

Understanding the Experiences of the Community-Dwelling Older Adults of the
FallProof™ Program

by

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Abstract

Background: One in three community-dwelling older adults aged 65 years or older experience at least one fall per year, leading to fall-related injuries, loss of independence, and, in some instances, death. Effective interventional strategies exist to prevent falls and their negative consequences in community-dwelling older adults. The FallProof™ program is a balance and mobility program for fall prevention offered through the Calgary Fall Prevention Clinic to community-dwelling older adults who have a history of falls. Although evidence established the effectiveness of this program in reducing fall risks, little is known about the perspectives of community-dwelling older people with respect to the program.

Objective: To explore the perspectives of community-dwelling older adults with a history of falls of a twelve-week FallProof™ program led by physiotherapists.

Method: A qualitative description approach was used to explore the perspectives of ten community-dwelling older participants (seven women and three men) aged 65+ years who completed the 12-week FallProof™ program. Participants were recruited using a purposive sampling method. Individual interviews were conducted at participants' homes, using a semi-structured interview guide. The interviewer's observations during the interview sessions and reflective ideas were documented in field notes. Interviews and participants' observation data from the field notes were transcribed verbatim. Data were analyzed using the constant comparative technique.

Results: The overall theme, "An award-winning program" was identified. Three categories supported this theme: 1) Participants experience fall-related benefits; 2) A variety of activities and great instructors empowered participation; and 3) Deterrents to participation.

Conclusion: Participants' experiences of the FallProof™ program were positive. They reported that the program met their fall prevention needs, and despite some challenges with chronic health conditions and life events relating to family responsibilities and unfavourable weather, they were motivated by the exercise program. Participants' perspectives guide a patient-centred approach to facilitate future delivery of FallProof™ program. Specifically, improving program awareness, maintaining content and mode of delivery, and extending duration of the FallProof™ program may optimize program implementation in future practice.

Preface

This thesis is an original work by Oluwaseyi Abigail Osho. The research project, of which this thesis is a part, received research ethics approval on November 13, 2015, from the University of Alberta Research Ethics Board, Project Name “Evaluation of the FallProof™ program for the Community-Dwelling Older Adults,” No. PRO00058286.

Dedication

This thesis is dedicated to older adults at the Calgary Fall prevention Clinic who participated in the FallProofTM interview and provided their perspectives on the fall prevention program.

Acknowledgments

I want to acknowledge the community-dwelling older adults in Calgary Fall Prevention Clinic who gave their valuable time to contribute thoughtful insights into this project. Without their willingness to participate, I would not have been able to complete this thesis.

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Chapter One

Introduction

Supporting community-dwelling older adults in preventing falls and fall-related injuries is a growing public health priority.¹ One in three community-dwelling older adults aged 65 years or older experience at least one fall per year.² Falls place older adults at risk of injuries, loss of independence, and death.^{3,4} About 20 to 30% of older adults in Canada are hospitalized per year due to fall-related injuries.¹ Fall-related injuries account for 57% of deaths among females and 36% of deaths among males aged 65 years and older in Canada.⁵ Falls and fall-related injuries impact “aging in place” in community-dwelling older adults, and increase burden to caregivers and the economy of the Canadian health care system.¹

In addressing the negative impacts of falls and fall-related injuries, exercise interventions either alone or as components of multimodal interventions are effective to reduce falls and fall-related injuries in community-dwelling older adults.⁶⁻⁹ Exercise interventions reduce the risk and number of falls by almost a third in community-dwelling older adults.^{2,6,10} Both multicomponent, individualized fall prevention exercise programs performed at home and supervised group-based programs are effective for reducing falls in community-dwelling older adults by 32% and 22%.¹¹ However, the evidence also suggest that greater fall reduction could be achieved by programs which include high frequency (three hours or more per week) of progressive balance training.⁶ An effective group-based fall prevention exercise program which progressively challenges balance also warrants tailoring the exercise program to individuals and their associated impairments.¹²

The FallProof™ program is a group-based balance and mobility program that is tailored to the needs of individuals and progressively challenges their balance.¹³ Because the program

specifically offers progressive activities which target the intrinsic risk factors for falling such as balance, muscle strength, gait, and posture,¹³⁻¹⁵ it is typically offered in small groups. Integral to the FallProofTM program is that, it is based on motor and ecological theory thus allowing participants to perform complex movement tasks that are progressed in a variety of practice environments.¹² This program also offers a multidimensional approach to the assessment and treatment of balance-related problems in community-dwelling older adults at high risk for falling.¹³

Evidence from small clinical and community studies have shown that FallProofTM program improved balance, mobility, and quality of life in older adults at risk of falling.^{14,15} However, the perspectives of participants of the program were not explored to provide evidence which is based on participants' experience. A qualitative study was embedded in the current feasibility study to explore experiences of older participants of the FallProofTM program for fall prevention.

Few qualitative studies have explored the experiences of community-dwelling older adults at high risk for falling of fall prevention programs.¹⁶ A systematic literature review of 14 qualitative studies exploring older adults' experiences of fall prevention programs suggested that healthcare providers should know older person's rationale for fall prevention programs to be able to support their longer-term exercise-related behaviour.¹⁷ Also, community-dwelling older adults reported a positive experience, and satisfaction following a home-based Otago exercise program for fall prevention.^{18,19} Older participants' health conditions such as pain and fatigue were barriers to participating in the Otago exercise program.¹⁸ The Step-On program is a group-based multimodal fall prevention program with a single session that addressed strengthening and balance training for community-dwelling older adults; participants reported a positive experience

and a wide range of psychological and physical outcomes following the program.¹⁶ Further exploration of exercise programs of multiple sessions that include progressive group-based strengthening and balance training for older adults at high risk for falling is needed so that participants' viewpoints can inform fall prevention programs.

Understanding community-dwelling older adult participants' perspectives of a fall prevention program may provide evidence for future program delivery specifically related to enhancing adherence and optimizing outcomes. Older participants' perspectives may give an insight into the overall dynamics at play in a group-based multiple component exercise program. We conducted a qualitative study using the *qualitative descriptive approach*²⁰ to explore perspectives of community-dwelling older adults aged 65 years and older who participated in a physiotherapist-led group-based FallProofTM program.

Specific Objective

To explore the perspectives of community-dwelling older adults who are at high risk of falling and participated in a physiotherapist-led 12-week FallProofTM program.

Chapter Two

LITERATURE REVIEW

This chapter presents an overview of the prevalence and burdens of falls and fall-related injuries in older adults, and the benefits of using qualitative study to augment a fall prevention program evaluation. Multiple risk factors predisposing older adults to falls were reviewed, along with the BEEACH (**B**ehaviour change, **E**ducation, **E**quipment, **E**nvironment, **C**lothing & footwear, **H**ealth management) model for fall prevention. This chapter also presents the philosophical paradigms of qualitative studies in the context of exploring experiences of older adults and fall prevention programs. Existing evidence on the FallProofTM program for fall prevention is discussed and gaps in evidence warranting a qualitative study identified.

2.1 The burden of fall and fall-related injuries in older adults

A fall is a sudden and unintentional change in position resulting in an individual landing at a lower level such as on an object, the floor, or the ground, with or without injury.²¹ Falls are the leading cause of accidental injury-related death in people aged 65 years and older.¹ Age-standardized death rates of 5.7 and 4.1 per 10,000 respectively for males and females aged 65 years and older in Canada are attributed to falls.^{1,3}

Older adults who survive fall-related injuries have an increased length of stay in the hospital when compared to older adults admitted for any other cause.¹ For instance, an analysis of average length of stay in 2010/2011 showed that older adults admitted for any cause (e.g., stroke, cardiovascular diseases) in Canada spent an average of 12 days in the hospital while those with fall-related injuries spent an average of 22 days.¹ The longer length of stay in hospital resulting from falls among older adults highlights the disproportionate health care costs for fall-related injuries in comparison to other causes of hospitalization among older adults.¹ Although

the most prevalent fall-related injury between 2010/2011 was fracture (35%), approximately 35% of fall-related hospitalizations were hip fracture.¹ The increasing length of stay and health care costs for fall-related injuries have a negative impact on the health care system.¹

The economic burdens of falls and fall-related injuries are enormous, and the annual direct costs of fall-related hospital admissions for older adults in Canada is estimated at \$228 million.¹ Approximately \$4.4 billion is estimated as direct health care costs relating to hospital admissions for fall-related injuries by 2031.³ Current estimations of costs are likely an underestimate given that indirect costs for medications, physiotherapists, home care services including caregiving were not included.

Preventing falls and fall-related injuries can positively impact the Canadian health care system and the economy at large.^{3,22} A reduction in 20% of falls would translate to an estimated 7,500 fewer hospitalizations and 1,800 fewer older adults with permanent disability in Canada.³ Overall national savings from this reduction could amount to \$138 million annually in Canada.³ These statistics on savings in the Canadian health care system by reducing falls and fall-related injuries call for intervention strategies that address fall risk factors in older adults.^{2,3}

2.2 Risk factors for falling in older adults

There are multiple risk factors for falling in older adults.^{1,23-27} Investigators in fall prevention have used different classifications to evaluate risk factors that impact falling in older adults.^{1,23-27} Some researchers generally categorized risk factors as intrinsic and extrinsic.²⁷ Intrinsic factors for falling are individual-specific and include advanced age, chronic disease, muscle weakness, gait and balance disorders, and cognitive impairment.²⁷ Extrinsic factors generally include medication use, environmental hazards, and hazardous activities.²⁷ Other

researchers adopted more specific classifications, dividing risk factors into sociodemographic, balance and mobility, sensory and neuromuscular, psychologic, medical, medication use, and environmental factors.²⁸ In addition, the Canadian Fall Prevention Curriculum presented the BEEEEACH model to elaborate on the multifactorial risks for falling that should be targeted through multilevel approach to behaviour change for fall prevention in older adults.²⁹

2.3 Multifactorial risk factors for falling and model for fall prevention in community-dwelling older adults

Although there are different models and frameworks to understanding the multiple fall risk factors and targeted approaches to preventing falls,^{21,29-31} the BEEEEACH model primarily address multifactorial risk factors by focusing on behaviour change.^{21,29} (Figure 2.1.) The model was developed from the Canadian Falls Prevention Curriculum for effective fall prevention interventions by targeting selected individuals or populations based on their fall risk profiles.^{21,29} BEEEEACH model has “**behaviour change**” as its core inner circle and emphasizes the need for a multilevel approach to fall prevention.²⁹ Based on this model, behaviour change to fall prevention initiatives is not only required in older adults, but also in health care providers, city planners, policy makers, caregivers, and anyone working with or has an impact on fall prevention in older adults.²⁹



Figure 2.1: The BEEACH model of fall prevention (adapted and modified from literature)²⁹

The multiple fall risk factors targeted through behaviour change in the BEEACH model include factors relating to equipment, environment, activity level, clothing and footwear, and health-related conditions of older adults.²⁹ Education is an integral component of the model that also target fall risk factors through behavioural change. The education component addresses measures to prevent falls, and various interventions and services available to support older adults at risk for falling.^{11,29} The audience for education include older adults, formal and informal caregivers, health care providers, and community members, to enact behaviour change to address risk factors for falling.²⁹

Equipment component of the model targets factors such as lack of use, poor maintenance, malfunction, or inappropriate fit or use of equipment that may increase risk of falling.^{27,32,33} Equipment-related factors are modifiable risk factors which health professionals (physiotherapist, occupational therapists) can appropriately address through proper sizing, adequate maintenance, and recommendations of appropriate equipment and safe use to decrease risk of falling.²⁹ Some recommended equipment for fall and fall-related injury prevention include mobility aids, bathroom aids, grab bars, hip protectors, and other new and innovative technology-based equipment (compliant floor, fall monitoring devices).^{27,29} This component of the model has clinical relevance since a synthesis of evidence from metanalysis of 74 studies reported that inappropriate use of equipment such as walking aids might increase risk of falling twice in fallers (OR: 2.18, 95% CI (1.79-2.65) and thrice in recurrent fallers (OR: 3.05, 95% CI (1.87-4.95) when compared to non-fallers.²⁷

Home, community, and institutional hazards are environmental factors described as risk factors for falling in BEEACH model.^{21,32,34} Examples of home hazards that may trigger tripping and falls include scatter mats, electrical cords, and slippery floors,^{21,32,34} while

community hazards include snow or ice on walkways, unsafe stairs, and uneven surface in the community.³² On the other hand, some examples of institutional hazards are poor enforcement of safety regulations, and lack of appropriate building codes and designs.²¹ Overall, environmental hazards increase the risk of falling by 40% in older adults.³⁴ Some environmental interventions include adequate lighting, decluttering pathways, and designing a building according to standard codes.²⁹ Other environmental interventions include designing stairs to standard uniformity – a maximum stair height of 17.5 cm and a maximum depth of 27.5 cm, with good contrasting visibility and handrails.^{27,29}

The BEEACH model also has an activity component which refers to physical activities/exercises targeted at the intrinsic (poor muscle strength, balance, gait, postural instability)⁹ and psychological (fear of falling) risk factors of falling.^{35,36} Exercise is one of the most recommended fall prevention interventions and, it is crucial for older adults at all risk levels.⁹ Different forms of exercise (strengthening, balance, gaits, endurance, and postural training) are proven to be effective in reducing falls in older adults.⁹ Fear of falling which is excessive concern about falling and its adverse consequences ranges from as low 3% to as high as 85% in community-dwelling older adults;¹³ however, exercise interventions have been shown to reduce fear of falling and its negative consequences such as poor quality of life, reduced mental health, and decrease participation in activities.^{35,36}

On the other hand, contradictory evidence also exists on issues regarding physical activity and its impact on falling. While some researchers claimed that physical activity does not impact falling,²⁷ others concluded that increased physical activity may increase risk of falling in older adults.^{2,6,37,38} Inconsistent evidence is partly attributed to lack of objective measures used to accurately assess physical activity and falls.³⁷ For instance, a systematic review which concluded

that physical activity reduction does not impact falling included less rigorous prospective studies which assessed physical activities and falls with questionnaires.²⁷ Although objective measures such as technology-based devices (accelerometer, pedometers) are less prone to measurement bias,^{39,40} limited studies have evaluated physical activity and fall risks using technology-based measures.

Clothing and footwear targeted in the BEEACH model refer to wearing appropriate attires to prevent tripping hazards and falls.^{29,41} Clothing and footwear related issues that increase risk of falling include inappropriate clothing that impedes walking by being too restrictive or too large, wearing socks without shoes while walking, and slippery and unsupportive footwear.^{29,42} For instance, wearing shoes with a heel height of greater than 2.5cm were associated with risk of falling [OR: 1.9, 95% CI (0.8–4.7), p for trend=.03] in a cohort of 1,371 older adults.⁴² However, evidence synthesized from a recent systematic review suggested that there is inadequate evidence to link any particular footwear style with falls in older adults.⁴³ Authors concluded that it might be how accustomed individual older adults are to wearing a particular style of footwear that impact falling rather than the style of footwear.⁴³ By contrast, a systematic review of literature on types and features of footwear associated with falls in older people concluded that supportive footwear (low heels and firm slip-resistant soles) with good fit worn either inside or outside the home is appropriate to decrease risk of falling.⁴⁴

Health management component of the model targets biological/intrinsic factors, comorbid conditions, and medication-related issues.^{1,27,32} Healthy aging process is a biological/intrinsic factor associated with physical, cognitive, and affective changes in older adults;^{23,27,33,45,46} however, these changes can increase the risk of falling.^{23,32} Gender is also an intrinsic risk factor

given that women fall more often than men and are more likely to sustain fall-related injuries, partly due to loss of bone mass, and greater muscles weakness as aging progresses.^{33,47}

Number of co-morbidities in both genders of community-dwelling older adults increase risk of falling; each medical condition resulted in a pooled overall odds ratio of 1.2 [95% CI (1.2-1.3)] for any faller and 1.4 [95% CI, (1.2-1.6)] for recurrent fallers.²⁷ Some of the numerous comorbid conditions that increase risk of falling in community-dwelling older adults who are recurrent fallers are dizziness and vertigo (OR: 2.18, 95% CI, (1.77-2.68), urinary incontinence (OR:1.75, 95% CI, (1.53-2.01), and diabetes (OR: 1.48, 95% CI (1.06-2.07)).²⁷ Also, comorbidities relating to poor nutrition/hydration (general weakness, fatigue, frailty, and delirium) may also negatively impact falling in older adults.^{48,49} For instance, a recent systematic review concluded that community-dwelling older adults who were malnourished or at risk for malnutrition have a higher risk for falling [RR: 1.45 (95% CI (1.18, 1.80))] compared to those who were well-nourished.⁴⁹

Polypharmacy (five or more medications use)⁵⁰ and side effects of fall-inducing medications (antidepressants, neuroleptics and antipsychotics, benzodiazepines, sedative and hypnotic, antihypertensive, and non-steroidal anti-inflammatory drugs) may impact health and increase risk of falling in older adults.⁵¹ For instance, antidepressant, and neuroleptics and antipsychotics respectively increase the likelihood of falling by 68% (OR: 1.68, 95% CI,1.47-1.91) and 59% (OR: 1.59, 95% CI,1.37-1.83).⁵¹ A systematic review of fall-inducing medications suggests that fall risks (RR 1.06, 95% CI 0.84 to 1.34) and fall incidence (RaR 0.98, 95% CI 0.63 to1.51) persist even after withdrawing these medications in older adults over a 6 to 12-month follow-up period.²⁵ However, some researchers suggested that a gradual withdrawal may reduce falls in older adults.^{38,52}

Interventions to target the numerous health-related fall risk factors in the BEEEEACH model are subdivided into three different sub-categories which include optimal management of underlying health conditions and addictions, medication management, and modification of diet and nutrition.²⁹ Annual medical assessments and vision tests, bone health, fracture risk reduction, good sleep habits, chronic disease management and referrals to specialists when necessary, are important health management strategies elaborated in the model.^{29,32} Medication management refers to a yearly medication review while diet and nutrition modifications address healthy nutrition and proper hydration.²⁹ This multiple intervention approach to fall prevention in the BEEEEACH model ensure collaborative and collective efforts not only from older persons at risk of falling, but also their caregivers, healthcare providers, and community networks.²⁹

The BEEEEACH model outlines collaborative and multilevel approaches to fall prevention²⁹ and the involvement of older adults at risk of falling suggests that perspectives of older adults need to be considered in planning and implementing fall prevention interventions. Effective collaborative approaches for providing patient-centred interventions for older adults may be better achieved by exploring their perspectives of interventions and initiatives for preventing their falls.^{29,53} Therefore, a qualitative study to explore older adults' experiences is relevant to provide evidence that ensures that patient-directed data drives the approaches to collaborative fall prevention.⁵³⁻⁵⁵

2.4 Exercise interventions to reduce falls, fall risks, and fall-related injuries in older adults

Exercise as a single intervention or as a part of multifactorial interventions reduces fall risks and prevent falls in community-dwelling older adults.^{9,56-58} Evidence from systematic

reviews shows that exercise programs reduce fall-related injuries in older adult population by about 30%.^{7,8}

The effectiveness of exercise programs for fall prevention for community-dwelling older adults partly depends on the type and frequency of the exercise programs.⁶ Exercise programs that include progressive balance training and provide a high frequency that is greater than three hours per week are proven to have 39% [Incidence rate ratio (IRR): 0.61 (95% CI 0.53 to 0.72, $p < 0.001$)] fall reduction in community-dwelling older adults.⁶ However, the mode of delivery and components of these exercise programs differs.

Exercise programs with multiple components are also effective for fall prevention in older adults.¹¹ For example, multicomponent individualized exercise programs reduce falls by 32% (RaR: 0.68, 95% CI 0.58 – 0.80; 7 trials, 951 participants) and the number of fallers by 22% (RR: 0.78, 95% CI 0.64 – 0.94; 6 trials, 714 participants) in community-dwelling older adults.¹¹ On the other hand, multicomponent exercise programs that are group-based decrease falls by 29% [rate ratio (RaR: 0.71, 95% CI 0.63 – 0.82; 16 trials, 3,622 participants) and the number of fallers by 15% [risk ratio (RR: 0.85, 95% CI 0.76 – 0.96; 22 trials, 5,333 participants)].¹¹

The Otago exercise program⁵⁹ and Lifestyle-Integrated Functional Exercise (LiFE) are well-known home-based multicomponent exercise programs for fall prevention.⁶⁰ Individualized home-based Otago exercise program targets older adults at high risk for falling.⁵⁹ It focuses on balance and strength training and includes a walking program which does not progress the participant over time unless a physiotherapy follow-up visit is arranged.^{57-59,61} In a systematic review involving 1,503 community-dwelling older adults, the Otago reduced falls by about 32%.⁶¹

LiFE program⁶⁰ is also a progressive, individualized, home-based balance and strength training program for fall prevention, yet it differs from the Otago exercise program in that it is embedded within everyday activities.⁶⁰ A study of 34 participants who completed a six-month LiFE program reported that number of fallers decreased [RR: 0.23, 95% CI (0.07-0.83)] in participating community-dwelling older adults compared to non-exercising older adults.⁶⁰

Supervised group-based programs such as the Falls Management Exercise (FaME), also improved balance and prevent falls in community-dwelling older adults.^{62,63} FaME is a bone loading, gait, dynamic posture, balance, reaction, and coordination training for older adults who are frequent or recurrent fallers.⁶⁴ A 36-week FaME program reduced falls [IRR:0.69, 95% CI (0.50–0.96, P=0.029)] in 50 older adults who are recurrent fallers.⁶² The FaME program also has an adapted Tai Chi and functional floor activities to improve coping skills and confidence of older adults with a history of frequent falls.^{62,64}

Tai Chi itself, is a group-based Chinese martial arts program for older adults at low risk of falling since it is characterized by skilled movements control over displaced body mass and the base of support which may be challenging for frailer older adults at high risk of falling.^{65,66} Although Tai Chi did not reduce falls in community-dwelling older adults at high risk of falling compared with non-exercise controls (IRR: 0.79, 95% CI 0.60–1.03; I2 = 68.6%, P not reported; 5 trials),³⁵ current evidence suggest that the program reduces fall by 19% (RaR: 0.81, 95% CI 0.67 to 0.99; 2655 participants, 7 studies; low-certainty evidence) and fall risk by 20% (RR: 0.80, 95% CI 0.70 to 0.91; 2677 participants, 8 studies; high-certainty evidence) in community-dwelling older adults regardless of their level of risk of falling.⁶⁷

Although the group-based FaME and Tai Chi exercise programs have been shown to be effective in reducing the number of falls, there is a need for an effective group-based exercise

program that offers an individualized level of challenge in a group setting for older adults at high risk of falling.¹² Likewise, a progressive program which targets a number of intrinsic risk factors in the assessment and treatment of balance-related problems is warranted for effective fall prevention.^{12,13}

2.5 The FallProof™ program

The FallProof™ program is a group-based fall prevention balance and mobility program tailored to the needs of the individuals and risk factors for falling.¹³ This program specifically offers progressive activities which target the intrinsic risk factors for falling such as balance, muscle strength, gait, and posture.¹²⁻¹⁵ The uniqueness of the program is in its ability to offer an individualized level of challenge in a group setting by enabling program instructors to progress each set of exercises presented to each participant in the group.¹²

The FallProof™ program is theory-based (motor and ecological) and is systematically designed to manipulate the demands of the tasks performed by participants by increasing the complexity of tasks in a variety of practice environments.¹² These practice environments are selected to simulate those encountered during daily life and match an individual's intrinsic capabilities while engaged in group-based FallProof™ program.¹² An important goal of the program is to challenge, but not exceed the individual's inherent capabilities by systematically introducing balance and mobility tasks.¹²

Program consists of 60-minute classes delivered to groups of participants. Group size ranges from four to six to ensure participants' safety and maximize opportunities to focus on interventions to address their fall risks.^{12,13} Classes are offered twice per week and target four core components to improve balance and prevent falls.^{12,13} These four components include the

center of gravity control, multisensory, gait pattern enhancement and variation, and postural strategy training.^{12,13}

Center of gravity control training

Balance and mobility activities target participants' ability to maintain an upright position and to improved postural control.^{12,13} The activities address physical-fitness parameters such as aerobic endurance, strength, power, coordination, flexibility.^{12,13} These exercises are systematically progressed from more stable seated position to standing, and to upright active tasks. Exercises are based on an individual's capabilities and demands associated with tasks given and practice environment.^{12,13}

Multisensory training

Multisensory activities are intended to target the sensory systems (e.g., vision, hearing, touch) that are not impaired while compensating for the system or systems known to be permanently impaired.^{12,13} For instance, program instructors may emphasize gaze-stabilization strategies as a means to optimize vision and provide a stable visual target during standing and locomotor activities.^{12,13} On the other hand, participants' visual inputs may be engaged by introducing a second task that requires reading, tracking, reaching for or catching objects.^{12,13} Visual input may also be removed as a sensory input by having participants perform activities with their eyes closed. Participants also perform a variety of balance activities on surfaces that are unstable or moving while performing a second task or the eyes are closed.

Gait pattern enhancement and variation training

Participants build advanced gait skills so that they can move about in a variety of different environments such as stepping on and off escalators, crossing busy streets or stepping over obstacles, and walking in crowded malls.^{12,13} Dual tasking is another important skill in this program component; participants may be instructed to perform activities that require them to count backward, reach for or catch objects, or turn the head while walking to enhance their gait pattern.^{12,13}

Postural-strategy training

Within this component of the program, participants' ability to select and adjust postural strategies (the ankle, hip, and step) that best suits the demands of tasks and the environment in which tasks are performed is enhanced.^{12,13} Participants perform activities such as forward stepping, taking big steps, side-stepping, and swaying side to side. These activities are progressed from seated to standing positions, and then to moving context depending on participants' capabilities.

2.6 The FallProof™ program for fall prevention in community-dwelling older adults

Few studies have evaluated the FallProof™ program.^{14,15} Two clinical trials that evaluated the effectiveness of the program reported improvements in balance, mobility, and quality of life in community-dwelling older adults at risk of falling.^{14,15} For instance, one of the clinical trials that compared 82 community-dwelling older adult participants at high and low physical functioning reported a significant improvement in gait speed [8-Foot Up and Go Test (main effect intervention = 0.002; p = 0.007), and balance scores [Modified Clinical Test of

Sensory Interaction in Balance (main effect intervention = 0.002; p = 0.009)] in both groups following an 8-week FallProof™ program.¹⁵

While quantitative studies evaluated the effectiveness of the FallProof™ program,^{14,15} no qualitative research has explored the experiences and perspectives of participating older adults in the FallProof™ program. Within the primary study that evaluated the FallProof™ study in Calgary, this qualitative study was included to explore the experiences of participating community-dwelling older adults at high risk of falling. Exploring experiences of older adults of the FallProof™ program may provide valuable data from the voices of participants.

2.7 Qualitative research to understand experience of a phenomenon

Qualitative research offers the opportunity to focus on questions centred on the subjective experience, how it is created, and how it gives meaning to human life.⁶⁸ All qualitative methods share a similar goal in that they seek to arrive at an understanding of a particular phenomenon from the perspectives of those experiencing the phenomenon.⁶⁹ However, different qualitative methods are used in achieving this goal.⁵⁵

The choice of a qualitative method depends on the research questions to explore in a qualitative research study.⁵⁴ Researchers need to identify the focus of inquiry to choose the appropriate qualitative method that will most effectively answer questions specified for their studies.⁵⁴ There are several qualitative research methods to address specific research questions in qualitative studies. While different authors presented various qualitative methods as commonly used,⁵⁴ Speziale and Carpenter (2011) described grounded theory, phenomenology, ethnography, and historical inquiry as some of the more frequently used qualitative methods.⁵⁴

Both grounded theory and phenomenology methods seek to explore individuals' experiences in the context of the worlds in which they live, but the aspects of experiences explored and data sources used by both methods differ.^{70,71} Grounded theory helps to gain a deeper understanding of the psychosocial processes embedded in the experiences of people.⁵⁴ It may also generate a theory based on participants' data.⁵⁴ Grounded theory uses multiple data sources such as interviews, observations, diaries, images, past literature, and research.⁵⁴ The method is one of the inductive approaches used to explore older adults' experience of a phenomenon, particularly relating to fall prevention delivery process.^{18,19} On the other hand, phenomenology describes the framework and the meaning of an experience from the lenses people who lived it.⁷² It uses only interviews to generate data from participants.⁷² A researcher who wants to describe the framework and the meaning of fall experiences of older adults may employ phenomenology to explore interview data from older adults who have lived through fall experiences.

Other qualitative methods have been used to explore different phenomena and perspectives of people.⁵⁴ Ethnography helps to explore a full understanding of the culture of one or more neighbourhoods by observing and collecting information about group members, their activities, values, meaningful artifacts, and lifeways.⁵⁴ Researchers may use ethnography to understand the social structures, activities, lifeways, and values of community-dwelling older adults with fall experiences.⁵⁴ On the other hand, qualitative researchers may consider historical inquiry if they aim to examine the interactions of people and to understand the broad picture of past history, the current trends, and future possibilities of a community or people.⁵⁴ Researchers interested in exploring the interactions of past fall experiences, trends, and future possibilities for fall prevention for older adults at risk of falling can use historical inquiry.⁵⁴ A historical inquiry utilizes multiple data sources such as observations, interviews, chart information, scores, maps,

survey, artworks, and other relevant data sources.⁵⁴ Researchers in qualitative study have also adopted other generic inductive approaches not labelled within the traditional methods (grounded theory, ethnography, phenomenology, historical inquiry) of qualitative design to efficiently explore and understand phenomena and experiences of people.⁷²

Qualitative description approach represents the characteristics of generic qualitative research rather than focusing on culture as does ethnography, the lived experience as in phenomenology, or the building of theory as with grounded theory.^{20,73} Qualitative description research studies are those that seek to discover or understand a phenomenon, a process, or the perspectives and worldviews of people involved.^{73,74} The qualitative approach provides a rich description of a phenomenon or experience of participants while also allowing researchers' interpretation of participants' perspectives of the phenomenon.^{20,73} It is an appropriate approach for understanding the experiences and perspectives of people who have undergone a fall prevention program. A qualitative description design may enable both older adults and researchers' perspectives to drive the overall outcomes for providing patient-centred care in fall prevention programs.

2.8 Exploring experiences and perspectives of community-dwelling older adults of fall prevention programs

There is little formal evaluation of community-dwelling older people's expectations, perspectives, or views about programs designed to prevent falls. A systematic review of 14 qualitative studies exploring older adults' experiences of continued participation in falls prevention exercise concluded that health care professionals need to be familiar with older person's rationale for falls prevention programs to be able to offer the best evidence-based

practice.¹⁷ Authors suggest that knowing older adults' rationale for falls prevention may help to support them for a smooth transition from structured exercise programs towards longer-term exercise-related behaviour for fall prevention.¹⁷

Two studies investigating community-dwelling older adults' accounts about falls prevention explored their experiences of the individually performed home-based Otago exercise program using the grounded theory approach.^{18,19} Participants reported a positive experience and satisfaction following implementation of the Otago exercise program for older adults.^{18,19} Existing health conditions associated with pain and fatigue were their perceived barriers to participating in the Otago exercise program.¹⁸ Another qualitative study explored older adult participants' experiences on what factor might encourage them to exercise at home following community-based fall prevention rehabilitation programs.¹⁶ A determination to regain independence after a fall was the key factor that encouraged exercising at home.¹⁶

Older adults also reported an overall positive experience and enhanced psychological and physical outcomes following a group-based fall prevention program ("Step-On") in a qualitative study.¹⁶ However, the protocol of this group-based fall prevention program has only one session of the seven weekly meetings designated for strength and balance exercise program.¹⁶ Further studies are required to explore the experiences of community-dwelling older adults at high risk for falling of a supervised group-based fall prevention program that progressively challenges balance and mobility. Likewise, studies that use the qualitative description approach to provide a rich description of the experience of older participants of a fall prevention program are warranted. Such studies may ensure that participants' data are appropriately geared by researchers to provide patient-centred care in fall prevention programs.

2.9 Qualitative description approach and the FallProof™ program

Qualitative description research is an inductive process used in describing and understanding a phenomenon of interest of participants.^{20,73} This approach offers the opportunity to gather rich descriptions about a phenomenon which little may be known about.²⁰ Qualitative description approach is a generic qualitative method which can add to knowledge and may be used to develop a conceptual and theoretical framework of the phenomenon of interest.^{20,73}

The advantage of a qualitative description approach is that data analysis is more likely to remain true to participants' accounts and contribute to ensuring the researchers' interpretations are transparent.^{20,75} This approach recognizes the subjectivity of the experience of not only the participants but also the researchers.⁷³ Both participants and researchers have their perspectives, and each perspective counts.⁷³ The researchers are active in the research process as they become part of the phenomenon being studied by directly talking to participants and observing their behaviours during data collection.⁷³ The perspectives and words of research participants are the starting point.⁷³ The researchers then proceed to take an *emic stance* that enables having a degree of interpretation of participants' perspectives.⁷³

Participants' driven concepts which are interpreted through the lens of researchers are particularly relevant in falls prevention research,¹⁷ where large-scale quantitative data often drives the industry standards.⁹ The perspectives of community-dwelling older adults at high risk of falling who participated in a 12-week FallProof™ program are relevant to explore using the qualitative description approach. This qualitative description approach may enable researchers' interpretations, and rich description of older adults' perspectives to drive the overall understanding of the FallProof™ program.^{20,75} The products of this approach may guide in evaluating the acceptability and feasibility of the FallProof™ program from the perspectives of

participating older adults. The viewpoints of participants are essential to understanding the multiple realities⁵⁴ embedded in the design and delivery of the program.

The views of older adults are often missed in physiotherapy practice, where goals targeted at mobility progress may override individual perspective of those participating in the interventions.^{9,53} Gathering qualitative data provides an in-depth and valuable participant-centred context,⁵⁴ which may guide physiotherapists in the planning, implementation, and delivery of future FallProofTM program geared to the needs of community-dwelling older adults.⁵³ Therefore, using the qualitative description approach in the FallProofTM study ensures that both the patients' perspectives and clinicians/researchers' interpretation of patients' perspectives drive the overall patients' outcomes.

Chapter three

Method

3.1 Study design

This qualitative study was informed by the qualitative description approach as outlined by Sandelowski (2006).²⁰ This approach is an iterative process that was used to collect (interviews, observations, and other relevant data sources) and analyze data to understand perspectives of participants regarding FallProofTM program.⁷⁴ Knowledge generated using qualitative description approach was developed inductively from empirical data obtained in a naturalistic setting such as participants' homes.¹⁸

3.2 Recruitment

This study was a secondary study of a primary study that evaluated feasibility of FallProofTM program for older adults in Calgary, Alberta. Older adults with a fall history were eligible to enroll in the program. The evaluation of the program occurred from December 2016 to December 2017. Two licensed physiotherapists who were certified FallProofTM master instructors delivered FallProofTM intervention at Calgary Fall Prevention Clinic. Five cycles of the program were offered during the study period. Ten of the sixteen participants who completed FallProofTM program participated in this qualitative study. One of the six participants who did not participate was unavailable to give consent while the remaining declined participation.

Program Eligibility

The inclusion criteria for FallProofTM program required that patients: a) be 65 years of age or older, b) ambulate independently for a minimum of 60 metres, c) be able to follow at least

two-step commands, d) reside in the community in Calgary, e) have transportation to attend program twice weekly, f) have at least one fall prior to initial assessment for the program, and, g) understand English.

Patients were excluded from FallProof™ program if they had already taken the program or had medical conditions that precluded participation in group-based FallProof™ exercise class (e.g., unstable cardiac conditions, open wounds on weight-bearing surfaces of either foot, unhealed fracture, vestibular, or neurological conditions that could significantly alter balance).

The Health Research and Ethics Board at the University of Alberta approved the study (PRO00058286). All participants read information sheet and signed informed consent (Appendix A) before to participation.

3.3 The FallProof™ intervention

Five cycles of the 12-week program were evaluated. One of two licensed physiotherapists certified FallProof™ master instructors led each cycle. The instructors delivered program in small groups of two to six participants for twelve consecutive weeks twice per week for a total of twenty-four classes. Each class session of the FallProof™ program was an hour in duration and consisted of a 10-minute warm-up and 10-minute cool-down periods. Participants performed exercises that addressed four core components (centre of gravity, multisensory, gait pattern enhancement and variation, and postural strategy training) of the program targeted at improving mobility, balance, and preventing falls.^{12,13}

The first core component, the *centre of gravity training*, included exercises that targeted participants' ability to maintain an upright position and to improve their postural control.^{12,13} Activities performed in this component included participants sitting on gym ball to perform

trunk exercises, and weight shifting in standing and walking to enhance balance and mobility.^{12,13}

Unlike the centre of gravity training, activities in *multisensory training* component of the program optimize functioning of the sensory systems (vision, hearing, touch) by compensating for systems known to be impaired such as vision, hearing, or touch.^{12,13} Participants performed activities in sitting and standing position with eyes closed and walked on foam with dark glasses to eliminate visual cueing.

The third component, *gait pattern enhancement and variation training*, consists of activities that built good walking pattern while moving in a variety of different environmental context. Some of the activities performed by participants in this component included gait re-education, walking at a different speed, dual tasking, and stepping over obstacles.^{12,13}

The last component, the *postural strategy training*, targeted participants' ability to select and adjust postural strategies (ankle, hip, and step). Participants were presented with different tasks with situational demands to elicit these postural strategies.^{12,13} Tasks were centred on taking appropriate steps (either of forward stepping, taking big steps, side-stepping) when they anticipate falling.

Education on fall prevention is an integral component of FallProof^{fTM} program. Unlike the original educational component of FallProof^{fTM} program,^{12,13} education component for FallProof^{fTM} program at Calgary Fall Prevention Clinic was delivered by multidisciplinary professionals (physiotherapists, occupational therapists, registered dietitians, and social workers). All the multidisciplinary professionals except physiotherapist-instructors offered education session on a separate day from FallProof^{fTM} exercise sessions. Physiotherapist FallProof^{fTM} master instructors used an integrated approach to reinforced education topics about falls throughout the

exercise sessions. Their emphasis on the education component was not only about fall prevention strategies, but also decisions to make prior to loss of balance and a fall. An occupational therapist presented information about footwear and issues regarding environmental interventions required to prevent falls (decluttering rooms and walkways, appropriate bed heights, and flooring). A dietician taught participants about appropriate nutrition and proper hydration while a social worker addressed psychosocial aspects of falling such as fear of falling. Participants also learned about available resources for preventing falls.⁷⁶

3.4 Data collection

Interviews

One interviewer (OAO) interviewed ten participants who consented to participate in their homes within one month of completing FallProofTM program. Individualized interview sessions were conducted at a mutually convenient time using a semi-structured interview guide (Appendix B). Questions in interview guide explored experiences and perceptions of the community-dwelling older adults who participated in FallProofTM program.

Participants were observed for non-verbal expressions, behaviours, and reactions before and during interview sessions. Relevant observation information (laughter, facial expressions, exercise demonstrations) was documented in field notes and was appropriately added into sections of the transcripts where participants demonstrated observations recorded. These interview sessions were approximately 30 minutes in duration, audiotaped, and transcribed verbatim by the interviewer.

Field notes

Field notes which were taken during interview sessions included reflective information in which interviewer recorded her thoughts, ideas, questions, and concerns as she conducted interviews and observations.⁷⁷

Chart review

The primary investigator extracted demographic information, date of birth, previous fall history, and comorbidities of participants from their clinic charts. The comorbidities were extracted from a predetermined list of 34 conditions.

3.5 Data analysis

We concurrently engaged in data collection and analysis throughout data generation process. The qualitative description approach guided data analysis.^{20,73} The interviewer listened to audio recordings of participants' interview sessions, reviewed field notes, and transcribed them to generate participant transcripts. Data analysis was iterative, with reviewers reflecting on participants' data and how they informed codes, categories, and themes. It was done in stages according to the qualitative description approach^{20,73,78}; (1) Familiarizing with data and generating initial codes; (2) Formation of categories and overall theme; and (3) Defining and naming categories and overall theme. These stages are described in more detail below.

1. Familiarizing with data and generating initial codes

The first stage of data analysis involved an independent analysis of each participant's transcript in a line-by-line manner⁷⁹ by three reviewers. Reviewers read all participants'

transcripts several times to familiarize themselves with data. They manually coded on hard copies of participants' transcripts after a line-by-line examination of data to identify concepts and underlying conceptual patterns.⁷⁹ A code is a word or phrase which stood out for the reviewers.⁵⁴ Some of the codes were directly extracted from data using participants' words.⁵⁴ Two primary reviewers (first; OAO and second; SRB) initially read participants' transcripts several times to generate codes. A third reviewer (PJM), also read transcripts, independently coded, and reviewed codes generated by the other two reviewers (OAO and SRB).

All three reviewers were knowledgeable and experienced in the research topic area. The first reviewer (OAO) was the primary investigator and interviewer. She is a physiotherapist and a graduate student in rehabilitation science with training in qualitative research methods. The second reviewer (SRB), a graduate nurse student, had expertise in qualitative research analysis. PJM, the third reviewer, is a professor of physiotherapy who is knowledgeable in qualitative research methods and had numerous published articles and mentorship for students in qualitative research.

2. Formation of categories and overall theme

This second stage of analysis generated an initial coding scheme. Three reviewers analyzed codes generated from participants' transcripts using constant comparative technique.^{79,80} The comparative analysis required reviewers to compare codes for similarities or differences.^{79,80} Codes were combined and collapsed, and clustered into categories and overall theme.

An initial in-person meeting was held with two reviewers (OAO and PJM) to determine and characterize shared meaning in data, and to define categories and overall theme. The two reviewers discussed discrepancies in codes and subcategories until an acceptable agreement was

reached in generating categories and overall theme. A fourth reviewer (CAJ) took a global perspective to review data analyzed by other reviewers. She reviewed the initial coding scheme and asked for clarification of rationale for theme and categories. CAJ is a professor of physiotherapy and primary investigator for the primary FallProof™ study that evaluated the feasibility of FallProof™ program.

3. Defining and naming the categories and overall theme

The third stage of analysis involved integrating, refining, and delimiting codes to those categories that relate to overall theme.⁷⁹ The overall theme described phenomenon of interest; the experiences of older adults and links categories together.⁷⁹ Overall themes and categories were finalized after vetting through study participants' comments that supported them. Categories and overall theme were then given names and defined. Categories and theme, their naming, and definitions were reiterated throughout data analysis stages to ensure rigour.

3.6 Rigour

Rigour is essential in qualitative research to ensure trustworthiness.⁷³ It helps in determining the quality (high or low) of a qualitative study. Caelli et al. (2003) used four categories to evaluate quality in qualitative research.⁸¹ These categories are theoretical positioning, congruence of methodology or methods, rigour, and analytic lens.⁷⁴ On the other hand, Spiers and colleagues (2018) use verification strategies and compare them to quantitative terminology of reliability and validity.⁸¹ These strategies are methodological coherence, sampling sufficiency, developing a dynamic relationship between sampling, data collection and analysis, thinking theoretically, and theory development.⁸¹ However, the four principles

(credibility, confirmability, dependability, and transferability) identified by Lincoln and Guba (1985) are widely accepted in evaluating quality of qualitative research.⁸² Bradshaw et al (2017) adapted these four criteria identified by Lincoln and Guba (1985) for describing rigour in qualitative description approach.⁷³ We adopted these four criteria in demonstrating rigour in our research.

Credibility

Qualitative research has credibility when research results mirror the views of people under study.⁷⁸ Credibility is the degree to which research represents the actual experience of participants.⁷⁸ We ensured credibility by establishing rapport with participants prior to commencing interviews to make them comfortable and willing to share their honest experiences and exchange information with interviewer.⁷³ Interviewer also allowed participants to freely engage in a prolong conversation to share their experience without interrupting their flow of thoughts during interview sessions.

Confirmability

Confirmability refers to the degree to which the results of a qualitative study could be confirmed by other reviewers since each reviewer tend to bring their unique perspectives to interpret participants' data.⁷⁸ Confirmability ensures that results are linked to conclusion in a way that can be followed, processed, and replicated.⁷⁸ We took several measures to ensure confirmability in our study in accordance to the recommendations of Bradshaw et al. (2016)⁷³:
1) The primary investigator recorded on field notes during interview, observation, and the iterative data analysis process; 2) We described demographic characteristics of participants; 3)

The reviewers reviewed participants' data to verify data accuracy through an initial in-person meeting with two reviewers (OAO and PJM) and regular bi-weekly teleconference meetings with three of reviewers (OAO, PJM, and CAJ); and 4) We ensured that findings represented data gathered and was not biased by reviewers, evidenced by the inclusion of direct quotations from participants. Quotations were described and illustrated with excerpts from data.

Dependability

Dependability refers to the consistency and reliability of research findings and the degree to which research procedures are documented, allowing someone outside the research to follow, audit, and critique research process.⁷⁸ To ensure dependability, we were transparent in explaining study procedures and the stage by stage data analysis processes. Besides, one of the reviewers took a global perspective to review data analysis process by reviewing initial coding scheme and asking for clarification of rationale for theme and categories.

Transferability

Transferability, a type of external validity, refers to the degree to which phenomenon or findings described in one study are applicable or useful to theory, practice, and future research.⁸² It is the transferability of research findings to other contexts.⁷⁸ We utilized a purposeful sampling, provided sufficient details, and rich description of data collection and analysis for reproducibility of study to ensure transferability.⁷³

Chapter Four

Results

4.1 Participants' characteristics

Most of the 10 participants were female (n=7) whose ages ranged from 68 to 88 years. Participants presented with three to ten chronic health conditions with the most prevalent conditions being hypertension (n=7) and degenerative arthritis (n=7). Eight of the ten participants attended at least twenty sessions of maximum of twenty-four sessions (>80%) of the program.

4.2 Themes and Categories

A theme, “An award-winning program,” exemplified the overall experiences of community-dwelling older adults who participated in the FallProof™ programs. Three main categories supported this theme: 1) Participants expressed fall-related benefits; 2) A variety of activities and great instructors empowered participation; and 3) Deterrents to participation. The model which represents the relationships between theme and categories is illustrated below. (Figure 4.1.)

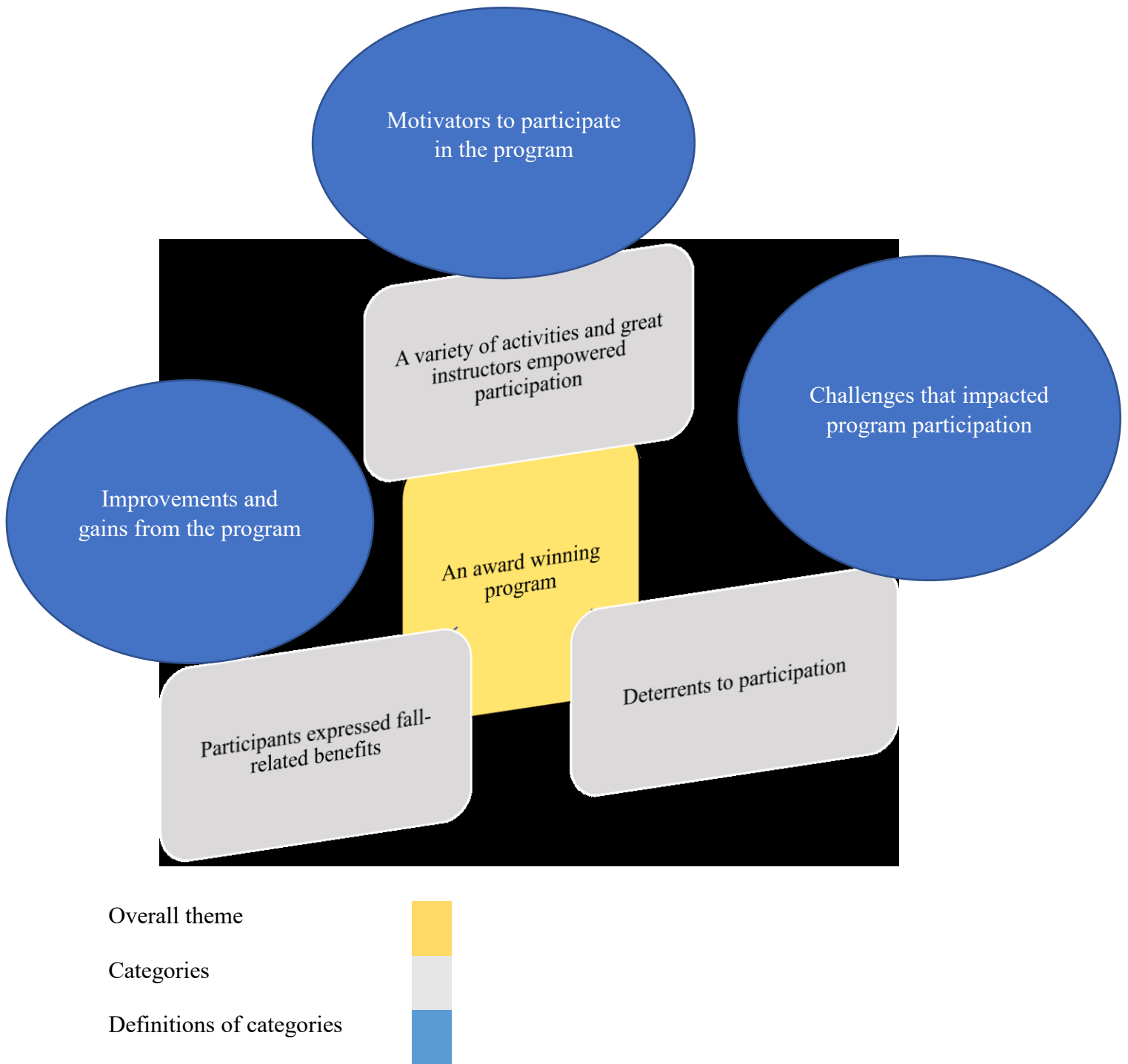


Figure 4. 1 The model for the participants’ experiences of the FallProof™ program

Theme: An award-winning program

One participant commented,

If I have to give a medal, I think I would give the program a gold. I don't wish the program should finish because it was so good, I thoroughly enjoyed it. I thought when it was finished, I wouldn't want to stop. (P012)

This comment embodies the theme that resonated throughout interviews with participants when asked about their overall experience of the FallProof™ program. The experience of a perfect and well-designed program came up during discussion with a participant;

The program was far better than I expected, and it was really, in my opinion, basically perfect. That is not to give a pat on the back, it was properly thought out. (P016)

Participants felt that the program was worth attending and were grateful for the opportunity to attend. Several participants' comments described this experience; *"it was a worthwhile project because I enjoyed it, it helped me."* (P015). *"I really hated to miss a class, I don't want to miss a class"* (P004). A participant also commented on how she looked forward to the program every week,

I'm very grateful I came; it was a very good experience. I look forward to it every week. It wasn't like, this program again? (P003).

Interestingly, family members of participants also seemed to be enthusiastic that their family member (i.e., spouse, parent, sister) was attending the fall prevention program. They were happy with feedback from participants. A participant described her experience with her family members;

My three kids told me when the program ended; mom, what do you mean you are finished, how come you are not going again? They were happy I was going. And my

younger sister is a retired nurse, and she said, I think you should see if you could get back and go to the program because I told her I really enjoyed it. (P011)

Another participant also commented on her experiences,

He (participant's husband) was very happy that I was doing the program and that it really helped me. I was very happy that I had taken it. (P008)

Category 1: Participants expressed fall-related benefits

All ten participants commented on benefits gained in the FallProofTM program, all of which are related to fall prevention. Nine participants who reported more than two falls before program reported having no falls during the 12-week intervention and at the one-month follow-up interviews. *“I haven't had any falls so something must be improving” (P009)*. Two other participants also made similar comments about how program helped them from falling, *“I haven't fallen since the program” (P003, P012)*. Numerous comments from participants on fall prevention gained from the program were captured:

I didn't have any falls but I think I have one short near missed fall but it wasn't anything major because I had some bad falls prior to the program. (P004); ...And I haven't fallen. (P011); It has helped me from falling. (P015); thankfully, I didn't have any fall. (P017)

A participant also talked about how she implemented skills she learned in the program and the positive outcome obtained,

So, I brought a lot of the skills that I learned there, and I started implementing them here at home and that really helped from falling. (P010)

These comments which reiterated throughout interview sessions with many participants suggested positive outcomes of program in preventing falls.

Participants also expressed their experiences of better fall prevention strategies and how the FallProof™ program positively impacted their fall risks such as fear of falling, agility, and posture. For instance, a participant described her experience,

A couple of times when I felt I would fall, but I knew how to react to it, and that was from the instructors drilling it into our heads what to do when we feel we will fall. I definitely have more confidence to go out in the crowd. I have more agility and better posture now and I am happy for that. (P004)

Fear of falling is a modifiable risk factor of falling, participants reported gaining confidence to perform daily activities without fear of falling following FallProof™ program. A participant expressed how the program helped to decrease her fear of falling,

This program built up my confidence and made me get rid of my fear of falling, and I'm sure many people in the program got this as well. (P010)

Another participant commented, *"It helped me to be more confident in the way I look after myself."* (P015) Participants' comments on program helping them to reduce their fear of falling and gaining more confidence in performing daily living skills without falling counted as positive outcomes and improvement. Some fall prevention strategies gained were emphasized,

....and if I do stumble, I'm able to recover like the way they showed us to take big steps if we are falling forward." (P003); I had learned not to rush but plan and give myself time when I am going somewhere. I have now been watching carefully and had learned to slow down. (P017)

A similar comment on paying more attention while walking to prevent falls was reiterated,

Before, I never pay any attention when I was walking, I would just walk but I learned that you have to look before you step out. (P011)

Participants recalled these fall prevention strategies and counted them as positive gains that helped them to prevent falling.

Category 2: A variety of activities and great instructors empowered participation

Participants discussed many of the components of the program that motivated them to participate such as the variety of activities engaged in during the program. The variety of exercises, the fun, and socialization experienced in the group-participation, along with the positive attributes of instructors were emphasized. Many participants were able to describe exercises that formed basis of the program and spoke in detail about them; the varieties of exercises performed were emphasized;

Everyday there was some that were the same, but there was a few within additional, we had a variety of exercises. Sometimes, you sit on the ball and they (instructors) keep the ball moving, and you have to learn to control that ball and do the exercise they give. It was quite a few different exercises all the time. (P008)

Another participant described the variety of exercises performed during program,

We did many exercises like you stand up with your hands folded across your chest making sure you're sitting on a hard chair and making sure you're sitting at the edge of it before you stand (sit-stand training). And the other one that I can remember we had to do was this walking heel-to-toe. (P011)

Several participants talked about how the group-facilitated program offered opportunity to socialize and have fun with their peers in their exercise groups. Overall, this social experience was enjoyable to participants. The experience of being part of a friendly group was expressed;

It was also fun to take it with the other two ladies in my group. I do like to socialize too, and the group helped with this. We had a little competition sometimes, and it was fun to see who will fall first. (P004)

A participant who claimed that she was usually alone and had no opportunity to interact with people prior to program spoke about her experience in the group;

It was fun with the group because each of us was there for the same reason; because of falling. We were just kinda laughing so many times and it made me feel happy. I didn't feel like an outsider, I was in the group. I liked to be with those people, and when you're exercising, it's just like your family around you and we're all doing the same thing. That's the part that I like because mostly, I've been alone. I don't associate, I was able to socialize in the group. (P012)

The fun and group socialization seemed to offer participants an opportunity to remain motivated in program.

Participants also emphasized the positive attributes of their instructors as facilitating and empowering them to continue program. They discussed the instructors' creativity, knowledge, patience, encouragement, and positive approaches to conducting program;

I found that the instructor who did the program for us was exceptionally patient. I just found that she was so kind and gentle to everybody that I really enjoyed it, you know. She was very understanding of our problems. (P008)

The support and knowledge of instructors were expressed by participants. A participant commented,

The instructors were supportive, I thought they all did an excellent job at portraying what they were saying, and they were all knowledgeable about the subject. People ask

questions, and they have all the answers. (P017)

Participants also emphasized on instructors' encouragement,

They weren't pushy, you went at your own speed, you do what you could, and you stop when you are tired. They kept encouraging you... There was a lot of encouragement, a lot of praises when you did it right. (P003)

The motivation by the instructors was also captured in a participant's comment,

I think the instructors were very good, in fact, I think they were excellent. Because they explained everything to us, and they made us feel comfortable. They probably motivated me to stay in the program as well. (P015)

Other positive attributes of the instructors such as their flexibility and their positive approaches to conducting program were reiterated,

They did not say; you do it this way, and this is the only way and get in there and do hundreds of them. They adjusted, they modified, and they were very creative. And yet there was never any shaming, they were always very positive. (P010)

Another participant commented,

Instead of saying; oh, I want you to do it only this way or that way or you are not doing it right. No, they didn't say that. (P008)

Some participants also spoke about the positive and encouraging approaches of instructors that were appealing to them. A participant commented;

The experience with the instructors was positive, you could ask them questions and I had quite a few questions. It might be a small question to them, but they would answer. The instructors were always ready to answer our question. You couldn't see any flaws in them. They were just good to each one of us equally. (P012)

The variety of exercises, social experience, and positive attributes of instructors were motivating and unforgettable experiences to participants.

Category 3: Deterrents to participation

Although participants reported how their health concerns, life events, short program duration, and lack of prior knowledge of the FallProofTM program impacted participation, they successfully completed program. Pain (back pain, knee pain, leg and foot pain), anxiety, and poor mobility were some of the health concerns which were personal barriers to participation. Participants reported on their struggles to participate in program,

I have a lot of back pain, and I found that sometimes with the exercises, I couldn't keep up with the rest of the class. I was struggling with my foot and with my legs, it took me a long time to stand up. You know, I didn't have that agility even to do that. (P010)

A participant with the most comorbidities anticipated challenges to participation. Interestingly, this participant was able to attend twenty of the twenty-four sessions of the program.

When my doctor told me to go for the program, I said that I couldn't because I had too many appointments for my multiple conditions and I felt that I wouldn't concentrate on doing anything else. (P012)

Life events such as a death in the family, along with environmental/weather, and transportation issues were perceived by participants as barriers to participating in program. A participant who attended twenty-two sessions described her challenges to attending all the sessions;

I think I missed two sessions of the program. The reasons for that was that I had a death in the family for one and I think we had a car problem for the other, so those were all kind of extraneous to me. (P011)

Another participant who attended program in winter season expressed her challenge, “*I missed some sessions of the program. Just the weather prevented me from going.*” (P008)

Five participants also expressed their concerns about short duration of the program and recommended extending duration beyond twelve weeks. A participant perceived that he might gained more benefits from the program by extending its duration.

The longer I went there, the better I get. The program is only for three months, so what next? Is it a one-time thing and that is it? It could have lasted longer even if I had to pay for it. I just wished it could have lasted longer, but it seems short because now I can't get into any program until the next six months. (P016)

Another participant expressed similar concern;

But I think the program is not long enough because when they said the program is coming to an end, I said, oh, already? it's time? (P011)

One participant felt there should be a follow-up program to maintain benefits she gained during program. It seems that she lacked confidence that a behaviour change to independently continue her exercises at home can be maintained,

One of the questions I had was, what the hell do we do when we leave this class? back and watch TV all day? which I don't do but anyway. You've always got to have a follow-up, so you don't lose what you got. (P010).

The willingness to have the program extended beyond twelve-week duration was expressed, “*Is there a continuation exercise part of it? if anything, I would say the program is not long enough*” (P009).

Several reports on the lack of awareness of FallProof^{fTM} program before referral by physicians were discussed. Five participants claimed they did not know about the program. After experiencing benefits of the program, these participants suggested that awareness of the program may benefit others who are at risk of falling.

I didn't even know that this was available to me until the doctor suggested it. And while I was taking the course (FallProof^{fTM} program), I recommended it to several of my friends because they were like me, you know; old and tripping (she laughed). (P004)

Another participant made a similar comment on a need for program awareness. The numerous positive experiences enabled participants to recommend program to other older adults at risk of falling.

I don't know if a doctor has to recommend it or if people can just walk in and ask to take it. It should be advertised to create more awareness. (P008)

While the overall experience of participants of the FallProof^{fTM} program was positive, there were concerns and challenges expressed which primarily centred on health concerns and life events. Despite these challenges, participants were able to successfully complete program and perceived it as award-winning. They were highly motivated and grateful for the opportunity to attend the physiotherapist-instructor led program. They overwhelmingly supported continuity of the program and felt that it should be extended to a broader audience of older adults at risk of falling.

Chapter Five

Discussion

The findings from this study contributed to the growing evidence on the perspectives of community-dwelling older adults participating in a physiotherapist-led FallProofTM program. Older participants expressed numerous fall-related benefits following the multicomponent fall prevention program. We gained insight into their motivators to exercise despite competing challenges such as chronic health conditions and life events relating to family responsibilities. Participants' perspectives guide a more patient-centred approach to future design and delivery of FallProof^{fTM} program for fall prevention.

Congruent with earlier studies, our findings indicate that older participants' perspectives are often missing in the planning and delivery of fall prevention programs and their perspectives may be relevant for a patient-centred program that enhances adherence.¹⁶⁻¹⁸ For example, community-dwelling older adults who participated in the Otago exercise program for fall prevention suggested integrating the program with everyday activities to enhance participation.¹⁸ Also, older adults who participated in a qualitative study which explored their perspectives of a community-based fall prevention program ("Stepping On") suggested that the program may better attract their interest if its outcomes were integrated with issues regarding their well-being and independence.¹⁶ Older adults who participated in the FallProof^{fTM} study perceived that the program was well delivered, outstanding, and worth attending; however, they felt the program duration should be longer than twelve weeks. Involving end-users such as older adults at risk of falling through all stages of program development and completion (i.e. co-production) may help to improve fall prevention program delivery and optimize adherence and effectiveness.

Conflicting evidence exists from previous qualitative and quantitative studies and our findings on the benefits of group-based fall prevention programs in reducing falls and fall risk factors in community-dwelling older adults.^{6,83,84} Our participants perceived that the FallProof^{fTM} program prevented them from falling and also reduced their risk for falling. In contrast, the perspective of older adults in another community group-based fall prevention program (Step-On) was not about the program preventing falls.¹⁶ They perceived that the program improved their risks for falling, such as confidence to perform activities and improved mobility.¹⁶ The findings in the Step-On program agreed with our FallProof^{fTM} study findings where participating older adults also described benefits of fall risks reduction such as confidence to perform routine activities with less fear of falling and improved balance. Although no qualitative study has explored the experiences of older adults of FallProof^{fTM} program, findings from quantitative studies reported improved fall risks such as better balance and dynamic gait function following program.^{14,15} These findings on the positive impact of the FallProof^{fTM} program on fall risk factors in our study supported by other qualitative and quantitative studies^{14,15} shed light on how older participants' perceptions and quantitative data may be consistent to improve understanding of the effectiveness of group-based fall prevention programs on fall risks.

Our findings which are supported by other studies^{16,17} emphasize how older adults at risk for falling could find the exercise contents of a fall prevention program engaging and as important core component of the program.^{16,17} While FallProof^{fTM} participants were motivated by the variety of exercises in the program, older participants in a Step-On program for falls prevention felt that the series of core exercises in the program were the most meaningful and useful to them.¹⁶ Likewise, the synthesis of evidence by Finnegan et al. (2019)¹⁷ suggests that older adults who were motivated to continue exercising perceived that exercises were key to their

independence, general health, and functioning.¹⁷ The findings of Ballinger & Clemson (2006)¹⁶ and Finnegan et al. (2019)¹⁷ which agrees with our study show that exercises in multidimensional fall prevention programs could be significant in enhancing older participants' interest and in reinforcing adherence to programs. The motivation for exercise also highlights a need to promote relevant and effective exercise programs that are pertinent to address the fall experience and general well-being of older persons at risk of falling.

An important feature of many group-based fall prevention exercise programs is the peer-facilitated social experience which is perceived as fun and motivating to participate.^{16,17} Participants in our study also emphasized the social connections and enjoyable experience as motivators to participate in the group-based FallProof™ program. Community-dwelling older adults who participated in an individualized home-based Otago exercise program for fall prevention also emphasized that they wanted group interaction and group-facilitated social connection and fun with peers, underlining the importance of peers.¹⁸ Social interaction is especially crucial in community-dwelling older adults with 1 in 5 reporting social isolation.⁸⁵ The social and enjoyable atmosphere reported by many participants in the FallProof™ program is a recommended strategy for all fall prevention programs. Enabling social interaction may address social isolation and its negative consequences on falls in community-dwelling older adults.⁸⁵

The motivation and positive learning atmosphere created by the knowledge, creativity, patience, skills, and encouragement of program instructors reported by participants in FallProof™ study, were similar to the reports of older adults in other studies.^{16,86} For instance, older participants who participated in a class-based Step-On program for fall prevention also claimed that the positive atmosphere created by their instructors whom they described as nice, friendly, and

resourceful made them comfortable and relaxed to engage in the program.¹⁶ Moody et al. (2019) who explored the perspectives of older adults who participated in a water-based exercise program to improve falls risk also emphasized that a motivating instructor is a key to sustaining participation adherence in the program.⁸⁶ Our findings supported by other studies^{16,86} on instructors' attributes facilitating adherence suggest that program instructors should adequately interact with older participants to demonstrate their positive attributes. The positive attributes of instructors which motivated our participants are recommended features for fall prevention programs to improve participation of persons at risk of falling.

Some of the health-related concerns and competing life challenges cited as barriers to program participation in the studies by Agha et al. (2015)¹⁸ and Finnegan et al. (2019)¹⁷ were reported in our study. Participants in FallProofTM study expressed how pain, poor mobility, and other chronic health concerns impact program participation. Competing family responsibilities and unfavourable weather conditions reported by FallProofTM participants were also barriers reported in fall prevention studies.^{17,18} Although the health challenges and most of the competing life events were surmountable by FallProofTM study participants, greater attention needs to be paid to improve health and well-being of our growing elderly population to encourage participation in fall prevention programs.

The accounts of participants that the FallProofTM program should be extended beyond twelve weeks for more benefits are supported by findings from systematic reviews and is a current recommendation by the program developer (Debra Rose).^{6,57,58,87} Report of systematic reviews on exercise to prevent falls in older adults suggested that ongoing participation in an exercise program is necessary or benefits will be lost.^{6,58} Supporting this recommendation, fall rate significantly decreased by 21% (RaR: 0.79, 95% CI, 0.71 to 0.88) and risk of falling by 17% (RR: 0.83, 95%

CI 0.76 to 0.92) in community-dwelling older adults who engaged in a long-term (>12 months) exercise interventions.⁸⁸ Debra Rose recently (2017) updated the duration of the FallProof™ program to 24-weeks because research indicated a minimum of 50 hours of targeted balance and mobility training is required to reduce fall incidence.^{57,58,87} We conducted our FallProof™ study prior to the program change (from December 2016) when the program was designed as 12-week duration, and our participants had a total of 24 hours of the class-based program. Based on recent evidence, we suggest an option that the program duration could be extended to twenty-four weeks or even beyond in future studies and practice. Most importantly, participants who attend the exercise program need to gain self-management strategies to successfully transition to the community and engaged in long-term exercise behaviour to continue the program for on-going falls prevention.

Regardless of the quest for longer duration and challenges to participation, participants' perspectives of the FallProof™ program were positive. The program met their fall prevention needs. The multi-component exercise program was motivating for participants; they overwhelmingly supported it. Given participants' expression of their experiences of the FallProof™ program, the content and delivery of the program should be maintained. Program awareness and longer duration were strong points that were raised by many participants. Therefore, further planning should include targeting a broader audience of community-dwelling older adults. Also, measures to support older participants for self-management strategies and long-term exercise behaviour to successfully transition to the community and independently continue the program should be encouraged.

Strength and Limitations

A notable strength is the quality ensured in data collection by minimizing information and recall biases and by establishing rigour in data analysis. We mitigated information bias by ensuring that the interviewer was not directly involved in the delivery of the FallProof™ program. The interview sessions were conducted within one month of program completion so that participants' recall of their experiences of the program was recent to minimize recall bias.

Four independent reviewers engaged in the data analysis process to ensure rigour and trustworthiness of the results of data analysis. We observed the credibility, confirmability, dependability, and transferability criteria required to ensure rigour and trustworthiness. We are confident that our findings truly reflect participants' perspectives of the FallProof™ program.

However, a limitation in our study included exploring only participants' and not instructors' experiences. It would be ideal also to explore the program instructors' perspectives of the program to gain a broad and extensive understanding of the perception of the program.

Chapter six

Conclusion

This study gives an insight into a patient-centred and co-design approaches to future FallProof™ program and suggest that the content of the program should be maintained. Barriers and motivators to participation should be acknowledged and where possible, addressed when implementing future programs for effective patient engagement and participation. Our participants' perceptions supported a need for program awareness to a broader audience of older adults. Their perspectives also suggest a long-term commitment to continuing the program for on-going support for fall prevention.

Clinical Recommendations

1. Physiotherapist instructors should be familiar with the rationale that could support long-term exercise behaviour for community-dwelling older adults to continue the FallProof™ program in the community following program completion. Likewise, on-going community support for self-management strategies to continue program in the community following intervention should be encouraged.
2. Based on participants' recommendations, awareness, and accessibility to the FallProof™ program should be extended to more older adults in the community.
3. Excellent interpersonal and professional skills of program instructors should be encouraged to enable motivating participants to continue program. Small class size of participants (2 to 6) may be maintained during the FallProof™ program so that instructors can adequately interact with attendees and demonstrate their positive attributes to enhance participation.

4. Participants' reports on the challenges to participating in the program warrants that older adults who are at risk of falling and with chronic health conditions referred to the program should be supported through an integrated approach to health management. This approach requires health care providers, families, and the community at large to support measures to improve the physical health and well-being of older adults to encourage program participation.

Implications for practice and future research

1. Based on the findings of this qualitative study, future research may explore how group dynamics and social interaction in group-based fall prevention exercise programs might impact program adherence and benefits in older adults.
2. Further studies should also interview the program instructors to explore their experiences of the FallProof^{fTM} program. Likewise, future studies should interview older participants at different levels (low and high) of risk of falling, physical function, and frailty to explore the differences in their experiences of the fall prevention program.
3. Although participants in the FallProof^{fTM} study suggested longer program duration and follow-up to maintain benefits gained, further research should be conducted to provide evidence on the sustainability of the program.
4. Further studies should explore older adults' perspectives on the rationale that could support self-management and long-term exercise behaviour required for a successful transition to the community to continue the FallProof^{fTM} program.

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Appendix A

INFORMATION SHEET

Understanding the Experiences of Community-Dwelling Older Adults of the FallProof™ Program

Principal Investigators: Dr. Allyson Jones, Cathy Harbidge BScPT.

Co-Investigators: Oluwaseyi Abigail Osho (student)

Background

It is essential to give recipients of a fall prevention exercise program the opportunity to share their experiences and know that their participation in the program contributes to progressing interventions that support community management of falls. This practice may give these participants the opportunity to shed light on their viewpoints, values, and perspectives which are paramount in understanding them as the experts in their lived experiences. The participants' viewpoints are often not known or overlooked by their healthcare providers. It is thus paramount that we embed this qualitative study in the FallProof™ study in order to capture participants' impressions of the program. This approach may provide researchers with a leverage to conduct a more in-depth formal evaluation of the effectiveness and efficiency of the FallProof™ program.

Purpose of the Study:

This research is being conducted to understand your experience during the FallProof™ program you have completed and to also have an insight into your adherence to the program and how it has affected your risk of falling.

Procedure

You will be asked to participate in an interview that will last around thirty minutes to one hour. Your participation is voluntary. You will be asked some questions about your particular experience during the program. You do not have to answer any questions you do not wish to answer, and you may terminate the interview at any time. The interviews will be audiotaped to make an accurate record of what you say during the interview.

Possible Benefits

There are no direct benefits to you as a participant, although it is hoped you will find the interview to be an enjoyable experience. Further, you will be able to express your impressions of

the program.

Possible Risks

There are no foreseeable risks to you as a result of your participation in this study.

Confidentiality

A transcript will be made of your interview. This transcript will not contain any information that links the interview with you. Your name and the names of any people or organizations you mention will be replaced with fake names in the transcript. Only the researchers will have access to the interview recording and the transcript made of the interview. Quotes from your interview transcript may be used for this project. However, the researchers will make every effort to present the data in a way that conceals your identity. If you decide to terminate the interview, the information you have provided will not be used for the research purposes. Anything that is published from the results of this study will not contain your name. Data will be kept in written, hard-copy and password-protected electronic formats. Printed materials will be stored in a locked filing cabinet in Dr. Allyson Jones' locked office and electronic data on the Department of Physical Therapy server at the University of Alberta. The information will be maintained for a minimum of five years after the study is completed. After that time, all paper and electronic formats will be destroyed in a way that ensures privacy and confidentiality. The information from this study may be used to plan future research, but if we do this it will have to be approved by a Research Ethics Board. You may request a report of the research findings and your own results at any time by contacting one of the study investigators.

By consenting to this study, you are giving permission to the research team to access your personal and health information that is needed for the study. You are free to withdraw from the study at any time.

Please contact the following investigators if you have any questions or concerns.

Allyson Jones, PhD PT 780-492-2020

Oluwaseyi Abigail Osho PT (student) 587- 703-3217

Cathy Harbidge PT, 403-955-1518

The plan for this study has been reviewed for its adherence to ethical guidelines by a Health Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at 780-492-2615. This office has no direct involvement with this project.

CONSENT FORM FOR PARTICIPANTS

Title of Study: Understanding the Community-Dwelling Older Adults' Experiences of the FallProof™ Program: A Qualitative Study

Principal Investigators:

Allyson Jones, PT PhD

Phone Number: 780-492-2020

Oluwaseyi Abigail Osho, PT

Phone number: 587-703-3217

Cathy Harbidge, BScPT

Phone Number: 403-955-1518

	Yes	No
Do you understand that you have been asked to be in a research study?	<input type="checkbox"/>	<input type="checkbox"/>
Have you read and received a copy of the attached Information Sheet?	<input type="checkbox"/>	<input type="checkbox"/>
Do you understand the benefits and risks involved in taking part in this research study?	<input type="checkbox"/>	<input type="checkbox"/>
Have you had an opportunity to ask questions and discuss this study?	<input type="checkbox"/>	<input type="checkbox"/>
Do you understand that you are free to leave the study at any time, without having to give a reason?	<input type="checkbox"/>	<input type="checkbox"/>
Has the issue of confidentiality been explained to you?	<input type="checkbox"/>	<input type="checkbox"/>
Do you understand who will have access to your data, including personally identifiable information?	<input type="checkbox"/>	<input type="checkbox"/>

Who explained this study to you? _____

IN (YOUR NAME) agree to take part in this study.

Signature of Research Participant

(Printed Name) _____

Date: _____

The pseudonym name I suggest for myself is: _____

Signature of witness _____

(Printed Name) _____

Date: _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to participate.

Signature of Researcher _____ Date _____

The information sheet will be attached to this consent form and a copy given to the research participants.

Appendix B

Interview Guide

Introduction

The researcher introduces the topic of the study using the consent form and information sheet. The purposes of the study are explained to the participants. The researcher will inform participants that the conversation will be recorded before conducting the interview.

Questions

The listed questions will guide the interview but may not necessarily follow the order presented. Interjecting and prompt questions may be asked when there is a need for further clarifications.

1. **Opening question:** Can you tell me about yourself; your age, occupation, your highest level of education, why you were referred for the FallProofTM program, and the total number of sessions attended during the program?
2. **Grand tour question**
 1. “Can you tell me about your experience attending the FallProofTM exercise class at the Calgary Fall Prevention Clinic?”
3. **Prompting questions**
 - a. “What kept you going to stay in the program?” (Facilitating/enabling factors)
 - b. What were the hindrances to your attending the program? (Barriers)
 - c. “Now that you have gone through this FallProofTM exercise class, would you say it has an impact on your risk of falling?”
- c. **Closing Question**
 - a. Are there questions you were hoping I would ask you?
 - b. Is there any question you would like to ask me?
 - c. Any other comments?