National Ageing Research Institute

A pragmatic trial of the implementation of a balance screening and home exercise program through existing community health services

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- Mr Paul Jeffrey (NARI, research assistant);
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Expert Panel Members:

- Members of the project team; and
- Ms Anne McGann (Physiotherapist, Melbourne Health);
- Ms Pek Hill (Physiotherapist, Sunbury Community Health Service); and
- Ms Katherine Baggeley (Occupational Therapist, Inner South Community Health Service).

Partner agencies:

NARI collaborated with the following community health centres for the implementation of this project:

- Merri Community Health Service (Coburg, Fawkner and Glenroy);
- Inner South Community Health Service;
- Caulfield Community Health Centre;
- Bentleigh Bayside Community Health Centre;
- Inner East Community Health Service (Hawthorn, Ashburton); and
- Sunbury Community Health Centre.

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Abbreviations

CHS	Community Health Service
DVA	Department of Veterans' Affairs
FR	Functional Reach
FROP-Com	Falls Risk for Older People in the Community
FSST	Four Square Step Test
HAP-AAS	Human Activity Profile Adjusted Activity Score
HREC	Human Research Ethics Committee
ICC	Intraclass Correlation
MFES	Modified Falls Efficacy Scale
NARI	National Ageing Research Institute
RCT	Randomised controlled trial
SD	standard deviation
ST	Step Test
TUG	Timed Up and Go

Contents

Executive Summary

Background

Early identification of balance impairment and early intervention are important components in maintaining and improving physical function for community-dwelling older adults. However, most research to date has focused on people with moderate to high levels of balance impairment. A recent innovative study undertaken through the National Ageing Research Institute and funded by the Department of Veterans' Affairs found that a physiotherapy-directed home exercise program incorporating strength and balance elements significantly improved balance and mobility-related outcomes in those with mild balance dysfunction (Hill et al., 2008). If this research outcome could be successfully translated into the community setting, there would be benefits for the wider community.

This report presents the findings from an implementation project conducted by the National Ageing Research Institute and funded by the Department of Veterans' Affairs. The National Ageing Research Institute worked with six community health services to translate the research findings of the recent project, "Effectiveness of a screening program for early balance problems and targeted exercise interventions among older community ambulant Veterans" into the community health setting.

Aims

The project had the following aims:

1. To determine whether a program of screening and exercise for mild balance dysfunction found to be successful in a previous trial could be implemented in the community health setting with similar levels of success
2. To determine the key factors in successfully translating a screening and exercise program for mild balance dysfunction into practice in the community health setting.

An additional aim was to evaluate the agreement between two forms of falls risk assessment.

Method

The project had three phases: protocol development; implementation of the screening and exercise component; and an evaluation phase.

In the protocol development phase, six community health services were recruited to participate in the study. A minimum data suite of assessment measures was developed using information obtained in the previously successful randomised controlled trial as well as advice from experts in the field. The best combination of two clinical tests to determine mild balance dysfunction was ascertained through calculation of the sensitivities and specificities of a range of measures. A training manual was developed for use by physiotherapists in the implementation phase of the project. The final component of the protocol development phase involved 29 physiotherapists from participating community health services attending a half-day training session aimed at providing background information to the project and to inform physiotherapists of project aims, methods and processes.

In the implementation phase, 82 community-dwelling ambulant older adults (> 65 years) with concerns about their balance were recruited from six community health centres. Each consenting participant was assessed at the start of the project and again after approximately six months by NARI physiotherapists. The assessment involved screening for mild balance dysfunction, followed by assessment of balance, strength, walking, fear of falling, activity levels and falls risk. Those identified at the initial assessment as having mild balance dysfunction were provided with a home exercise program by the physiotherapist at the community health service. Exercise prescription was based on the findings of the initial assessment and additional assessment tasks undertaken by the community health centre physiotherapist. Exercises were selected from those detailed in the Project Manual, including a range of exercises from the Otago Exercise Programme and the VHI exercise kit. After the initial home visit, participants received two extra visits at four and ten weeks from the physiotherapist aimed at monitoring and progressing the exercise program and encouraging adherence. Those who were assessed as having balance within normal limits for age at baseline were not offered the exercise program and were reassessed after six months.

In the evaluation phase, focus groups were conducted with community health service physiotherapists and exercise participants to identify key factors in relation to the project's outcomes.

The sub-study evaluating the reliability of the telephone and face-to-face version of the Falls Risk for Older People in the Community assessment tool was conducted with 16 participants. Approximately one week after the final assessment, the FROP-Com was administered over the telephone by a physiotherapist blind to the results of the face-to-face assessment, and the results for individual items and the overall score were compared.

Outcomes

The combination of two measures, Functional Reach (FR) and Step Test (ST), was found to be most accurate in classifying mild balance dysfunction. The optimal cut-off scores for these two measures were a Functional Reach below 29 cm and Step Test of less than 17 steps for those aged between 65 and 75 years, and a Functional Reach below 27 cm and Step Test less than 15 steps for those aged over 75 years. This combination correctly identified 70.8% of people with mild balance dysfunction and 80.8% of those without in the lower age category, and 86.1% and 71.9% respectively in the older group, using the data from the original RCT.

Overall 72 participants (88%) were identified as having balance outside normal limits for age at initial assessment, and 10 participants (12%) as having normal balance for age. Of the 72 participants offered the exercise program, 58 (81%) were reassessed after six months, and of the 10 participants who had normal balance, 6 (60%) were reassessed after six months.

Of the participants who completed the 6 month reassessment who were originally classified as having abnormal balance, 15 (26%) achieved scores within the normal range for age for balance at reassessment after participating in the exercise program. Across the entire group participating in the exercise program, there was significant improvement on several balance and strength measures from initial assessment to follow-up. There was no significant change over time in those assessed as normal at baseline.

From the focus groups conducted with participants and physiotherapists, several key themes emerged. The program was seen as very positive, in particular the value of focusing on improving balance and strength rather than a general exercise program. Exercising in the home environment was considered to enhance uptake and carryover. Participants recognised the physiotherapists' important role in adapting and modifying the exercise program to ensure its suitability for the individual and their environment. Physiotherapists identified enhanced knowledge of mild balance dysfunction, assessment tools and working with a group of people they seldom encounter through community health centres as benefits of participation in the project. Ease of implementation was a hindrance for some physiotherapists, with a degree of inflexibility of their community health service administrative procedures to accommodate the new program, impacting prompt scheduling of intervention after assessment. Key factors influencing adherence were identified as the functional and home-based nature of the program; being able to fit exercise in with their daily routine; and the support, monitoring and feedback from the physiotherapists. Participants used a range of strategies to maintain adherence, but indicated they would have preferred more variety in the latter stages of the exercise component.

The sub-study evaluating the agreement between two forms of falls risk assessment administration found that telephone administration of the Falls Risk for Older People in the Community assessment tool had good reliability compared to the face-to-face version (ICC = 0.83, $p < 0.001$).

Resources

A training manual for physiotherapists implementing the exercise program has been developed. The manual contains details of rationale, background, screening processes and program procedures.

Possible future directions

As the program has been shown to be implemented successfully through existing community health services, wider dissemination and uptake of the program would be of benefit. Rolling out the program more broadly would necessitate adequate training of community health physiotherapists and further development of the

resources. Prior to wider dissemination, resource development would need to factor in an exploration of using the two commercially available exercise kits; the consideration of online or interactive training materials; and professional design of the materials.

Conclusion

This project demonstrated the successful implementation of a balance screening and exercise program run through community health services. The study highlights that home-based exercise for community-dwelling older people with mild balance dysfunction is effective and suggests that screening and intervention for mild balance dysfunction on a broader scale may be warranted as a preventive health measure.

1. Introduction

1.1. Research questions

The primary research questions for this project were:

1. Can a pragmatic approach to the assessment and home exercise program implemented in a recently completed Department of Veteran Affairs (DVA) funded project (Effectiveness of a screening program for early balance problems and targeted exercise interventions among older community ambulant Veterans) (Hill et al., 2008) be implemented with similar levels of success through existing community health settings?
2. What are the key factors influencing successful implementation of the program for physiotherapists working in relevant community settings?
3. What are the key factors influencing successful implementation of the program, in particular maximizing participant adherence to the program, for older people with mild balance impairment?

An additional research question was:

1. What is the agreement between face-to-face and telephone assessment of falls risk?

1.2. Background

Although there is good research evidence for the effectiveness of single and multiple interventions in reducing falls in older people (Gillespie et al., 2009; Hill & Schwarz, 2004; Tinetti, Gordon, Sogolow, Lapin, & Bradley, 2006), translation of successful research findings into practice remains a major challenge (Oliver, 2007; Salter et al., 2006). Most research in the area of falls prevention targets older people with moderate to high levels of balance impairment or falls risk, with little attention paid to those with mild or early balance dysfunction.

A recent innovative study undertaken through the National Ageing Research Institute (NARI) and funded by the Department of Veterans' Affairs found that identifiable mild balance dysfunction was evident in approximately three quarters of community ambulant older people (recruited for the study) expressing concerns

about balance (Hill et al., 2008). Importantly, the randomised controlled trial found that a physiotherapy-directed home exercise program (incorporating strength and balance elements) significantly improved balance and mobility-related outcomes in those with mild balance dysfunction (Hill et al., 2008). The results of this study highlighted that early identification of balance impairment and early intervention are important components in maintaining and improving physical function for community-dwelling older adults.

However, there are several factors which limit direct translation of the study and its methods into clinical practice. In the randomised controlled trial balance and function was assessed and classified using a combination of results from computerised force platform assessments (Neurocom Balance Master, long plate) as well as clinical measures (Functional Reach, Step Test, Timed Sit to Stand, Nicholas Manual Muscle Tester, Human Activity Profile Adjusted Activity Score, Modified Falls Efficacy Scale). This assessment procedure was relatively lengthy and required the use of expensive equipment, both of which would limit its utility in the community health setting. In addition, the individualised home exercise program provided in the randomised controlled trial was informed by the results of all baseline assessment tasks (including computerised balance assessment), whereas in a community setting, exercise prescription would occur without information provided by the Neurocom Balance Master. Another factor limiting direct translation also relates to the intervention, specifically exercise selection and prescription. For the randomised controlled trial, exercises were selected from two relatively large exercise kits: the Otago Exercise Programme (Robertson, Campbell, Gardner, & Devlin, 2002) (further information at http://www.acc.co.nz/preventing-injuries/at-home/older-people/information-for-older-people/otago-exercise-programme/index.htm) and the Health Promotion Resources Kit (further information at http://www.vhikits.com/). To ensure successful implementation in the community setting, evaluation of the most commonly prescribed exercises, ultimately leading to an abbreviated core set of exercises, would be advantageous in order to streamline the program.

Apart from the factors relating to the specific method of this randomised controlled trial, there are also some general factors that need to be considered if this research is to be successfully translated into practice. Potential barriers and enablers exist at the policy, organisational and practitioner levels as well as at the level of the

affected individual. For example, staffing levels, training and funding may influence implementation at the organisational level and factors such as adherence, acceptability and attitudes to exercise may influence successful implementation at the individual level. Practitioners and the target individuals should have knowledge of these factors, thus identifying supports and gaps which would aid successful implementation (Simons-Morton & Winston, 2006).

The challenge, therefore, was to identify the most appropriate set of clinical tests of balance and function which can be used to assess and classify balance as well as which can be used to individually tailor an exercise program (ideally taking about 20-30 minutes); to identify a core set of exercises which will be effective in improving balance and related function; to identify factors at all levels which will assist with translation of the program into practice; and to develop the resources necessary to enable widespread uptake of the approach. These issues are all addressed in this research translation project.

An additional issue in relation to implementation of community-based programs is the ability to conduct screening and at least a part of an assessment suite over the phone. While functionally-based assessment tasks require face-to-face contact, some assessments such as surveys and questionnaires may potentially be conducted over the telephone. To date there has been limited research into the agreement between these two modes of assessment for falls risk assessment tools. Potentially, this information will enable more widespread use of a phone-based falls risk assessment to further assist in the identification of individuals for whom a balance and strength training program would most benefit. Therefore a secondary aim of the study was to evaluate the intermodal agreement between formal falls risk assessment and a telephone falls risk assessment.

In summary, this project aimed to implement and evaluate the translation of the randomised controlled trial method into practice within the community health setting.

1.3. Ethics

Ethics approval was sought from the DVA Human Research Ethics Committee (DVA HREC) and granted at their meeting on August 14, 2009. An amendment to the

protocol, to undertake a reliability analysis of the FROP-Com (phone version) was approved by the DVA HREC on October 8, 2010.

2. Research Design

The project consisted of three phases:

A) a protocol development phase;

B) an implementation phase; and

C) an evaluation phase.

A sub-study to investigate the intermodal agreement of the Falls Risk for Older People in the Community (FROP-Com) assessment tool was added after ethics approval was granted.

2.1. Protocol Development Phase (Phase A)

The protocol development phase consisted of several components:

2.1.1. Development of a minimum data collection suite

A minimum data collection suite of clinical balance and related measures to enable accurate classification of balance performance (either within normal limits for age, or outside normal limits for age) and to inform the physiotherapy exercise selection for the home exercise program was developed. The successful randomised controlled trial upon which this project is based, utilised a very comprehensive assessment program to determine whether a participant had mild balance impairment, and to provide the basis for the physiotherapist to develop an individualised home exercise program addressing identified balance related impairments. However, this assessment process was lengthy (approximately 2 hours) and included both clinical measures (that could be undertaken quickly with minimal equipment, time and training) as well as a range of measures using a $50,000 force platform to provide sensitive measures of balance related performance. Results of the randomised trial indicated that some of the single

clinical measures were sensitive in identifying mild levels of balance impairment. These included:

Functional Reach **(FR)** test, a dynamic test of standing balance (Duncan, Weiner, Chandler, & Studenski, 1990). The participant stood next to a wall, with their feet 10cm apart and with their dominant arm raised to 90 degrees. They were asked to reach as far forward as possible without overbalancing and the distance of additional reach in centimetres was recorded;

Step Test, a dynamic test of standing balance (Hill, Bernhardt, McGann, Maltese, & Berkovits, 1996). The number of times the participant could step one foot fully on and off a 7.5cm block step in 15 seconds was recorded. Each leg was tested separately, and performance on the worse side used for data analysis;

Timed Sit to stand (5 times), a simple functional strength measure for the lower limbs. The participant sat in a standard height chair (45cm, with a back and arms), and was asked to stand up and sit down as quickly as they could without using their arms to push up. The time taken to complete the task was recorded.

Nicholas Manual Muscle Tester (dynamometer) was used to measure leg strength – quadriceps and hip abductors bilaterally. Three measures of each muscle group were taken, and the average of the last two were used as the score for that muscle group (Hill, Schwarz, Flicker, & Carroll, 1999).

Activity level was assessed using the Human Activity Profile (HAP) (Fix & Daughton, 1988). This questionnaire evaluated 94 activities, rated by the participant as "still doing", "have stopped doing", or "never did". The Adjusted Activity Score (AAS) was calculated, by subtracting from the highest numbered activity still being done, the number of lower numbered activities listed as "have stopped doing".

Fear of falling (loss of confidence) was assessed using the Modified Falls Efficacy Scale (MFES)(Hill, Schwarz, Kalogeropoulos, & Gibson, 1996). This tool measured confidence in performing activities of daily living without falling. This scale consisted of 14 items which were rated on a 0 to 10 scale, where 10 was complete confidence in performing the task without overbalancing, and 0 was not confident at all in performing the task without overbalancing. An average MFES score was calculated out of 10 across the 14 items.

Falls Risk of Older People – Community. Falls risk was assessed with the Falls Risk for Older People (FROP-community) assessment tool (Russell, Hill, Blackberry, Day, & Dharmage, 2008). This consisted of 14 domains, each of which described a

risk factor for falling, which has been well-documented among community-dwelling older adults. Each domain is scored to reflect the graded risk (nil, mild, moderate or severe) of that falls risk factor, with a maximum possible overall score of 60. A higher score reflected the presence of a greater level of risk for falling.

In order to determine the best mix of clinical measures to obtain an accurate classification of balance dysfunction (either within normal limits for age, or outside normal limits for age), data from the project "Effectiveness of a screening program for early balance problems and targeted exercise interventions among older community ambulant Veterans" were reviewed. The full range of clinical and force platform measures were analysed to determine which single tests and combination of clinical tests gave best accuracy of classification compared to the full suite of tests. Sensitivity and specificity were calculated for each test and combination of tests.

2.1.2. Consultation with experts.

An expert panel was convened on August 27, 2009. The purpose of the expert panel was to invite clinicians, expert in the field of falls and balance, to provide feedback and guidance on:

- The use of the two measures deemed to identify a participant as "outside of normal limits for balance";
- The best mix of clinical measures to be used in the assessment of participants in order to provide sufficient information for community health physiotherapists to develop an individualised exercise program;
- Any additional clinical measures to be included in the assessment suite that may be utilised by physiotherapists to gain a clearer understanding of the participant's balance status based on their clinical judgment; and
- A training manual to be developed for use by community health physiotherapists involved in implementing the project.

The panel identified the assessment measures listed below as important for inclusion in the initial assessment:

Four Square Step Test (FSST) (Dite & Temple, 2002). This test involved stepping as quickly as possible in four directions over four sticks on the ground, first in one direction, then in the other.

Timed Up and Go test (Podsiadlo & Richardson, 1991). An individual was timed standing from a 45cm high chair, walking 3 metres, turning, then returning to the chair and sitting down.

Timed Up and Go test as a dual task activity *(Shumway-Cook, Brauer, & Woollacott, 2000)*. An individual was timed standing from a 45cm high chair, walking 3 metres, turning, then returning to the chair and sitting down while counting backwards by 3's from a number between 20 and 100.

Gait Speed was assessed by timing participants walking at their "comfortable walking pace" along the central six metres of a ten metre walkway (m/min), using their usual indoors gait aid (Hageman & Blanke, 1986).

The expert panel determined that in addition to the assessment tools provided by the research team, the Community Health Service physiotherapist may wish to undertake a selection of further clinical measures, based on their clinical judgement. These measures may include:

- Rocking forward onto toes and back onto heels
- Hip hitching
- Step up (forward)
- Sit to stand without upper limb support
- Observation of gait
- Static stand on firm surface, tandem stance

The expert panel, in consultation with the research team, also determined the mix of exercises to be highlighted in the training program for the collaborating physiotherapists. These exercises included an abbreviated version of a mix of exercises most commonly utilised in the successful randomised controlled trial (Hill et al., 2008), with exercises selected from two large exercise kits – the Otago Exercise Programme and the Visual Health Information - Health Promotion Resources exercise kit.

2.1.3. Recruitment of participating community health centres.

Initial contact was made with a number of community health centres across Melbourne by phone or email to establish an expression of interest in participation. This was followed with a letter and/or visit to the centre, providing further explanation of the project. The following community health centres were invited and accepted involvement in the project:

- Merri Community Health Service (Coburg, Fawkner and Glenroy);
- Inner South Community Health Service;
- Caulfield Community Health Centre;
- Bentleigh Bayside Community Health Centre;
- Inner East Community Health Service (Hawthorn, Ashburton); and
- Sunbury Community Health Centre.

2.1.4. Development of a manual and a training workshop for physiotherapists from participating community settings.

A manual was developed for use by physiotherapists from participating community health services. The manual comprised:

- An overview and background of the project;
- Recruitment of participants;
- Baseline assessment protocol;
- Protocol for commencement of the exercise program for those participants classified as having balance 'outside of normal range for age';
- Recommendations for exercise program prescription;
- Evaluation for participants via 6 month follow-up assessments and focus groups;
- Evaluation for physiotherapists via focus groups;
- Dissemination of project findings.

A half-day training program for physiotherapists from the participating centres was held at NARI on October 21, 2009. Eighteen physiotherapists from four community health services attended.

Two other training sessions were held with participating community health services to accommodate the physiotherapists who were unable to attend the initial workshop at NARI.

- October 20, 2009 (Ashburton) – 7 physiotherapists attended
- November 17, 2009 (Caulfield) – 4 physiotherapists attended

The training workshop incorporated:

- An overview of the previously successful randomised controlled trial upon which this project was based;
- Primary research questions for this implementation project;
- Identification of mild balance dysfunction;
- The role of community health centres in recruitment and implementation;
- An overview of the clinical measures to be used in the assessment of balance performance in participants;
- Exercise program prescription and modification;
- Use of various forms for the purposes of data collection;
- An overview of the evaluation phase, including reassessment of participants, and focus groups for participants and physiotherapists;
- Addressing practical issues for physiotherapists.

2.1.5. Project timelines

The project timelines were established as follows:

Project activity	Date delivered
Sign contract and finalise preparatory procedures for full project	April 2009
Obtain ethics approval	September 2009
Recruitment and baseline assessments	Sept 2009 - July 2010
Implementation of exercise program through participating centres	Dec 2009 - February 2011
Post exercise program assessments	June 2010 – March 2011
6 month falls recall – at baseline assessment, and end of exercise program (6 months)	June 2010 – March 2011
Focus group with participating physiotherapists	November 2010
Focus group with participating Veterans / War Widows / other participants	Nov 2010 and Feb 2011
Data analysis and report production (throughout the project, but completed by end of month 21)	Progress report 1 – Dec 2009 Progress report 2 – June 2010 Progress report 3 – Dec 2010 Final report April 2011

2.2. Implementation Phase (Phase B)

In this phase, community-dwelling older people reporting concerns about their balance were recruited, assessed and offered an exercise program if their balance was outside normal limits for age.

2.2.1. Participants

Participants were required to meet the following inclusion criteria (these were the same inclusion criteria as for the completed randomised trial):

- aged over 65 years;
- living at home or in a retirement village;
- community ambulant (walk away from home at least 3 times weekly) using either no walking aid, or a single point stick;
- having had no more than one fall in the preceding 12 months (i.e. nil or one fall only);
- reporting concern about their balance, confidence, or near falls; and
- provide informed consent to participate.

2.2.2. Sample size analysis

The study team aimed to recruit a similar sample size of exercisers as was recruited in the recent DVA funded randomised controlled trial (n=82, allowing for 28% drop-out rate, n=59 completing the program). Assuming the same rate of participants being classified as "within normal limits for age" as reported in the randomised controlled trial project report (Hill et al., 2008), it is anticipated that approximately 75% of participants volunteering for the project will be classified as "outside normal limits for age". As such, a target of 110 participants was set for recruitment. With five participating centres, this meant an average of 22 participants per centre over the recruiting period of nine months.

2.2.3. Method of selection

Participants were recruited in specific geographic areas, where community health centres had agreed to participate. Potential participants were recruited through the existing waiting lists of the community health centres as well as by the following approaches:

- brief advertisement / article about the project in veteran newsletters, local newspapers, and newsletters for older people (eg COTA, National Seniors),
- separate expressions of interest (EOI) flyer outlining the project and requesting volunteers, to be sent out with other DVA material in a DVA

mail-out (eg newsletter) and placed in local general practices and collaborating community health centres,

- through discussion / presentation by the project team about the project at gatherings including older people e.g Probus, senior citizens, as well as Veterans' gatherings and forums for Veterans, War Widow/ers and representatives of Ex-Service organisations around Melbourne, and
- through existing exercise groups in the participating community health centres.

The flyer advised potential participants that the researchers would ask participants to complete two assessments (one at the start of the program and one six months from initial assessment) as part of the research process. The flyer stated that participants would be offered a physiotherapist-directed home exercise program if balance problems were identified at the initial assessment. The flyer included contact details of the researchers and invited participants to contact them if they required more information.

Interested potential participants responded to the EOI as indicated on the flyer which asked those them to ring the researchers to further discuss the project. For people ringing in response to promotional material about the project, a brief phone screen was undertaken to determine whether the person met the study's inclusion criteria. If so, the research process was explained in plain language and a time offered with the researcher for an appointment either at the National Ageing Research Institute or the local community health centre. A letter of invitation including the date and time suitable to the participant was sent by mail. Participants were provided with the researchers' contact details in case they wished to discuss the project further.

2.2.4. Obtaining consent

The researchers provided written information about the purpose of the study and the proposed research process which was given to participants prior to consent being sought. At the first appointment, prior to seeking consent, the researchers verbally explained the study to the participant again, giving the participant the opportunity to ask questions and express any concerns or uncertainties about the study. Once the investigator felt that the participant understood the study, and the

participant had expressed their understanding, consent was obtained. If consent was obtained, the Participant Information and Consent Form was completed and signed by the participant and the researcher. All participants retained the right to withdraw from the study at any time.

2.2.5. Baseline assessment of all participants

Participants were assessed by an experienced physiotherapist from the research team on the suite of measures determined in Phase (A) (see above), and classified as "within normal limits for age" or "outside of normal limits for age". These assessments were performed at the Gait and Balance Laboratory at the National Ageing Research Institute, or at the local health centre, if space was available for this purpose. This provided participants with an option for the initial assessment.

Participants classified as ***within normal limits for age*** were informed of this assessment outcome; provided with an information brochure regarding physical activity (Choose Health: Be Active; A physical activity guide for older Australians, developed by the Department of Veteran Affairs); and asked to return for a re-assessment in six months time.

2.2.6. Commencement of home exercise program for participants classified as having balance outside of normal range for age

Participants classified as having balance ***outside of normal limits for age*** were informed of this assessment outcome, and that they were to be referred to a physiotherapist at their local community health centre, who would provide them with a set of home exercises to address identified impairments. The home exercise program involved the physiotherapist from the local community health centre visiting the participant at home and prescribing a selection of exercises at the first visit, if possible, within a week of the initial assessment. This physiotherapist was provided with the baseline assessment results by the research physiotherapist. They then determined the most appropriate mix of exercises from the Project Manual (Phase A - see above). An exercise booklet with pictures and descriptions of selected exercises was provided to the participant at the initial visit. Each

participant received two additional home visits: four weeks and ten weeks after the initial exercise prescription home visit. These visits were to review performance of the home exercises, to modify exercises if too easy or too hard, and to support ongoing motivation by the participant for the exercise program. Participants were encouraged to exercise every day if possible (approximately 20-30 minutes each time) for six months. Exercise log sheets were provided for the participants to record the exercises they performed, and these were reviewed at each home visit. Participants were encouraged to contact the physiotherapist who prescribed the exercises by phone if required at any time, to discuss progress or issues with the exercise program.

Physiotherapists were asked to collect information about the implementation of the exercise program such as:

- home visit and travel time required;
- additional assessment tasks completed;
- exercise completion rating for participants at each visit;
- participant reasons for not completing the exercises;
- comments regarding the exercises and any other issues facing participants; and
- any additional contact with participants outside of the allocated visits and phone call.

Participants who ceased participation in the program part way through were sent an "exit survey" to determine reasons for not completing the program, and/or discussed their reasons for withdrawal over the phone; whether they felt any benefits from the program prior to ceasing participation; and whether they would suggest any improvements to the program.

2.2.7. Adherence to the exercise program

Adherence to the exercise program was assessed using participant exercise log sheets. Full adherence for a month was classified as the participant completing 60% or more of the prescribed exercises (excluding walking and warm up exercises) for at least 20 days (if the full month was completed). The overall adherence was obtained from the average adherence across the six months.

2.3. Evaluation Phase (Phase C)

This phase covered the reassessment of participants recruited for the study (whether or not they received the home exercise program), as well as an exploration of factors related to program implementation from the perspective of participants and physiotherapists.

2.3.1. Re-assessment at end of 6 month program

All participants, those who were classified as "within normal limits for age" and those classified as "outside of normal limits for age", underwent a re-assessment at the end of the six month period. This involved a reassessment of all the baseline measures as discussed in Phase A above, by the research physiotherapist.

2.3.2. Data analysis

Comparison of baseline and post exercise performance for the exercise group was assessed through paired t-tests to determine changes on individual outcome measures. The alpha level for statistical significance was adjusted using Bonferroni's adjustment procedure to account for multiple comparisons.

2.3.3. Focus groups for participants and community health physiotherapists

2.3.3.1. Participants

Participants in the exercise program who had completed the 6 month reassessment, at the time of the planned Focus Group (n=21 for first focus group, n=15 for second focus group), were invited to participate in one of two focus groups. An invitation flyer was given to participants, as well as verbal information, and they were asked to consider their involvement and reply to the project team if interested.

The first focus group was conducted on November 10, 2011 at NARI. Eight people participated. The second focus group was conducted on February 10, with only one participant. As such, this represented 25% of the people who had completed the exercise program at the time of the Focus Groups being conducted.

The focus groups explored factors that participants found supported their participation and adherence to the program, factors that made it harder to maintain adherence, and suggestions for improving the program if rolled out more broadly.

2.3.3.2. Community Health Physiotherapists

Physiotherapists from participating community health services were invited to a focus group on November 11, 2010 at NARI. Three physiotherapists, representing Sunbury Community Health Service and Inner East Community Health Service, attended the focus group.

A second focus group was conducted at the Merri Community Health Service on February 25, 2011 with two physiotherapists who were unable to attend the previous focus group.

Several attempts were made for an informal telephone conversation with a physiotherapist from Bentleigh Bayside Community Health Service, to no avail.

The focus groups explored issues around the usefulness of the assessment data, factors that facilitated or impeded recruitment of participants and appropriate exercise prescription for participants, factors influencing high adherence with the exercise program, and other factors considered relevant to successful broader translation of the approach.

2.3.3.3. Data analysis

Focus group discussions were taped and transcribed verbatim. Two members of the project team independently identified key themes from the focus group discussion. These were compared, and where disagreement occurred, the two researchers discussed the discrepancy until consensus was reached.

2.4. Sub-study – Intermodal agreement of the Falls Risk for Older People in the Community (FROP-Com) assessment tool

2.4.1. Background

The Falls Risk for Older People in the Community (FROP-Com) tool, developed by the National Ageing Research Institute, assesses the general risk of falling for community dwelling older people. This tool gives an overall score for falls risk in an individual based upon the risk factors of falls history, medications, medical conditions, sensory loss and communications, feet and footwear and clothing, cognitive status, continence, nutritional conditions, environment, functional behaviour, function, balance, and gait/physical activity.

It can be delivered in verbal or written format and has shown to be high for retest reliability (Russell et al., 2008)

A sub-study for determining the reliability of administering the FROP-Com over the phone was conducted within this project. A reliable falls risk assessment tool which can be administered over the phone may mean more readily available falls risk assessment for Veterans and other older people, especially where delay in access for health services may be experienced.

2.4.2. Design

Participants who were due for their final 6 month assessment were sequentially asked to participate in the sub-study. If a participant did not wish to receive the phone call assessment, then no phone call was made, and the six month follow-up assessment occurred as planned.

Sixteen participants consented to an additional assessment, the Falls Risk for Older People (FROP-community) assessment tool, to be administered a second time over the phone, within 2 weeks of the final assessment. The phone call was undertaken by a physiotherapist who did not participate in the final assessment.

2.4.3. Analysis

The intraclass correlation coefficient was used to evaluate the reliability of the overall FROP-Com score from the two approaches. For individual items on the FROP-Com, weighted Kappa coefficients were calculated, together with percentage agreement scores.

3. Results

3.1. Development of the screening assessment

It was found that most of the clinical measures utilised in the previous study had moderate to strong discriminatory power in detecting mild balance dysfunction compared with the overall classification. However, for both age categories, **Functional Reach test (FR)** combined with the **Step Test (ST)** appeared to provide the best discrimination.

In the lower age category (65-75 years), optimal cut-off points were 29cm for FR and 17 steps /15 seconds for ST. These values were associated with sensitivity and specificity of 70.8% and 80.8%, respectively. For participants aged older than 75 years, optimal cut-off points were 27cm for FR test and 15 steps/15 seconds for ST. Associated sensitivity was 86.1% and specificity was 71.9%.

Table 1 summarises the cut off scores to be used for 65-75 years and older than 75 years in determining normal balance.

Table 1: Cut-off scores for classification of mild balance dysfunction

	Cut-offs (to be considered normal)	Test validity
Aged 65-75 years	Functional Reach Test R: ≥ 29 cm Step Test: ≥ 17 steps / 15 secs	Sensitivity: 70.8% Specificity: 80.8%
Aged over 75 years	Functional Reach Test R: ≥ 27 cm Step test: ≥ 15 steps / 15 secs	Sensitivity: 86.1% Specificity: 71.9%

This indicates that compared to the complete balance assessment suite, for those aged between 65 and 75 years, a functional reach test or a step test below the cut-off scores listed above correctly identified 70.8% of people with mild balance dysfunction and 80.8% of people without mild balance dysfunction. Similarly, for those aged over 75 years, the cut-off scores correctly identified 86.1% of people with mild balance dysfunction (as defined by the full suite of tests) and 71.9% of people without mild balance dysfunction.

3.2. Recruitment and flow through the study

A total of 101 people contacted the research team, expressing interest in the project. Eighty-two participants were eligible, were recruited to the project and completed the initial assessment.

Six community health services recruited the 82 participants:

- Merri Community Health Service, 15 (18%);
- Inner South Community Health Service, 3 (4%);
- Caulfield Community Health Centre, 2 (2%);
- Bentleigh Bayside Community Health Centre, 5 (6%);
- Inner East Community Health Service, 35 (43%); and
- Sunbury Community Health Centre, 22 (27%).

Eleven participants (14%) were assessed as having balance within normal limits (according to the criteria set – see section above), and 71 (86%) were assessed as having balance outside normal limits for age. Of the 71 participants offered the exercise program, 57 (80%) completed the program and were reassessed after six months, five (7%) withdrew before starting the exercise program and nine (13%) commenced exercise but withdrew from the program before the six month reassessment. Of the five who withdrew before starting the program, four were no longer interested and one participant had an exacerbation of pain from the exercises. Of the nine who withdrew prior to the final assessment, four were due to illness; two had too many other commitments; and three were unable to be contacted.

Of the 11 participants assessed as having normal balance, four (36%) withdrew before the six month reassessment. The reason for withdrawal was that they were no longer interested in having their balance reassessed. One participant with normal balance was reassessed six months later (as per the protocol) and found to have balance outside normal limits. This participant was offered the exercise program and assessed again after six months. Therefore, in total 72 participants (87.8%) were offered the exercise program and 10 (12.2%) were not (Figure 1).

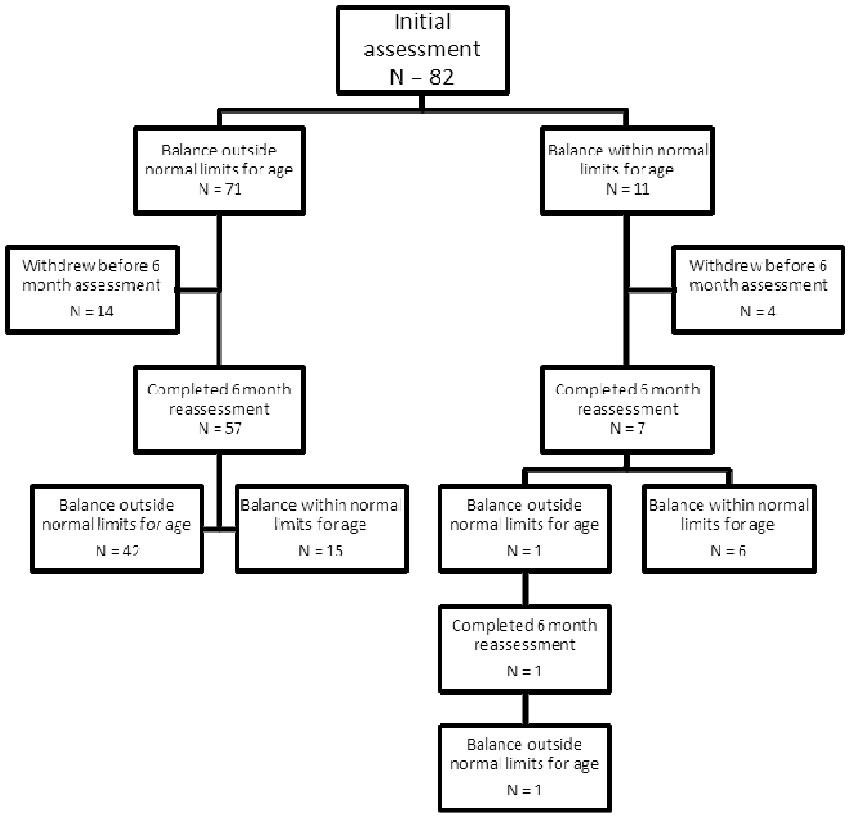

Figure 1 : Flow of participants through study

3.3. Participant demographics

Table 2 reports the baseline demographic characteristics of the participants according to balance ability. The mean age of the overall sample was 77.2 years (sd = 6.6). Sixty-two participants (75.6%) were female and 79 (96.3%) lived independently at home (with or without a spouse). The participants assessed as having balance outside normal limits were slightly older than those with normal balance, were more likely to be female and were more likely to receive community services, predominantly home help (33% compared to 0). Forty-one (57%) participants classified as having balance outside normal limits reported having had a fall in the previous year, compared to five (50%) of participants with normal balance.

Table 2: Baseline demographic characteristics of recruited participants (n = 82)

	Balance performance within normal limits for age (n = 10)	Balance performance outside normal limits for age (n = 72)
Age, years; mean (sd)	76.4 (7.8)	77.3 (6.5)
Gender, female; n (%)	7 (70)	55 (76)
Living arrangement, n (%)		
- Independent at home, with or without spouse	10 (100)	69 (96)
- at home, with carer	0	1 (1)
- retirement village	0	2 (3)
Community services received, n (%)		
- Home help	0	24 (33)
- Meals on wheels	0	2 (3)
- Physiotherapy	0	2 (3)
Fallen in 12 months preceding baseline assessment, n (%)		
- No falls in past 12 months	5 (50)	41 (57)
- One fall in past 12 months	5 (50)	31 (43)

As performance on the Step Test and Functional Reach formed the basis of the classification system, participants classified as having balance outside normal limits had worse scores on these two measures at baseline compared to those with normal balance (Table 3 and Table 4). Mean baseline Step Test scores were 12.2 (sd = 2.9) and 18.3 (sd = 3.8) for those outside normal balance limits and those with normal balance respectively. Mean Functional Reach scores were 25.1 cm (sd = 6.9) and 33.0 cm (sd = 6.0) respectively. In addition, those classified as having balance outside normal limits for age had worse performance at baseline on all other measures (Table 3 and Table 4).

The mean time from baseline assessment to first home visit by the community health service physiotherapist was 37.9 days (sd = 22.3), and ranged from seven to 89 days.

3.4. Changes from baseline to follow-up

Participants who participated in the exercise program showed significant improvement in Step Test, Functional Reach and Timed Sit to Stand (Table 3). For the Step Test and the Functional Reach, the mean percentage change from baseline to follow-up was 15.5% and 21.6% respectively, whereas for the Timed Sit to Stand the mean percentage improvement was 7.0%. Although the mean percentage improvement in quadriceps and abductor strength was relatively large (23.3% and 19.2%), the difference between baseline and follow-up was not significant.

Table 3: Characteristics of participants undertaking exercise program: baseline and final, n = 58

	Baseline Mean (sd)	Final Mean (sd)	Mean (sd) %change from baseline†
Step Test, no.	12.2 (2.9)	13.8 (2.9)*§	15.5 (25.6)
Functional Reach, cm	25.1 (6.9)	29.3 (6.2)*§	21.6 (27.9)
Four Square Step Test, secs†	11.8 (3.9)	11.0 (3.2)§	-5.3 (16.1)
Timed Sit to Stand, secs†	12.4 (6.6)	10.7 (3.6)*§	-7.0 (21.9)
Gait speed, m/min	78.4 (21.9)	83.1 (19.3)	8.5 (18.6)
Timed Up and Go, secs†	9.8 (4.0)	9.4 (3.8)	-1.8 (14.9)
Timed Up and Go Cognitive, secs†	13.0 (9.0)	12.5 (7.1)	-2.6 (18.3)
Leg strength, Nm/kg			
Quadriceps	0.17 (0.07)	0.20 (0.06)§	23.3 (44.0)
Hip abductors	0.10 (0.07)	0.10 (0.06)	19.2 (68.9)
HAP-AAS	63.8 (11.1)	64.8 (9.4)	3.0 (14.2)
MFES	9.1 (0.9)	9.1 (0.9)	0.6 (11.1)
FROP-Com†	9.3 (3.8)	9.5 (3.1)	15.5 (56.7)

*significant difference between baseline and follow-up (paired t-test, Bonferroni correction, adjusted $p < 0.004$); §significant difference between baseline and follow-up (paired t-test, $p < 0.05$); †lower scores represent improved performance/negative percentage change represents improvement

For the participants who were classified as having normal balance at baseline, there was no significant difference between baseline and follow-up on any of the variables assessed (Table 4).

Table 4: Characteristics at baseline and follow-up for those not undertaking the exercise program, n = 6

	Baseline Mean (sd)	Final Mean (sd)	Mean % change from baseline
Step Test, no.	18.3 (3.8)	18.3 (2.9)	1.3 (14.2)
Functional Reach, cm	33.0 (6.0)	33.7 (3.6)	3.7 (14.0)
Four Square Step Test, secs†	8.8 (1.7)	8.2 (1.1)	-5.4 (7.9)
Timed Sit to Stand, secs†	8.6 (2.8)	7.9 (1.8)	-4.3 (17.8)
Gait speed, m/min	103.9 (31.1)	96.9 (31.1)	-4.1 (22.6)
Timed Up and Go, secs†	7.3 (1.5)	7.5 (1.4)	5.6 (14.9)
Timed Up and Go Cognitive, secs†	8.8 (1.8)	9.6 (2.0)	9.6 (11.7)
Leg strength, Nm/kg			
Quadriceps	0.21 (0.05)	0.25 (0.04)	23.0 (17.5)
Hip abductors	0.11 (0.03)	0.14 (0.03)	17.4 (43.4)
HAP-AAS	73.2 (7.1)	74.8 (5.2)	2.8 (8.3)
MFES	9,6 (0.4)	9.9 (0.1)	3.8 (4.6)
FROP-Com†	7.7 (2.7)	5.2 (1.9)	-18.4 (55.0)

†lower scores represent improved performance/negative percentage change represents improvement

3.4.1. Changes in classification of balance

Of the participants who completed the 6 month reassessment who were originally classified as having abnormal balance, 15 (26%) had normal balance for age at reassessment (abnormal to normal), and forty-two (74%) remained with the abnormal classification (abnormal to abnormal). As mentioned above, of the seven

participants with normal balance initially, one (14%) was classified as abnormal at reassessment (normal to abnormal) (Figure 1), with the remaining six (86%) staying within the normal classification (normal to normal).

3.4.2. Adherence to exercise

Adherence data from the exercise log sheets was available for 47 participants. Participants had a high rate of adherence to the exercise program with the mean adherence across six months found to be 85.3% (sd 22.4%, range 15%-100%).

3.5. Qualitative Results

This section incorporates the findings from the participant and community health physiotherapist focus groups; the comments from all participants collected at the time of the 6 month reassessment; and any additional comments recorded by community health physiotherapists.

3.5.1. Participants

Program participants were overwhelmingly positive about the program. They identified numerous benefits from participation, as well as facilitators and barriers to completing the exercise component of the program. While most of their feedback focused on their own experience, on the effects of the program for themselves, participants also discussed aspects of the program from a broader perspective and provided recommendations about how the program could be improved and applied more widely.

3.5.1.1. Improvement for self

The overall impression of the program for their own benefit was positive, with quite specific and broader benefits of exercise noted.

> *"I felt it helped me tremendously"*
>
> *"exercises made all the difference"*
>
> *"really appreciate the program"*

The walking component of the program was noted as having physical, social and psychological benefits.

> *"it did get me walking"*
>
> *"more inclined to go for a walk"*
>
> *"met your neighbours that way when you're walking"*
>
> *"we're discovering the changes that are happening in the area, which we don't really see from the car".*

Strength and balance were highlighted as improvements, importantly being seen as a specific aim of this program in contrast to other, more general, exercise programs.

> *"felt stronger"*
>
> *"the whole program was to improve our balance and I feel mine did because I got my confidence back".*
>
> *"my understanding is that it was for balance, not for general fitness"*
>
> *"it was fairly comprehensive, but especially on balance and leg movement"*
>
> *"recovering balance better"*

From a psychological perspective, improvements were noticed in confidence; less concern for a loss of balance or tripping; and even in levels of depression.

> *"gave me a lot more confidence"*
>
> *"significant increase in confidence in the community"*
>
> *"you were able to walk and look around and not look down"*
>
> *"improved psychological symptoms with the greatest effect is that I don't feel depressed anymore, my mind is sharper and I am less sleepy"*

There was recognition of a progression in abilities throughout the course of the program, particularly from a functional perspective.

> *"can get out of a chair more easily"*
>
> *"now able to get out in the garden"*
>
> *"not losing balance when bowling now"*

Falls and injury prevention was of importance, with an increased awareness of hazards.

> *"haven't had a fall since"*
>
> *"probably as a result of the exercises, I didn't do damage to myself [after a fall]"*
>
> *"this program made us very conscious of walking and how we're walking and lifting our feet […] it was absolutely fabulous for that as it becomes automatic"*

For themselves, there was also an acknowledgement of learning new information relevant to balance and movement

> *"now I know what to do with balance, which I must admit I never found out from the GP"*

> *"just a small thing, but I think a very important thing is that you learn how to get up out of the chair and how to sit properly".*

3.5.1.2. Opportunity for engagement

The project was seen by participants as an opportunity to make improvements to their physical health. There was recognition of the value of exercise for prevention as well as for addressing any current health issues. For some, this related to their own individual risk factors, whereas others saw the relevance in broader terms. In particular, falls prevention was highlighted as one of the main reasons for commencing the project.

> *"If you think of travelling overseas, you ought to do some exercises first"*

> *"I needed something with the permanent injuries that I have"*

> *"I realised I needed to do exercises, and knowing the percentage of people who fall, I knew I needed something"*

> *"falls, yes it's balance and not lifting your feet, that is a fair warning to do something about it"*

> *"I acknowledged my need to prevent falls"*

Participating in a research project acted as a motivating factor for participation

> *"[the project] gave me an incentive to exercise"*

> *"my husband was a research scientist so I always have a feeling for research if it's a worthwhile project"*

> *"it got me going"*

The project design was acceptable with the focus on challenging and useful exercises, and was perceived as not being targeted at older people.

> *"I felt this sounded worthwhile, not like exercise that was for an aged person".*

> *"useful, not time consuming"*

"challenging"

Engaging with older people who may consider their balance mildly impaired occurred through numerous avenues. Participants learnt about the project through their community health service, both through verbal and written modes, from physiotherapy or other staff.

> *"I was having trouble with my shoulder and as part of that I went to a different person, and she said, would you be interested? It was promotion via the physio at the health centre"*
>
> *"the physio presented me with the information"*
>
> *"where we do go it was offered to us at the centre"*
>
> *"[…] she said, would you be interested […]"*

In contrast, others found out through peers

> *"there was a woman there who has a problem too, she brought a brochure"*

3.5.1.3. Commitment to the program

Ongoing participation in a program, both from an individual and broader perspective, can be straightforward for some, while a challenge for others.

Regular commitment to exercise was generally viewed as positive, although the number of exercises, time taken to complete the program each day, and the duration of the whole program were deemed challenging by some participants.

> *"I felt as though it was a commitment, something I had to do each day and I don't think that is negative at all"*
>
> *"I found the discipline good"*
>
> *"I need discipline"*
>
> *"I was relieved when six months were up"*
>
> *"I think that some people would find the six months daunting"*
>
> *"I didn't do any of them […] I had nine to do which I found took 52 minutes"*

In contrast, others would have liked a program of longer duration.

> *"a six month period is perhaps not long enough".*

For some, the monotony of the exercises challenged their commitment to the program.

"boring toward the end"

"tedious at times, but stayed committed"

"incredibly boring"

Developing a routine for exercising, incorporating the exercises into the rest of the day, enhanced motivation for continuing.

"felt I could incorporate it into my lifestyle"

"did exercises first thing in the morning as a habit"

"I just do them in my own time"

Participating in a research project was acknowledged as a main reason for their commitment.

"I've got to do it to support the people who come to assess me"

"it's for a good cause, as well as for me"

The physiotherapist was seen as crucial in maintaining adherence and ongoing participation by encouraging participants, providing feedback about performance and altering the exercise program according to need. The timing of the physiotherapist's visits was also identified as a factor important in adherence to the program.

"you need the encouragement of somebody else to say 'yes, you're doing all right or you need to change this'"

"they encourage you at three months"

"I thought he looked intently at what I was doing to improve my way of doing it"

"the update from my physio made my exercises a bit harder"

There was recognition that the physiotherapists tailored the exercise program to the individual, modifying exercises as required and making exercises harder or easier as required.

"one exercise I was doing up against the table, he looked in the kitchen and said do it up against the sink"

"made me correct them when I was wrong and made them a bit harder too"

In combination with the physiotherapy visits, the assessment component provided by the NARI research physiotherapist was also identified as a motivating factor in continuing with exercise, as participants wanted an objective measure of improvement.

"If I had not known I was going to be assessed […] I probably would've dropped off and not been conscientious enough"

"I like follow-up because I think we need encouragement"

3.5.1.4. Exercising in context

Participants recognised the value of exercising in their own homes as it was convenient and practical, but also because the setting was functional and conducive to carryover. Having the physiotherapist visit at home was seen as crucial as it meant that exercises could be tailored for each individual. The ability to space out the exercises and complete the program at suitable times was also seen as an advantage of exercising in the home compared with a structured group setting. These factors were seen as enhancing overall adherence to the exercise program.

"they can see in your home what facilities you have, one exercise I was doing up against the table, he looked in the kitchen and said do it up against the sink"

"Yes, it was an advantage coming to my home as she saw a position that fitted. In somebody else's house it might be better in the bedroom"

"I'd rather do exercises at home"

"I don't drive far, so if it had been far away I wouldn't have been able to go"

"you can always do other things until they've come, so there's no waste of time"

"well, you don't need to do them all at once"

"[…] I've sort of spaced them during the day"

3.5.1.5. Recommendations/suggestions for improvement

Participants had many suggestions for improving the program, covering aspects of intensity, sustainability, content and availability. Because the program was seen as beneficial in improving balance and walking, concern was expressed about not being able to continue with a structured program. Although some participants had expressed that the six month duration was too long for them, others would have preferred a program of longer duration.

"a 6 month period is perhaps not long enough"

"something ongoing after that preliminary time, for those who felt the benefit"

"it's just dropping off that worries me, because you do something and you drop off and you've got no excuse to have another"

Suggestions for added content were general as well as specific.

"I think we should be taught how to fall"

"I'd like to do a program that advanced on what we've done"

Overall, participants would like to see a program with increased visits from physiotherapy staff and less time between visits.

"too much space between the 10 week period and the 6 months"

"there could be a further 4th visit which I feel would be ideal or spread out the first 2 a little more"

"I needed perhaps another physio visit to sort of help me understand my need to balance"

Additional reviews following completion of the program were seen as desirable, and peer support to encourage ongoing participation was recommended by one participant in the form of a get-together rather than exercising in a group setting.

"[…] brought us back in another 6 months to see if we maintain the changes that we had or otherwise"

"could be self-initiated, for example in 6 months at the end of the program go to the physiotherapist who saw you"

"a regular once a week get together, not necessarily a big group, to encourage people to keep going"

If programs were not going to be implemented in their homes, there was an emphasis on keeping programs at a local level.

"keep it local"

"can't expect people to come from far and wide"

3.5.2. Physiotherapists

Physiotherapists embraced the program with enthusiasm and resourcefulness, willingly undertaking the challenges of working with a clientele seldom encountered. There were expressed limitations of the program, useful information in the context of potentially rolling out the program more broadly.

3.5.2.1. Engaging in preventive health

Engaging in preventive health, particularly as it relates to falls prevention, is of importance when undertaking a program such as the one reported on here. Potential participants for this program were a relatively well and active group of older people, having minimal falls. Engaging this group of people in the program proved challenging at times, given they have busy lives, have other pressing social issues and a potential reluctance to admit a balance problem, while others were especially self-motivated being already engaged in other health enhancing behaviours.

"they were interested and not stressed by other social factors which limit people from taking an interest in those things"

"when they realised their commitment, it made it very difficult…cause they probably feel they were OK"

"I guess most people…will manage something when it becomes a problem and it's hard to convince them probably at the right time before it, in prevention rather than later on it's hard to target that group and promote in a way that makes sense"

"very self-interested….a certain level of motivation already in their lifestyle and their approach to their health"

"the ones that I think did well were the ones who were engaging well anyway"

"when you turned up, you knew that this one wasn't going to. And, others you turned up and they were committed before I even started …It's usually a lot more of a sales job to convince any sort of health change and these were really sold before we got to them, a lot of them"

"the ones who wanted to take an active role in their betterment was the sort of person who'd be out there engaging anyway"

The need for preventive health is acknowledged as important by physiotherapists, to ensure the best outcomes for older people with balance problems.

"People could understand the effectiveness of intervening early… The participants and the other people, like the GPs and everybody like that… we get cluttered with all the end stage things… to be able to get some breathing space, to be able to focus on preventative work in those early stages"

"If we can prevent them from getting to the stage where they are falling a lot, then obviously it's going to…be better, not only for us, but for them as well… obviously better for our waitlist but also better for the clients themselves"

"if this is the only 3 home visits that we need to do to set someone up, to change their outcome of decreasing their falls risk, I think it's value for money"

"if you can get those people before their balance goes to such a poor level, if you can target those people, if you can get them started hopefully then they'll maintain that…then 3 home visits is worth it when you look at it"

3.5.2.2. Supportive environment

To undertake a preventive health approach, physiotherapists identified the importance of a *supportive environment* for the participants, for themselves, for the broader community health service, together with the research team in order to run an effective program.

Peer support for participants came through friends and spouses, being encouraging and motivating, while at times generating competition.

"I had a lot of couples and I thought that was… motivating"

"the men were actually fitter and they were the ones that were doing all the walking and they were encouraging their spouse to go along for the walk"

"you didn't want them comparing"

The use of home visits allowed for a supportive environment to be established for an effective home exercise program, focussing on safety and the establishment of suitably challenging exercises.

"I think at the home it's much easier particularly with the more challenging ones you can secure the safety of the environment… more encouraged in the safety of the environment to challenge them a bit more"

"make sure you put it on a surface where the pillow's not going to slip"

"going on the home visit is good because then you can scout out in the house which is the best, appropriate spot for them to do the exercises …make it easy for them…. so that they don't shift a lot of furniture…I actually watch them do the whole exercise routine to see if they've got any problems"

"they'd had no concept of what was safe in their home environment"

"for the more challenging ones…where it involves more space or you know, stability"

Administrative challenges were, at times, the least conducive to a supportive environment for physiotherapists. Numerous challenges were faced at the point of intake to the community health service, with services variable in the flexibility for scheduling client appointments.

"our intake is always undergoing phenomenal change… demands from all sorts of management things"

"an enormous administrative challenge, dealing with these clients"

"we're booked up 4 or 5 weeks in advance… we needed to schedule those 3 visits right up front... We have no control. Absolutely no control"

"We were a bit fortunate in the sense that um, we, we made our own appointments… we know we'd want to try and see them within 3 weeks, but sometimes we don't. But that's the reality"

The support of other health professionals both within, and outside of, the community health service was seen as important for the recruitment process. There was a sense that the program was not considered of importance, especially if there were competing falls prevention programs at the same time.

"we have podiatry, we have dieticians, we have OTs, we have everyone and I promoted it at meetings, I'd go around and talk to people, I'd give them flyers and not one from any other discipline (except physio)"

"OTs..they run the No Falls… were very sensitive about their clients, they want to keep them…didn't want us poaching them…I didn't think it would be competition"

"announced it at staff meeting…OTs were pretty good"

"…GPs around the area and gave them some flyers… but I don't think we recruited any through there"

Logistical support was provided by the research team, together with an undertaking of the initial and 6 month follow-up assessments. This support was considered beneficial, with the initial assessment being sufficient and thorough.

"It was enough to know that you didn't have to worry about anything else, and that you could just focus on finding the right exercises"

"you focus down to the problem a lot more quickly than going through"

"was a lot of information so it was adequate. I could easily walk in and know what to expect and so, that was good"

"enjoyed your thoroughness"

Feedback was provided to participants at the time of the initial and 6 month follow-up assessments. The feedback was considered beneficial, being laid out in a functional context, relevant for the participants.

"you sent out the letter to them and you identified the goals, you actually put it in functional sort of wording… and make it sort of relevant to their issues"

"she enjoyed getting the feedback from yourself, that this had improved but this hadn't and so it was motivating for her, possibly to follow on, to work on her balance more rather than strength…information can be quite good in self-management and knowledge"

3.5.2.3. Knowledge and understanding

A supportive environment is conducive to the third identified theme of *knowledge and understanding.* Knowledge of what the research project entailed, knowledge of the details of the program and the commitment it necessitated and finally,

knowledge of balance and its relationship to falls was variable across the individual participants.

> *"some others who had agreed, had agreed without understanding what the research… non-English background …didn't realise their own active role in it"*
>
> *"Cause they thought that doing this assessment meant they got 3 home visits of physio massage"*
>
> *"When I said they were better, it's not that they're better physically, it's attitude and comprehension and knowledge. It's just that whole"*
>
> *"More aware of falls risk and then they're more alert to risk out there in the community"*

Physiotherapists also felt their knowledge of falls and balance was strengthened by participation in the program, primarily through the initial training session held with physiotherapists.

> *"I learnt some of those tests…I generally do the standard ones… timed up and go and the functional reach or the step test, but some of the other ones were new as well…so it was good to go through those"*
>
> *"Really interested to see people with more advanced knowledge on balance training compared to someone like myself with not much at all"*

While shared knowledge and understanding underpins the importance of the *relationship between the physiotherapist and the client,* trust and rapport were also identified as crucial.

Establishing a relationship with a potential client for the program assisted with motivating people to consider participating in the program. Clients known to the physiotherapist either individually or through group exercise programs, where there was already an established sense of trust and rapport, were recruited the most readily.

"People you'd actually build a good working relationship with….build a good rapport with"

"but, it was only with the people we'd built rapport with and had some maybe therapeutic success with, who were actually positive about their physio intervention that were willing to take it for us and help us"

"I found the one-to-one was good because you'd had a good idea of whether they'd be suitable and then you'd have the time to really explain what the project entailed"

The time spent with clients, within the context of their own homes, allowed the relationship to strengthen, providing an opportunity to address other concerns.

"No interruptions… there's nothing else happening there… had a whole hour with these people and I got to know them a lot better, and I got to know about all their other issues and… their motivations and, really able to discuss barriers to performing things that I wouldn't normally get a chance in a quick 20 minute"

"she had since developed quite severe spinal pain and because we've established that intimacy, I felt that duty of care to see her here and continue on some treatment"

"could identify some orthopaedic problems that I couldn't ignore and want to follow up"

An understanding of the individual needs of a client allowed for flexibility and the delivery of a tailored program for all participants.

"because of her, sort of reluctance, you're thinking oh she's got to commit to these exercises, I gave her a much shorter program instead of giving her 5 balance and strength, I only gave her 4 on top of the warm-ups, because I thought… if I make the program shorter then she's more liable to comply with it"

"I also looked at what they needed, if the muscles are weak then I make sure I put in strengthening, and I also looked at what aspect they were not good at, like with the stepping thing, I put in a stepping exercise"

3.5.2.4. Program design

Overall, the *program design* was acceptable for physiotherapists. Recruitment presented the greatest barrier for physiotherapists, garnering sufficient interest form older people to participate as well as acknowledging the support required from the community health centre as presented above.

"weren't that many interested in getting their balance assessed"

"the timing issue was really bad… right near Christmas time… and Steady For Life…two programs of similar emphasis were starting at the same time, so that actually got quite muddled"

While the choice of exercises given to physiotherapists was broad, they tended to focus on a selection of most commonly used exercises, which were readily modified to the client's ability. Several exercises were deemed more appropriate given their relationship to functional tasks.

"Although you gave us a whole repertoire of exercises, I narrowed it down to a certain handful of the basic exercises, which I would fall back on…this cut down on paperwork time with them"

"when I upgrade it, I can up the number of reps or I can change it …with the eyes closed with some of them, or some do it marching in place … it's basically same exercise but it's different"

"Because marching in place, if you say you've got to do it slow, that is very challenging compared to doing it fast… then if they get really good at that, you can get them to do it with the eyes closed to make it more difficult or you could change it and give them a pillow underneath"

"I used rocking a lot and marching in place, because I associate marching in place in gait, getting the clearance in…to help with clearance of the curb"

Despite reluctance from participants at times, the exercises were presented as activity to be incorporated into their lives, despite busy schedules, holidays and illness.

"Only gave 6-7 exercises, reiterating that this is a lifestyle thing, and if I gave them too many, they wouldn't do it. It wouldn't take them more than about 15 minutes"

"they took it on their holiday…on the boat"

"the little booklet was good….I had all the old exercises underneath and encouraged them to go back to the simple ones if they had an illness or weren't feeling up to it…you could even rotate the exercises if you were bored"

"I didn't give them the choice of 6 months, I said this was a forever thing"

Structured use of the booklet appeared successful, with daily recording of the exercises providing motivation to continue the exercises, but also eliciting a sense that they may not have been accurately filled out or may disillusion those who are not so diligent.

"diary of recording what they did is really very good…so that they can know themselves, if they see a whole blank spot and say "oh gee, I haven't been doing them'"

"the tick sheet, there was quite a few that I could see…they did it at the last minute"

"you don't want people getting disillusioned when they've gone off track… I don't know that I would've done it right across like that…week to week"

The graphics of the exercises within the booklet were both a help and a hindrance.

"booklet with exercises all with graphics…nicely presented"

"if the pictures weren't exact to the exercises, I had a lot of trouble keeping people on track"

The design of three home visits was positive from the perspective of allowing personalised exercise prescription and modification/progression, ensuring safety within the participant's own environment. The third home visit was particularly useful to allow for consolidation of knowledge.

"really luxurious in a way, because we had these 3 allocated visits and we could go to such levels of exercise prescription and correction and picking nice exercises and making them functionally relevant for this person and all those sorts of things. But that's not our normal work, our normal work is down at that basic convincing level"

"the participants really enjoyed having us back, everyone liked the 3rd session to consolidate"

"everyone liked the 3rd session to consolidate the exercises, and they were a lot more confident that this is a program they could carry through, more motivated to carry through"

"usually by the last home visit you know that they're actually doing it as it should be and you are quite confident that they'll continue doing that for the remainder"

"seeing them in their own environment… functioning in their own environment"

"you've really got to check them (the exercises), because they get into doing it wrong"

"they'd had no concept of what was safe in their home environment…. I don't know how you could do that if you held it in a clinical setting"

While there was overwhelming support for the use of home visits, there was some concern among the group that the home visits may not be cost effective and would need to be supported by evidence.

> *"labour intensive for us"*
>
> *"it sounds like it's worth a balancing act between the resources (for Steady for Life etc) that you have and that sort of administrative kind of load (required) but on the other side, delivering it at home has distinct advantages as well"*
>
> *"to go to the home takes a bit of extra time, so I think we need that evidence that it helps before we can start to put into practice broadly…"*

3.5.2.5. Resourcefulness

The *resourcefulness* exhibited by the physiotherapists throughout the program was to be commended. They displayed extraordinary commitment to recruiting participants through many varied channels, despite the difficulties.

> *"best one was actually just using the clients that came through our door"*
>
> *"veteran affairs talks…the RSL"*
>
> *"mainly a lot of your pool people"*
>
> *"strength training group"*
>
> *"University of the Third Age talks"*
>
> *"we got our best ones from taking it down to Probus with them, taking it to their exercise group, taking to their quilting group"*
>
> *"I think the worst one was when we were at the Ashburton festival, going up to someone and say 'we're doing a research, oh, for people over 65,' and the guy will go 'oh! Do you think I'm over 65?"*
>
> *"failures, bowling clubs, I thought bowling clubs would be a good source, but I went to 2 and, nothing"*

"you left flyers at bowling clubs, because there's this misconception of people 'I'm active, I'm doing bowling, my balance, I've got no issues with my balance,' but they haven't… all these people, they were the ones you should have had"

"went to each library in Boroondara…nothing"

"gave out lots of pamphlets to our exercise classes… that often attracted the wrong type of client too"

Managing the administration of the program was reported as an arduous task, however, a variety of approaches were used to address this issue.

"I just printed out the 20-30 exercises for each new client… the starter pack…and all the requirements you needed us to fill in"

"before I do the home visit I read up and see what's wrong with the person… I think I will likely use this and this exercise or maybe that. So I make sure I get photocopies of all the exercises I think I might use and then take that with me"

"we didn't put ourselves on extra hours or anything…. normally they'd be on a wait list… we didn't treat them like research people… we treated them as not project people, we treated them as another centre client that needed the home visits"

Participants recruited for this program varied from their usual clientele, presenting a challenge for scheduling, recruitment and exercise prescription.

"higher socio-economic, health literacy status than our normal client base"

"it's a different type of client….from Make a Move"

"she was tough to just find appointments for"

"really hard to book these people in who were a lot more demanding than our standard clients… they live busy lives and they expected appointments …very stressful… super challenging…"

Physiotherapists were receptive of the need to challenge their perceptions of balance dysfunction in an active, relatively well group of older adults, together with challenging a highly functioning group in contrast to their usual workload.

> *"a lot of the people that may seem really high level … are we committing too many people with balance dysfunction in the cut-off or have they got really a problem"*
>
> *"those ratings, what you called mild… I would have rated them moderately high. I think this woman's really at risk of falling over in the street' …I had to challenge my way of looking at someone (that) what I look at might have been different to what I should be looking at when I rate people"*
>
> *"But it was a challenge, I think because most of the people that I see, in the normal falls prevention program… we are down at this end of the scale and I'm dealing with people at the other end of the scale"*

3.5.2.6. Recommendations

Recommendations from physiotherapists to potentially roll the program out more broadly were varied and insightful. As mentioned under the "*preventive health"* section above, the need for education of health professionals and older people themselves regarding early intervention was seen as vital to establish a focus on early balance dysfunction and its implications. Implementation of a program such as this is required to be based on evidence after which community health services may consider its value for a change in practice.

> *"we need that evidence that it helps before we can start to put into practice broadly"*

Despite the recognised benefits of home visits, suggestions included home visits as an option for care, in contrast to other available programs; utilisation of an Allied

Health Assistant once the initial program was set up; or modifying the program set-up to allow for some centre-based sessions.

> *"it won't be the only strategy to use for someone…we can address some of these strengthening problems and balance problems by the pool, by doing other classes…just different strategies"*
>
> *"in the real world I probably wouldn't like just focus on the exercises and I'd be looking at everything else…it might be that they like variety"*
>
> *"for future practice it's a bit hard to go 3 times…I'd probably rely more on an Allied Health Assistant…in help delivering and checking on the exercises and then us reviewing as required"*
>
> *"maybe 5 or 6 people who commit to every second week for 6 weeks or something coming in to the centre… some compromise of taking this program and delivering it in a different sort of format, but not quite exactly as you'd like it to be done"*

With community health services increasingly seeking to tap into alternative sources of funding, an individualised falls prevention program may be of benefit through the Allied Health Initiative of Medicare. The flexibility of five allied health sessions for an individual may suit this type of program.

> *"tapping into this extended Medicare plan…to promote it with the care plan for falls…evidence based…if you use three physio visits, one podiatry visit and one OT visit… there's a very good care plan designed around falls prevention…get that extra bit of Medicare funding which may offset some of the time and expense that the Community Health physio has to do"*

Tapping into existing services to promote the importance of testing for mild balance dysfunction was suggested. Linking with routine screening opportunities that exist through GP practices would potentially detect those who require further intervention.

"you really don't know whether you have or not until you are tested… practice nurses that do this (for) clients of a certain age… for over 65 or over 70…they need to do a couple of those tests that Jing's picked out, and then if there's an issues with that…they will suggest to these people that they get seen"

There was acknowledgement among physiotherapists that taking the message to older people, rather than expecting them to come to a service, was crucial. These active, relatively well older people often do not consider balance to be an issue, reiterating the importance of the preventive health message through the transfer of knowledge.

"there's this misconception of people 'I'm active, I'm doing bowling, my balance, I've got no issues with my balance,' but they haven't (thought about it)"

"only other way to target these people is hopefully they will volunteer and come in and be tested...but a lot of people, 'I'm so busy, I haven't got the time. I'm not going to do it. My balance is alright. I'm playing bowls. I haven't had a fall"

"assessing them at the bowling green…or at the retirement centre…a mobile balance assessment"

3.5.3. Key factors in enhancing participation

From the valuable insights gained from both older people in the community who exhibited mild balance dysfunction and the community health physiotherapists who delivered the program, the program was overwhelmingly positive. Key benefits of the program, as well as challenges, lay at the individual, organisational and wider community level.

Successful implementation of the program for older people exhibiting mild balance dysfunction, including maximising adherence to the program, emerged through the key themes discussed above. From the participants perspective these include:

- A program with the focus on strength and balance, which assists with improving functional activity;
- Marketing the program in a manner which engages, but doesn't specifically target, older people, contrasting the program with more general exercise programs;
- Providing education prior to commencement that the program will potentially:
    - Allow individuals to make improvements in their physical health, by addressing current health concerns;
    - Improve confidence, with less concern for a loss of balance or tripping;
    - Increase knowledge of falls and injury prevention, balance and movement; and
    - Provide physical, social and psychological benefits.
- Strategies to enhance commitment to the program which:
    - Encourage and incorporate individual preferences such as the number of exercises prescribed, the total time commitment required on a daily basis, and options for developing a routine for exercise;
    - Provide challenging and useful exercises;
    - Reduce monotony and tedium of exercises by providing options for modification in the absence of the physiotherapist, if deemed safe to do so; and
    - Allow for physiotherapist involvement with regular contact to provide encouragement; feedback about performance in a timely manner; and the tailoring of the program to individual need.

Both the participants and physiotherapists stressed the importance of the home visits. Participants stated the importance of exercising in the home as:

- Convenient, with exercise programs carried out at a time suitable to an individual, contrasting with the rigidity of a structured group setting;
- Practical, with the home setting functional, specific to their needs and conducive to carryover; and
- Individual, with tailoring of exercises specific to their needs.

Physiotherapists had similar views, additionally expressing the importance of:

- establishing a safe and functionally relevant exercise program;
- enhancing the trust and rapport between client and physiotherapist, aiding motivation and commitment to the program;
- providing timely and effective feedback for progression and/or modification of the exercises; and
- allowing for a consolidation of knowledge over several visits.

Other key aspects relevant to the success of implementation of the program identified by physiotherapists include:

- Being able to engage a relatively well and active older group of people in the preventive health area of improving balance. This may involve taking the preventive health message to them, rather than expecting older people to present to a health professional;
- Having adequate administrative support to ensure a smooth running program; and
- Providing training to health professionals to enhance the identification of mild balance dysfunction among older people, and the need for subsequent early intervention.

3.6. Intermodal agreement of the Falls Risk for Older People in the Community (FROP-Com) assessment tool

The sample for this sub-study consisted of sixteen participants, 12 (75%) female and 4 (25%) male. They had a mean age 79.1 (sd = 5.4) with a range of 65 to 86 years. The mean time between face-to-face and telephone administration of the tool was 10 days (sd 5 days). One participant experienced a fall with serious injury between the face-to-face and telephone assessment. The mean face-to-face and verbal FROP-Com total scores were 9.8 (sd = 3.2) and 10.0 (sd = 3.4) respectively, with no significant difference between the two modes of administration (paired t-test, $p = 0.621$). The intraclass correlation coefficient (ICC) between the total FROP-Com scores was 0.83 ($p < 0.001$). Table 5 contains the Kappa coefficients and percentage agreement for the individual FROP-Com items as well as for falls risk category. For nine items, kappa coefficients could not be calculated because of the lack of variability in scores on that item. For the other items, kappa scores ranged from 1.00 to -0.10. Percentage agreement ranged from 100% to 56%, and the mean percentage agreement across all items was 83.1%. The items with 100% agreement between the modes of administration were assistance required for personal activities of daily living, the ability to walk safely in the house and the ability to walk safely in the community. For some items, difference in agreement was due to an actual change in status in the time between face-to-face and telephone administration. For example, for the participant experiencing a serious fall, a change in level of assistance required to perform domestic ADLs occurred in that time.

Table 5: Kappa coefficients and percentage agreement for FROP-Com falls risk category and individual items

Risk factor item			
	Kappa	**p-value**	**Percentage agreement**
Number of falls in the past 12 months	0.87	<0.001	94%
Injury in past 12 months	0.86	<0.001	88%
Number of medications	-		88%
Number of falls risk medications	-		81%
Number of medical conditions	0.85	<0.001	81%
Vision deficit	0.46	0.032	81%
Somatosensory deficit	0.65	0.002	94%
Foot problems	0.13	0.315	56%
Inappropriate footwear	-		81%
Cognitive status	-0.10	0.693	81%
Incontinence	0.65	0.002	94%
Nocturia	0.54	0.012	81%
Food intake	0.83	<0.001	94%
Weight loss	-		94%
Alcohol intake	0.85	<0.001	63%
Functional behaviour	-		63%
Assistance required to perform personal PADLs	-		100%

Risk factor item			
	Kappa	**p-value**	**Percentage agreement**
Change in personal ADL status	0.62	0.004	81%
Assistance required to perform domestic ADLs	0.75	<0.001	88%
Change in Domestic ADL status	-		56%
Observation of balance	0.39	0.051	75%
Walking safely in the house	-		100%
Walking safely in the Community	1.00	<0.001	100%
Level of physical activity	-0.14	0.568	75%
Change in physical activity	-		88%

-Kappa could not be computed for these items because of lack of variability in the range of scores

3.7. Training Manual

A training manual was designed at the commencement of the project, as outlined in Phase A of research design. The manual was to be used as a resource for physiotherapists throughout the project, in addition to the practical workshop attended.

The intention had been, from the outset of the project, that the training manual would be available for community health physiotherapists more broadly at the completion of the project.

An expert panel meeting was convened on April 21, 2011 at the National Ageing Research Institute, to consider proposed changes to the manual based upon the feedback of participating physiotherapists and the expertise of the panel members and project team.

The training manual has been updated in response to feedback. It is yet to be determined how the training manual will be best disseminated.

4. Discussion

This project has demonstrated the successful implementation of a home exercise program for older people with mild balance dysfunction through existing community health services. The original research design of a randomised controlled trial proved to be successful in the research setting, but prior to this current project it was unclear whether results could be readily transferred into the clinical setting.

4.1. Impact of exercise program comparable to effect seen in RCT

The results of this project demonstrate that a group of older people measured as being "outside of normal limits for balance for age" can improve their balance at a similar magnitude to the previously successful randomised controlled trial. In the present study, of the individuals with mild balance dysfunction at baseline who subsequently undertook a home exercise program, 26% returned to "within normal limits" when reassessed after six months. This is almost identical to the proportion seen in the previous randomised controlled trial, in which 24% returned to "within normal limits" after six months (Hill et al., 2008). In addition, participants receiving the exercise program showed significant improvement on several balance and mobility measures over the six month period, again mirroring the results of the randomised controlled trial, which saw similar magnitudes of change in Functional Reach, Step Test and quadriceps strength. Both these factors suggest that the home-based exercise program does have similar effects when implemented in a clinical setting. The suite of clinical balance and mobility measures used was suitable to identify mild balance dysfunction and provided adequate information for the basis of a home exercise program. Older people with mild balance dysfunction are a group not commonly seen by community health physiotherapists, presenting an unusual, but positive, challenge for preventive health. Identification of mild balance dysfunction is not widely recognised, but results from this project and the previous RCT strongly suggest that this group of people can be identified with a small number of clinical measures, and would benefit from the home based exercise intervention. Physiotherapists demonstrated an increased awareness of

being able to make improvements for this group of older people, but expressed concern with the feasibility of sustaining the program. Education of health professionals is imperative to ensure early recognition of mild balance dysfunction and appropriate management.

4.2. Participant and physiotherapist experience

Overwhelmingly, both participants and community health physiotherapists found the program to be acceptable and beneficial. Consensus existed for the program design, with participants and physiotherapists alike commenting that the home visit program was beneficial; the assessment process thorough; exercise prescription flexible and adaptable; and the materials useful. There was some ambiguity about the ideal duration of the program; the need for three home visits; and how best to recruit participants to the program. Adherence to the exercise program was high. While this is encouraging, it could perhaps be reflective of the high levels of motivation of people engaging in research. Participants employed individual strategies for maintaining adherence, but being able to exercise at home at a convenient time was consistently identified as an advantage of this program over group or centre-based exercise.

4.3. Implementation

Implementing this program more broadly does meet with some administrative barriers. Meeting the challenges of administrative procedures for individual community health centres featured strongly, together with engaging a socially active group of older adults. Convincing older people of the benefit of the program can be demanding, and additional investigation may be required to consider the unique needs of people from culturally and linguistically diverse backgrounds.

Adherence to exercise programs is an ongoing area of active research, with this project contributing to the understanding of an individual's motivation. Participants were motivated by an improvement in their physical and psychological wellbeing; an understanding that research is of benefit to the wider community; an improvement in their knowledge and understanding of falls and balance; and,

perhaps most importantly, by an improvement (generally) in their personal balance and mobility measures which encourage them to persevere with the program.

4.4. Sub-study

The sub-study undertaken to determine the intermodal reliability of the Falls Risk for Older People assessment tool showed that telephone administration of the tool had good reliability in this sample of people with relatively low falls risk. However, before routine use of the FROP-Com via telephone can be recommended, some items need to be modified and the tool re-tested. In addition, the intermodal reliability needs to be ascertained for people across a broader range of falls risk. Guidelines for telephone administration of the FROP-Com will need to be developed, with modifications of items which required direct observation of function or status in the face-to-face version.

5. Recommendations

This project has demonstrated that a balance screening and home exercise program is effective and can be implemented for older people through community health services. Based on these findings, the project team recommends the following:

- That the program be implemented more broadly through community health centres. With adequate training (possibly to be conducted through the National Ageing Research Institute), community health centres should be capable of screening for mild balance impairment, recruitment of suitable participants for the program, and implementation of the intervention;
- Consideration should be given to a sustainable approach of the provision of training and support to enable wider dissemination and uptake of the program. This may be through further grant funding or through cost recovery programs;
- The delivery style for training be face-to-face sessions (possibly through the National Ageing Research Institute), followed by access to the training manual to guide implementation;
- All materials to be professionally designed, including consideration of developing online training and learning resources; and
- That the Department of Veteran Affairs and the Victorian Government Falls Prevention Network promote the program outcomes and available resources.

6. Project resources

It is recommended that community health physiotherapy staff attend a training session to support skill development. Trained staff would then be provided with a manual for reference (draft manual attached to this report).

7. Dissemination of project outcomes

7.1. Conference Presentations

An abstract has been submitted to the 9th International Association of Gerontology and Geriatrics Asia/Oceania Regional Congress to be held in Melbourne, October 2011.

Poster presentation for the 4th Australian & New Zealand Falls Prevention Society Conference - Dunedin, New Zealand, November 2010

7.2. Publications

A paper is in preparation for submission, subject to approval from the Department of Veteran Affairs.

7.3. Summary of Findings for Participants

A one-page summary of the study findings (Appendix 1) will be sent to all participants on completion of the project.

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9. Appendices

Appendix 1 Summary of findings for participants

A pragmatic trial of the implementation of a balance screening and home exercise program through existing community health services

Summary report to program participants

Thank you for participating in the above named project over the last two years. The project is now completed, with the final report sent to the funding body - the Department of Veterans' Affairs. The final report can shortly be accessed on the NARI website at www.nari.unimelb.edu.au for those who wish to have more information than the brief summary provided here.

Most research in the area of falls prevention targets older people with moderate to high levels of balance problems or falls risk, while this project paid particular attention to those with mild balance problems. A previously successful research trial showed that the home exercise program could improve a person's balance, but it was unknown whether this program could be delivered through existing community health services.

Six community health centres (Sunbury, Merri, Inner South, Inner East, Caulfield and Bentleigh Bayside Community Health Services) recruited eighty-two participants. Seventy one people were assessed as having mild balance problems. Of the seventy-one people offered the exercise program, fifty-seven completed the program. Fourteen

participants withdrew for reasons such as illness; busy with other commitments; and a loss of interest in the program.

Participants in the exercise program were a relatively well, active group of older people. Despite this, all had reported a degree of loss of confidence in balance or walking when admitted to the program, with 43% having had one fall in the past 12 months. Half of the participants who had been assessed as having balance within normal limits had also fallen within the past 12 months. Performance on the stepping test (Step Test) and the reaching test (Functional Reach) formed the basis of classification for balance. Those within the "normal" group had an average of 18.3 steps compared with 12.2 steps for those with mild balance problems, whereas the reaching test showed an average of 33 cm for the "normal" group and 25.1cm for those with mild balance problems.

Following the exercise program, there was a significant improvement in the Step Test, Functional Reach and Sit to Stand tests, with an additional, but non-significant improvement in front of thigh and hip muscle strength. Such was the improvement in balance amongst the exercise group that 26% of participants returned their balance levels to within "normal" limits.

Four focus groups were held with exercise participants and physiotherapists from the community health centres, providing valuable insights into how the program can be best implemented. Key benefits of the program were that it was a program focused on challenging and useful strength and balance exercises which assisted functional ability; improved confidence; increased knowledge of falls and balance; and allowed for an individualised program with encouragement and feedback from the physiotherapist. Both the

participants and physiotherapists stressed the importance of the home visits, which provided convenience together with an environment that enhanced safety, rapport and focused on the needs of an individual.

Challenges of the program included the difficulty of staying motivated with unchanging exercises in the latter stages, particularly when there was a lack of peer or physiotherapy support. Preventive health messages at times do not find their target, with physiotherapists expressing difficulty in attracting people to the program.

On behalf of Sue Williams and Frances Batchelor (project managers) and the rest of the research team, I wish to thank each and every one of you again for your time and commitment to the program.

If you wish to become a registered volunteer for future research projects, I encourage you to fill out the enclosed form and return it to the National Ageing Research Institute in the reply paid envelope.

Kind regards,

Claudia Meyer

Research Physiotherapist