

**THE ATTITUDES AND INTENTIONS OF SENIORS IN NEWFOUNDLAND
AND LABRADOR RELATED TO FALLS PREVENTION PRACTICES**

By

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ABSTRACT

Falls are significant concern for the health and well-being of the ageing population, particularly in Newfoundland and Labrador (NL) where the rate of ageing is the highest in the country. Many falls result in hospitalizations and subsequent therapy and treatments that can drastically change an individual's quality of life. Many programs have been developed in efforts to reduce the occurrence of falls, however little research has been done to address what seniors' personal views are on the topic of falls and falls prevention. The purpose of this study was to explore the attitudes and intentions NL seniors have towards strength and balance activities and advice on specific falls prevention strategies. A survey, modified from Yardley et al. (2008), was used. Data analysis included sociodemographic descriptive statistics bivariate correlations of survey items and Mann-Whitney and Kruskal-Wallis tests. The results of this study suggest NL seniors understand the benefits of strength and balance activities and find they are personally relevant. Seniors expressed intentions to participate in programs either group-based or home-based and a likelihood of following advice on falls prevention strategies such as home modifications and proper footwear. These findings provide essential knowledge for future research and program development for the ageing population in NL.

Key words: older adults, falls, falls prevention, perceptions, views, seniors, community-dwelling, Newfoundland and Labrador

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CHAPTER 1: INTRODUCTION

1.1 Background

Every year, about one third of seniors, persons over the age of 65 years, fall and 51% of these falls occur in the home (Public Health Agency of Canada, 2014). The province of Newfoundland and Labrador (NL) has one of the largest populations of seniors in the country and the percentage of seniors in NL is growing at a more rapid rate than any other province (Statistics Canada, 2010). Given the high fall rates among seniors and the ageing population in the province, it is particularly important to reduce the occurrence of falls in NL. Falls prevention programs have shown to be an effective method in reducing falls, however the specific content and design needed to create the most effective programs has yet to be determined (Clemson et al. 2004; Haas & Haines, 2013; Hakim, Roginski, & Walker, 2007; Li et al., 2008; Palvanen et al., 2014; Power & Clifford, 2013; Pynoos, Steinman & Nguyen, 2010). It is widely known that the risk of falling increases with age, and there are a number of factors, both intrinsic and extrinsic, that contribute to this increased risk (Dickinson et al., 2011; Mignardot et al. 2014; Pynoos et al., 2010). Intrinsic factors include muscular weakness, decreased endurance, poor postural stability, poor vision, and decreased joint range of motion. Extrinsic factors are in the individuals' immediate environment such as poor lighting, obstacles on the floor, steps, wet surfaces, rugs, improper footwear, and medication (Lord, Menz & Sherrington, 2006; Pynoos et al., 2010). As such falls prevention initiatives designed to reduce fall risk among seniors must consider both the intrinsic and extrinsic risk factors.

Community-dwelling seniors who are living independently can experience drastic changes in their health and quality of life after experiencing a fall. Many falls result in

injury, loss of independence, reduced strength and balance, a need for mobility aids, and home care (Aziz, Park, Mori, & Robinovitch, 2012). Of all injury related hospitalizations in NL, approximately 86% were sustained from seniors' falls (Public Health Agency of Canada, 2014). Serious injuries from falls, the most common of which are hip fractures, place a high financial burden on both seniors and the health care system (Dickinson et al., 2011; Granacher, Zahner, & Gollhofer, 2008; Health care in Canada, 2011). Hip fractures account for approximately 48% of all fall-related injuries for NL (Scott, Wagar, Elliott, 2010), while 98% of all hip-fracture related hospitalizations were the result of a fall. This compares to a rate of 95% for Canada as a whole. Even if a fall does not result in physical injury, psychological consequences, such as development of fear of falling, often result (Delbaere, Crombez, Vanderstraeten, Willems & Cambier, 2004; Public Health Agency of Canada, 2014; Tischler & Hobson, 2005).

Tischler and Hobson (2005) found that fear of falling stems from previous falls and increasing age. Seniors do not only fear the possible physical injury resulting from a fall, but they are also afraid of losing their independence and becoming dependent on others as a result of falling. Such fear can lead to many negative outcomes that include anxiety, depression, decreased activity and mobility, and increased pharmaceutical use (Child et al. 2012; Dickinson et al., 2011; McInnes & Askie, 2004; Yardley, Donovan-Hall, Francis, & Todd, 2006). Fear-related avoidance of daily activities negatively impacts physical abilities and has been found to be a good predictor of future falls (Delbaere et al., 2004). This is most likely due to the fact that fear of falling leads to a reduction in activity, which subsequently leads to decreased muscle strength, balance and coordination which in turn increase falls risk (Public Health Agency of Canada, 2014)

In addition to the negative consequences of falls for seniors the demands placed on the health care system are also considerable. Canadian healthcare costs allocated to senior care reached up to 45% of all healthcare expenditures in 2009, with the leading cause of injury related hospitalizations being fall related (Scott et al., 2010). Given that the number of seniors is steadily increasing (Dickinson et al., 2011; Elskamp, Hartholt, Patka, van Beeck, & van der Cammen, 2012; Health Care in Canada, 2011) the prevalence of falls is expected to rise. Not only are the occurrences of hospital visits more frequent, the length of each visit is much higher for seniors. Per capita health care for seniors is 5 times higher than health care spending for those 20 – 64 years of ages (Health Care in Canada, 2011). These statistics may be attributed to the high levels of inactivity and obesity in senior citizens, both factors that can increase the risk of falling (Rose & Hernandez, 2010).

With the serious implications that falls have to overall health and quality of life, and the high cost of health care following a fall, there is a great need for interventions that aim to reduce the number of falls in seniors. There is fairly strong evidence to suggest that falls prevention initiatives that minimize medications, assess visual impairments, incorporate home hazards assessments and modifications, and have exercise and education components can help reduce falls risk in community dwelling seniors (Child et al., 2012; Dickinson et al., 2011; Fixzen, Scott, Blasé, Naoom, & Wagar, 2011; McInnes & Askie, 2004; Tischler & Hobson, 2005; Yardley et al., 2006).

1.2 Statement of the Problem

To implement effective fall prevention programs there are many factors that must be considered. Much research has been done to better understand seniors' perceptions of falls and fall risk, as well as, what they perceive as barriers and facilitators to participating in exercise programs or following falls prevention advice (Dickinson et al., 2011; Tischler & Hobson, 2005; Yardley et al., 2006). No matter how well a falls prevention program is designed, if seniors do not feel the need to participate, or if there are barriers to their participation, they will be unlikely to participate and as such will not see any benefits from the program. To date, knowledge of seniors' views towards falls prevention initiatives, particular towards strength and balance (SAB) training is limited. Even fewer studies have been done looking at more rural settings, which may differ from urban areas with greater resources (Boehm, Franklin, & King, 2014; Yardley, Donovan-Hall, Francis, & Todd, 2007; Yardley et al., 2008). Acknowledging the potential challenges associated with falls prevention programming in rural communities is important because community layout and opportunities (i.e. walking clubs, exercise facilities/classes) may present different barriers than those experienced in more urban areas. For example, program sustainability in communities with very low populations may be more challenging than in urban areas due to issues such as: lack of facilities, lack of trained staff, and lack of funds and other resources (Dickinson et al., 2011; Yardley et al., 2006; Zachary, Casteel, Nocera, Runyan, 2011). Dickinson et al. (2011) state availability, or lack thereof, of interventions was a major barrier for seniors' participation in falls prevention. Newfoundland and Labrador is a province that includes both urban and rural communities. To the best of our knowledge, there has been no research done

examining how NL seniors, living in either rural or urban centers, view falls prevention programs. Therefore, efforts to design and implement a province wide falls prevention initiative would benefit from research aimed at more fully understanding seniors' perceptions of these programs and their own fall risk.

By the year 2036, 31% of NL population will be senior citizens in comparison to the projected 23.7 % national average (Statistics Canada, 2011). With this realization, it is imperative to develop initiatives that target falls prevention for the population of NL seniors. This will prove difficult, however, if those developing this programming have no knowledge of seniors' attitudes towards falls prevention programs. The NL government has identified falls as a major health issue for older adults. The visions and principles, which form the basis of the NL Provincial Healthy Aging Policy Framework (Department of Seniors, Wellness, and Social Development, 2015), strive for "optimal health and well-being" of seniors and include: dignity, social inclusion, independence, safety and security, fairness, and self-fulfillment. Indeed, prevention of falls and injuries has been identified by the PHAPF as a priority direction in healthy aging initiatives. Implementing a successful, multifactorial program for seniors' fall prevention in NL will help ensure that the priorities of the PHAPF to reduce falls and injuries are met in addition to maintaining or improving quality of life for seniors. Given the many factors known to increase falls risks, falls prevention programming must attempt to impact numerous intrinsic and extrinsic risk factors. As a comprehensive examination of all aspects of a falls prevention program would be very challenging, the current research will focus specifically on the strength and balance (SAB) training component of such a program. This choice was made given the definitive and conclusive evidence that recommends that SAB training is an

absolutely essential aspect required to reduce falls risk (Clemson et al. 2004; Costello & Edelstein, 2008; Gillespie et al., 2009; Haas & Haines, 2013; Li et al., 2008; Palvanen et al., 2014; Yardley et al., 2008), The current research will therefore examine seniors' understanding of a SAB component commonly used in falls prevention interventions, determine the likelihood they would uptake a SAB training program offered in their community, whether they would prefer group-based vs. , home-based training and how likely they would be to follow general advice related to home and outdoor safety. This basic knowledge will provide valuable insight that can be used to inform those working to develop the much-needed falls prevention initiative for the province.

The proposed research will answer the following questions:

1. What are the personal beliefs or attitudes that NL seniors have in relation to falls prevention behaviours such as strength and balance training or home and outdoor safety?
2. Do NL seniors possess the intention to practice falls prevention behaviours such as strength and balance training and home and outdoor safety if the opportunity is given?
3. Do the attitudes and perceptions of seniors living in urban versus rural communities differ in regards of strength and balance activities?

CHAPTER 2: REVIEW OF LITERATURE

The following review examines literature related to falls prevention. The research presented will focus on the content of the programs and the views seniors carry regarding falls prevention.

2.1 Program Design and Content

There are a variety of approaches that have been used for falls prevention. These range from education focused programs, exercise programs, and a combination of the two. Education components to falls prevention programs are mainly used in conjunction with exercise interventions to promote seniors awareness and knowledge of falls risk factors (Costello & Edelstein, 2008). Education interventions that have been examined in the literature include group-based programs, individual information sessions or information that is just distributed either on-line or in paper format (Hakim et al., 2007). Irrespective of the method of delivery, most educational components of falls prevention programs provide seniors with knowledge on fall related risk factors and hazards, prevention or risk reduction methods, the role of exercise in prevention and the importance of vision screenings, medication reviews, home hazard reductions, and overall community safety (Child et al., 2012; Garcia, Marciniak, McCune, Smith, & Ramsey, 2012; Palvanen et al., 2014; Yardley et al., 2008).

Although there are clearly many components of the educational aspect of any falls prevention initiative, when asked about what falls prevention means to them most seniors will say it is about home hazard reduction or modifications (Kruse et al. 2010; Yardley et al., 2006). While it is unlikely that any one risk factor is most important, Pynoos et al. (2010) found that 80% of older adults' homes do possess at least one identifiable hazard,

while 39% contain at least five. Hazards range from poor lighting, bathtub design, and slippery surfaces (Kruse et al., 2010; Lord et al., 2006; Pynoos et al., 2010). Despite the prevalence of hazards in seniors' homes, seniors appear to have a mixture of attitudes towards home modifications. While some seniors simply do not realize the number of potential risks in their home others are completely dismissive of making any changes to reduce the risks (Kruse et al. 2010; Dickinson et al. 2011). As previously stated, half of all falls occur in seniors' own homes (Public Health Agency of Canada, 2014). This is an important fact to consider when developing a program aimed at reducing falls. Home hazard reduction has shown to be an effective method for some senior populations and would be a useful supplement in any falls prevention initiative (Kruse et al., 2010; Lord et al., 2006; Pynoos et al., 2010; Yardley et al., 2006).

Although clearly education and home modifications are key to reducing falls risk, exercise has also been identified as an essential component. Whether done alone (Costello & Edelstein, 2008; Hakim et al. 2007; Pynoos et al., 2010) or in concert with education and home modifications (Clemson et al., 2004; Palvanen et al., 2014) exercise has been shown to be a successful tool in fall prevention. There has been considerable attention paid to what constitutes the 'best' exercise for falls prevention (Clemson et al., 2004; Costello & Edelstein, 2008; Palvanen et al., 2010; Power & Clifford, 2013; Pynoos et al. 2010). Research into exercise programs has found that a combination of strength (i.e., resistance training) and balance training is most effective in reducing falls compared to aerobic exercises or either just strength or just balance exercises. For example, walking was not found to be particularly important to falls reduction, whether alone or in conjunction with the other exercise programs (Costello & Edelstein, 2008; Gillespie et al.,

2009; Power & Clifford, 2013; Public Health Agency of Canada, 2014; Sherrington et al., 2011). Collectively, in order for exercise to help reduce falls risk it must include: proper dosage of exercise, which depending on the individual should be two or three days per week (Power & Clifford, 2013; Public Health Agency of Canada, 2014; Sherrington et al., 2011), adequately challenge balance (Power & Clifford, 2013; Sherrington, Tiedemann, Fairhall, Close & Lord, 2011), and ultimately offer a combination of both SAB training (Gillespie et al., 2009; Power & Clifford, 2013; Sherrington et al., 2011).

While an exercise component is clearly important to any falls prevention program, the delivery method used for that exercise program must also be considered. Two main choices exist – either home-based or group-based designs. While both have been shown to be effective (Costello & Edelstein, 2011; Gillespie et al., 2009; Palvanen et al., 2010; Power & Clifford, 2013; Sherrington et al., 2011), knowing seniors' preference for one over the other can be invaluable when designing fall prevention programs. Using a survey completed by over 5000 seniors in the UK, Yardley et al. (2008) found that while seniors were very likely to consider participating in group exercise sessions, a larger percentage of them indicated that they would prefer home-based exercises. From Yardley et al. (2008) it is apparent that fall prevention programs that focus on exercise should likely include both home-based and group sessions, thereby allowing seniors the choice of a program that suits them best. With further investigations into falls prevention programs, the complexity of the design needed for such programs is evident. It is clear from the literature, that there is no one simple solution to an effective program. A comprehensive program that consists of both home-based exercise instructions and group programs in the

community will provide seniors with the resources to choose the program that is best suited to them.

It is exceptionally important that any program developed is relevant and targeted to the individuals involved, otherwise participants will not adhere to a program long enough to see the benefits (Costello & Edelstein, 2008; Dickinson et al. 2011; Hakim et al., 2007; Yardley et al. 2008). From the literature, programs including both exercise and education have been successful (Costello & Edelstein, 2008; Hakim et al. 2007; Pynoos et al., 2010), so an important consideration to implementation of any program is the risk factors of the individual participants and matching their needs and abilities to the programs (Costello & Edelstein, 2008). With many studies indicating reduced fall risk, using a variety of interventions, the optimal program still remains unclear. One thing that is clear is the importance of raising seniors' knowledge and awareness of falls risk and prevention. By doing this, seniors will hopefully be able to better understand their options for reducing their falls risk and maintaining their personal quality of life.

2.2 Challenges to Falls Prevention

Falls prevention is a complex issue, as there are several factors that influence falls and many reasons why programs aimed at reducing falls may not succeed. To date, falls prevention research has identified challenges such as: fear of falling leading to activity avoidance (Boyd & Stevens, 2009; Delbaere et al., 2004; Tischler & Hobson, 2005); personal relevance of programs (Elskamp et al., 2012; Yardley et al., 2006); lack of knowledge or understanding of falls prevention programs and benefits (Dickinson et al. 2011; Elskamp et al., 2012); and knowledge and availability of falls prevention programs (Dickinson et al., 2011). The discussion below will examine each of these in detail.

A major challenge to falls prevention in seniors is the fact that many seniors avoid activity due to fear (Boyd & Stevens, 2009; Delbaere et al., 2004; Tischler & Hobson, 2005). Delbaere and colleagues (2004) evaluated the impact of fear-related avoidance of daily activities on falls. The authors found that fear of falling and avoidance of activities could help predict future falls. Specifically, seniors who avoided major mobility tasks such as walking tended to develop physical frailty as a consequence of physical inactivity, which further increases falls risk (Delbaere et al., 2004). Seniors who possess this sort of fear may likely avoid any program that targets exercise, or possibly even involves simply having to leave the house (Delbaere et al., 2004; Tischler & Hobson, 2005). Tischler & Hobson (2005) interviewed a group of seniors to understand their perceptions of the consequences of falling and possible effects those consequences had on their quality of life. Seniors identified that the main reasons fear of falling developed were because individuals were worried about: physical injury, losing independence and being institutionalized, not being able to get up after a fall, and being confined to a wheelchair or unable to walk. Loss of independence was sometimes expressed as a greater fear than actually falling (Tischler & Hobson, 2005). Physical injury was a major concern among the participants due to the fact that it would result in persistence of pain or future procedures and surgeries. Many of the participants also discussed the feelings experienced during a fall. These feelings included helplessness, embarrassment and the possibility of becoming dependent on other people or devices following the fall. The experienced loss of independence, increased pharmaceutical use, pain, and other consequences of falls reduced seniors' perceived quality of life (Tischler & Hobson, 2005).

Some of the other major barriers that have been found to reduce a seniors' likelihood to uptake a program are: lack of information related to what the program actually involves or what is expected of them (Dickinson et al., 2011; Elskamp et al., 2012); lack of knowledge that falls prevention programs are available at all (Dickinson et al., 2011; Haas & Haines, 2014); availability of interventions or funding to maintain programs and trained staff (Dickinson et al., 2011; Zachary, Casteel, Nocera & Runyan, 2011); lack of benefits or unwillingness to continue until benefits became apparent (Dickinson et al., 2011; Elskamp et al., 2012; Yardley et al., 2006); feeling that their current health is not good enough (or too good) to participate in falls prevention programs (Dickinson et al., 2011; Elskamp et al., 2012; McInnes, Seers & Tutton, 2011); expense associated with modifying behavior (Bunn, Dickinson, Barnett-Page, McInnes & Horton 2008); a perception that the intervention either will not help or is not appropriate for them (Bunn et al., 2008); perceived lack of time (Dickinson et al., 2011; Elskamp et al., 2012; Yardley et al., 2006; Zachary et al., 2011), chiefly due to caring of others (Dickinson et al., 2011); and language barriers (Dickinson et al. 2011; Yardley et al. 2006).

Accessibility is also a key factor that greatly influences seniors' participation in falls prevention programs (Yardley et al., 2006). Seniors identified accessibility barriers to participation such as lack of transportation (Elskamp et al., 2012; Yardley et al., 2006), inconvenient location (Dickinson et al., 2011; Yardley et al., 2006) and type of facility (Dickinson et al., 2011; Zachary et al., 2011). In addition to accessibility of the program, program intensity can also be a major factor that could discourage or intimidate seniors from further participation in exercises related to SAB training (Dickinson et al. 2011; Zachary et al., 2011). Equally as important to consider is how falls are defined both for

participants and program designers. Research by Zecevic et al. (2006) suggest that if an inconsistency exists in how a fall is defined and understood among all those who are affiliated with falls prevention initiatives, then the initiatives in place will not achieve the best possible outcome. If falling, or falls risk, does not possess the same meaning to each individual relaying or receiving the message within the falls prevention program, then the strategies addressed to prevent falls may not carry the same impact (Zecevic et al., 2006).

With any program, there are a number of challenges or obstacles to consider that may hinder the target population from participating or maintaining participation. Whether it be personal barriers such as activity avoidance, lack of awareness that programs exist, environmental barriers such as transportation, location, or actual program availability all challenges are important to address at the foundational stages of developing a good program. Addressing and understanding the challenges discussed will help in future efforts to design and implement an accessible, relevant, and effective falls prevention program.

2.3 Factors influencing program success

As with many health related interventions, those offering falls prevention programs often encounter issues in relation to seniors' intention to stimulate behavior change. This is due, in large part, to the fact that many seniors do not acknowledge that they are at an increased risk of falling (Elskamp et al., 2012; Yardley et al., 2006; Yardley et al., 2007). When the topic of behaviour change arises in relation to health behaviours, specifically, one major theory that has long been used to describe stages of change is the Transtheoretical Model (TTM) (Glanz, Lewis, & Rimer, 1997, p. 60). The process of behaviour change, as stated by the TTM, involves five stages that categorize an individual

in terms of their personal readiness to change certain behaviours. These stages proceed through precontemplation, contemplation, preparation, action, maintenance, and termination (Glanz, Lewis, & Rimer, 1997). When attempting to elicit behaviour change, health care professionals, researchers and program facilitators would benefit from an appreciation of where individuals may fall within these stages in order to best support and encourage their efforts to practice new behaviours. Hutton et al. (2009) explored the TTM in their study detailing seniors' views towards physical activity. Although no immediate behaviour change was found in the period of the study, participants gained an awareness of the opportunities for physical activity in their surrounds (i.e. such that as walking groups, tai chi classes, and aqua aerobics). The work by Hutton et al. (2009) suggested that not only is there an adherence to increased physical activity level, there is increased knowledge of falls subsequent to a falls prevention intervention that employs the TTM. It is important when developing a falls prevention program that supporting and encouraging behaviour change be considered in order to increase knowledge and awareness regarding falls and foster adherence to the program.

Confidence in one's own abilities has a large influence on adherence to exercise behaviors (Garcia et al., 2012; Glanz, Lewis, & Rimer, 1997; Li et al., 2002). Several authors have reported that one of the major deterrents for continued physical activity participation was a lack of self-belief or self-confidence in one's abilities, as opposed to other minor influences such as previous commitments or accessibility to facilities (Dickinson et al., 2011; Hutton et al. 2009; Zachary et al., 2011). Bandura's Self-Efficacy Theory explains that self-efficacy is the amount of confidence an individual has in their ability to perform a task or activity (Bandura, 1977). Self-efficacy has been shown to

relate to exercise behaviors (Lox, Martin Ginis & Petruzzello, 2010). The idea of increasing self-efficacy in a falls prevention program has been questioned (Garcia et al., 2012; Li et al., 2005). Garcia and colleagues (2012) based a falls prevention intervention on Bandura's self-efficacy theory. In this study the authors used a modified self-efficacy scale as their outcome measure and the Stepping On program previously done by Clemson et al. (2004) as the intervention. No significant changes in self-efficacy were found during the 7-week program, however, participants did have an increased overall awareness of falls risk. These results may be due to the lack of follow up with participants proceeding the intervention in the study by Garcia et al. (2012) compared to the 14-month version employed by Clemson et al. (2004) that included an extensive follow up and home visits in addition to the 7-week Stepping On component. The lack of follow-up may not have provided participants with a long enough period to establish changes in self-efficacy and falls awareness. Authors Li et al. (2005) examined the role of falls self-efficacy in relation to fear of falling (FoF) in older adults. The authors used a tai chi exercise group and a stretching control group to determine whether falls self-efficacy mediated changes in FoF in the two groups. The findings suggest the intervention group showed increases in falls self-efficacy at 6 months compared to the stretching control groups. The primary difference between the interventions used by Garcia et al. (2012) and Li et al. (2005) is that the Stepping On program is education based with no actual physical activity being performed. This may have accounted for the differences in self-efficacy findings for these two studies. The actual participation in physical tasks that indirectly reduce falls (i.e., strength increases) may be more beneficial for confidence than simply learning about how to prevent falls.

Social support in physical activity settings can be an essential factor that determines whether seniors begin a program and maintain participation (Dickinson et al. 2011; Elskamp et al. 2012; Lox, Martin Ginis & Petruzzello, 2010). There are various types of social support that heighten an individual's experience of physical activity. Instrumental support provides a person with practical support during exercise that helps create convenience; emotional support involves encouragement and reassurance of the exerciser; informational support involves advice, tips, and suggestions regarding exercise that helps individuals educate themselves on physical activity; companionship is the presence of another person or a group that increases enjoyment and social well-being (Lox et al., 2010). Authors Hass & Haines (2014) performed a 12-month follow-up as part of their 15-week falls prevention intervention, which involved an exercise program. These authors reported that participants felt a sense of social support, as the group-based program was more enjoyable to them than exercising alone, and thus easier to maintain. This literature suggests that the supports provided have a large influence on individuals' participation in exercise-based programs, social support being particularly favored (Child et al., 2012; Dickinson et al., 2011; Haas & Haines, 2014; Lox et al., 2010). A program that is supportive through its convenience, encouragement, and the reassurance it provides and also one that is enjoyable, will likely achieve good adherence compared to one that is not (Child et al., 2012; Dickinson et al., 2011; Haas & Haines, 2014; Lox et al., 2010).

Program success and adherence is influenced by many factors, as discussed in this section, and individuals involved in designing and implementing a falls prevention program will benefit from having insight into what those factors are and how they

influence seniors' decisions to participate. It is essential to create a program that will foster confidence, reduce fear, and offer a supportive and constructive environment for seniors to achieve the best possible outcomes.

2.4 Seniors Views of Falls Prevention Programs

Research examining seniors' views of falls prevention has taken place in many locations including the Netherlands (Elskamp et al., 2012), United Kingdom (Dickinson et al., 2011; Yardley et al., 2006), United States (Zachary et al., 2012), Australia (Haines et al., 2013) and Canada (Gopaul & Connelly, 2012; Tischler & Hobson, 2005).

Collectively this research indicates that seniors have adopted a number of negative beliefs about falls prevention, including not seeing the personal relevance of falls prevention to them, not seeing the benefit of exercise in falls risk reduction, being resistant to engaging in exercise and being in denial about their personal falls risk.

A common view among seniors is that falls prevention interventions are not relevant to them because they do not feel they are personally at risk of falling (Haines et al. 2013; Elskamp et al., 2012; Yardley et al., 2006). Even for those that do recognize they are at risk, many believe that nothing can be done – that falling is inevitable (Elskamp et al., 2012; McInnes, Seers, & Tutton, 2011; Yardley et al., 2006). While many seniors in the Yardley et al. (2006) study acknowledged the fact that others in their age group were at increased risk of falling they reported that advice about falls prevention was really just common sense and not beneficial to them. Based on a survey distributed to seniors in Australia, Haines et al. (2013) found that 34% of participants believed that home assessments and modifications would not benefit them, but would likely benefit others in reducing falls risks. As was the case in the Yardley study, participants did

recognize that these types of programs would be well suited for other seniors who they perceived were at risk of falling (Yardley et al. 2006). Similarly, Elskamp et al. (2012) reported that many individuals did not see the personal relevance of falls prevention strategies such as mobility aids. Despite this fact, they recognized that others may find these strategies useful if they were afraid of falling. Therefore, when speaking to seniors about falls prevention programming it is most important to make a personal connection to each senior so that they understand how an intervention will provide benefits to them specifically (Haines et al., 2013). If they can make the connection between falls prevention information and their personal falls risk, seniors may be more likely to participate in programs and actively make changes to reduce their risks.

An important piece of falls prevention programs is the exercise component. As mentioned previously seniors can often find the thought of participating in exercise intimidating (Dickson et al., 2011; Zackary et al., 2011). For many this may be due to the fact that they do not understand the relationship between exercise and falls prevention. For example, Elskamp et al. (2012) found seniors had a general impression that falls prevention interventions were mainly information sessions that provided seniors with advice on preventing falls – exercise did not emerge as an area related to falls prevention in this interview based study. While there has been relatively little research in this area, a study by Hutton et al. (2009) does provide some initial insight. These authors asked seniors how exercise was related to falls prevention. While seniors perceived exercise as being important for general health they did not appear to connect exercise to falls risk reduction. These authors also reported that seniors voiced an interest in understanding the benefits of exercise for them, what they needed to do to exercise, and how to improve

motivation. Another consideration is that seniors often misinterpreted their physicians' caution for exercise as a recommendation to restrict exercise completely (Hutton et al. 2009). It is encouraging to know seniors want more information and knowledge of exercise and its benefits. With greater understanding of how exercises can benefit them, seniors may be more willing to uptake and adhere to SAB programs that ultimately aim to reduce falls.

A third negative perception that may deter seniors from participating in falls prevention programs is that the advice offered in such programs may be viewed by seniors as threatening to their autonomy (Yardley et al., 2006) or intrusive (Kruse et al., 2010; Dickinson et al., 2011). When Yardley et al. (2006) interviewed seniors about their perceptions of falls prevention programs, many participants reported that they did not like programs that told them what they needed to do or that focused on consequences of falls. By presenting information in this way seniors were reminded of the fact that they were getting older and potentially at risk of losing some independence, as such they found the advice both unwanted and unwelcome (Yardley et al., 2006). Kruse et al. (2010) and Dickinson et al. (2011) reported that most seniors felt that making modifications to their home would not prevent a fall, and that in fact assessments or advice on modifications was seen as more intrusive than helpful. Collectively these findings suggest that more attention should be paid to how falls prevention information is provided to seniors to ensure they do not feel threatened or that their personal home space is being violated. In doing so it may be more likely that seniors participate in falls prevention programs.

Clearly many seniors have negative beliefs regarding falls prevention initiatives. Seniors often view falls prevention advice as intrusive or unwanted, or simply do not feel

that the advice is relevant to them (Kruse et al., 2010; Yardley et al., 2006). The issue with relevance is that if seniors do not understand that a falls prevention initiative is for them, they will not attend. Furthermore, it is unclear to seniors what falls prevention programs consist of, which makes it difficult for interests to be peaked. An effective falls prevention program should ensure that seniors understand what the program consists of and how it will personally benefit them.

2.5 Rationale

In summary, seniors' views and personal barriers to participating in falls prevention initiatives is an essential consideration to development of falls prevention programs (Dickinson et al., 2011; Haas & Haines, 2014; Hutton et al., 2009; Elskamp et al., 2012; Haines et al., 2013; Yardley et al., 2006; Yardley et al., 2008). Understanding seniors' expectations of falls prevention programs should be the first step to developing any initiative. Promoting interventions that focus on exercise, information, and ways of maintaining independence have been shown to be most effective as they create greater knowledge of benefits that can be achieved (Dickinson et al., 2011; McInnes et al., 2004; Pynoos et al., 2010; Yardley et al., 2006). Seniors' views of falls prevention initiatives and perceptions of their own falls risk will determine whether a program will achieve uptake and adherence. Perceived barriers to participating in or adherence to these programs were found to include location, type of activity, staff quality and information (Dickinson et al. 2011). Research has shown that even though seniors understand the benefits of falls prevention programs, they do not see them as personally relevant as some seniors feel that they are not at risk of falling (Elskamp et al., 2012; Haines et al., 2013; Yardley et al., 2006;). For many, the consequences that follow a fall are perceived as

more detrimental than a fall itself (Tischler & Hobson, 2005). The fear of these consequences, or another fall, creates fear-related avoidance of activities, which only exacerbates the need for aids, support and increases risks for conditions such as anxiety or depression. It is clearly important seniors understand that they are at risk of falling, however, taking steps to reduce their risk is within their control.

To date, there is considerable research that has been done related to the content and design of falls prevention programs. Despite this fact none of this research has been done in NL. As such, the present study aims to initiate research efforts that will address this gap. The purpose of this research is to understand the attitudes and intentions seniors in NL have towards programs geared for SAB activities and on following falls prevention advice. This will aid in determining whether seniors in NL possess the same needs as described in the review of literature above. Furthermore, this research is the beginning to formulating a falls prevention program that would be widely accepted by the NL senior population and inspire future research on falls prevention in NL.

CHAPTER 3: METHODS

3.1 Introduction

The current research used a survey modified from Yardley et al. (2008) to assess understanding of strength and balance benefits and intention of practicing falls prevention behaviours. The modifications were made to better suit the needs of this particular research study. Modifications include: the addition of a different gender identification or choice to not disclose gender, layout of the survey, question wording, removed ethnic origin questions, and added questions that provided more information on living arrangement (i.e. alone, with spouse, etc.).

3.2 Recruitment and Materials

The study consisted of a cross-sectional survey distributed using purposive sampling to community dwelling seniors across NL. Demographic information was collected and quantitative measures of seniors' attitudes of SAB programs and intentions to follow instructions and advice on falls prevention strategies were obtained from the survey results. The Interdisciplinary Committee on Ethics in Human Research granted prior approval for this research. Data for the survey were collected between June 2015 and December 2015. Surveys were excluded if respondents indicated that they were younger than 65 years.

The survey used by Yardley et al. (2008) was modified for the purpose of this study; a copy of the modified survey is presented in appendix A. The survey assessed seniors' attitudes towards the benefits of strength and balance exercises for falls prevention using six questions (responses ranging from 1 (strongly agree) to 7 (strongly disagree)). The questions included measures of knowledge of benefits, perceived

confidence, opinions of others, ease of performing such activities and opportunity. The survey also assessed intention to practice falls reducing behaviors using four questions (responses ranging from 1(very likely) to 4(not likely)). These questions measured respondents likelihood of utilizing group-based, instructor led programs, performing exercises at home, and acceptance of advice on home and outdoors safety.

The Seniors Resource Centre of Newfoundland and Labrador (SRCNL) and 50+ clubs across NL assisted with the distribution of surveys to older adults through-out the province. Surveys were distributed in two primary ways: during face to face sessions with seniors and via the mail. The face to face sessions consisted of two Ageing Friendly Fairs held in communities on the Avalon Peninsula. These fairs, usually run by local seniors groups, are designed to provide seniors with knowledge and information about all things related to ageing well. They are attended by seniors in the community and have a variety of vendors, information booths and speakers. We had a booth at these fairs and asked seniors in attendance to complete surveys as they walked by. The surveys were included in a mail out package. Approximately 120 packages were sent to all peer helpers of the SRCNL and 150 group leaders of each seniors 50 + club in the province. The mailed out packages included an introductory letter that explained the purpose and intention of the study followed by the survey and prepaid envelop for completed surveys. The group leaders then requested more surveys for the members of their club if the interest was there. This helped ensure surveys collected were representative of the population in NL as surveys were distributed and collected from both urban dense and rural spread areas of the province.

3.3 Data Analysis

An initial exploratory analysis was done on the data file prior to completion of collection. Data was screened for potential outliers and tests for normality were performed (skewness, kurtosis and Kolmogorov-Smirnov test). Tests were done on all attitude items, questions on the 1 to 7 scale and all intention items, questions on the 1 to 4 scale. BMI was calculated in SPSS with height and weight measures provided by participants using standard formula ($BMI = \text{Weight}/\text{Height}^2$). A series of bivariate correlations were calculated between SAB attitude items and falls prevention behaviour intention; standardized scores were used to determine relations between survey items and main variables. Spearman's rho correlation coefficient was chosen, as the variables were not normally distributed (Field, 2013). Total scores for all correlations were obtained. Bootstrapping was performed with all correlations using 1000 bootstrap samples. Differences between total attitude and intention scores were determined based on sociodemographics (i.e., gender, age groups, BMI category and urban versus rural). Assumptions of t-tests and ANOVA were violated, as the data was not normally distributed; thus, Mann-Whitney, Kolmogorov-Smirnov, and Kruskal-Wallis tests were employed (Field, 2013).

CHAPTER 4: RESULTS

Out of the 488 survey distributed to seniors 255 were completed, yielding a response rate of 46%. The results obtained from this survey serve to explain what seniors' attitudes are towards strength and balance activities, and their intentions to actively participate in programs or practice falls prevention behaviors.

4.1 Descriptive Analyses

4.1.1 *Sample Descriptives*

Descriptive statistics were performed for sociodemographic variables to obtain sample characteristics (See Table 1). Mean age of participants was 74.7 years ($SD=6.1$). Of the 225 respondents, a large majority were female (79.6% female, 20.4 % male), which compared to the provincial statistics is slightly misrepresentative (53.6% female, 46.4% male; Statistics Canada 2015). Participants who reported to have fallen (17.3%) in the past year, had an average rate of falling of 0.488 ($SD= 1.00$) times in one year from a range of 0 to 6 falls. Average weight class (based on BMI) for the sample was obtained, 25.1% were in the normal weight class (18.5 to 24.9), 35.9% were categorized as overweight (25.0 to 29.9) and 39.0% categorized as obese (30 or higher). For education background of participants, 30.9% of respondents graduated from high school (25.5% attended high school) and 27.5% graduated from a post-secondary institution (16.2% attended a post-secondary institution). Of the respondents, 72.4% still lived in their own home, 13.1% lived in a home that they rented, 8.4% lived in subsidized housing and 6.1% lived in rent-free accommodations. Moreover, 42.1% of respondents lived alone, 52.3% lived with spouse or partner and 5.6% lived with their child or other family member. Approximately half of respondents were residing in the Avalon region, which for the

purpose of this study was designated as “urban” and all other regions were designated “rural”(see results in Table 2).

Table 1: Sociodemographics of Sample

Socio-Demographic Variables	% (n)	Socio-Demographic Variables	% (n)
Age Group		Education	
65-70	25.3 (57)	Less than high school	25.2 (53)
71-75	30.2 (68)	High school	30.0 (63)
76-80	23.1 (52)	Attended Post-Secondary	16.2 (34)
81-85	12.9 (29)	Graduated Post-Secondary	28.6 (60)
86+	8.5 (19)		
Gender		Living Status	
Male	20.9 (45)	Live Alone	41.4 (91)
Female	79.1(170)	Live with Spouse/Partner	52.7 (116)
		Live with adult child or other family	5.9 (13)
BMI category			
Normal Weight	24.7 (55)		
Overweight	35.9 (80)		
Obese	39.0 (87)		

N = 225 sample size in certain sociodemographics vary

Table 2: Geographical Summary of Participants

Region	Participants (n)	Percent (%)
Avalon	106	50.2
Central	27	12.8
Burin	25	11.8
Western	41	19.4
Northern	2	.9
Labrador	10	4.7
Total	211 ^a	100.00

^a Missing data from respondents not providing postal code

4.1.2 Strength and Balance

For the questions encompassing seniors' attitudes towards SAB activities the results are shown in Table 3; the table shows the data were not normally distributed. In summary, 62.7% of respondents agreed to SAB activities being good for them and only 9.3% chose disagree. When asked about SAB activities giving them confidence in other daily activities, 45.1% agreed and 8.4% disagreed. The majority of respondents (62.7%) agreed that those whose opinions matter to them would want them to participate in SAB activities, while only 2.3% strongly disagreed. When asked about ease in participating and personal relevance for SAB activities, many respondents strongly agreed (29.8% and 35.6%, respectively) and a very small percentage strongly disagreed (4.1% and 5.5%, respectively). Finally, 36.0% of respondents strongly agreed and 14.2% agreed that they would attend a program offered in their community, only 9.6% (disagreed and strongly disagreed) would not. Results of the Mann-Whitney tests determined that SAB attitude scores of female respondents did not differ significantly from the attitude scores of males ($U = 3835.00$, $z = .027$, $p = .978$, $r = .0018$) nor did they differ between fallers and non-fallers ($U = 3054.00$, $z = -1.462$, $p = .144$, $r = .098$). Similarly, individuals living in rural

versus urban areas had similar SAB attitude scores ($U = 5,646.00$, $z = -1.156$, $p = .248$, $r = .077$). Results for Kruskal-Wallis tests show SAB scores between age groups did not differ significantly from one another ($H_{(4)} = 3.710$, $p = .447$), nor did they differ between BMI categories ($H_{(2)} = .308$, $p = .857$).

4.1.3 Intention

Questions relating to intention measures, asked how likely participants were to implement falls prevention behaviours. Descriptive results for this portion of the survey are shown in Table 4, similarly, the results were not normally distributed. When asked about the likelihood of participating in an instructor led program, 47.9% strongly agreed while 27.4% were very unlikely to participate. When asked the same question about home-based programs, where individuals would follow general exercise instructions, 47.9% strongly agreed, while only 16.4% reported being very unlikely to do so. In terms of other falls prevention strategies, 62.1% of respondents would follow home modification advice and 60.3% would follow advice for outdoor safety, while 5.9% and 3.7% were very unlikely to follow this advice, respectively.

Results of the Mann-Whitney tests showed intention scores of females did not differ significantly from the intention scores of males, ($U = 3893.00$, $z = .313$, $p = .755$, $r = .021$) nor did the intentions of fallers and non-fallers ($U = 3338.00$, $z = -.591$, $p = .554$, $r = .039$). Falls prevention intentions of those living in urban centres did not differ significantly from those residing in rural areas ($U = 6,323.50$, $z = .499$, $p = .617$, $r = .033$). No statistical difference was found between intention scores of different age groups ($H_{(4)} = .156$, $p = .997$) or between weight class ($H_{(2)} = .659$, $p = .719$).

Table 3: Descriptive Statistics for Strength and Balance Question

	Item	<i>M</i> (<i>SE</i>)	<i>Z</i> _{Skew}	<i>Z</i> _{Kurt}	<i>D</i> _{df}
(SAB1)	Doing strength and balance activities would be good for me	5.5 (.126)	-6.3	-.32	.281 (178)***
(SAB2)	Doing strength and balance activities would make me feel confident in performing daily activities	5.4 (.125)	-5.4	-.58	.238 (178)***
(SAB3)	People whose opinions matter to me (e.g. family, friends, doctor) would think it was a good idea for me to do strength and balance activities	5.7 (.109)	-6.8	1.3	.252 (178)***
(SAB4)	If I wanted to, it would be easy for me to do strength and balance activities	5.2 (.127)	-4.8	-.88	.206 (178)***
(SAB5)	I am the kind of person who should do strength and balance activities	5.4 (.122)	-5.7	-.033	.234 (178)***
(SAB6)	If a strength and balance activities program was offered in my community I would attend	5.3 (.133)	-4.7	-1.5	.227 (178) ***
Total		32.5(.74)	-33.7	-2.0	2.0

1 = strongly disagree; 7 = strongly agree; *** $p \leq .001$ for test of normality

M(SE) – mean and standard error of score; Z_{Skew} - skewness; Z_{Kurt} kurtosis; D_{df} tests for normality with degrees of freedom

Table 4: Descriptive Statistics for Falls Prevention Intention

	Item	<i>M</i> (<i>SE</i>)	<i>Z</i>_{Skew}	<i>Z</i>_{Kurt}	<i>D</i>_{df}
INTENT1	Attend a group-based strength and balance program led by an instructor	3.04 (.077)	-4.72	-2.6	.291 (178)***
INTENT2	Follow general instructions on how to do strength and balance activities at home	3.28 (.066)	-6.53	.89	.315 (178)***
INTENT3	Accept advice and support to make your home safe (e.g. fit grab-rails, improve lighting, ensure carpets and rugs)	3.44 (.060)	-9.14	4.1	.381 (178)***
INTENT4	Follow advice on how to improve your safety when you go out (e.g. proper footwear, wearing glasses, using a cane or walker)	3.48 (.058)	-8.88	4.3	.396 (178)***
Total		13.2(.26)	-29.3	6.7	1.38

1 = very unlikely; 4 = very likely; *** $p \leq .001$ for tests of normality

M(SE) – mean and standard error of score; Z_{Skew} - skewness; Z_{Kurt} kurtosis; D_{df} tests for normality with degrees of freedom

4.2 Comparative Analyses

4.21 Correlations

As shown in Table 5, all SAB items were strongly correlated. Particularly, respondents who indicated SAB activities would be good for them also specified that these activities would help build confidence in other daily activities. Respondents who indicated a positive attitude towards attending programs in their community also indicated intention to attend instructor led programs. Respondents who indicated positive attitudes towards doing SAB activities showed strong correlations with the intention to follow home-based exercise advice. The relationship between attitudes was stronger with intentions for home-based activities versus group-based activities. Urban and rural groups were separated to compare correlations of attitude and intention measures and no significant differences were found.

Correlations were also performed for other measures as they related to SAB attitudes and intentions (not reported in Table 5). Interestingly, BMI was not correlated with attitude or intention measures. Age groups were not significantly correlated with attitude or intention measures. On average number of falls did not correlate with attitude or intention measures, however, a negative, weak correlation was found between number of falls and ease of performing SAB activities ($\rho < 0.3$).

Table 5: Correlations Between Strength and Balance Attitudes and Intentions

Variables	2	3	4	5	6	7	8	9	10
1. SAB1	.870**	.592**	.544**	.643**	.513**	.205**	.338**	.319**	.245**
2. SAB2		.580**	.526**	.654**	.552**	.223**	.362**	.440**	.391**
3. SAB3			.521**	.610**	.522**	.293**	.463**	.401**	.356**
4. SAB4				.549**	.537**	.223**	.414**	.349**	.293**
5. SAB5					.507**	.307**	.518**	.391**	.354**
6. SAB6						.504**	.442**	.347**	.332**
7. INTENT1							.484**	.337**	.306**
8. INTENT2								.467**	.469**
9. INTENT3									.726**
10. INTENT4									

Note: All correlations are presented as Spearman correlation coefficients (ρ), ** $p < .01$

SAB1 = Doing strength and balance activities would be good for me

SAB2= Doing strength and balance activities would make me feel confident in performing daily activities

SAB3= People whose opinions matter to me (e.g. family, friends, doctor) would think it was a good idea for me to do strength and balance activities

SAB4 = If I wanted to, it would be easy for me to do strength and balance activities

SAB5 = I am the kind of person who should do strength and balance activities

SAB6 = If a strength and balance activities program was offered in my community I would attend

INTENT1= Attend a group-based strength and balance program led by an instructor

INTENT2 = Follow general instructions on how to do strength and balance activities at home

INTENT3 = Accept advice and support to make your home safe (e.g. fit grab-rails, improve lighting, ensure carpets and rugs)

INTENT4 = Follow advice on how to improve your safety when you go out (e.g. proper footwear, wearing glasses, using a cane or walker)

CHAPTER 5: DISCUSSION AND CONCLUSIONS

This study provides valuable information that may be used to assist in the development of an initiative for falls prevention efforts that will aim to try and reduce the number of falls NL seniors experience each year. With answers to a foundational set of questions from the current study, key aspects of seniors' attitudes towards strength and balance training and falls prevention advice can be applied in the design and implementation phases of the initiative. The following chapter summarizes the results found in the study as they relate to current literature on the topic. It also discusses strengths and limitations of the study, and provides recommendations for future research on this topic.

5.1 Sample Description

Of the sample, 17.3% had experienced a fall in the past year, which is lower than the Canadian average of 20% to 30% (Public Health Agency of Canada, 2014). The gender distribution among the sample was not representative of the NL population where the percentage of females is approximately 53% (Statistics Canada, 2015), while the sample included a much larger portion of females compared to males, as shown in Table 1. The sample also contained an overwhelming percentage of participants in the overweight and obese categories (35.9 % and 39.0 %, respectively). This high level of obesity exceeded the national average for all weight classes (36.1% normal weight, 36.8% overweight and 25.1% obese; Statistics Canada, 2010). The obesity level was also much higher than 2011 data that indicated 35.3% of NL seniors were obese (Statistics Canada, 2010). Although many factors are known to contribute to maintenance of a healthy weight, low levels of physical activity and unhealthy lifestyle behaviors are

known to be highly correlated with body weight (Logan, Gottlieb, Mailand, Meegan & Spriet, 2013). As such it is likely that the survey respondents in the current study had low levels of physical activity and had at least some other unhealthy lifestyle behaviours. The sample was also well educated with 30% of participants having a high school diploma and 28.6% of participants having a post-secondary degree or diploma. While the number of individuals with post-secondary degrees or diplomas was comparable to the provincial average of 30%, provincial data indicates that a high school diploma was the highest degree attained by only 19.9% of the population, about 10% lower than the sample in this study (Newfoundland & Labrador Statistics Agency, 2011). As such our sample was not altogether representative of the educational level of individuals in NL. The housing status of the sample was also slightly misrepresentative of the NL population, as more individuals indicated they lived alone (41.4%) compared to provincial average of 22.9% for the age group. In contrast, the 52.7% of seniors who reported living with their spouse or partner was less than the provincial average (64.4%), while more individuals reported living with their adult children or other family (5.9%) in compared to the province (1.1%) (Newfoundland & Labrador Statistics Agency, 2011).

5.2 Survey Measures and Interpretations

5.2.1 Strength and Balance Activities

The information collected from this sample indicates that seniors possess the knowledge that SAB activities are beneficial and pertinent to them. Specifically, the seniors surveyed agree that SAB activities are good for them, would give them confidence in other activities of daily living, believe others would want them to do SAB activities, believe they are the kind of person who should be participating in SAB

activities, and would attend any programs if they were offered in their immediate communities. Not only did participants have positive attitudes towards SAB activities, the intentions to perform these activities were significantly correlated with these attitudes.

Similar to Yardley et al. (2008), individuals reported an overall higher likelihood of performing SAB activities at home compared to attending instructor-led group sessions (3.28/4 as compared to 3.04/4: see Table 4). The reported willingness of seniors to engage in home-based programs is an important finding of this study that has implications for the design of SAB programs in the province. Although seniors reported being likely to engage in both home- and group-based programs the higher ratings assigned to home-based programs highlights the importance of including home-based options in any SAB programs designed for NL seniors. Yates and Dunnagan (2001) found home-based program to be highly effective in achieving improvement in balance and endurance, and also falls reduction. Not only are these programs convenient for seniors, they are simple, low cost options that seniors have interest in participating in (Yates & Dunnagan, 2001). From this, it is evident that home-based programs would be a beneficial component of a falls prevention program that will reach many seniors across the province, as more seniors have indicated greater interest in such home-based instructions. Nevertheless, group-based programs were still preferred by some participants. These findings agree with Yardley et al. (2008), which suggests that it is particularly important to develop a program that allows seniors to choose interventions that suit their preferences.

Individuals who reported being likely to attend a SAB program in their community also showed a greater likelihood of participating in an instructor-led program compared to a home-based program. While on the surface this may seem to contradict the

finding reported above, that seniors were more likely to participate in a home-based program, closer examination of the response may indicate another explanation for the finding. It is possible that seniors interpreted the question “if a strength and balance activities program was offered in my community I would attend” as referring to a program offered outside of their home, rather than a community led initiative that could occur either in or out of the home. If respondents did not consider home-based programs as being a possibility for a community program then this relationship between community program and group-based program, compared to home-based, is reasonable. Reports from Yardley et al. (2008) indicate that females, younger seniors, and those with a higher socioeconomic status were more likely to participate in group-based programs. Although the analysis performed by Yardley et al. (2008) and the one used for the current study differed, there was no evidence from our survey results of a relationship between gender or age with likelihood of participating in group or home-based programs. While we did not examine socio-economic status directly we did track education level and found no correlations between education level and program participation in the current sample. While this lack of correlation between age, gender or education level with program participation may be due in part to our relatively low sample size, the results do suggest NL seniors appear to be generally inclined to participate in SAB programs.

Participants in the current study indicated that doing SAB programs would be good for them, as well as feeling that participating in these activities would give them confidence when performing other daily activities. In addition to ranking both of these attitude scores highly, the strongest correlation between scores was found between these two measures (see Table 5, $\rho = 0.870$). This strong correlation indicates that seniors who

feel strongly that SAB activities are good for them also can see that doing these activities will improve confidence when doing other activities. This suggests that seniors understand that improved SAB has the potential to improve other aspects of health and quality of life. Yardley et al. (2007) found that the uptake of SAB training by seniors was related to enjoyment, the perceived health benefits and acquired confidence from participation, as opposed to the direct effect of the program on fall risk reduction. Yardley et al. (2006; 2007) concluded that when marketing programs to seniors, attention should be paid to the fact that programs would improve SAB and quality of life as opposed to focusing solely on falls reduction. While seniors in the current study were not asked explicitly if they would participate in a falls prevention program, their awareness of the benefits of SAB training suggest they may consider participating in a program marketed as helping to improve SAB.

5.2.2. Advice on Falls Prevention

On average, the intention to follow advice on home modifications was very high among participants (3.44/4 see Table 4). The intention to make home modifications was likely facilitated by the feeling of ownership in regards to the decision-making process (Bunn et al., 2008; Keung Yen & Carter, 2006; Yardley et al., 2006). From the results of this study, the high likelihood of following home modification advice could indicate that NL seniors see benefit in home safety measures. Based on the work of Keung Yen & Carter (2006) this suggests participants in the current study may see these home modifications as a preventative strategy to reducing falls and as such have the intentions of making home modifications.

The willingness to make home modifications was significantly correlated (.467, Table 5) with the likelihood of performing SAB exercises at home. These findings are consistent with the work by Yardley et al. (2008), although in the current study the willingness to attend sessions or follow advice was not correlated with age, as Yardley et al. (2008) found in their research. While seniors in the present study appeared willing to make home modifications, research has shown that willingness to make home modifications may be dependent on how the information is presented as seniors have reported these strategies as intrusive or perceived a lack of control over the decision (Bunn et al., 2008; Dickinson et al., 2011; Keung Yen & Carter, 2006; Yardley et al., 2006). Therefore, while the NL seniors studied view home modifications as something they would do, careful attention should be paid to how this message is presented. If seniors do not see hazards within their own homes, or feel that the cost of making modifications outweighs the chance of falling, advice in regards to home modifications will likely not be well received. The extent to which seniors will accept home safety or modification advice has yet to be determined. A component of designing a falls prevention program is how to best relay the message regarding the importance of home modifications so that the advice is better accepted. What a falls prevention program including home assessments and modifications should consider is the need seniors have towards keeping control of the decisions made to changes in their home.

For outdoor safety advice participants displayed an intention to follow advice on strategies such as use of proper footwear, mobility aids, and vision tests. Although the current findings indicate seniors are likely to accept advice on outdoor safety strategies, this does not mean they do or will. Some research suggests that seniors are resistant

towards mobility aids (Bunn et al., 2008; Dunne, Bergman, Rogers, Inglin, & Rivara, 1993). In theory, the use of aids may not seem burdensome, however, when the time comes to implement these changes some barriers may present themselves, such as cost of such aids or bulkiness or the social aspect of being perceived as ageing and needing assistance (Dickinson et al., 2011). No measure was taken to address whether this advice has been given to participants before; however, with the high number of falls and fall-related injuries in NL (Public Health Agency of Canada, 2014) it is likely that the uptake of this advice has been minimal. Prior to developing a province wide falls prevention initiative for NL seniors, further research should focus on the finding that seniors will be likely to follow this advice and further explore why seniors chose not to follow the advice when given.

In comparison to the present study, work done by Yardley et al. (2006) reported very different findings when it came to advice related to falls prevention. In their work Yardley and colleagues evaluated seniors' views of falls prevention advice. The seniors Yardley examined reported that advice related to falls prevention was irrelevant to them. Specifically, falls prevention advice seemed threatening to seniors who reported that it simply reminded them that they were ageing (Yardley et al., 2006). The difference between the Yardley study and the present one was that Yardley used focus groups and semi-structured interviews with 66 individuals. The difference in methods therefore makes it difficult to compare the results of the two studies directly. Moreover, Yardley et al. (2006) found that a common perception of falls prevention advice is that it is generally good advice, however, only for others who likely need it. This poses a challenge in efforts to provide falls prevention advice to seniors if they do not understand their personal falls

risk. We can develop any type of program, whether it be exercise, education, home sessions, group sessions, or information packages; however it will be of no use if seniors do not agree that these are programs they need. This suggests that more falls awareness messages should be implemented so seniors begin to understand that they are in fact at a higher risk of falling. Yardley et al. (2006) propose the promotion of enhancing health and balance rather than focusing on falls reduction messages. This approach may instill in seniors that by doing these programs they will maintain their independence, which is often what seniors fear they will lose.

5.2.3 From Attitude and Intention to Participation

SAB activities have been established as beneficial tools for maintaining a healthy and active lifestyle at all ages (Clemson et al., 2004; Yardley et al., 2008). The present results are parallel with the findings of Yardley et al. (2008) who indicate similar correlations between intentions and attitudes towards strength and balance activity. These findings suggest that implementing a SAB training program geared towards seniors in various communities in NL would likely succeed. However, research that has examined seniors' activity levels suggests that this would not necessarily be the case. Nyman (2011) states that even though individuals may have knowledge regarding the benefits of an activity this does not directly translate to the uptake of falls prevention behaviours. As previously mentioned, the Transtheoretical Model (TTM) (Glanz, Lewis, Rimer, 1997, pp. 60) is one of many models of behaviour change that offers great insight into why healthy lifestyle behaviours, although effective, are not practiced. A main construct of TTM is self-efficacy, in which confidence and temptation must be present in situations to elicit behaviours. Individuals who have confidence and the desire to engage in specific

situations are more likely to succeed in progressing to the action, or maintenance stages of behaviour change (Glanz, Lewis, Rimer, 1997, pp. 60). This can be said of individuals' participation in falls prevention programs requiring confidence, desire and readiness to participate. Lack of self-efficacy was found to be a barrier to participation in exercise-based falls prevention programs (Bunn et al. 2008). As such, ensuring self-efficacy in falls prevention initiatives may increase the likelihood individuals will participate and adhere to the programs put in place.

When it comes to seniors implementing falls prevention practices, there is an existing gap between the intention, or likelihood, of participation and action. The uptake of a new lifestyle or program to improve health and reduce falls does not come without challenges (Dickinson et al. 2011; Elskamp et al. 2012). Many facilitators and barriers to participation in falls prevention programs have been found. Major barriers to participation included a lack of knowledge regarding falls prevention, the belief that falls are beyond personal control and that ageing and thus "physical deterioration" was inevitable, no perception of need for help, not previously active, stereotypes of modality use associated with old age and the sense that advice is viewed as patronizing (Bunn et al., 2008; Dickinson et al., 2011; Elskamp et al., 2012; Yardley et al., 2006). Barriers to falls prevention programs exacerbate the lack of attendance, and these barriers are not always considered when developing the programs. From the literature, the barriers seniors have to participating in falls prevention programs include: fear of falling, lack of personal relevance, location, transportation, and the lack of accessible and sustainable programs (Bunn et al., 2008; Dickinson et al. 2011; Elskamp et al., 2012). These perceived barriers likely contribute to a lack of seniors' participation in physical activity programs and also

contribute to the fear-related avoidance of activities, resulting in more falls among seniors. As such, educational components of falls prevention initiatives that provide seniors with the realization that prevention is within their control, may be more beneficial to the action phase of falls prevention behaviours.

5.3 Strengths and Limitations

A strength of the current study was that a large sample size was obtained for the survey data. The survey provided definitions for both falls and strength and balance activities, which reduced the likelihood of confusion as to what was meant by each question. The distribution of data obtained seems to be relatively representative of the NL population with urban versus rural population spread; 59% and 41% respectively (Newfoundland & Labrador Statistics Agency, 2011). With respect to gender, this sample was also similar to the sample obtained by Yardley et al. (2008), consisting of more females than males. This is indicative of the fact that females in this age group are either more abundant, or more likely to be involved in social gatherings in their community, thus more likely to volunteer for community targeted research. A final strength of this study was the use of a survey that has previously been developed and validated to measure attitudes and intentions (Yardley et al., 2008).

Limitations of the current study include the misrepresentative sample of participants. The demographics show that the current sample was more educated, and had higher rates of overweight and obese individuals than are found in the NL population. This survey was based on self-report and was retrospective of falls occurrences. The survey used was intentionally shorter to encourage participation with only a few pages to complete rather than a lengthy survey participants may feel burdened by. Although it

served the purpose of the current study, the survey could not address questions on barriers or current physical activity levels to gain more insight. Another weakness of the study was that the number of fallers versus non-fallers was drastically uneven. This may have reduced the power of the independent t-test to specifically make comparisons between the two groups. This information could prove useful in future research that wishes to investigate falls prevention.

5.4 Future Recommendations

Research in this area needs to look more closely at the current activity levels of seniors, specifically fallers, in order to address any lack of physical activity participation. Similarly barriers to both physical activity participation and falls prevention program participation should be investigated with this population. Future research would benefit from using quota sampling to ensure equal groups of male and female participants, as well as fallers and non-fallers. Furthermore, research aimed at identifying perceived facilitators and barriers to participation in falls prevention programming needs to be done. While such research has occurred in other regions of the world, information from NL seniors would be better suited to assist in the design of a NL based falls prevention initiative, given the unique spread of few dense urban centres and many rural communities. As a starting point for these investigations our research group has recently begun holding focus groups with seniors on the Avalon Peninsula in an effort to gain insight into some of the barriers and facilitators that NL seniors perceive related to participating in falls prevention programs. This research will help address the findings of the current research with a more in-depth investigation into seniors' views of advice, SAB activities (home-based and group-based programs), and barriers to engaging in these

programs.

5.5 Conclusion

Based on the results of the current study, it appears that if opportunities were available, whether home- or group-based programs, NL seniors would be highly likely to participate in SAB programs. Generally, the seniors surveyed believe they should be performing SAB activities, and they understand the benefits to such activities. Much research needs to be done regarding the specific barriers and facilitators NL seniors have to implementing falls prevention practices. If barriers and facilitators are considered prior to implementing any initiative and careful planning is done to address them, seniors will have access to an effective and supportive falls prevention program. There is currently more research being done to answer many questions specific to seniors' perceptions of falls risk and falls prevention programs.

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APPENDIX A: QUESTIONNAIRE

Public views on services for preventing falls

1. Are you? ____Male ____Female ____Prefer not to say
Other: Please specify_____

2. Date of Birth: _____(day)/_____(month)/_____(year)

3. Height (in feet/inches) _____ Prefer not to say _____

4. Weight (in pounds) _____ Prefer not to say _____

5. A fall is an unexpected event in which you come to rest on the floor, ground or lower level. Falls include slips or trips in which you lose your balance and land on the floor, ground, or lower level. During the past year, how often have you fallen? _____

‘Strength and balance activities’ means doing physical activities most days to build up the strength in your body and also activities that improve your balance. These kinds of activities include lifting and stretching your legs, standing on your toes, playing a sport, fitness classes, dancing, T’ai Chi, yoga, water fitness, regular walking or and other activities.

For each question please circle the option that is closest to your opinion – see below for a sample of how to complete the form:

Example:	Strongly Agree						Strongly Disagree	
The weather in Newfoundland is nice	1	2	3	4	5	6	7	

	Strongly Agree						Strongly Disagree	
Doing strength and balance activities would be good for me.	1	2	3	4	5	6	7	
Doing strength and balance activities would make me feel confident in performing daily activities.	1	2	3	4	5	6	7	

Public views on services for preventing falls

	Strongly Agree			Strongly Disagree			
People whose opinions matter to me (e.g. family, friends, doctor) would think it was a good idea for me to do strength and balance activities.	1	2	3	4	5	6	7
If I wanted to, it would be easy for me to do strength and balance activities.	1	2	3	4	5	6	7
I am the kind of person who should do strength and balance activities.	1	2	3	4	5	6	7
If a strength and balance activities program was offered in my community I would attend.	1	2	3	4	5	6	7

We have listed below some ways in which you can reduce your risk of falling. How **likely** are you to take part in these activities? **(Please circle the number that best describes your answer).**

	Very likely			Not likely		
Attend a group-based strength and balance program led by an instructor	1	2	3	4		
Follow general instructions on how to do strength and balance activities at home?	1	2	3	4		
Accept advice and support to make your home safe (e.g. fit grab-rails, improve lighting, ensure carpets and rugs cannot slip)?	1	2	3	4		
Follow advice on how to improve your safety when you go out (e.g. suitable footwear, wearing glasses, using a cane or walker)?	1	2	3	4		

Please answer the following questions by placing a check mark in the box that best fits your answer:

Which best describes where you live?

- ☐ I live in my own home or have a mortgage (by yourself or with your family)
- ☐ I live in subsidized housing
- ☐ I live in a home that I rent privately from a landlord
- ☐ I live in rent free accommodation

Which best describes your living situation:

- ☐ I live alone
- ☐ I live with spouse/partner
- ☐ I live with adult child or other family

Which best describes your education:

- ☐ I attended high school
- ☐ I graduated high school
- ☐ I attended a postsecondary institution
- ☐ I graduate from a postsecondary institution

Have you had any full or part time education since you left school?

- ☐ Yes
- ☐ No

What is your full postal code? _____

(NOTE: This information will ONLY be used by the researchers to determine which part of the province the survey has been sent from.)

THANK-YOU for taking the time to complete this survey. Please place it in the addressed envelope that you received with the survey. There is no need to add postage - you can simply drop the sealed envelope in the mail.