Akesson, 2003; Gillespie et al., 2001; American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001). Among those aged 85 or older the risk is even greater, with approximately 50 percent having at least one fall within a year (Health Promotion England, 2001a).

Falls among older people are associated with considerable mortality and morbidity. In the UK falls are the leading cause of mortality due to injury among people aged over 75 years (Unsworth & Mode, 2003). Each year 400,000 older people attend accident and emergency departments as a result of a fall and approximately 14,000 deaths occur from hip fractures (DoH, 2001). Those older people who survive a fall often suffer ongoing problems such as injury and infection, a loss of confidence, loss of mobility leading to social isolation and depression, increased dependency and permanent disability (DoH, 2001).

Aside from the human cost of hip fracture, the economic implications of this outcome are significant. One single hip fracture costs £13,000 in the first year and £7,000 for follow-up care and nursing in the second year (Health Promotion England, 2001a). In 2001, the NHS spent approximately £1.7 billion per annum on hip fractures (DoH, 2001). The health and economic burden of falls is anticipated to increase over the next decade. By 2010, the number of non-fatal falls experienced by people aged 65-74 years is expected to increase by 17%. Among persons aged 75 years or over,

non-fatal falls are expected to increase by over a third (DTI, 1999 cited in Unsworth & Mode, 2003).

2.2 Risk factors for falling

Risk of falling among older people is determined by many complex, inter-related factors. Approximately 130 risk factors for falls have been identified in the literature (Myers et al., 1996 cited in Unsworth & Mode, 2003). These include intrinsic (individual) factors associated with movement and physical functioning, and extrinsic (external) factors associated with the environment. Intrinsic risk factors include impaired vestibular or movement senses, reduced visual senses, reduced balance, low muscle strength, gait and mobility problems, taking four or more medications, being visually impaired, being cognitively impaired or having depression, and postural hypotension (DoH, 2001). Extrinsic falls risk factors include cluttered rooms, slippery floors, type of footwear and poor lighting.

A review of 16 studies sought to identify the most common factors associated with falls among older people. This review identified muscle weakness, a history of falls, gait deficiencies, balance deficits, the use of an assistive device such as a walking stick, visual deficit, arthritis, impaired activities of daily living, depression, cognitive impairment and being over 80 years of age as the factors most strongly associated with falls risk (American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001). Additionally, meta-analyses have also identified psychotropic medication, antiarrhythmic medication, digoxin and diuretics as strongly associated with falls risk. As the number of risk factors a person has increases, so too does their falls risk (American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001). Health Promotion England (2001a) also identified risk factors for falls in older people. These factors include many of those described by the American and British Geriatrics Society (2001). Additionally, they also include nutritional status, acute and chronic diseases such as stroke and heart disease, female sex, lifestyle factors such as alcohol use and environmental hazards.

As a fall often results from multiple risk factors, falls prevention programmes need to address a range of risks if they are to be effective. To address these multiple risks a multi-agency collaborative approach has been advocated (National Institute for Clinical Excellence [NICE], 2004). Primary and secondary care, ambulance services, housing and social services, pharmacists, volunteer groups, therapists, patients and

carers have all been identified as needing to work together to implement falls prevention programmes (McMurdo & Harper, 2002).

2.3 National Service Framework for Older People

One of the eight standards in the National Service Framework for Older People is to 'reduce the number of falls which result in serious injury and ensure effective treatment and rehabilitation for those who have fallen' (DoH, 2001, p. 76). The Framework notes the problem of continued under-investment in preventative and rehabilitative services for falls. The NSF states that this ongoing problem has not been adequately addressed, despite the Audit Commission advising the need for investment in falls services more than half a decade ago in 1997.

The NSF suggests that community-wide falls prevention strategies are urgently needed to address this situation. Consistent with the findings of other studies (McMurdo & Harper, 2002; American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001; Health Promotion England, 2001a), the NSF emphasises the need for health services to work in partnership with a range of local agencies to implement a specialist falls service. According to the NSF, this team should include consultants in aged care, nurses, physiotherapists, occupational therapists, social workers, pharmacists, chiropodists and podiatrists. Additionally, the NSF also suggests that falls services should have access to ophthalmologists, orthotists and dieticians.

The NSF also endorses a multi-faceted approach; the key components of falls programmes identified include information, advice and support, the promotion of weight-bearing and strength-enhancing exercise, healthy eating and smoking cessation.

Individually tailored exercise programmes are recognised by the NSF as particularly effective in reducing falls. The NSF suggests that exercises that focus on balance training, strengthening the muscles around the hip joints and leg joints, increasing the flexibility of the trunk and lower body and improving mobility are most likely to reduce falls risk. As well as this, the NSF identifies restoring the independence and confidence of older people in performing activities of everyday living, as an important factor in reducing falls risk.

The NSF also endorses home falls risk assessments for older people living in community settings, and the importance of providing a service to identify and modify or remove falls hazards in the home. It advocates education strategies being delivered as part of a multi-faceted falls prevention programme and within this recommends that older people should be taught how to prevent falls, how to cope with a fall if one occurs, how to get up, how to call for help, prevent hypothermia and prevent pressure sores.

The NSF identifies three important milestones for the implementation of falls services in local health systems. The first of these milestones was April 2003, by which time all local health care providers should have audited existing procedures and implemented falls risk management strategies. By April 2004 local services should have developed plans with the local independent sector to develop an integrated falls service. Finally, the NSF states that by April 2005 each local health system should have implemented a comprehensive falls service for older people.

2.4 Multifaceted interventions to prevent falls

There is good evidence to support the effectiveness of falls prevention programmes. Research conducted in the UK has shown that prevention initiatives can reduce falls among older people by 15 to 30% (DoH, 2003; Oliver, Hopper, & Seed, 2000; Tinetti, et al., 1994). A Cochrane Review of falls prevention programmes found multi-factorial interventions to be most effective in preventing falls among unselected older people and older people identified as being at risk of falling (Gillespie, et al. 2001). According to Feder, Cryer, Donovan, & Carter (2000), programmes that are most effective in reducing falls include interventions aimed at improving gait, balance, strength, postural hypotension, range of motion, ability to transfer, home safety assessment and modification, and prescription drug reviews and advice.

Several studies have investigated the effect of multi-factorial programmes on falls incidence. One randomised trial of a falls prevention intervention reported a 22% lower incidence of self-reported falls in the intervention group compared to controls (Kempton, Van Beurden, Sladden, Garner, & Beard, 2000). This intervention consisted of awareness raising, community education, home hazard reduction, gentle exercise classes and working with health professionals. The most notable finding of the study was a 20% reduction in age standardised fall-related hospital admissions in the intervention group compared to controls. The study also reported an increased awareness of falls risk among older people and an increase in the wearing of safer

footwear. After adjustment, lower rates of taking fall-related medications and improved self-reported balance were also found. However, the results of this study must be treated with caution due to losses to follow-up, the possibility of reporting bias, and the fact that reduced hospital admissions may have stemmed from multiple factors unrelated to the intervention.

Tinetti et al. (1994) also studied the impact of a multi-faceted falls reduction intervention on falls risk. This study concluded that a multiple risk factor intervention can significantly reduce both risk of falls and risk factors for falls in community-dwelling older people. Tinetti et al. (1994) reported that during one year of follow-up, 35% of the intervention group fell, compared with 47% of the control group. A decline in the mean number of falls risk factors among the intervention group compared to controls was also found, with lower proportions of the intervention group continuing to use at least four prescription medications, to transfer unsafely from bathtub or toilet or have impaired balance or gait.

Another randomised trial of a multi-factorial intervention reported a significant reduction in risk of falling (odds ratio 0.39) and recurrent falls (odds ratio 0.33) among the intervention group compared to controls (Close, et al., 1999). This trial consisted of a full medical and occupational assessment, falls advice and education, and environmental modifications. Close et al. (1999) concluded that the findings of their study support the relevance of an interdisciplinary approach to falls prevention.

While systematic reviews have found multi-factorial interventions to be effective in reducing falls risk factors and the incidence of falls, single dimensional programmes have been found to have little or no effect on these outcomes (Gillespie, et al., 2001). A study of home visits to older people (to assess falls risk), followed by advice and referrals found no evidence for improvements in falls incidence, physical functioning, admissions to institutions or mortality (Van Haastregt, et al., 2000).

The American Geriatrics Society, British Geriatrics Society and American Academy of Orthopaedic Surgeons Panel on Falls Prevention (2001) outlined guidelines for multi-factorial interventions to reduce falls among community-dwelling older adults. These guidelines advise that interventions should include: gait training, advice on the proper use of assistive devices, a review and modification of medications, exercise programs which include balance training, treatment of postural hypotension, environmental hazard modification and treatment of cardio-vascular conditions. In

addition to these components, Speechley and Tinetti (1991) argue that multi-factorial falls prevention programmes should also provide opportunities for older people to socialise and should involve other family members in the provision of follow-up. Feder et al. (2000, p. 1009) highlight the importance of individually tailoring falls prevention activities. They argue that, 'A multifaceted programme should consist of a core assessment and recommendations adapted to individual risk'.

Guidelines recently published by the National Institute for Clinical Excellence (NICE, 2004) regarding the assessment and prevention of falls in older people, also recommend that all older people with recurrent falls or assessed as being at increased risk of falling should be considered for an individualised multifactorial intervention. The NICE report that successful multifactorial intervention programmes contain the following components:

- strength and balance training;
- home hazard assessment and intervention;
- vision assessment and referral;
- medication review with modification/withdrawal.

The NICE (2004) also recommend that following treatment for an injurious fall, older people should be offered a multidisciplinary assessment to identify and address future risk, and individualised intervention aimed at promoting independence and improving physical and psychological function.

2.5 Exercise programmes to prevent falls

A Cochrane review of the benefits of progressive resistance training (PRT) among older people found that PRT has a large and positive effect on strength and on some functions such as gait speed. However, the report notes that only one study, conducted among hospitalised older people, has demonstrated a significant reduction in falls from progressive resistance training (Latham, Anderson, Bennett, & Stretton, 2003). Another Cochrane review, of a range of exercise programmes for the prevention of falls among community-dwelling older people, concluded that the evidence for their effectiveness is limited (Gillespie, et al., 2001). An earlier review conducted by Feder et al. (2000, p.1008) had similar findings, arguing, 'The results from the trials of exercise on its own cannot support a recommendation of exercise programmes for preventing falls in unselected older people, with the exception of T'ai Chi'. While both reviews found little evidence for the effectiveness of exercise

programmes alone in reducing falls, Gillespie et al. nevertheless suggest that multi-factorial programmes which include a well targeted, tailored exercise component are effective in reducing falls risk factors and falls incidence.

Feder et al. (2000) argue that exercise programmes to reduce falls in unselected older people have not been proven to be effective. However, the authors support the implementation of exercise programmes, administered by qualified instructors, among selected groups of older people with mild deficits in strength and balance, such as women over 80 years of age. Feder et al. argue that there is evidence that these types of exercise programmes reduce the risk of falls. The authors argue that exercise programmes of sufficient duration, intensity, frequency and specificity should be designed to address specifically, problems such as muscle weakness and balance deficiencies within selected groups. Among the general, unselected population of older people living in the community, the authors suggest that T'ai Chi exercise programmes may reduce falls risk.

Research into the effectiveness of T'ai Chi has found that this type of exercise reduces both falls risk and falls incidence. A review of the literature on Tai Chi and falls found the exercise to have a positive effect on both balance and postural stability in older people (Zwick, Rochelle, Choksi, & Domowicz, 2000). Other studies have reported a reduction in risk of falling of approximately 50% among the groups receiving instruction in T'ai Chi compared to controls (Wolf, et al., 1996 cited in Feder et al., 2000; Health Promotion England, 2001b). Thornton, Sykes and Tang (2004) reported that Tai Chi exercise also has benefits for middle aged adults. Their study showed decreases in both mean systolic and diastolic blood pressure for a control group who undertook a 12 week Tai Chi exercise programme, as well as improved dynamic balance measured by functional reach.

In contrast to the reviews conducted by Gillespie et al. (2001) and Feder et al. (2000), a review of nine randomised controlled trials of exercise and falls risk by Carter et al. (2001) reported that exercise alone can be useful in preventing falls and fall-related fractures in older adults. Similarly, a review of eleven randomised controlled trials of exercise programmes for falls prevention found that the rate and risk of falling was significantly reduced in five of the trials reviewed (Gardner, Robertson, & Campbell, 2000). A randomised trial conducted by Hogan et al. (2001) did not find any significant differences in likelihood of falling among their intervention

group compared to controls. However, they did find an increase in the period between falls among those who participated in the exercise intervention.

The importance of exercise components in multi-faceted falls prevention programmes is reinforced by the American Geriatrics Society, British Geriatrics Society and American Academy of Orthopaedic Surgeons Panel on Falls Prevention (2001). The guidelines produced by this Panel concluded that although the optimum level, duration and intensity of exercise for falls prevention is yet to be determined, exercise programmes have a beneficial effect on falls risk in older adults. The guidelines note that exercise programmes which incorporate balance training are particularly effective in reducing falls risk. They conclude with a recommendation that, 'Older people who have had recurrent falls should be offered long-term exercise and balance training' (American Geriatrics Society, British Geriatrics Society and American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001, p. 668).

Campbell et al. (1997) conducted a randomised controlled trial of a home-based exercise programme for women aged 80 and over in New Zealand. The intervention consisted of individually tailored home-based strengthening and balance exercises and a twice-weekly walking plan, and was delivered by a physiotherapist. After one year of follow-up there were 152 falls in the control group compared with 88 falls in the exercise group. The authors also report that the intervention group had improved balance after six months and better performance on the chair stand test (time taken to rise from a chair and return to the seated position five times). They were also at lower risk of moderate to severe injury from a fall and less fearful of falling.

A paper by Robertson, Delvin, Gardner, and Campbell (2001) on the same repeated intervention delivered by a district nurse, reports that analysis of age groups participating in their study found that the programme was effective for those aged over 80 but not for those aged 75-79 years. The authors suggest that this finding may relate to critical strength and balance thresholds for falls risk. Younger people may already be at, or above, the critical level of balance and strength for falls risk, whereas older, frailer people are more likely to be below this threshold at the time of entry to the programme. Robertson et al. (2001) suggest that exercises to improve balance and strength would therefore yield greater benefits to frail older persons, raising their level of balance and strength above the critical level for falls.

In a randomised controlled trial of the effectiveness of a multi-faceted falls prevention intervention, Day et al. (2002) found group-based exercise to be most effective in preventing falls among older people living in the community. The programme consisted of supervised one hour class-based exercises for 15 weeks supplemented with home-based exercise for up to 12 months. The authors note that improvements in balance were associated with decreased falls risk in the intervention group. However, the reduced risk may have also been linked to the social interaction of the group exercise programme, behavioural change, an increased awareness of falls developed in the exercise classes or a combination of these factors.

Studies of exercise programmes to reduce falls among osteoporosis sufferers have also reported improvements in falls risk factors. Carter et al. (2002) conducted a randomised controlled trial of a community-based 20 week exercise programme among women aged 65 to 75 years with osteoporosis. The exercise intervention was run on a twice-weekly basis by certified instructors and consisted of exercises to improve posture, balance, gait, coordination, and hip and trunk stability. Carter et al. reported significant improvements in dynamic balance and strength in the intervention group compared to controls at the conclusion of the trial. The success of the study by Carter et al. contrasts with an earlier trial of an unsupervised walking programme for women with a history of osteoporosis. This trial reported a higher risk of falls and fractures among participants in the exercise intervention (Feder, et al., 2000). The divergent findings of the two studies highlight the importance of individually tailoring and supervising exercise programmes for older people identified as being at risk of a fall.

Research conducted into exercise and falls prevention has identified a number of key elements in successful exercise programmes. Perhaps the most important of these elements is the need for exercise programmes to target those most at risk of falls and to tailor exercises to match participants' needs. Exercises that are of sufficient intensity, are performed regularly and sustained over time are most likely to maintain their preventative effect (Skelton & Dinan, 1999).

According to Skelton and Dinan (1999) a combination of class-based and home-based exercise are of most value in promoting compliance with falls prevention exercise programmes. They also argue that class-based programmes are valuable in motivating participants, allowing for faster progression of training, reinforcing exercises and providing a safe environment in which to try new or challenging

exercises. Furthermore, Skelton and Dinan (1999) argue that group-based exercise classes provide participants with psycho-social benefits including peer support, an opportunity for social contact, a reduction in feelings of isolation and physical contact with others.

As well as the exercise itself, the attitude toward exercise among the target population has also been identified as an important factor to consider in the development of an exercise intervention. Qualitative research conducted by Simpson, Darwin and Marsh (2003) found a lack of enthusiasm for exercise among some older people. Three barriers to exercise were identified in the study, including the belief that any existing pain would be exacerbated by exercise, or that exercise would cause pain. Secondly, that exercise requires too much effort and would lead to exhaustion and, thirdly, some participants perceived that they were too old to exercise. To overcome these fears Simpson et al. (2003) suggest that exercise intervention programmes should include an education component targeting community-dwelling older people, their GPs and other service providers.

2.6 Hip protectors

To date, research investigating the effectiveness of hip protectors has been limited to small studies among nursing home residents. Within this population hip protectors have been found to reduce the relative risk of hip fractures by 40% (Meyer, Warnke, Bender, & Muhlhauser, 2003). However, compliance remains a major issue in the evaluation of the effectiveness of hip protectors. Further research is needed into compliance issues and the effectiveness of hip protectors over longer periods of time. There is also widespread recognition of the need for the evaluation of hip protectors among community-dwelling older people. Feder et al. (2000) are among the many authors who argue that more research is urgently needed to investigate the effectiveness of hip protectors in different settings. Although the effectiveness of hip protectors have not yet been evaluated within exercise, Skelton and Dinan (1999) recommend the distribution of hip protectors to frail participants and those identified as being at high risk of falling.

Due to insufficient evidence at present, the recent guidelines published by the NICE (2004) regarding the assessment and prevention of falls in older people, do not recommend the use of hip protectors as a falls intervention. According to the NICE, reported trials that have used individual patient randomisation have provided no evidence for the effectiveness of hip protectors to prevent fractures when offered to

older people living in extended care settings or in their own homes. However, the NICE also report that data from cluster randomised trials provide some evidence that hip protectors are effective in the prevention of hip fractures in older people living in extended care settings who are considered at high risk.

2.7 Home safety assessments and modifications

Home safety checks and the elimination of environmental hazards are an important component of multi-factorial falls prevention programmes. Several studies have identified home safety checks and modifications as integral to the reduction of falls (Speechley & Tinetti, 1991; Close, et al., 1999; Feder, et al., 2000). Guidelines produced by the American Geriatrics Society, British Geriatrics Society and American Academy of Orthopaedic Surgeons Panel on Falls Prevention (2001) highlight the importance of environmental hazard modification, advising that this should be included in all falls prevention programmes. The NICE (2004) also regard this as an integral part of any multifactorial falls prevention service.

Despite home safety assessments and modifications being recognised as integral to the success of falls prevention programmes, low implementation rates have been reported. One study of home safety assessments and modifications reported that only 11% of carers of older people carried out safety alterations recommended by a physiotherapist (Buri, et al., 1999 cited in Skelton & Dinan, 1999). To avoid this low compliance with safety modification advice, some falls prevention programmes have provided a free minor modification service.

The literature presented in this chapter shows that falls among the elderly have wide reaching implications for both individuals and health services around the globe. Although the precise value of some strategies to reduce falls are still somewhat contested (such as the use of hip protectors), it is widely acknowledged that a multifaceted approach involving a number of different interventions is likely to be the most effective.

Chapter 3

Methodology

3.1 Introduction

This study utilised a combination of qualitative and quantitative research methods. It is often useful to combine these methods in social research, particularly when the study seeks to provide a description of a service and the extent to which it has been utilised (Kumar, 1999). The study aimed to assess the extent to which the WFMPs achieved its stated objectives. In particular, the study focused on changes in functional performance and mobility levels among clients as a result of taking part in an exercise programme, clients' awareness of the multi-factorial risks associated with falls and the extent to which social isolation of the elderly was addressed by the service.

The following outcome measures were used:

- falls accident data from two care homes in Warrington;
- identification of a falls problem assessment (assessed by WFMPs pre-intervention using 'identification of a falls problem form F1', see Appendix 1);
- quantitative falls risk assessment scores (measured by WFMPs pre-intervention and calculated using 'falls risk level assessment form F2', see Appendix 2);
- improvements in functional assessment scores including timed up and go, functional reach and visual analogue measurements taken pre- and post-exercise programme;
- experience of the service from the perspective of service users (qualitative focus group data);
- the extent to which the WFMPs conforms to current guidelines.

In order to assess the extent to which the service was able to influence the compliance of wearing hip protectors, hip protector diaries were supplied to those clients who were given hip protectors as part of their tailored falls prevention strategy. However, the number of hip protector diaries returned were not sufficient to conduct analysis regarding the compliance of service users to wearing hip protectors.

For the purposes of this evaluation, data were not available to show falls admissions to Accident and Emergency during 2004/5.

3.2 Service activity data

Data were collected by the WFMPs from all persons referred to the service at the initial point of referral. Data that were available for the purpose of this evaluation comprise 121 persons referred to the WFMPs between 22 January 2004 and 6 December 2004.

3.2.1 Identifying a falls problem

In identifying those who should be referred to the WFMPs, each potential client was required to complete an 'identification of a falls problem assessment form' (Appendix 1). In many cases these were completed on clients' behalf, for example, by a nurse who could ask the questions verbally and note the respondent's answer during a consultation. The results from these assessments have been included here in order to illustrate the types of referrals being made to the WFMPs. Data relate to: how many times (if any) the person has fallen within the last year; injuries incurred as a result of falls; whether the person was able to get up from the floor by themselves or needed assistance, and, if the person was frightened of falling. These factors were used to establish or identify a falls 'problem', after which, if this was identified, the person would then complete a more comprehensive falls risk assessment.

3.2.2 Assessing falls risk

Persons referred to the WFMPs and identified as being at risk from falls were required to complete a comprehensive falls risk assessment to determine their risk of falling and appropriate intervention. Individuals were each assessed by a member of the WFMPs team using the 'falls risk level assessment form' (Appendix 2). This assessment attributes a score to falls risk in seven different areas, and a final aggregate score pertaining to 'total falls risk'. The areas scored include: medical; environment; social; medication; mobility; nutrition, and general. A higher score indicates increased falls risk. It was anticipated that the data gathered from the falls risk assessments would enable a general view to be developed of those at risk from falling in the Warrington area who had been referred to the WFMPs. Table 3.2.2.1 shows how falls risk scores, as measured by the 'falls risk level assessment form' (Appendix 2), equate to falls risk.

Table 3.2.2.1 Falls risk level assessment scores

Score	Falls risk
3-8	Low risk
9-13	Medium risk
14-20	High risk
21-25	Very high risk
26+	Almost inevitable

3.3 Functional assessment scores

Functional assessment data collected by the WFMPs were included in the study and used for analysis. These data are derived from three, 16 week exercise programmes run by the WFMPs as part of the intervention programme. Participants were asked at the beginning of session one, before the commencement of the session, to complete the functional assessments in order to gain a baseline measure for their current functional ability. At the end of the final session of the exercise programme (the sixteenth week), participants were asked to complete the same functional assessments that they had completed at the beginning of the programme, on week one. The instructor running the exercise sessions completed the assessments with the participants. Thirty-eight referrals into the exercise classes resulted in 23 matched pre- and post-exercise class functional assessment scores for participants. Fifteen participants' were not measured for either pre- or post-scores for the following reasons: not being present at the first or last session when measurements were taken; voluntarily opting out of the exercise programme; deceased before completion of the programme.

All functional assessments were completed pre- and post-intervention, that is, week one and week sixteen of the 'sit to get fit' exercise class. This was done to enable a comparison between scores pre- and post-intervention to be made, in order to assess the impact, if any, of the 16 week exercise programme.

The functional assessment used by WFMPs was made using three tools: timed up and go; functional reach; and visual analogue score.

3.3.1 Timed up and go assessment

The timed up and go functional assessment is a test of basic functional mobility for frail elderly persons that provides data on gait and transfer skills. Studies suggest that the test is a reliable and valid test for quantifying functional mobility that may also be useful in following clinical change over time (Mathias, Nayak, & Isaacs, 1986;

Posiadlo & Richardson, 1991; Skelton & Dinan, 1999). In this study it was used to assess the effects of the 'sit to get fit' exercise class delivered to clients as part of the WFMPs.

The assessment requires a stopwatch, a chair (preferably without arms) and a clear area of at least 3 metres. A large marker (such as a cone) is placed 3 metres from the front of the chair. The person performing the assessment begins seated on the chair, they are then required to stand up (trying first not to use their arms on their knees to help them rise), walk three metres, turn and return to the chair and sit down, at their own pace. The movement is timed; timing begins when the individual's back leaves the chair and stops on subsequent return of the individual's back to the chair.

3.3.2 Functional reach assessment

The functional reach assessment is a valid and reliable tool used to detect balance impairment and change in balance performance over time (Duncan, Weiner, Chandler, & Studenski, 1990; Eagle, et al., 1999; Whitney, Poole, & Cass, 1999). The test is a simple measure of the arm's length at maximal forward reach using a fixed base support.

3.3.3 Visual analogue score

The visual analogue score (Appendix 3) is a graphic representation of a person's level of anxiety towards falling. It consists of a black line 22 cm long, along which people are asked to mark an X to represent how anxious they feel about falling and injuring themselves. Zero cms (far left along the line) indicates that they are not anxious at all and 22 cms (far right along the line) indicates that they are extremely anxious.

3.4 Focus groups with service users

The DoH (2003) notes that older people should be involved in developing falls interventions and pathways, and that the evaluation of programmes should encompass the experiences of older people who use services. Focus groups with service users were conducted as part of this study to gather data on the experience of using the service from the perspective of service users.

Focus groups are unstructured interviews with small groups of people who interact with each other and the group leader (Bowling, 1997). They have the advantage of making use of group dynamics to stimulate discussion, gain insights and generate

ideas in order to pursue a topic in greater depth. The group processes can help people to explore their views and generate questions in ways that would not occur in face-to-face interviews. In this sense, focus groups capitalise on communication between research participants in order to generate data.

In focus groups people are encouraged to talk to one another, asking questions, exchanging anecdotes and commenting on each other's experiences and point of view (Kitzinger, 1995). This form of everyday communication may reveal what people know or experience. In this sense focus groups can reveal dimensions of understanding that often remain untapped by more conventional data collection techniques.

For the purpose of this study, focus groups were conducted at the end of the 16 week exercise programme, immediately following the final session. In total, three focus groups were conducted with 3 separate groups. Each group had completed the same 'sit to get fit' exercise programme, a chair-based exercise class to music, to help strengthen muscles and help to make everyday activities easier. Participants had also accessed a number of other components of the WFMPs such as home safety checks and the distribution of hip protectors. To gain a fuller picture of the programme as a whole, these were discussed in the context of the overall programme. The groups consisted of between 5 and 20 participants, aged 65 or older and of mixed sex.

Participants were asked to take part in a focus group by the instructor delivering the exercise class. The instructor explained the purpose of the focus group one week before it was due to take place (the fifteenth week) and asked those who would be willing to take part, to volunteer by staying on at the end of the final exercise class. Participants were given an information sheet (Appendix 4) and asked to sign a consent form (Appendix 5) prior to the focus group taking place on the final week of the exercise programme.

Participants were asked to discuss a number of topics including their general awareness and anxiety of falls, their experiences of WFMPs, if and how their experience had changed their attitude towards falls, and whether they had experienced any physical changes as a result of any of the components of the WFMPs that they had been involved with. The schedule for conducting the focus

groups can be found in Appendix 6. However, this was only used as a guide and often participants would deviate from the questions asked or issues raised.

All the focus groups were tape recorded with the permission of the participants and subsequently transcribed; a scribe was also present to take notes and make observations. A thematic analysis was carried out, with data being coded by theme.

3.5 Falls data from residential homes in Warrington

Data were also collected from records kept by one retirement village and one nursing home in Warrington. It was anticipated that data relating to falls in these relatively 'controlled' environments would be reliable and accurate, and provide a 'microcosm' of what occurs in these communities. The residential homes that took part in the study record all accidents or incidents in detail and log them in an accident book.

Accident data relating to falls were extracted from a retirement village from the 1st January 2003 to 10th February 2004. Similar data was extracted from accident records kept at a nursing home from 1st January 2003 to 29th April 2004. The WFMPs acted as the 'gatekeeper' to gain access to the data. Both residential homes had had presentations regarding the WFMPs and a number of residents were being referred to the service.

The data collected included the following: total number of falls among residents; falls occurring among men and women; the result of a fall (no injury, moderate injury, serious injury); time of day that the fall took place; location that the fall took place in, and the total number of falls for individual residents. Where available, data were also collected regarding the circumstances of each fall, for example, if the faller had slipped on ice, had consumed alcohol or was confused.

These data were collected in order to examine who is most at risk from falling, the location that older people are most at risk from falling in, the time of day they are most at risk and to investigate under which circumstances falls occur.

3.6 Ethical approval

The ethical issues inherent in this research project were considered and scrutinised by South Cheshire Local Research Ethics Committee. The committee approved the study in January 2004.

Chapter 4

Findings

4.1 Introduction

This chapter presents the findings in relation to:

- falls accident data from residential homes;
- service activity;
- functional assessment scores pre- and post-exercise programme;
- experience of using the service from the WFMPs users (qualitative focus group data).

4.2 Falls accident data from two residential homes in Warrington

This section presents data in relation to falls incidence collected from a nursing home and a retirement village in Warrington. Given that the needs of residents in the nursing home are different from those residents in the retirement village it is perhaps difficult to make direct comparisons between the two. For example, residents of the nursing home are likely to have greater mobility difficulties, and as such be wheelchair users, which may affect falls incidence within the home. However, for the purposes of this study it is useful to examine both sets of data to gain an overview of the incidence of falls among older people more generally.

4.2.1 Falls among residents of a nursing home in Warrington from 1 January 2003 to 29 April 2004

Out of a total of 139 residents 345 falls occurred between 1/1/03 and 29/04/04. Of the 345 falls, 39 men fell 122 times (35% of total falls) and 100 women fell 223 times (65% of total falls). Of the total of 345 falls, 220 (64%) resulted in 'no apparent injury'. Of those that were injurious, 111 (89%) were recorded as resulting in 'slight injury' and 10 (8%) were recorded as causing 'moderate injury'. Four falls (3%) resulted in 'serious injury'.

Figure 4.2.1.1 below shows the number of falls according to the time that they occurred. Falls peaked during two separate points in the day: the first being early morning at approximately 6:45am and the second being in the evening at approximately 9:30pm. The reason for this is unclear, particularly as falls also occur regularly throughout the rest of the day. One explanation may be that residents are more active during these times and therefore more likely to fall while bathing, dressing, transferring and so on. It may also be hypothesised that this pattern follows

the scheduled checks carried out by staff members, or that medication is taken at these times.

Falls also occurred during the night and early hours of the morning. This is likely to be the result of residents falling out of bed (particularly when going to the bathroom) and requiring assistance.

Figure 4.2.1.1 Number of falls according to the time they occurred in a nursing home in Warrington

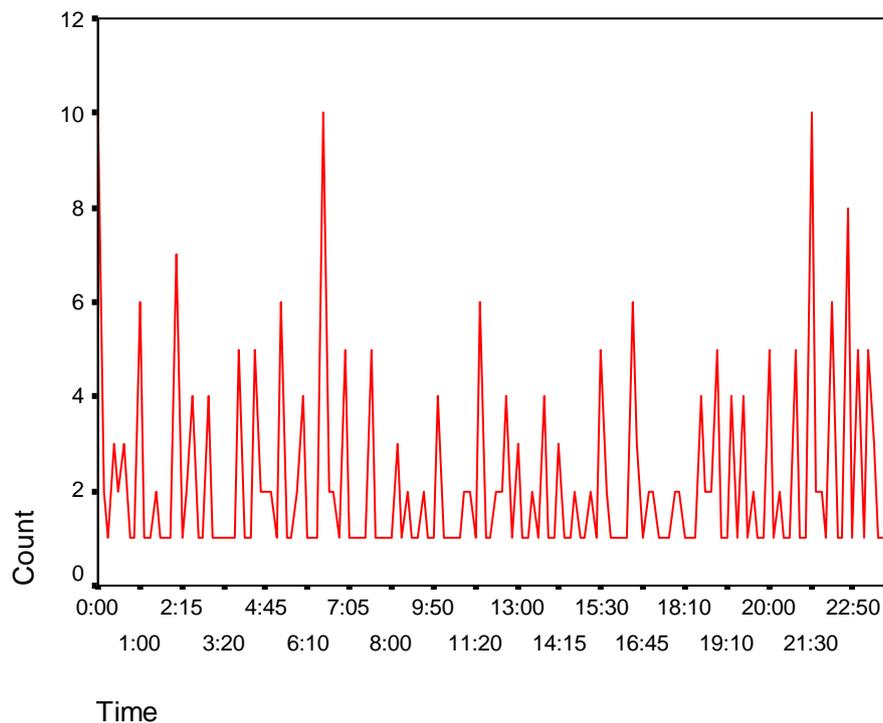


Table 4.2.1.1 shows the locations that falls occurred in. Over half of all falls occurred in the resident's own bedroom (154, 54%), followed by the lounge area (81, 23%), and in the hallway or corridors of the retirement home (42, 12%).

The high rate of falls occurring in the bedroom corresponds with the time that falls occurred, as shown in Figure 4.2.1.1. This shows the majority of falls occurring in the morning (when residents may be getting up) and in the evening (when residents may be going to bed).

Table 4.2.1.1 Number of falls by location in a nursing home in Warrington

Location	Frequency	Percent
Bedroom	185	54
Lounge Area	81	23
Hallway	42	12
Dining Area	13	4
Bathroom	11	3
Garden	5	1
Kitchen	4	1
Retirement centre	3	1
Home Unspecified	1	0
Total	345	100

Those residents in the nursing home who experienced more than two falls during the 16 month period investigated, were classified as 'frequent fallers'. This group make up approximately 25% of total residents at the nursing home (n=139), and account for 76% of total falls occurring within the home. Thus, a quarter of residents are involved in the majority of falls incidents. From this evidence it may be possible to hypothesise that a 'high risk' group exists within the nursing home population. It is also possible that this group is more mobile than other residents and as such are involved in more falls incidents. If this is the case than high risk groups such as this could be identified and may benefit from referral to the WFMPs.

4.2.2 Falls among residents of a retirement village in Warrington from 1 January 2003 to 10 February 2004

Out of a total of 284 residents, 258 falls occurred between 1 January 2003 and 10 February 2004. Of the 258 falls, 101 men fell 80 times (31% of total falls) and 157 women fell 178 times (69% of total falls). In nine falls (3%) staff noted that the resident appeared to have consumed alcohol or appeared drunk. In four falls (2%) it was noted that the faller had slipped on ice.

Of the total of 258 falls, 190 (74%) resulted in 'no apparent injury'. Of those that were injurious, 52 (76%) were recorded as resulting in 'slight injury' and 16 (24%) were recorded as causing 'moderate injury'. There were no 'serious injuries' recorded.

Figure 4.2.2.1 below shows the number of falls according to the time that they occurred. Once again falls most commonly occurred among residents during mid-morning, peaking at approximately 9am, and during the evening, peaking at approximately between 6:30 and 7pm.

Figure 4.2.2.1 Number of falls according to the time they occurred in a retirement village in Warrington

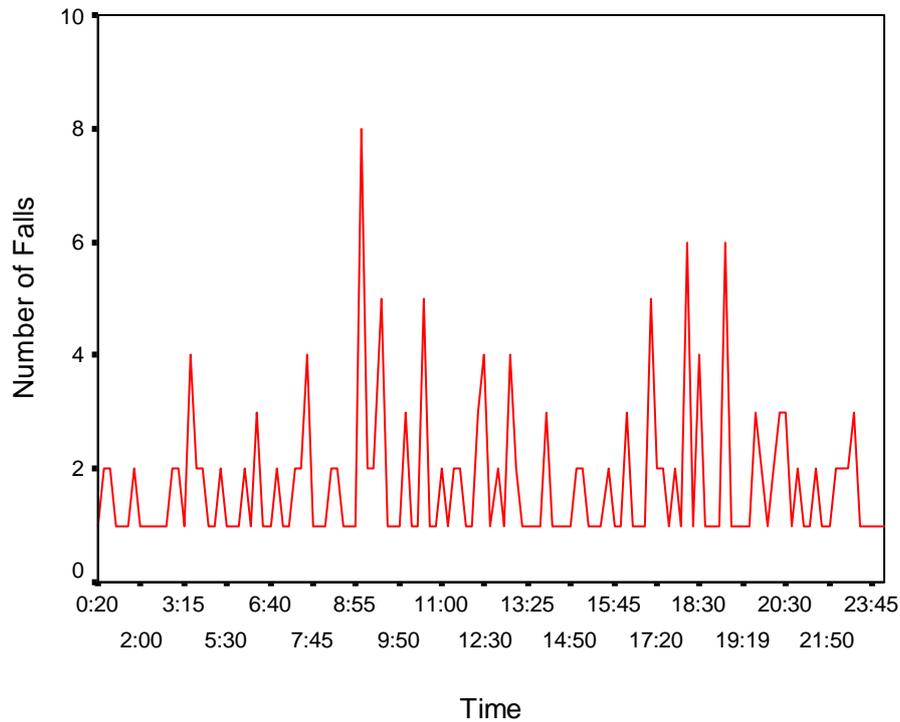


Table 4.2.2.1 shows that the location that had the highest number of falls was the bedroom (65, 25%) followed by the living room (56, 22%). This corresponds with the time that falls occurred in Figure 4.2.2.1.

Table 4.2.2.1 Number of falls by location in a retirement village in Warrington

Location	Frequency	Percent
Bedroom	65	25
Living room	56	22
Home unspecified	44	17
Bathroom	38	15
Hallway	23	9
Retirement Village	12	5
Missing	7	3
Kitchen	6	2
Street	4	2
Transport Vehicle	3	1
Total	258	100

The data collected from both the nursing home and the retirement village suggest that older people are most at risk from falling in the bedroom or living room area.

This may reflect the amount of time spent in these main 'living areas' as opposed to specific falls risks or dangers present in these areas. The data also suggest that older people are most at risk in the morning (between 6.45 and 9am) and early evening (between 6.30 and 9.30pm). As stated previously this may be due to residents being more active during these times, or may perhaps reflect the scheduled checks carried out by staff members

4.3 Service activity

This section presents data collected by the WFMPs from persons referred to the service at the initial point of referral. The data presented here comprise 121 persons referred to the WFMPs service between 22 January 2004 and 6 December 2004. Of this group, 107 (88%) were female and 14 (12%) were male.

4.3.1 Identifying a falls problem

Table 4.3.1.1 shows the number of falls experienced by individuals in the previous 12 months prior to being referred to the WFMPs. Of the 121 individuals, one third (33%) had experienced between two and five falls in the previous 12 months, while 15 (12%) had not experienced any falls at all. Over half of those who fell (69, 58%) were aged 81-99 years. However, those participants who experienced no falls (15), were spread between the ages of 76-80 (5), 81-85 (6), and 86-99 (4). Those participants aged under 65 (1) or 65-75 (12) had all experienced at least one fall in the previous 12 months prior to being referred to the WFMPs. This suggests that falls is a highly complex problem, and that although age can be used as one of a number of indicators to calculate falls risk, risk of falling is not exclusively age specific. These data also suggest that the WFMPs is providing access to a service which can be beneficial to individuals of differing age groups.

Table 4.3.1.1 Number of falls that individuals had experienced in the last year prior to their referral to the WFMPs

Falls	Number	Percent
No falls	15	12
1 fall	23	19
2-5 falls	40	33
6-9 falls	2	2
10+ falls	5	4
Several or numerous	9	7
Unknown	27	22
Total	121	100

The data collected by the WFMPs (from 130 referrals) also shows some of the consequences of falling for those who experienced one or more falls in the previous 12 months, as well as whether or not individuals were frightened of falling. Not all individuals answered each question.

- Twenty-six individuals (25%) said that they had suffered a broken bone as a result of a fall whilst 78 individuals (75%) said that they had not.
- Twenty-five individuals (25%) said that they were able to get up by themselves after falling, whilst 74 individuals (75%) said they required assistance to help them up after having a fall.
- Eighty-nine individuals (87%) said that they were frightened of falling, whilst 13 (13%) said that they were not.

This suggests that while falls were often not sufficiently serious to cause a fracture, individuals experienced difficulty in getting up alone. This is likely to increase their fear of falling and dealing adequately with the consequences of a fall. Being unable to get up without assistance may also, in certain circumstances, put individuals at risk of conditions or injuries that may occur if they are unable to get medical attention, such as hypothermia.

4.3.2 Assessing falls risk

Completed comprehensive falls risk assessment data were available for a total of 75 individuals from the 121 referrals (the remaining 46 were unobtainable). Table 4.3.2.1 shows the number of individuals in each risk category. Over two thirds of these (68%) were classified as either 'very high risk' or 'almost inevitable', while the mean falls risk score for individuals was 23 (very high risk). This shows that the WFMPs is capturing those with a high risk of falls and thus receiving appropriate referrals.

Table 4.3.2.1 Number of individuals in each risk category

	Frequency	Percent
Low risk	1	1
Medium risk	5	7
High risk	18	24
Very high risk	19	25
Almost inevitable	32	43
Total	75	100

4.4 Functional assessment scores pre- and post-exercise programme

The functional assessment scores were recorded by WFMPs staff before and after the completion of the 16 week exercise programme run by the WFMPs. Only those who completed both pre- and post-intervention measures were included in the analysis; 23 persons out of 38 completed pre- and post-measures for ‘timed up and go’; 23 persons out of 38 completed pre- and post-measures for ‘functional reach’; 20 persons out of 38 completed pre- and post-measures for ‘visual analogue score’.

Table 4.4.1 shows the mean time that it took all participants to complete the ‘timed up and go exercise’ pre- and post-intervention. It shows participants’ time between pre- and post-intervention improved by a mean of 4.04 seconds (from 29.08 at pre-intervention to 25.03 at post-intervention). However, this narrowly fails to reach statistical significance ($p = 0.055$). Overall, 17 (74%) participants reduced the time it took to complete the task, while 6 (26%) completed the task in a longer period of time.

Table 4.4.1 Mean timed up and go assessment pre- and post-intervention (seconds)

Pre-intervention time		Post-intervention time		Time difference post-intervention	
Mean	Std. dev	Mean	Std. dev	Mean	Std. dev
29.08	15.55	25.03	15.59	-4.04	9.56

Table 4.4.2 below shows the mean functional reach for all participants pre- and post-intervention and the mean change in functional reach experienced by participants between these two periods. Participants’ mean functional reach pre-intervention was 13.09 while participants’ mean functional reach post-intervention was 17.11. Thus, participants’ functional reach increased by 4.02, a statistically significant finding ($p = 0.002$). Overall, 17 (74%) participants’ functional reach increased, while 3 (13%) remained constant and 3 (13%) participants’ decreased between pre- and post-intervention measurements.

Table 4.4.2 Mean functional reach pre- and post-intervention (cm)

Functional reach pre-intervention		Functional reach post-intervention		Functional reach difference post-intervention	
Mean	Std. dev	Mean	Std. dev	Mean	Std. dev
13.09	4.91	17.11	4.35	4.02	5.56

Table 4.4.3 shows the mean visual analogue scores for all participants' pre- and post-intervention, and the mean change in visual analogue scores between these two periods. It shows that participants' mean visual analogue score decreased (became less anxious) by 2.18 following participation in a 16 week 'sit to get fit' exercise programme (from 10.98 pre-intervention to 8.80 post-intervention). Again however, this reduction narrowly failed to reach statistical significance ($p = 0.051$). Overall, 11 participants' (55%) scores had reduced (indicating a reduction in anxiety) when measured post-intervention, while 4 participants' scores (20%) remained constant (indicating no change in anxiety regarding falls) and 5 participants' (25%) scores increased (indicating a higher level of anxiety).

Table 4.4.3 Mean visual analogue scores pre- and post-intervention (cm)

Visual analogue score pre-intervention		Visual analogue score post-intervention		Visual analogue score change post-intervention	
Mean	Std. dev	Mean	Std. dev	Mean	Std. dev
10.98	5.38	8.80	6.12	-2.18	4.68

In total 19 participants completed all three functional assessment tests, of these, ten participants (53%) improved in the timed up and go, and the functional reach test. However, despite making these improvements, only five participants (27%) improved in all three tests which included the measure of fear of falling.

4.5 Focus groups with WFMPs users

This section presents findings from the qualitative data collected from the focus groups conducted as part of the study. The focus groups were analysed thematically and the findings are presented in relation to the following themes: referral pathway for clients; anxiety about falling; falls and medication; improvements in mobility and physical fitness; self-reported falls; reducing social isolation; and, sustained activity. Quotations from participants in the groups are used to illustrate these themes, which have been anonymised with code numbers.

4.6 Referral pathway for clients

Any new programme requires a referral pathway in order for potential service users to be referred into the service. However, it is also important that referrals are appropriate, that is, people who need and can benefit from the service are identified. Participants in the focus groups reported a number of different ways in which they

heard about, or were referred to the service. These ranged from participants seeing advertisements for the service while others were referred to the service by a health professional because of noted problems with falling. Some participants in the focus groups reported that they had self-referred to the service not because they had experienced a fall but because they were concerned about the possibility of falling. One participant commented that *'I wasn't falling but you feel unsteady on your feet'* (group one), while others reported self-referring *'just for confidence'* (group one), or because they *'needed exercise'* (group two). One participant reported self-referring to the service purely because of its innovative approach to care and falls prevention strategy. The participant made the following statement about the service:

'This course is a new departure. Something that was being funded by the NHS for the first time and that brought me here.' (Group two).

4.7 Anxiety about falling

Participants who were referred or self-referred to the WFMPs because they were at risk from having a fall, said that they felt anxious about falling and described how they were *'afraid'* of falling, regardless of whether or not they had actually had a fall. There was something of a consensus across all the focus groups that while some were more concerned than others, the risk of falling was always present and all participants were aware of the dangers. In summing this up, one participant commented:

'Whether we're steady on our feet or not we're always frightened about falling ... Because we know what damage it can do ... I think we're all a bit frightened of falling when we get older.' (Group one).

Participants stated that these feelings of anxiety also led to a lack of confidence in mobility, and that this in turn limited them in terms of their day-to-day activities and daily behaviours. One participant commented:

'I'd fallen three times in six weeks. Not that I'd hurt myself but I was losing my confidence. You lose your confidence if you keep falling, and I was becoming afraid.' (Group two).

Feelings of anxiety regarding falling, coupled with a loss of confidence resulting in decreased day-to-day activity, may be compounding people's behaviour and responses to the dangers of falling. For example, a person who becomes less active due to their fear of falling, or lack of confidence that they can no longer perform certain tasks without increasing the likelihood that they will fall, may exacerbate their own decline in mobility (by, for example, accelerating muscle wastage). This may

result in a further decline of confidence leading to even less activity, so becoming trapped in a cycle of ever decreasing confidence and ability.

Despite re-gaining confidence and increasing physical fitness and mobility, clients still expressed concern regarding falls. Participants in the focus groups felt that the prospect or fear of falling was always present, even if slightly reduced, and that although they had all taken steps to reduce the dangers of falling as much as they could, this amounted to *'damage limitation'* as opposed to eliminating the possibility of falling altogether. One participant made the following statement about her continued anxiety about falling:

'I expected to get some confidence...I'm still afraid of falling...less afraid but still aware that it could happen'. (Group three).

4.8 Falls and medication

Participants in the focus groups discussed how their medication was a factor that contributed to them becoming less steady on their feet and consequently more at risk from falling. This perhaps illustrates the importance of regular medication reviews for older people, and how these measures can contribute to falls prevention strategies. One participant described how beginning a course of medication resulted in creating problems with balance:

'It all started with me with starting blood pressure tablets which caused dizziness'. (Group one).

Conversely, another participant described how a change of medication lead to an increase in balance and mobility and subsequently a reduction in falls risk, as well as an increase in levels of confidence. This highlights that making changes in the treatment or care of older people can indeed result in a reduction of falls risk. He stated:

'I was convinced I was going down hill. I came here fully believing I was going down hill....I started walking. I got up one night and walked to the toilet...without my Zimmer frame. It seemed to have something to do with a change of medicine.....tablets I'd been given to take ...' (Group two).

4.9 Improvements in mobility and physical fitness

A theme identified by participants during the focus groups was their own improvement in physical fitness, particularly strength, which they attributed directly to taking part in the exercise programme. Participants reported being able to *'do things'* that they were previously unable to do prior to participating in the group sessions. One participant stated the following:

'A small thing. I couldn't ever get up off my seat without huffing and heaving and now I can get up and sit down beautifully.' (Group two).

As well as this, some participants spoke about how their own improvements in physical fitness and mobility had not only benefited them, but had also had something of a knock-on effect on the lives of those around them. One participant reported that not only her day-to-day living, but that of her husband's had also improved as a result of her being more physically able, and that this had made them both happier.

'When I'd finished the lessons with [Teacher] I could manage to move my husband about in a wheelchair. I couldn't do it before, but I can now ... It helped me a lot.' (Group two).

Thus, as well as purely physical benefits that clients were reporting, participants in the focus groups stated that these had led to improvements in other areas of their lives, therefore improving their quality of life. Participants in the focus groups expressed that improved physical mobility in itself (although welcomed), was not the main benefit of attending the exercise programme, but that it was these improvements in the context of people living their day-to-day lives, and being able to *'enjoy things the way we used to'* that resulted in improved self-esteem, happiness and subsequently quality of life. One participant illustrated this by making the following statement:

'Yesterday we went to see our fourth grandchild. We went in my car, pulled up outside the house. This [the wheelchair] was in the back of the car. I left it there and without a stick and without a Zimmer or anything, I walked out of the car and into the house. It was the best thing I've ever done and that was yesterday.' (Group two).

Participants in the focus groups considered that as a result of attending the exercise sessions, they had experienced an increase in both physical ability and mobility, as well as having increased confidence to attempt tasks that perhaps they would have previously avoided. It is difficult to state which of these has had the greater effect on people's actual abilities to perform tasks that previously they said they were not able to. It is possible that both of these attributes (physical ability and confidence) contribute to this, and furthermore that an increase in one can lead to an increase in the other.

4.10 Decline in self-reported falls

Participants in the focus groups felt that part of their increased levels of confidence regarding falls risk stemmed from a decreased number of self-reported falls since

beginning the 'sit to get fit' exercise component of the WFMPs. Participants reported experiencing fewer, or, in some cases no incidences of falling. Participants attributed this decrease in falls to attending the exercise programme. One participant explained how she was falling frequently before attending the exercise programme but had subsequently not experienced any falls:

'I was falling all the time. Touch wood I've not since...Since I've been here.' (Group three).

4.11 Reducing social isolation

Another theme identified during the focus groups related to the social aspect of attending a activity group. Participants reported that this was just as important, or for some even more so, than improving physical fitness. The process of meeting new people and making new friends who had shared similar experiences was highly valued by clients. There was a feeling amongst participants that being elderly was almost synonymous with being lonely, particularly for those who had lost partners and were reliant on occasional visits from family members for company and conversation. One participant commented:

'To me though more than half of it is the company. It takes you out of yourself. If you're in the flat on your own you can get withdrawn really ... In company it brings you out of yourself.' (Group two).

Participants in the focus groups considered that reducing social isolation or the feeling of being excluded was an important step in actually increasing physical functioning. Participants explained how this could be used firstly to motivate people to attend the sessions, and, secondly, to work hard in the sessions to increase mobility, and subsequently take part in other social activities. Participants stated that the social aspect of attending the programme had been instrumental in improving people's physical functioning, and that this was just as important as the physical training itself. Participants said that they enjoyed the opportunity to meet others and make new friends with those who had had similar experiences with regards to falling. One participant, observing the progress of another, made the following statement:

'I've looked round while we've been doing our exercises and there's such a difference in people. You know from where they've started to where they are now there's such a difference. There's a lady who's 92 ... she came in very quiet and withdrawn, she was helped in by her son. She was very timid and now she's outgoing. There's such a big change ... It's socialising as well as the physical that's done it ... It's been a very successful class.' (Group two).

In discussing the more social aspects of attending the exercise programme, participants in the focus groups also stressed the importance of having a 'sense of

fun' within the group. Participants felt that this made the physical exercise not seem as difficult as they expected and also took the emphasis away from the physical objective of the programme. Participants explained how they could come and enjoy themselves, and yet at the same time reap the benefits of engaging in physical activity. In this respect one participant commented on why she had kept attending all of the sessions:

'The friendliness. The fact that people here can have a laugh. [Teacher] has been a great teacher. She brings the group together. It's camaraderie we have whilst you're moving all your muscles.' (Group two).

4.12 Sustained activity

Although almost all participants recognised the benefits of taking exercise, when the issue of continuing the exercises at home was raised by the researcher, many participants felt sceptical as to whether they would continue to do the exercises to the extent that they do them within the dynamics of the group. There was widespread consensus among participants taking part in the focus groups that without the motivation or incentive of attending something that was *'fun'*, people may not be encouraged to maintain the level of fitness that participants said they attained from attending the classes.

A number of participants expressed the view that it *'simply isn't the same as when you're in a group'*. Others also stated that they would *'miss the company'*. As a consequence of this participants maintained that people would not be encouraged to work as hard and therefore not reap the same kinds of physical benefits that they were currently getting from attending the classes. One participant summarised this view by stating the following:

'It's not the same doing them on your own. If you do it on your own you do your favourites, and you miss out the ones that are probably doing you the most good. When you're in a group you've got to do them.' (Group two).

Some participants in the focus groups suggested that in order to maintain the group motivation and the social benefits that accompany coming together in a group situation, that they could arrange their own smaller groups to perform the home exercises in.

However, this was more practical for those living in a residential home. For others, who were collected by bus and taken to the venue, travelling by themselves to meet with a small group of *'exercise partners'* would be more difficult. For this reason,

some clients expressed how they would prefer the exercise sessions to continue indefinitely, in order to sustain the benefits they felt they had already gained from taking part. Participants felt that they had only just begun to improve and were concerned that without the structure of the group to motivate, encourage and '*feel part of*', that these improvements would be somewhat wasted. This was illustrated by one participant who stated: '*Now where do we go from here?*'

It is evident that the participants who took part in the focus groups reported overwhelmingly positive feelings about the exercise programme that they had taken part in. To sum this up, one participant commented:

'I think we're all in agreement that it's been wonderful. It's done us a load of good and should really be continued.' (Group two).

Chapter 5

Discussion

5.1 Introduction

The findings of this evaluation are discussed here in relation to the objectives of the study and in light of the literature reviewed in Chapter 2. They are also discussed in relation to the outcomes for service users who were referred to the WFMPs.

5.2 Outcomes for service users

It is evident from this study that referral into the WFMPs has resulted in a number of different outcomes for service users. This section will focus on these outcomes, particularly those attending the 'sit to get fit' exercise programme.

5.2.1 Increased physical functioning

The literature reviewed as part of this study suggests that exercise programmes are particularly effective in helping to prevent falls. Evidence suggests that PRT (such as that used in the WFMPs) has a large and positive effect on strength and some functions such as gait speed, and that this in turn can be effective in reducing falls risk factors and falls incidence.

Increasing physical functioning and mobility levels was one of the objectives of the WFMPs. The findings from this study show that many clients of the WFMPs improved aspects of physical functioning. However, despite improvements in 'timed up and go' and 'visual analogue' scores, only improvements in functional reach (the measure of the arm's length at maximal forward reach using a fixed base support) had a statistically significant result. However, the sample size for these measurements was relatively small and it is possible that given a larger sample, all improvements may reach statistical significance.

5.2.2 Reduction in self-reported falls and increased confidence to be mobile

Reducing the incidence of injurious falls was one of the objectives of the WFMPs. Participants who took part in the focus groups reported that they had fallen significantly fewer times, or had not fallen at all compared to previously when they were not taking part in the 'sit to get fit' exercise programme. This reduction in falls may be attributable to the improvements in functional assessment scores that a number of clients achieved as a result of taking part in the exercise component of the WFMPs. Quantitative data regarding the number of falls that were experienced by

service users of the WFMPs were unavailable and thus a reduction in falls can only be observed from participants' accounts in the focus groups.

During the focus groups it was evident that those who had attended the 'sit to get fit' exercise programme had, as a result of experiencing fewer falls, increased their levels of confidence with regard to mobility and also reduced their feelings of anxiety about falling. It was also evident that this had led to improvements in their day-to-day lives. Participants said that they were able to perform, or at least were not afraid to attempt, certain tasks that previously they would not have.

5.2.3 Reducing social isolation

Another objective of the WFMPs was to relieve social isolation and promote social inclusion. It is evident from the qualitative data collected during the focus groups that service users of the WFMPs who had attended the 'sit to get fit' exercise programme had experienced many social benefits of attending a regular activity group.

The participants in the focus groups placed high value on having contact with others who had similar experiences of falls and also on the more general benefits of meeting new people, such as social interaction. In some cases participants valued this more than the physical benefits of attending the exercise groups and cited this as their primary reason for attending classes. This suggests that as well as helping to reduce falls and improve physical functionality within its client base, the WFMPs is improving the quality of life for many of those referred to the service. In some cases, increased mobility led to a more active lifestyle, increasing confidence and helping to restore independence. Many clients also found comfort in discovering that they were not alone in suffering from falling or fear of falling.

5.2.4 Sustained fitness levels by doing home exercises

One issue raised by some participants was whether or not the benefits of attending the sessions (such as increased mobility and confidence) will be sustained subsequent to the exercise programme coming to an end. The WFMPs provides instructions and manuals as well as equipment, to enable attendees to continue to do the exercises that they have learnt at home. However, it was evident from the focus groups that those who had attended the course were sceptical as to whether or not they would continue their commitment to exercise without the other associated social benefits of attending classes. One measure to counter this may be to introduce quarterly meetings for groups to discuss both progress and difficulties that they may

have encountered doing exercise at home, or, to support home-based activity through an outreach service.

Many participants stated that they found it easier to be motivated to complete all the exercises when being led by a trainer in a group and in the company of others trying to achieve the same aim. Indeed, a number of clients also said that without this setting, they may lose motivation and subsequently the physical benefits that they had achieved since beginning the exercise programme. Participants viewed attending the classes and doing the activities in them enjoyable, and this formed a large part of their motivation to attend. Given that in order to benefit from the exercise classes, clients should ideally attend for all sessions in the 16 week programme, it is more likely that they will do so if the classes are viewed as something enjoyable as well as being motivated by the health benefits.

In relation to participants sustaining the exercises people had learnt on the programme, it is not clear whether or not 16 weeks is sufficiently long to increase confidence and develop the required skills so that exercises become routinised and habitualised, such that they are more likely to be continued as an aspect of their everyday life. This is also something of a contentious issue in the literature surrounding exercise programmes in relation to falls prevention (American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention, 2001). Although much of the literature advocates using exercise programmes as part of a falls prevention strategy, the optimal length of time that programmes should run for is unclear.

It is thus uncertain whether clients will continue to perform the level of exercise required to sustain the level of fitness that many had attained from attending the classes without the social incentive of group activities. For this reason, many clients stated that they would like the programme to continue indefinitely. It is also possible that if the length of the programme was increased, service users may have more opportunity to routinise exercise into their daily lives, and thus increase the likelihood that the benefits would be sustained.

5.3 Measuring falls risk

Evidence suggests that the risk of falling among older people is determined by many complex, inter-related factors. Indeed some studies have identified approximately 130 separate risk factors (Meyers et al., 1996 in Unsworth and Mode, 2003). The

findings of this study show that the majority of clients referred to the WFMPs were at an 'almost inevitable' risk of falling.

This in itself may be unsurprising as the purpose of the WFMPs may be considered to be to target those who are specifically at risk from falling. Accurately identifying those at risk from falling has important implications for resource usage within the NHS. While underestimating falls risk may result in preventable falls occurring, overestimating risk may result in inappropriate referral to a falls prevention service.

Perhaps more insightful are the risk factors themselves. If factors such as age and sex are not changeable, then the importance of considering what *is* changeable becomes paramount to the objectives of a falls prevention service, and also to the evaluation of any such service. It is a complex issue however, for example, chronic morbidity may arguably be a falls risk factor that is unchangeable. Yet the effects of chronic morbidity on an individual may indeed be influenced by intervention. For example, osteoporosis and arthritis are degenerative diseases which cannot be cured. However, preventative intervention such as exercise can inhibit or slow down their onset and thus decrease the likelihood of falling, and of hip fracture. From this perspective of improving quality of life for older people, falls intervention strategies may be regarded as an integral part of NHS provision.

In order to decrease overall falls risk, it is therefore important for falls prevention programmes to focus on the factors they can influence and equally important to recruit those who are most at risk, but who have the potential to benefit from falls prevention strategies. The WFMPs appear to be capturing a diverse client group (aged between 65 years to over 100 years of age) and as such have clients of differing falls risk and physical mobility. It also focuses on changeable attributes of those service users such as increasing strength and providing education about how to reduce the dangers associated with falling.

5.4 The practicalities of implementing a falls service

Given the diversity of the elderly population it is not difficult to envisage the complex logistics involved in setting up a multi-agency falls service such as the WFMPs. A key factor in the success of the programme is its capacity to engage members of the target group. This is important because the largest benefits from the exercise classes will be accrued in those individuals whose attendance is highest (other elements being equal) since their exposure to the intervention will be greatest. A

critical factor in successfully engaging this client group is the ease of access to appropriate community facilities. Thus, transport is a crucial factor in facilitating attendance for this client group. The WFMPs encountered initial difficulties with transportation for those who do not use or have access to a car. This problem was exacerbated by a shortage of vehicles with suitable disabled and mobility friendly equipment.

Other practical issues should also be highlighted. Finding and retaining appropriate accommodation in which to run sessions is also important to recruiting and retaining service users. The setting should meet a number of criteria: it should be located in an area that is easily accessible to members of the community; it should have the appropriate facilities to be able to accommodate those with disabilities or mobility difficulties (for example, a disabled toilet); and it should also be economically viable and within budget constraints. Perhaps a more obvious but equally valid point to make here is with regard to the presentation and delivery of a falls prevention service. In order to recruit and retain clients, the service should be regarded by those who use it as an enjoyable experience rather than a chore, and should be made to be 'fun' by the exercise instructor delivering the programme. This study showed that those who took part in the focus groups had a very positive view of attending the programme sessions, and that this was one aspect that encouraged them to keep attending.

Establishing a service and then meeting the needs of large numbers of service users is also a challenge. As the WFMPs became more established, referrals increased which led to one part-time member of the team taking a full-time role to prevent the service becoming overwhelmed.

It is also worth noting here, the absence of comprehensive and complete data on falls. The establishment of a falls register to monitor the incidence of falls in Warrington would be an important development in being able to assess the impact of local interventions.

5.5 The WFMPs in accordance with the NSF and the NICE

The development of the WFMPs is part of a commitment by Warrington PCT to reduce the incidence of falls within the elderly population and to conform to NSF requirements regarding falls among the elderly. According to the DoH (2003, p.20) there is "*not one model service, approach or structure for effective work to implement*

the NSF” but more a number of core principles that underpin local design and implementation of a falls prevention service.

Broadly speaking these core principles encompass the following standards for any local falls prevention service, and from table 5.5.1 it is possible to examine how the WFMPs has addressed them.

Table 5.5.1 NSF Core principles and the WFMPs’s methods of implementation

NSF Core Principles	The WFMPs
Work in partnership with local agencies	The WFMPs has links with, and works in conjunction with the following local agencies: Warrington Borough Council; Age concern; Citizens Advice Bureau (CAB); North Cheshire Hospital NHS trust; Carecall).
Take a multifaceted approach to preventing falls	The WFMPs takes a multifaceted approach in assessing falls risk by examining falls history, functional ability, fear of falling, medication and home hazards. The WFMPs provides multi-factorial interventions to reduce falls in the elderly by providing strength and balance training, hip protectors, home hazard assessment and intervention, and education on the risk factors associated with falls.
Use individually tailored exercise programmes	The WFMPs exercise programme is tailored to individuals’ needs and ability by firstly screening for a person’s individual falls risk, and, subsequently, providing intervention based on this measure.
Restore independence for everyday living	The WFMPs exercise programme helps elderly persons retain their independence in doing everyday tasks by improving and sustaining strength, balance, functional ability and confidence about falling.
Conduct home safety assessments	The WFMPs can arrange for these to be carried out.
Provide education about how to prevent falls and what to do if you have one	The WFMPs provides education as part of the exercise sessions.

The NICE also somewhat mirrors these standards in its recommendations for the assessment and prevention of falls in older people. It emphasises case/risk identification, multifactorial risk assessment and intervention, education and

information giving. From these it can be observed that the WFMPs is underpinned by the standards set out by the NSF and recommendations made by the NICE.

5.6 Conclusion

This report has provided a description of the WFMPs and analysed data about service usage. The report has also outlined the key benefits to service users. It is evident that the service is meeting the service objectives that were set out at the beginning. The findings from this study show a reduction in self-reported falls (as reported in the focus groups) and an increase in physical function for many clients. Taking part in the WFMPs relieved social isolation and improved social inclusion for many clients. Strategies for surviving a fall were successfully taught to clients, who stated that as a result of this, they felt less anxious about falls and falling.

Given the complex and inter-related factors associated with falls, programmes such as the WFMPs can be regarded as effectively 'managing' those risks, and improving the quality of life for older persons. However, the practical aspects of successful implementation should not be overlooked in the roll out of a service, particularly to this client group.

References

- American Geriatrics Society, British Geriatrics Society, & American Academy of Orthopaedic Surgeons Panel on Falls Prevention. (2001). Guideline for the Prevention of Falls in Older Persons. *Journal of the American Geriatrics Society*, 49, 664-672.
- Baloh, R.W., Jacobson, K.M., Enrietto, J.A., Corona, S., & Honrubia, V. (1998). Balance disorders in older persons: quantification with posturography. *Otolaryngology, Head and Neck Surgery*, 119, 89-92.
- Bowling, A. (1997). *Researching methods in health: investigating health and health services*. Buckingham: Open University Press.
- Buchner, D. M., Hornbrook, M. C., Kutner, N. G., Tinetti, M. E., Ory, M. G., Mulrow, C. D., et al. (1993). Development of the common data base for the FICSIT trials. *Journal of the American Geriatrics Society*, 41, 297-308.
- Campbell, A.J., Robertson, M.C., Gardner, M.M., Norton, R.N., Tilyard, W.M., & Buchner, D.M. (1997). Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *British Medical Journal*, 315, 1065-1069.
- Carter, N. D., Khan, K. M., McKay, H. A., Petit, M. A., Waterman, C., Heinonen, A., et al. (2002). Community-based exercise program reduces risk factors for falls in 65-75 year-old women with osteoporosis: randomized controlled trial. *Canadian Medical Association Journal*, 167(9), 997-1004.
- Cho, C., & Kamen, G. (1998). Detecting balance deficits in frequent fallers using clinical and quantitative evaluation tools. *Journal of the American Geriatrics Society*, 46, 426-30.
- Close, J., Ellis, M., Hooper, R., Glucksman, E., Jackson, S., & Swift, C. (1999). Prevention of falls in the elderly trial (PROFET): a randomised controlled trial. *The Lancet*, 353, 93-97.
- Davidson, C.W., Merrilees, M.J., Wilkinson, T.J., Mckie, J.S., & Gilchrist, N.L. (2001). Hip fracture mortality and morbidity – can we do better? *New Zealand Medical Journal*, 114(1136), 329-32.
- Davis, J.W., Ross, P.D., Nevitt, M.C., & Wasnich, R.D. (1999). Risk factors for falls and for serious injuries on falling among older Japanese women in Hawaii. *Journal of the American Geriatrics Society*, 47, 792-98.
- Day, L., Fildes, B., Gordon, I., Fitzharris, M., Flamer, H., & Lord, S. (2002). Randomised factorial trial of falls prevention among older people living in their own homes, *British Medical Journal*, 325, 128.
- Department of Health. (2001). *National Service Framework for Older People*. London: Department of Health.
- Department of Health. (2003). *How can we help older people not fall again? Implementing the Older People's NSF Falls Standard: Support for commissioning good services*. London: Department of Health.

-
- Directorate of Health Improvement. (2002). *A Profile of Health in Warrington*. Warrington: Warrington Primary Care Trust.
- Department of Trade and Industry (1999). *Research on the patterns and trends in home accidents*. London: Department of Trade and Industry.
- Duncan, P.W., Weiner, D.K., Chandler, J., & Studenski, S. (1990). Functional reach: a new clinical measure of balance. *Journal of Gerontology: Medical Sciences*, 45(6), M192-M197.
- Eagle, J., Salamara, S., Whitman, D., Evans, L.A., Ho, E., & Olde, J. (1999). Comparison of three instruments in predicting accidental falls in selected inpatients in a general teaching hospital. *Journal of Gerontological Nursing*, 25 (7), 40-45.
- Edwards, B.J., & Lee, S. (1998). Gait disorders and falls in a retirement home: a pilot study. *Annals of Long-Term Care*, 6, 140-3
- Feder, G., Cryer, C., Donovan, S., & Carter, Y. (2000). Guidelines for the prevention of falls in people over 65. *British Medical Journal*, 321, 1007-1011.
- Gardner, M. M., Robertson, M. C., & Campbell, A. J. (2000). Exercise in preventing falls and fall related injuries in older people: a review of randomised controlled trials. *British Journal of Sports Medicine*, 34, 7-17.
- Gillespie, L. D., Gillespie, W. J., Robertson, M. C., Lamb, S. E., Cumming, R. G., & Rowe, B. H. (2001). *Interventions for preventing falls in elderly people (Cochrane Review)*. (3 ed.). Oxford: Update Software.
- Hannan, E. L., Magaziner, J., Wang, J. J., Eastwood, E. A., Silberzweig, S. B., Gilbert, M., et al. (2001). Mortality and locomotion 6 months after hospitalization for hip fracture: risk factors and risk-adjusted hospital outcomes. *Journal of the American Medical Association*, 285(21), 2736-42.
- Health Promotion England (2001a). *Fact Sheet 2: Older people and accidents*. London: Health Promotion England.
- Health Promotion England (2001b) *Fact Sheet 5: Older people and physical activity*. London: Health Promotion England.
- Hogan, D. B., MacDonald, F. A., Betts, J., Bricker, S., Ebly, E. M., Delarue, B., et al. (2001). A randomized controlled trial of a community-based consultation service to prevent falls. *Canadian Medical Association Journal*, 165(5), 537-543.
- Kempton, A., Van Beurden, E., Sladden, T., Garner, E., & Beard, J. (2000). Older people can stay on their feet: final results of a community-based falls prevention programme. *Health Promotion International*, 15(1), 27-33.
- Kitzinger, J. (1995). Introducing focus groups. *British Medical Journal*, 311, 299-302.
- Kuehn, A.F., & Sendelweck, S. (1995). Acute health status and its relationship to falls in the nursing home. *Journal of Gerontological Nursing*, 21, 41-49.
- Kumar, R. (1999). *Research Methodology*. London: Sage Publications Ltd.

Latham, N., Anderson, C., Bennett, D., & Stretton, C. (2003). *Progressive resistance strength training for physical disability in older people (Cochrane Review)*. (3 ed.). Oxford: Update Software.

Legge, A. (2003). Breaking the fall. *Nursing Times*, 99(1), 23-5.

Leipzig, R.M., Cumming, R.G., & Tinetti, M.E. (1999). Drugs and falls in older people: a systematic review and meta-analysis: I. Psychotropic drugs. *Journal of the American Geriatrics Society*, 47, 30-9.

Lundin-Olsson, L., Nyberg, L., & Gustafson, Y. (1998). Attention, frailty, and falls: the effect of a manual task on basic mobility. *Journal of the American Geriatrics Society*, 43, 1198-1206.

Mathias, S., Nayak, U., & Isaacs, B. (1986). Balance in elderly patients: the get up and go test. *Archives of Physical Medicine and Rehabilitation*, 67, 387-9.

Meyer, G., Warnke, A., Bender, R., & Muhlhauser, I. (2003). Effect on hip fractures of increased use of hip protectors in nursing homes: cluster randomised controlled trial. *British Medical Journal*, 326, 76-80.

McMurdo, M. E., & Harper, J. R. (2002). Falls, bones and the primary care team. *European Journal of General Practice*, 9(1), 10-12.

Mustard, C.A., & Mayer, T. (1997). Case-control study of exposure to medication and the risk of injurious falls requiring hospitalisation among nursing home residents. *American Journal of Epidemiology*, 145, 738-45.

National Institute for Clinical Excellence. (2004). *Falls: the assessment and prevention of falls in older people*. Clinical Guideline 21. London: NHS.

Oliver, D., Hopper, A., & Seed, P. (2000). Do hospital fall prevention programs work? A systematic review. *Journal of the American Geriatrics Society*, 48, 1679-89.

Posiadlo, D., & Richardson, S., (1991). The timed up and go: a test of basic functional mobility for frail elderly persons. *Journal of the American Geriatrics Society*, 39, 142-8.

Robertson, MC., Delvin, N., Gardner, MM., & Campbell, JA. (2001). Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 1: Randomised controlled trial. *British Medical Journal*., 322, 1-6.

Skelton, D.A., & Dinan, S.M. (1999). Exercise for falls management: Rationale for an exercise programme aimed at reducing postural instability. *Physiotherapy Theory and Practice*, 15, 105-120.

Simpson, J. M., Darwin, C., & Marsh, N. (2003). What are older people prepared to do to avoid falling? A qualitative study in London. *British Journal of Community Nursing*, 8(4), 152-159.

Speechley, M., & Tinetti, M. (1991). Falls and injuries in frail and vigorous community elderly persons. *Journal of the American Geriatrics Society*, 39, 46-52.

-
- Thornton, E.W., Sykes, K.S., & Tang, W.K. (2004). Health benefits of Tai Chi exercise: improved balance and blood pressure in middle-aged women. *Health Promotion International*, 1, 19, 33-8.
- Tinetti, M.E., Richman, D., & Powell, L. (1990). Falls efficacy as a measure of fear of falling. *Journal of Gerontology*, 45(6), 239-43.
- Tinetti, M.E., & Williams, C.S., (1998). The effect of falls and fall injuries on functioning in community-dwelling older persons. *Journal of Gerontology: Medical Sciences*, 53A, M112-M119.
- Tinetti, M. E., Baker, D. I., McAvay, G., Claus, E. B., Garrett, P., Gottschalk, et al. (1994). A Multifactorial Intervention to Reduce the Risk of Falling among Elderly People Living in the Community. *The New England Journal of Medicine*, 331(13), 821-827.
- Unsworth, J., & Mode, A. (2003). Preventing falls in older people: risk factors and primary prevention through physical activity. *British Journal of Community Nursing*, 8(5), 214-220.
- Van Balen, R., Steyerberg, E. W., Polder, J. J., Ribbers, T. L., Haberma, J. D., & Cools, H. J. (2001). Hip fracture in elderly patients: outcomes for function, quality of life, and type of residence. *Clinical Orthopaedics and Related Research*, 390, 232-43.
- Van Haastregt, J. C. M., Diederiks, J. P. M., Van Rossum, E., De Witte, L. P., Voorhoeve, P. M., Crebolder, H. F. J. M. (2000). Effects of a programme of multifactorial home visits on falls and mobility impairments in elderly people at risk: randomised controlled trial. *British Medical Journal*, 321, 994-8.
- Whitney, S. L., Poole, J. L., & Cass, S. P. (1999). A review of balance instruments for older adults. *The American Journal of Occupational Therapy*, 52 (8), 666-671.
- Woolf, A. D., & Akesson, K. (2003). Preventing fractures in elderly people. *British Medical Journal*, 327, 89-95.
- Zwick, D., Rochelle, A., Choksi, A., & Domowicz, J. (2000). Evaluation and treatment of balance in the elderly: a review of the efficacy of the Berg Balance Test and Tai Chi Quan. *Neurological Rehabilitation*, 15(1), 49-56.

Appendix 1
Identification of a falls problem assessment form



F1- Falls Problem
FALLS MANAGEMENT & PREVENTION SERVICE



Please complete in BLOCK CAPITALS

Patient Details:

NHS Number (if known)

SURNAME

FORENAME

ADDRESS:

TELEPHONE NO.

DATE OF BIRTH

GP NAME

SURGERY ADDRESS

1 Have you had a fall in the last year?

Please Circle

Yes	No
-----	----

If yes how many?

2 Did you break any bones?

Yes	No
-----	----

3 Did you hurt yourself?

Yes	No
-----	----

4 Could you get up off the floor by yourself?

Yes	No
-----	----

5 Are you frightened of falling?

Yes	No
-----	----

If two or more of the shaded areas are circled a full Falls Assessment (F2) is advised.

Please tick whether you have an alarm.

Pendant Alarm

Pull Cord

None

I agree to being referred to the Falls Service: Patients Signature: _____

Name of Referrer

Signature

Contact details of referrer

Appendix 2
Falls risk level assessment form



F2 - Risk Assessment
FALLS MANAGEMENT & PREVENTION SERVICE



Please complete in BLOCK CAPITALS

Patient Details: NHS Number (if known)

SURNAME FORENAME

ADDRESS: TELEPHONE NO.

DATE OF BIRTH

GP NAME

SURGERY ADDRESS

SCORE		SCORE	
GENERAL		MEDICATION	
65-75	1	Heart or angina tablets	1
76-80	1	Water or high blood pressure tablets	1
81-85	2	Psychiatric drugs	1
86+	3	Sleeping tablets	1
Female	2	Strong pain killers	1
Male	1	Drugs for Parkinson	1
TOTAL	<input type="text"/>	4 or more of the above	3
MEDICAL		MOBILITY	
Osteoporosis	1	Stops walking to talk	2
Confusion	1	Raises using chair arms/other furniture	3
Fear of falling	1	Transfer difficulties	2
Poor vision/hearing	1	Difficulty walking	2
Dizzy on standing	3	Uses walking aids	1
Arthritis	2	Poor balance i.e. can't reach	3
Previous falls	2	Foot problems	1
Previous fracture	2	Urgent need for toilet	2
TOTAL	<input type="text"/>	TOTAL	<input type="text"/>
ENVIRONMENT		NUTRITION	
Pleats, folds, holes in carpet/rugs	3	Underweight	1
Inappropriate/unsafe footwear	2	Obese	1
Poor Lighting	1	Alcohol intake exceeds 7 a week	1
Holds on to furniture	2		
Dog or cat/cluttered environment/trailing wires	1	TOTAL	<input type="text"/>
Stairs	3		
TOTAL	<input type="text"/>	OVERALL SCORING <input type="text"/>	
SOCIAL			
Nursing/residential home/full home care package	2		
Cared for by relatives or partner	1		
Lives alone	1		
Self caring	0		
TOTAL	<input type="text"/>		

Low Risk 3-8	Medium Risk 9-13	High Risk 14-20	Very High Risk 21-25	Almost Inevitable 26+
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

I agree to being referred to the Falls Service Patients Signature: _____

Name of Referrer Signature _____

Contact details of referrer

Date of Assessment

Comments

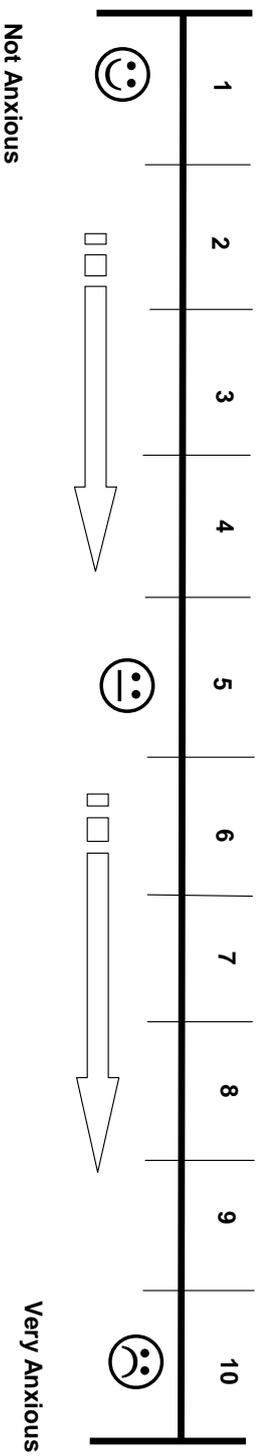
Appendix 3
Visual analogue score sheet



Falls Management and Prevention Service
Visual Analogue Scale

Name: _____ Date: _____

How **anxious** are you about falling over and injuring yourself?
(Circle one number)



Appendix 4
Participant information sheet

Participant Information Sheet

“Warrington Falls Management and Prevention Service Evaluation”

You are being invited to take part in a research study. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?

Warrington Primary Care Trust has received funding for a Falls Prevention Programme in the inner wards of Warrington. The study aims to evaluate the effectiveness of the Warrington Falls Management and Prevention Service in preventing injurious falls, increasing functional performance and mobility levels, increasing awareness of risk factors associated with falls and falls survival strategies, increasing compliance with hip protectors and reducing social isolation among persons aged 65 and over.

Additionally, we would like to find out the perspectives, expectations and experiences of persons who have been in contact with the Warrington Falls Management and Prevention Service. We hope to gather information on what service users think about the Falls Prevention Programme and to investigate their experiences of the different aspects of the Falls Prevention Programme. The findings will be used to evaluate the overall effectiveness of the Falls Prevention Programme and to inform the development of similar programmes in the future.

Why have I been chosen?

You are being asked to take part because you have either been referred to the Warrington Falls Management and Prevention Service or have participated in an activity of the programme. We hope to include every person who has been referred to the service, or has participated in any activities, in the evaluation study. The Evaluation study of Warrington Falls Management and Prevention Service does not wish to investigate the effectiveness of the programme in specific persons, rather it seeks to evaluate the overall effectiveness of the Warrington Falls Management and Prevention Service for all participants.

Do I have to take part?

It is up to you to decide whether or not to take part. Your decision whether or not to participate will not affect your relationship with the Warrington Falls Management and Prevention Service or access to the services provided by the programme. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. If you withdraw from the study this will not affect

your relationship with the researcher or the Warrington Falls Management and Prevention Service.

What will happen to me if I take part?

You will be asked to complete a balance, functional ability and mobility assessment upon joining the Falls Prevention Programme and will be asked to complete a follow-up assessment at the end of the programme. You will also be asked to take part in a focus group with others, to discuss your experiences of the programme.

What are the possible disadvantages and risks of taking part?

There is a very small risk that you may fall, sustain an injury or make become breathless or exhausted while participating in the balance, function and mobility assessments. However, every precaution will be taken during these assessments to ensure your safety. If you feel unwell or are not comfortable doing any activity please stop and let us know.

There is a risk that your participation in the study will increase your anxiety about falling. If this occurs please speak to the physical exercise instructor and/or a Falls Coordinator. Alternatively, there is also a risk that you develop a false sense of security about falling. If at any time your feelings towards falling change please speak to a physical exercise instructor and/or a Falls Coordinator.

The study involves questionnaires about your general health and history of falling. It is not expected that these questionnaires will cause any distress. However, if you become upset or are uncomfortable completing a questionnaire please tell the researcher that you do not wish to answer specific a question or wish the leave the questionnaire incomplete.

What are the possible benefits of taking part?

A possible benefit of participating is the opportunity to find out if you have improved on any of the measures of balance, function and mobility or if your risk of falling has changed since participating in the Warrington Falls Management and Prevention Service.

Will my taking part in this study be kept confidential?

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you which leaves the hospital/surgery will have your name and address removed so that you cannot be recognised from it.

If you consent we will notify your GP of your participation in the Warrington Falls Management and Prevention Service Evaluation study.

What will happen to the results of the research study?

The research will be used to evaluate the Warrington Falls Management and Prevention Service and to inform the development of future falls prevention programmes in the Warrington area. Individuals who participate will not be identified in any subsequent report or publication.

Who is organising and funding the research?

The Warrington Falls Management and Prevention Service (Warrington Primary Care Trust) has received funding from the Warrington Health Partnership to carry out this research. The Centre for Public Health Research at University College Chester will be involved in organising and conducting the study.

Who may I contact for further information?

If you would like more information about the research before you decide whether or not you would be willing to take part, please contact:

James Caiels (Researcher, Centre for Public Health Research on 01244 375444 ext.2058).

Thank you for your interest and co-operation in this research.

Appendix 5
Participant consent form

Appendix 6
Focus group guide

Focus Group Guide

1) Introduction

The researcher will explain the purpose of the focus group.

2) Feedback on the referral process to the service

How did you learn about the Falls Management and Prevention Exercise Classes?

Were you referred by a health professional or someone else?

Who referred you to the service?

What did they tell you about the service?

Why did you decide to attend the service?

Did you have any concerns or anxiety about the attending the service? If so what were they?

How did you hope or think the service would be able to help you?

3) Feedback on the delivery of the service

Reflecting on your expectations of the service, how did your experience of attending the Falls Management and Prevention Exercise Classes compare to your expectations? Was it different to what you expected? How and in what ways?

Were there any barriers to you attending the service? Eg. Location of the service, time constraints, poor health etc?

What do you think of the facilities?

4) Feedback on the delivery of the exercise classes

What did you think of the equipment used during the class? Was it easy to use? If not, why?

What did you like about the classes?

What didn't you like about the classes?

How did you find the instructors?

What are your views on the actual exercises? Were there some that you liked more than others? Were there any that you didn't like or found very difficult to do? Why didn't you like them?

5) Feedback on the home-based exercise classes

What are your views on the home-based exercises?

Did you actually do the home-based exercises? If so, how often, if not, why?

Was there anything at home that prevented you doing the exercises? Eg. Not enough room, furniture in the way etc?

What will you do after the programme ends?

How likely are you to carry on / keep doing the exercises?

How important do you think it is to keep going?

6) Falls

After participating in the falls classes and doing your home-based exercise how do you feel about falls now?

Can you notice any physical differences that you think may be due to the exercise? If so what are these differences?

Has anyone had a fall or a near-fall since starting the exercise classes? If so can you describe what happened? Do you think the exercise you have been doing has made any difference in terms of falls?

Do you think that running exercise classes such as this is a good way to try and help reduce the risks associated with falling? Do you think there is anything else that could be done to help people who might be at risk of falling?

Do you feel any less at risk of falling having completed the exercise program? Has your fear of falling changed at all?

7) General feedback

Are there any other issues about the Falls Management and Prevention Exercises Classes that you would like to discuss?

Is there anything about the Warrington Falls Management and Prevention Programme that you would like to discuss?

8) Conclusion

Are there any final comments that anyone would like to make?

Thank you for your time.

Appendix 7
Functional assessment raw data

Timed up and go assessment pre- and post-intervention (seconds)

Pre-intervention time	Post-intervention time	Time difference post-intervention
43.74	21.84	21.9
68	46.38	21.62
34.95	17.73	17.22
26	9.35	16.65
34.2	21.38	12.82
18.28	10.62	7.66
27.24	20.31	6.93
19.09	13.82	5.27
15.21	10.91	4.3
54.13	50.1	4.03
14.68	10.88	3.8
21	18.69	2.31
46.3	44.09	2.21
15.34	13.24	2.1
18.59	16.7	1.89
20.8	19.52	1.28
16.27	15.23	1.04
12.3	12.45	-0.15
26.3	26.48	-0.18
31	36.28	-5.28
58.49	64.4	-5.91
14.84	25.63	-10.79
32	49.77	-17.77

Functional reach assessment pre- and post-intervention

Pre-intervention functional reach (cm)	Post-intervention functional reach (cm)	Functional reach difference post-intervention (cm)
16.5	30	13.5
6	19	13
3	16	13
10	21	11
11	21	10
13	21	8
6	14	8
11	16	5
7	12	5
10	14	4
15	18	3
14	17	3
18	20	2
15	17	2
15	17	2
15	16	1
15	16	1
20	20	0
20	20	0
15	15	0
12.5	11	-1.5
10	8.5	-1.5
23	14	-9

Visual analogue scores pre- and post-intervention (cm)

Visual analogue score pre-intervention	Visual analogue score post-intervention	Visual analogue score difference post-intervention
7.3	17	9.7
1	3	2
9	10	1
13.5	14	0.5
19.25	19.5	0.25
17	17	0
10	10	0
10	10	0
9.5	9.5	0
2.5	1.5	-1
19.5	18	-1.5
9.5	8	-1.5
4.8	3	-1.8
7.5	3.3	-4.2
10.5	4.7	-5.8
20	14	-6
15	7.5	-7.5
8.7	0.5	-8.2
10	1	-9
15	4.5	-10.5