

Original Article

The Footfall Programme: participant experiences of a lower limb, foot and ankle exercise intervention for falls prevention - an exploratory study

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Abstract

Objectives: Despite growing evidence that foot and ankle exercise programmes are effective for falls prevention, little is known about older adults' views and preferences of programme components for long-term maintenance. The aims of this study were to explore the experiences and acceptability of Scottish and Portuguese older adults of undertaking a home-based foot, ankle and lower limb exercise intervention. **Methods:** Ten Scottish (mean age 76 years, 7 female) and fourteen Portuguese (mean age 66 years, 12 female) community-dwelling older adults undertook the programme for one week, followed by focus group discussions (2-6 people per group), guided by a semi-structured interview guide. Data was analysed using thematic analysis. **Results:** Seven themes were identified: Assessment, Group exercise taster, Home based exercise; Footfall programme kit, Midweek phone call, Reasons for participation and the Research Process. Programme components, support telephone calls and research procedures were generally well accepted by participants and they valued having a contribution to the design. They preferred a blended home and intermittent group-based programme format for motivation and progression and recommended changes to some of the exercises and equipment to reduce barriers to participation. Some cultural differences emerged, including importance of the functional assessments for Portuguese participants, time issues and difficulty in completion of the exercise diary, reflecting lower literacy levels. **Conclusions:** Participants found the programme acceptable but preferred a blended home and occasional group-based programme for adherence and motivation. A strong educational component to improve health literacy and simple paperwork completion to avoid data loss in future studies with Portuguese older adults is important.

Keywords: Exercise, Falls, Feet, Feasibility, Older adults

Introduction

Exercise-based interventions offer a multitude of health benefits to community-dwelling older adults, including reducing falls risk, falls rate and falls-induced injuries^{1,2}. Home-based exercise interventions, if adhered to, offer effects similar to group based programmes. But such interventions are only effective when meeting sufficient 'dosage', progression and individual tailoring requirements². Programme characteristics (e.g. convenience of setting; home-based vs group exercise)³ and sociocultural aspects appear to be factors that influence uptake and completion of falls prevention exercise interventions⁴. Franco et al⁵ reported that both home-based exercise formats and avoidance of the need to travel to were rated as the highest value attributes of exercise programmes by mobility-impaired and older adults who had suffered falls. Given the barriers to exercise faced by older adults, home-based solutions offer advantages by

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removing the need for transportation and facilitating the integration of exercise into daily routines⁶.

Adherence to home-based interventions for falls prevention can be low and may be influenced by programme characteristics and the amount of support provided⁷. The social interaction that comes from group exercise interventions is highly valued by older adults⁸ and facilitates acceptability⁹. It is possible that blended programmes, which combine intermittent group sessions (i.e. focusing on progression) with a regular home-based exercise regimen, could perhaps offer a reasonable compromise for most older adults.

Despite growing evidence that foot and ankle exercises appear to be effective for falls prevention when integrated in multifaceted podiatry interventions¹⁰⁻¹², their effectiveness as standalone interventions within a home-based or blended context remains unclear. These studies did not offer insight into older adults' views and preferences of the exercise programme characteristics that could potentially promote their long-term maintenance. Indeed, when one large study¹⁰ was replicated in the UK¹³, there were no positive effects on falls prevention. Cultural differences could possibly explain divergence in intervention effectiveness. As such it would be useful to know if there are different views on the intervention delivery between participants in different countries¹⁴.

The **Footfall** programme is a standalone lower limb, foot and ankle exercise programme that has adapted the delivery and exercises (including the equipment used), from the original study by Spink et al.¹¹, for use in the UK and in Portugal. There is a scarcity of published qualitative evidence focusing on Portuguese Older Adults views and attitudes about exercise intervention components and it is not known if the outcome measures are feasible or if the adapted programme is acceptable to older adults in the UK and in Portugal. This study explores the views and experiences of older participants in the two countries about the exercises, the delivery of the exercises and the outcome measures for running this study as a larger feasibility study in the future.

Materials and methods

Objectives

This study aimed at achieving the following primary and secondary objectives.

Primary objectives

- To explore the experiences of Scottish and Portuguese older adults of undertaking a one-week home-based foot and lower limb exercise intervention.
- To determine to what extent the planned home-based exercise intervention is acceptable to Scottish and Portuguese Older adults and take into account any adaptations that might be needed.
- To evaluate relevance and burden of outcome measurements.

Secondary objectives

In order to inform culturally adapted future interventions and research, including a feasibility study of a future trial:

- To examine the participants' feedback on the delivery and support methods and the different components of a home-based foot and lower limb exercise intervention after experiencing it for a week (acceptability of the intervention in principle);
- To explore the views of British and Portuguese community-dwelling older adults about study enrolment, informed consent procedures, research process, recruitment strategies, intervention uptake and participatory approaches to research.

Subjects

Participants from the UK were recruited in Glasgow. Participants from Portugal were recruited from Setúbal, Tomar and Portimão. In Glasgow, posters were distributed in the local community and invitation letters and emails sent via partner organisations (see acknowledgments) mailing lists. An advertisement was also placed in a free local newspaper and events held by partners were attended by the researchers. In Portugal, networks used by researchers included community centres and voluntary organisations (see acknowledgments) along with word of mouth from Physiotherapy colleagues. Recruitment methods varied between Scotland and Portugal, due to contextual differences and available resources.

Inclusion criteria

Participants were older adults (≥ 60 years old) living in the community, able to ambulate and travel independently to the venue, able to read and write in English (British group) or in Portuguese (Portuguese group), free from diagnosed central nervous system diseases and significant cognitive impairment (as defined by cut-off points of the Mini mental state examination)^{15,16}, self-reported depression, self-reported significant visual impairment or registered blindness, recent lower limb fractures (<6 months), recent joint replacements (<1 year), non-controlled diabetes mellitus or other medical contraindications for physical exercise. Recruitment took place between February 2018 and August 2018.

Methods

A qualitative methodology is appropriate to capture views, understandings and perceptions of participants on a topic^{17,18}. Focus groups were undertaken in each country (Scotland and Portugal). Group interaction is important to this method, as it facilitates participants in exploring and elucidating perspectives in a more naturalistic way¹⁷.

Participants came to an introductory session (details follow) about the intervention. Focus groups then took place between 7 and 9 days after they tried the **Footfall** programme for a week. Three focus groups were held in each country. Each focus group had between 3-8

participants, as recommended¹⁷.

A semi-structured interview guide (Table 1) was used, inspired by previous feasibility exercise studies^{19,20}. Interviews were flexible in nature and adaptable to the direction of participants' contributions¹⁷. Focus groups were led by the same moderator in both countries (MC) with support from DAS/GH in Glasgow and three assistants in Portugal for note-taking. A PowerPoint™ presentation of the questions of the interview guide was simultaneously presented, acting as a guide for the flipchart notes and participants. Participants were asked to confirm if their views had been captured accurately on those notes at the end of the focus group (data validation). Focus groups were audio recorded on to a digital sound recorder (Model MICD-UX560 Sony™). Field notes were made immediately after each focus group, and the researcher kept a reflective journal throughout the study in order to assess personal attitudes and feelings. Brief discussions also took place with the second observer covering both their views about the focus groups, as well providing feedback on the moderating style of the researcher.

Ethics

This exploratory study was approved by the School of Health and Life Sciences Research Ethics Committee of Glasgow Caledonian University (HLS/PSWAHP/17/147). The Portuguese National Data Commission also authorized all procedures related to the collection and analysis of data from Portuguese participants (CNPD n° 1760/ 2018). Each participant gave written informed consent before data collection.

Introductory session, baseline assessment and one-week trial of the exercises

The first session was attended by groups of 3-8 participants and was divided into three parts: assessment; brief foot health and falls presentation and a group exercise session. Each is described below. This took approximately 2 hours and refreshments were provided throughout.

Assessment outcomes

Participants completed a study specific questionnaire covering basic demographics, general health, falls and foot pain. They also independently completed the Yale Physical Activity Survey for Older People^{21,22}; Foot and Ankle Outcome Score (FAOS)^{23,24}; Falls Efficacy International (FES-I)^{25,26}; Activities-specific Balance Confidence (ABC) Scale^{27,28}; a single question on whether they had pain in either foot (yes/no)²⁹; and Foot pain severity (each foot separately) was measured with a 100 mm visual VAS^{30,31}.

They also completed functional assessments individually in a different room from the rest of the group. These tests included the Timed up and Go test³², Functional Reach Test³³, 30-s Chair-Stand Test³⁴ and the Chair sit-and-reach test³⁵.

Participants were asked to self-report on previous falls. A fall was defined as "an unexpected event in which the

Topic	Key questions
Topic 1: Assessment session	Views about the assessments
	Views about foot health and falls
	Views about exercise and falls prevention
Topic 2: Home-based lower limb and ankle exercise programme	Views about the group session
	Views about the exercises
	Views about exercise booklet
	Views about the participant diaries
	Views about mid-week call
	Views about overall programme.
Topic 3: Study procedures	Views about recruitment, enrolment, participation

Table 1. Key topics forming the semi-structured interview guide.

participants come to rest on the ground, floor or lower level"³⁶. Participants were also asked to keep a falls diary³⁶ with telephone reporting to the researcher over the course of one-week.

The outcome measurements were selected because they were validated and affordable instruments that could be easily applied in a real-life setting and many had published European Portuguese versions available.

Brief presentation about foot health and falls

A presentation of an overview of the evidence base about the ageing foot, foot health, foot-related falls risks factors and role of physical exercise in falls prevention was delivered by MC. This was an interactive presentation, where participants could ask questions or make remarks at any time.

Group exercise session

The **Footfall** programme is based on the exercises from a previous foot and ankle exercise programme¹⁰ plus some exercises from the Otago Exercise Programme³⁷ and the FaME programme^{38,39}. The English and Portuguese **Footfall** programme booklets can be obtained from the authors.

Participants took part in an initial taught 'taster' group exercise session, allowing people to try each exercise and ask questions. Each participant then received their tailored home programme (selection of exercises, number of repetitions and sets of each exercise) according to their functional and fitness level. They also received a programme package that comprised the participants booklet (in English or Portuguese) and exercise equipment. Participants were informed they could keep the study package forever but asked to return the exercise and falls diaries at the focus group.

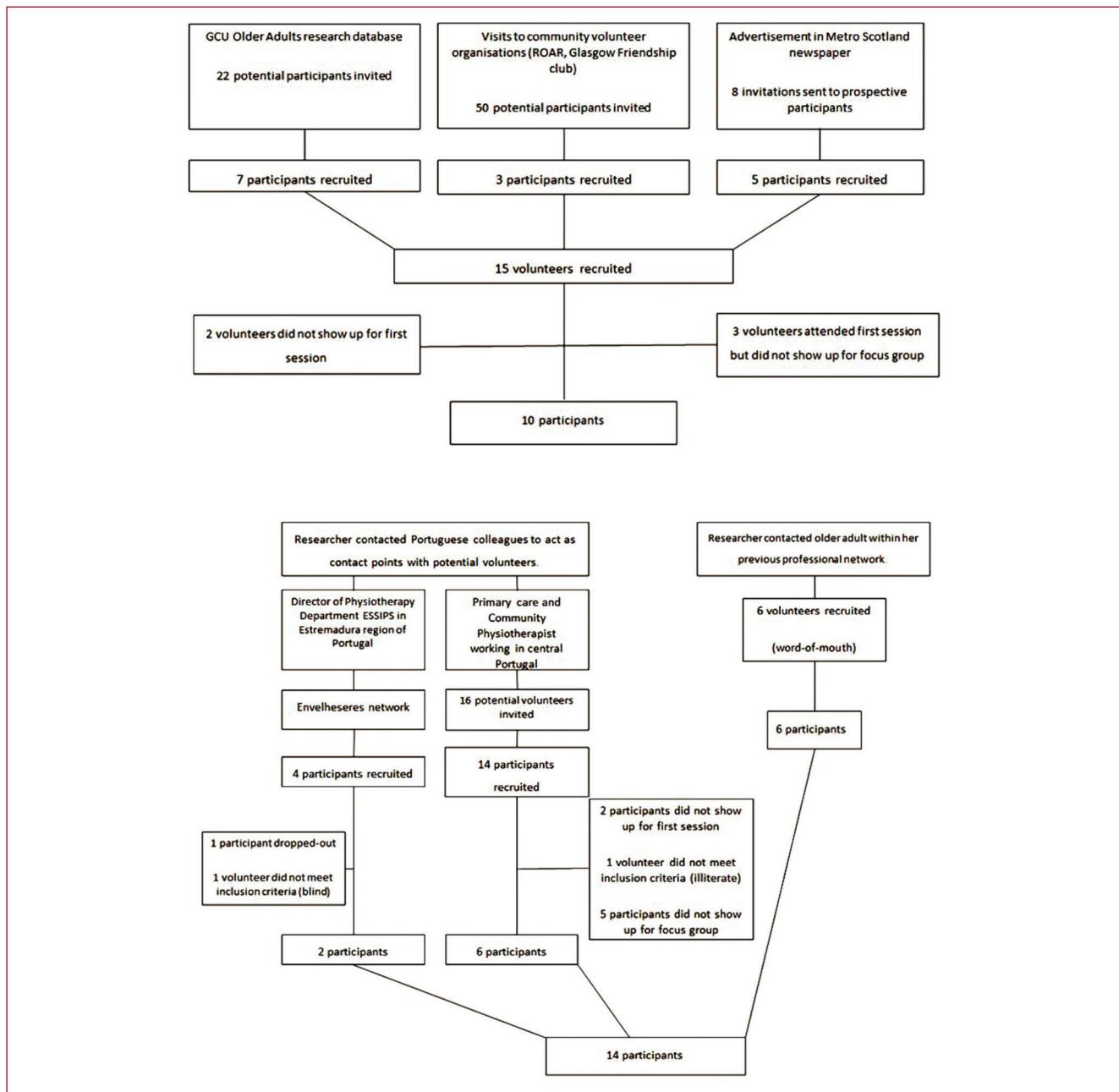


Figure 1. Flowchart of the recruitment process in Scotland and in Portugal.

The exercise booklet contained instructions about the study and exercise programme, general information about the components of the programme, instructions and illustrations of lower limb and foot exercises. They were asked to complete the exercise diary after each exercise session to facilitate adherence⁴⁰. The falls diary was only to be completed in case of a fall. Both documents had the researcher's contact information and participants were asked to contact the researcher if they suffered a fall or had any questions about the exercises. The exercise

equipment included a dense foam wedge, an anti-slip mat, a small cloth, a resistance band, a big toe exerciser and a bag to keep the materials in. The booklet and further information about the exercise equipment is available from the corresponding author.

Mid-week support

One mid-week telephone call to each participant was made asking about their views and to motivate participants to proceed with the programme.

Data analysis

Demographic data

Descriptive statistics were computed for demographic data, varying with the type of variables. Frequencies were calculated for nominal variables, whereas median and interquartile range was ascertained for all scores of questionnaires and functional tests. Statistical analysis was performed with IBM SPSS 25®.

Transcription and translation of audio recordings

The focus group audio recordings were fully transcribed verbatim and anonymised. Transcripts followed the Braun & Clarke annotation system for orthographic notation, including little punctuation, as well as vocalised sounds to reproduce spoken language¹⁷. The anonymised Portuguese transcripts were then translated to English by the researcher. Following this, a certified translator proofread and resolved any discrepancies between original transcripts and English translations. Original Portuguese content was kept alongside the English translations, so that the researcher could to easily refer to it whenever necessary.

Thematic analysis

This study followed the coding and analytic steps proposed in the six phases of thematic analysis framework established by Braun & Clarke¹⁷: 1) Familiarization with the data, 2) Generating codes, 3) Generating themes, 4) Reviewing potential themes, 5) Defining and naming themes. The other researchers also independently read and analysed 3 randomly selected hard-copy transcripts each, enhancing validity and allowing the coding frame to be developed through a process of collaborative reflection and discussion. After consensus was reached, the coding frame was applied to all transcripts. Data was managed by the researcher using NVIVO 11™.

Results

Recruitment

Fifteen participants were recruited in Glasgow and 24 in Portugal (Figure 1). Two UK and 2 Portuguese participants did not attend the first session and therefore were not consented into the study. Two Portuguese participants did not meet the inclusion criteria. Those who withdrew after consenting at first visit (3 UK, 5 Portugal), did so for a multiple of reasons that were not related to the study, though 4 participants who provided no reasons for withdrawal. Unfortunately, it was not possible to interview participants who had not completed the exercise programme in the focus groups discussions. Therefore, focus group analysis was conducted with 10 UK and 14 Portuguese participants (Figure 1).

Demographics

In Scotland, the mean age of participants was 76 years (range 68-80 years, 7 women). In Portugal, it was 66 years (range 64-74 years, 12 women) (Table 2). All

participants had experienced at least one fall in the previous 12 months, with 2 falls episodes being the most commonly reported frequency in both countries. Participants reported suffering minor injuries (bruises) with some reporting limb fractures. The majority of participants from both countries reported having no foot pain at the time of assessment and had moderate functional status. Moderate-to-high concern with falling affected half of both Portuguese and Scottish individuals. They had relatively good functional scores on Timed Up and Go and 30s Chair Stand tests, reflecting their relatively good self-reported physical activity levels. Scottish participants had more school and higher educational qualifications than Portuguese. The majority of participants were retired (Table 2).

Focus groups

There were differences in terms of numbers for attendance (2 to 6 participants), as well as duration (45 minutes to 180 minutes) between focus groups in both countries. In Scotland, 10 participants were divided into 3 groups with 3, 3, and 4 participants respectively. In Portugal, 14 participants were divided into 3 groups with 2, 6 and 6 participants each.

Views and experiences of research procedures

Participant views about the research procedures are grouped in seven main themes: Assessment session; Group taster session; Home based exercise week trial; Footfall programme kit; Midweek phone call; Reasons for participation and the Research process. Quotes to support the context are presented as (*proxy name, Focus Group number and Country (UK/PT)*).

Assessment session

The assessment session was generally considered an easy and straightforward process with participants indicating that they felt comfortable throughout the session, including the outcome measurements and functional tests.

"We came in for the first time, without you knowing our potential... Therefore, we had to do something for... I mean, to integrate us and for you to assess...." (Catarina, FG3_PT)

Scottish and Portuguese older adults were particularly interested in the results of the mini-mental examination test, expressing great relief that their scores were within normative range. A few were surprised by how apparently simple questions and tasks could suggest deeper implications about their functional status. Several Portuguese participants also reported that it had been their first time undergoing any of the assessments, whereas most Scottish participants were familiar with at least some of them. Some Portuguese participants felt that knowing the results of this assessment could be a further motivator to exercise.

"Well information ... what are the advantages... What could I do..." (Júlia, FG3_PT)

Characteristics		Portugal	Scotland
Age	Median (P25; P75)	66 (64; 74)	76 (68; 80)
Sex			
Male	n (%)	2 (14.3)	3 (30.0)
Female	n (%)	12 (85.7)	7 (70.0)
Occupation			
Retired	n (%)	9 (64.3)	10 (100.0)
Worker	n (%)	5 (35.7)	0 (0)
Education			
Primary school	n (%)	6 (42.9)	0 (0)
Secondary school	n (%)	8 (57.1)	4 (40.0)
College diploma	n (%)	0 (0)	4 (40.0)
University degree	n (%)	0 (0)	2 (20.0)
MMSE	Median (P25; P75)	0.0 (0.0; 0.6)	0.0 (0.0; 0.5)
Current Foot Pain (Yes)	n (%)	4 (28.6)	2 (20.0)
Intensity of pain in R foot †	Median (P25; P75)	0.0 (0.0; 0.6)	0.0 (0.0; 0.5)
Intensity of pain in L foot †	Median (P25; P75)	0.0 (0.0; 0.0)	0.0 (0.0; 0.6)
FAOS			
Pain	Median (P25; P75)	81 (53; 89)	72 (53; 84)
Other Symptoms	Median (P25; P75)	79 (54; 89)	62 (53; 80)
Activities of Daily Living	Median (P25; P75)	84 (49; 96)	81 (68; 94)
Sport (recreation)	Median (P25; P75)	81 (68; 91)	85 (68; 91)
Quality of Life	Median (P25; P75)	75 (41; 89)	56 (30; 75)
No. falls in last 12 months	Median (P25; P75)	2 (1; 3)	2 (1; 4)
Medical attention ¶			
Yes	n (%)	7 (53.8)	6 (60.0)
No	n (%)	6 (46.2)	4 (40.0)
Types of injuries ¶			
No injuries	n (%)	3 (21.4)	1 (10.0)
Bruises	n (%)	9 (64.3)	5 (50.0)
Fracture	n (%)	2 (14.3)	4 (40.0)
Concern with falls^a			
Low	n (%)	7 (50.0)	1 (10.0)
Moderate	n (%)	0 (0)	4 (40.0)
High	n (%)	7 (50.0)	5 (50.0)
Functional status^b			
Low	n (%)	6 (42.9)	2 (20.0)
Moderate	n (%)	7 (50.0)	6 (60.0)
High	n (%)	1 (7.1)	2 (20.0)
Timed Up & Go (sec)	Median (P25; P75)	9 (9; 10)	8 (7; 11)
30s Chair Stand (reps)	Median (P25; P75)	10 (9; 11)	11 (8; 13)
Functional Reach (cm)	Median (P25; P75)	22 (19; 27)	23 (20; 27)
Chair Sit & Reach R (cm)	Median (P25; P75)	-10 (-26; 0)	-10 (-14; -6)
Chair Sit & Reach L (cm)	Median (P25; P75)	-11 (-28; -7)	-10 (-21; -5)
Yale Physical Activity			
Total (min/wk)	Median (P25; P75)	60 (40; 97)	34 (15; 47)
Energy Expend (Kcal/wk)	Median (P25; P75)	248 (114; 380)	125 (54; 151)
Vigorous Activity (units/day)	Median (P25; P75)	20 (9; 33)	10 (0; 40)
Walking Activity (units/day)	Median (P25; P75)	20 (12; 32)	24 (9; 33)
Standing (units/day)	Median (P25; P75)	9 (6; 12)	14 (9; 15)
Sitting (units/day)	Median (P25; P75)	2 (2; 3)	2 (1; 3)

Key: Median (P25=25th percentile; P75=75th percentile); MMSE=Mini mental state examination test score (MMSE); † measured using Visual Analogue Scale; FAOS=Foot and ankle Outcome Score; ¶ from falls in the last 12 months; ^a (FES_I cut-offs); Low concern (16-19 points), Moderate concern (20-27 points), High concern (28-64 points). ^b (ABC cut-offs); Low functional status (< 50%), Moderate functional status (50-80%), High functional status (> 80%).

Table 2. Baseline characteristics of participants.

Group exercise 'taster' session

Participants generally reported that they enjoyed the delivery of the brief educational session and group exercise taster session which followed the assessment session. The first was described as informative and introduced pertinent facts that facilitated their understanding of the context of the exercise programme.

"I liked learning 'cause I did learn some new things' and just things that I should be aware of and I wasn't so that was good" (Elaine, FG2_UK)

They expressed that they benefited from and were happy with the delivery approach (room set up, language and pace). Participants suggested that the taster session was an essential step to allow them to complete the home-based programme. However, they felt that more sessions could help to consolidate the exercise learning and could be incorporated a few times over a programme to ensure they were still doing the exercises correctly and aid motivation. There was an apparent preference towards a small group setting (4-6 participants) for these, rather than one to one supervised session (e.g. physiotherapist-participant). Participants discussed being able to share views and strategies to motivate/complete the exercises. Peer-learning and socialising opportunities arising from these moments appeared important to the participants.

"We exchange ideas, it's best! So... Each one of us show theirs. It's different." (Leonor, FG3_PT)

Home-based exercise week trial

A home-based programme with intermittent group sessions was seen as a good balance and achievable commitment for those who could not attend regular group exercise classes due to different constraints (e.g. time, transport, work).

"The home-based...Time and place to suit myself. That's better..." (Emma, FG2_UK)

Generally, they felt the regularity of group sessions depended on the length of the programme (ranging from every few weeks to monthly). All participants reported that they tried the home-based exercise programme over the previous week. Frequency varied between individuals, ranging from doing a full session only once to completing the exercises every day of the week. Three Portuguese participants reported that a lack of time and opportunities were barriers to undertaking the programme.

"Let me see what I did... ahem... It's like I told you, my available time is none." (Sofia, FG3_PT)

Poor motivation also seemed to contribute to non-completion, with two participants stating that a supervised programme twice a week would be better. Several participants reported doing the exercises every day as a result of misunderstanding the instructions to complete three times per week. Whereas other participants preferred to exercise every day because it made it easy for them to fit into their

routines and make it a habit. Participants considered the number of exercises, level of difficulty and time to complete the session achievable. Many reported dividing the session into smaller workouts during the day as it better suited their daily routine and duties. Participants were keen to support a flexible format that could accommodate both options.

"I am different in the sense that I have a busy schedule... so I like to have time to do the exercises... So it depends..." (Elaine, FG1_UK)

"In my case... Yes! I mean, to ensure that I would do... that I would do all, everyday. So I would start in the booklet during the day, leave the booklet open, then at night I would return and do the rest, since I was working during the day." (Catarina, FG3_PT)

Doing ankle and foot exercises in barefoot was something quite new, even among those who had previous experience with exercise, in both countries. Most were comfortable with being barefoot, although some mentioned that transitioning between shoes and no shoes, or the need for different pieces of equipment, affected the flow of the session or how easily they could integrate the exercises into daily life.

"It wasn't hard to remember it was just to get all the bits out to do the work with them (...) I found that time consuming and taking it away from the fluidity that you needed to keep your exercises." (Louise, FG1_UK)

The warm-up and cool-down stretching components were well accepted by the participants, but some challenges were noted in the strength and balance exercises. Strength exercises targeting the intrinsic foot muscles were the exercises that some found particularly difficult or mentioned mild pain/discomfort. The difference between pain versus muscle discomfort caused by exercise was discussed across focus groups and participants felt they could ascertain the difference after discussion and confirmed they meant discomfort and sometimes cramp. Interestingly, a few participants in both countries were able to spontaneously enunciate contents from the educational components of the programme, as demonstrated in the quote below:

"You said 50 hours or something around 50..." (Jean, FG2_UK)

Participants talked about different levels of support needed (holding on to something) during the balance exercises, but overall felt safe to do them independently in a home environment. Preplanning the workout space was mentioned as important for safety. Some participants also mentioned integrating some balance exercises in their routine, as Jean's (FG2_UK) words illustrate:

"Yes yes... and just walking from room to room... I found out I was going on my toes because that was the one I was teetering at... and doing the penguin... That you know I find I go off to the side all over the place, but I was doing that when I was going about my business. ((laughter))" (Jean, FG2_UK)

Footfall programme kit

Overall the participants were satisfied with the Footfall programme kit, particularly with the exercise booklet which many described as essential.

"The booklet was essential I think that was one of the most useful things" (Louise, FG1_UK)

"Very accessible. It's very... it's at anyone's level" (Catarina, FG3_PT)

"We would put the open booklet there on top of the table and would do them" (João, FG2_PT)

The fact that the booklet was printed in colour was also greatly valued, for ease of quick visual reference, also being a motivational driver to many participants.

"Colourful is brighter, more incentivising. Black and white would become more monotonous" (Catarina, FG3_PT)

The print booklet format was supported over other formats such as videos or digital apps. It was considered the most accessible and user-friendly delivery format for older adults. Digital illiteracy was a shared point throughout all focus groups, even though some Scottish participants appeared more familiar with smartphones and tablets. Despite admitting different levels of competence in technology use, they all preferred the booklet.

"No. Paper copy to me (...) Our generation wants this!" (Anthony, FG3_UK)

"...you work with print and actually to me if you put it on DVD there would be much concentration..." (John, FG3_UK)

Participants felt that providing just the booklet would not be enough for them to feel confident to perform the exercises by themselves at home without the taster session.

"Encourages you. ...I would read it but I would put aside. But when someone tells you that you do it... You know... You think like ok... I got to do this." (Lucy, FG1_UK)

Many participants found filling in the exercise diary challenging. This was particularly evident among Portuguese older adults, who felt they needed extra support and guidance to be able to fill it in correctly.

"So for example written by someone else, you would then understand what is what..." (FG3_PT)

A couple of participants from both countries admitted to having had help from family members to fill in the diary, and one Scottish participant suggested that numbering the exercises would make it easier. One Portuguese participant admitted that having a simpler system, such as just having to tick which ones were done would make it easier for them. Five Portuguese participants did not fill in their exercise diaries at all, whereas all Scottish participants did.

On the whole participants liked the exercise equipment, but some devices had mixed reviews across both countries. One Scottish participant emphasized that including different exercise equipment added extra difficulty to

the exercise programme, which could be perceived as a barrier to some older adults:

"I'm just a wee bit concerned with all the accoutrements you've got to have to do these... ahem... there's a lot there where most people would just expect to do exercises" (Louise, FG1_UK)

The resistance band was the device that received more criticism. Attaching the resistance bands to the table legs was considered very difficult and impractical by the great majority of older adults. Most of them did not do it by themselves, asking someone else to attach it or opting for variation of the exercise all together. Some just gave up on this exercise.

"First of all I couldn't [find] anywhere to put it I've tried table legs and chair legs I really got I got to a stage I think I really couldn't do this cause I couldn't get the thing set up properly and at the end of the day I must be able to do something else and find another exercise for this" (Louise, FG1_UK)

"To attach this to the table leg, I think that I would need to ask someone help to lower down..." (Vera, FG3_PT)

They also found it particularly challenging using the 'toe exerciser' because of difficulties moving their toes, especially dissociating the hallux and lesser toes. The same was often mentioned regarding picking up the cloth with the toes. A couple of Scottish participants suggested alterations to the kit by repurposing the wedge in replacement of the cloth. Nevertheless, many reported an improvement in range of motion and movement of the toes throughout the week. They admitted there was a learning curve to these exercises, and they were somewhat fascinated by seeing the slow improvement. The anti-slip mat was less necessary in the UK than in Portugal because of different cultural floor surfaces (carpet vs tiles/wooden floor).

Midweek telephone call

Telephone calls were endorsed by participants, who viewed them as extremely valuable opportunities to speak directly to a responsible professional. They were also perceived as a sign of care towards them.

"I think it was quite nice if someone is checking up on us and also you can ask questions and make us think then we go back and look and see what's there" (Louise, FG1_UK)

"it's a sign that people care (...) That they've remembered me!" (Júlia, FG3_PT)

The majority preferred to keep it an open-ended discussion, so that observations and questions could be truly interactive. A fortnightly phone call appeared to be the preference for a longer-term programme.

"I think that's quite good... because that motivates people to keep going" (Elaine, FG1_UK)

"It also helps to motivate us... Oh I didn't do it yesterday and now I'm hearing it" (Joana, FG2_PT)

In Scotland, some participants felt this could also sometimes be delivered by text message to their phones.

"Cause I'm out and about such a lot. That even just to get a text to say how you're doing, what you're doing..."
(Sarah, FG2_UK)

Portuguese participants were more reluctant about this:

"I don't I don't know how to read SMS... I only know how to make and answer calls" (Mariana, FG1_PT)

Reasons for participation

All participants viewed their participation in the study as very positive. They highlighted the new knowledge obtained on the discussed topics, and a sense of making a valid contribution to something relevant to them and society.

"It makes you feel that you're contributing"
(Sarah, FG3_UK)

"I would say... ahem... it is very important to explain the benefits not just to the individual but to other people..."
(Elaine, FG2_UK)

They generally described feeling more empowered by doing the exercises, but also by being an active part of the process and having their voices heard.

"People who are going through it... So, who is the best people to ask? Us!" (Anthony, FG3_UK)

This latter idea appeared quite new to Portuguese older adults, who explicitly shared that they were not used to such opportunities. Overall, participants expressed that they would recommend this programme to others without hesitation. Some said that they intended to keep using the resources and doing the exercises beyond the current study:

"I think now you can take out of this the bits that you think that would do you good" (Louise, FG1_UK)

"Oh I think I would do them indefinitely, maybe not all of them every day, but... I do exercises the minute I wake up in the morning so" (Elaine, FG1_UK)

Research process

Finally, focus groups were also asked about their experience of taking part in this study and how we might improve recruitment, uptake and retention to exercise in a future research study. They were happy with the information provided prior to their recruitment and with the consent process; stating that it was quite clear and explanatory. No objections were raised to the informed consent procedures. These views were shared across countries, even though Portuguese older adults did not have any prior self-reported experience of enrolment in research, whilst some of the Scottish participants had taken part in research before. Portuguese participants particularly emphasized the importance of a thorough verbal debriefing and support from researchers throughout the process. One participant admitted to finding it difficult and being bored by having to read the participant information sheet. Some Portuguese

participants emphasized that making the programme freely available and offering social gatherings with refreshments would be good options.

However, all of them considered that they would value being referred to research projects by someone they trusted, namely a health professional or community worker and free programmes with a good social component would have better uptake. Scottish participants offered suggestions for recruitment using methods already used in many published interventions. However, word-of-mouth (via their peers) and institutional recruitment (i.e.: senior organisations) were perceived as the most effective recruitment approach.

"Word of mouth! I think will...you'll be saying to your friends if indeed it improves your walking... you'll be recommending and saying yes, yes" (Jean, FG2_UK)

Discussion

This is the first study to consider the views and opinions of older people, from the UK and from Portugal, about a tailored home-based lower limb, ankle and foot exercise programme aimed at preventing falls. Only one recent study has explored older adults views of self-footcare practices, including exercise in general⁴¹. This study provides relevant feedback from end-users that can be built into a culturally suitable future intervention in Scotland and Portugal. Seven key themes were identified that are important when planning future **Footfall** studies with Scottish and Portuguese older adults.

Recruitment and research process

Recruitment to this explorative study was challenging and there was also a considerable attrition rate. Three participants in Scotland and 5 in Portugal withdrew between the first and second sessions. Unfortunately, it was not possible to interview these individuals to explore their views about the research process and programme. Reasons for dropout were known in 3 Portuguese participants (e.g. family duties, medical appointments) and 1 Scottish participant (felt the exercises were too easy), but unknown in the other 2 Portuguese and 2 Scottish participants (uncontactable). Therefore, alternative recruitment strategies will be important in a future study. Gatekeepers should also be contacted to ascertain what best recruitment strategies may work within their networks. Agreeing with previous research⁴²⁻⁴⁴, participants also suggested that a personal invite from a known health or care professional could facilitate recruiting prospective volunteers. A large drop-out rate needs to also be factored for, so that it can be mitigated by multiple recruitment strategies. This is not unusual in falls prevention exercise studies^{39,44}.

In terms of the research process, Portuguese participants' expressed a preference towards a thorough verbal debriefing, which may potentially be due to their lower education levels. Considering that Portuguese older adults have low literacy levels⁴⁵, this should be accounted for in a future trial.

Assessment session

The assessment session was well accepted by participants of both countries. It is a time-consuming process; therefore, a second assessor will be necessary if participants are all to be assessed in the same day and session in a future study. Data completion was excellent, with focus groups participants completing all outcome measurements. The only exception being the exercise diary, which was not completed by three Portuguese participants. They offered suggestions to help future completion rates.

Taking into consideration participant views and experiences, the researchers feel that additional outcome measures could be explored. In particular, self-efficacy related to exercise^{46,47} and an objective measure of foot strength (eg: foot dynamometry).

Group 'taster' exercise session

Both national groups enjoyed having a group exercise taster session. Small groups (4–6 people) were favoured by participants for the first session, over one-to-one appointments with a physiotherapist or exercise instructor. Overall, participants from both countries were pleased with the delivery methods of both the education component and exercise component of the group session. The information was considered relevant, and something that improved their knowledge. Ideally, there should be a flexible schedule for the group 'taster' session so that different needs for support among participants can be accommodated (health literacy, frailty etc.).

Although following a general exercise delivery protocol for standardization, the researcher adapted her delivery style to the participants of each exercise group session. Ensuring the fidelity and quality of the delivery of the *Footfall* programme will be a key point in future studies, particularly if using multiple sites for delivery. Some recent studies have used quality assurance checklists to confirm fidelity and quality during observations of delivery^{44,48,49}.

Home-based exercise week trial

Most participants in both countries were keen to undertake a home-based exercise programme due to convenience reasons (e.g. transport, self-managing exercise schedule), agreeing with previous research^{5,6,47}. The ability to plan their exercise routine around their daily routines was also greatly appreciated, with participants from both countries describing a wide range of preferences: from dividing the session in small bouts during the day to doing all in one go in any given time of the day. It seems important to offer a variety of strategies for the participants to choose from so that there is more chance they will achieve the required dose for effectiveness. Choices that may resonate with their preferences and needs. Similar findings were described in a recent qualitative study looking at self-managing exercise interventions for community-dwelling older adults⁵⁰.

Despite a preference for home-based exercise, the idea

of having intermittent group sessions was prominent. These occasional group sessions (preferences of 1 or 2 sessions per month) were described as very important to ensure progression, reassurance of participants and to motivate towards continuing adherence.

The specific foot strengthening exercises were a novelty aspect even among exercise-experienced Scottish participants. So was the idea of exercising barefoot. Some of the balance exercises were known by the Scottish participants. This was unsurprising, as the Otago and FaME programmes are well disseminated in Scotland. Scottish and Portuguese participants described adapting their level of manual support and surroundings, according to their self-appraised balance ability, confidence and limitations. They felt safe to perform the exercise programme independently, as they were able to exercise within their limits. Pettersson et al.⁵⁰ hypothesised in their qualitative study with Swedish older adults that such confidence in exercising may derive from being provided with enough knowledge and support to do so.

Footfall programme kit

Reviews of the programme kit were generally positive. The foam wedge was well accepted by participants in the two countries, even though the exercise that used it was considered difficult in the beginning, the participants recognized the relevance of it. Many could also observe an improvement in their ability to flex and extend the toes, throughout the week. Alternative uses were also suggested for the wedge, with two Scottish participants saying that it could replace the cloth. These suggestions should be taken into consideration since two participants also mentioned that having to manage too many equipment devices may be a barrier to adhering to the programme. Using the 'toe exerciser' was also challenging to many older adults in both countries. Replacing this exercise by another without equipment, or using the resistance band, may be more acceptable in future studies. It will also decrease costs in the acquisition of materials.

Most Scottish and Portuguese participants had difficulties in setting up and using the resistance band in the inversion and eversion exercises, some just chose not to do the exercise at all. Overall these exercises had poor acceptability from Scottish and Portuguese participants. This is a surprising finding because these were the exercises included in the original Foothold programme¹⁰. Considering the feedback from participants and observations from the researchers, the Footfall exercise programme will in future include exercises in which the resistance band is primarily manually secured by the participant; resembling the exercises in a programme with healthy older adults⁵¹.

All design aspects of the paper exercise booklet (font type and size, illustrations, colour-scheme etc.), content and language received excellent feedback. Contrasting with previous qualitative research where a digital program enhanced supported learning and reflection of a falls

prevention home-based exercise programme⁵⁰, Scottish and Portuguese older adults expressed preferring a paper booklet. Many were not used to technology and many preferred the tangible nature of having something that visually prompted them. Digital literacy remains very low in Portuguese older adults⁴⁵.

Useful alterations to the presentation of the exercise diary were given, to allow easier completion (eg. tick boxes against exercise numbers). In particular, the Portuguese participants often did not complete the diaries, perhaps reflecting the general trend across older Portuguese adults of whom 22.1% are not literate, 52.6% have no more than 4 years of schooling (primary school) and only 7.3% hold a higher education degree⁵³.

Midweek telephone call

Telephone calls were perceived as very important and a motivational component. The frequency for telephone calls varied from weekly in a shorter 12-week programme to monthly in a longer-term programme, although many Portuguese and Scottish participants mentioned that receiving a fortnightly telephone call would be ideal. This latter frequency may also minimize the possibility of the telephone call becoming an intervention in its own right. Some Scottish participants mentioned that they would also be keen to receive an SMS text message during the programme, as prompts or reminders to keep exercising.

Reasons for participation

Similar to previously published literature, Scottish participants expressed a wish to make a contribution to research and society⁴⁴. Also, in agreement with previous research, it appears that the 'commitment' to the study was a motivation for doing the exercise during the week amongst both Scottish and Portuguese participants^{50,53}. Overall, the idea of having their 'voices heard' and a say in interventions being developed for people of their age-group with the same health concerns greatly resonated with both national groups. This was perceived as an important step to guarantee the development of more suitable solutions to their needs and preferences.

Limitations of the study and recommendations for future research

Due to the nature of qualitative research with a volunteer sample, there will be some selection bias with those most interested in exercise being interviewed. Data saturation was reached however, amongst the sample focus group opinions. A longer experience trial (more than one week) could potentially have allowed participants to mature their views surrounding the acceptability and adherence of the intervention, as any novelty effect would be reduced. Nonetheless, this week trial allowed relevant information on the first impressions of participants which is important to inform uptake. Future research should engage stakeholders (health professionals, community workers, policymakers

etc.) to explore their views and feedback about this exercise programme. This will also further contribute to the robustness of future studies and even future implementation into practice.

Despite following a robust approach to translation of Portuguese transcripts to English, there are linguistic challenges associated with the translation task⁵⁴. Furthermore, differences between the contextual settings, such as organisation of health services and delivery of services (e.g. availability of falls prevention programmes), interplayed with the findings. The two national groups of participants presented differences in baseline characteristics (e.g. age, education, professional status) that could influence our findings, independently of cultural context. Future research should adopt purposive sampling strategies covering different geographic locations within countries, age ranges, socioeconomic and ethnic groups.

The selection of outcome measures (questionnaires and scales) was restricted by the availability of published validated European Portuguese versions. This precluded the possibility of using the most adequate international patient-reported outcome measures of foot health and foot function in older adults, such as the Foot Health Status Questionnaire⁵⁵. Future research should address the cultural adaptation and validation of European Portuguese instruments for these dimensions, whenever necessary. This exploratory study has ascertained that the outcome measures are good candidates for low data loss but efficacy of the programme has not been ascertained.

Conclusion

This exploratory study has shown that the *Footfall* programme appears to be acceptable to this sample of Scottish and Portuguese Older adults with minor adaptations to the exercises, equipment and documentation. Participants described feeling more empowered by doing the exercises, but also by being an active part of the process and having their voices heard. This latter idea appeared quite new to Portuguese older adults, who explicitly shared that they were not used to such opportunities. Overall, participants expressed that they would recommend this programme to others without hesitation. Quantitative research needs to be integrated in a future large study to ascertain if the *Footfall* programme is effective.

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Declaration of Interest

Dawn A Skelton is a Director of Later Life Training Ltd, a not for profit company delivering training (including the Postural Stability Instructor based on FAME and the Otago Programme) to health and fitness professionals who work with older people to prevent falls.

References

1. Hopewell S, Adedire O, Copsey BJ, Boniface GJ, Sherrington C, Clemson L, et al. Multifactorial and multiple component interventions for preventing falls in older people living in the community. Cochrane Database Syst Rev 2018;7:CDO12221.
2. Sherrington C, Fairhall NJ, Wallbank GK, Tiedemann A, Michaleff ZA, Howard K, et al. Exercise for preventing falls in older people living in the community. Cochrane Database Syst Rev 2019;1:CDO12424.
3. Picorelli AM, Pereira LS, Pereira DS, Felício D, Sherrington C. Adherence to exercise programs for older people is influenced by program characteristics and personal factors: A systematic review. Journal of Physiotherapy 2014;60(3):151-6.
4. Jang H, Clemson L, Lovarini M, Willis K, Lord SR, Sherrington C. Cultural influences on exercise participation and fall prevention: A systematic review and narrative synthesis. Disability and Rehabilitation 2016;38(8):724-732.
5. Franco MR, Howard K, Sherrington C, Ferreira PH, Rose J, Gomes JL, Ferreira ML. Eliciting older people's preferences for exercise programs: A best-worst scaling choice experiment. Journal of Physiotherapy 2015;61(1):34-41.
6. Geraedts H, Zijlstra A, Bulstra SK, Stevens M, Zijlstra W. Effects of remote feedback in home-based physical activity interventions for older adults: A systematic review. Patient Education and Counseling 2013;91(1):14-24.
7. Simek EM, McPhatel, Haines TP. Adherence to and efficacy of home exercise programs to prevent falls: A systematic review and meta-analysis of the impact of exercise program characteristics. Preventive Medicine 2012;55(4):262-275.
8. Cavill NA and Foster CEM. Enablers and barriers to older people's participation in strength and balance activities: A review of reviews. Journal of Frailty, Sarcopenia and Falls 2018;03(02):105-113.
9. Devereux-Fitzgerald A, Powell R, Dewhurst A, French DP. The acceptability of physical activity interventions to older adults: A systematic review and meta-synthesis'. Social Science and Medicine 2016;158:14-23.
10. Spink MJ, Menz HB, Fotoohabadi MR, Wee E, Landorf KB, Hill KD, Lord SR. Effectiveness of a multifaceted podiatry intervention to prevent falls in community dwelling older people with disabling foot pain: randomised controlled trial. BMJ (Clinical research ed.). British Medical Journal 2011;342:d3411.
11. Wylie G, Menz HB, McFarlane S, Ogston S, Sullivan F, Williams B, Young Z, Morris J. Podiatry intervention versus usual care to prevent falls in care homes: Pilot randomised controlled trial (the PIRFECT study). BMC Geriatrics 2017;12;17(1):143.
12. Wylie G, Torrens C, Campbell P, Frost H, Gordon AL, Menz HB et al. Podiatry interventions to prevent falls in older people: a systematic review and meta-analysis. Age Ageing 2019;48(3):327-336.
13. Cockayne S, Adamson J, Clarke A, Corbacho B, Fairhurst C, Green L et al. Cohort Randomised Controlled Trial of a Multifaceted Podiatry Intervention for the Prevention of Falls in Older People (The REFORM Trial). PLoS One 2017;12(1):e0168712.
14. O'Cathain A, Hoddinott P, Lewin S, Thomas KJ, Young B, Adamson J et al. Maximising the impact of qualitative research in feasibility studies for randomised controlled trials: Guidance for researchers. Pilot and Feasibility Studies 2015;1:32.
15. Simard M. The Mini-Mental State Examination: strengths and weaknesses of a clinical instrument. The Canadian Alzheimer Disease Review. 1998;(Dec): 10-12.
16. Freitas S, Simões MR, Alves L, Santana I. The Relevance of Sociodemographic and Health Variables on MMSE Normative Data. Applied neuropsychology Adult 2015;22(4):311-9.
17. Clarke V & Braun V. Successful Qualitative Research: A Practical Guide for Beginners. London: Sage. 2013.
18. Krueger R & Casey M. Focus group: A practical guide for Applied Research. 5th ed. London: Sage. 2015.
19. de Jong LD, Peters A, Hooper J, Chalmers N, Henderson C, Laventure RM, Skelton DA. The Functional Fitness MOT Test Battery for Older Adults: Protocol for a Mixed-Method Feasibility Study. JMIR Research Protocols 2016;5(2):e108.
20. Skelton DA, Bailey C, Howel D, Cattan M, Deary V, Coe D et al. Visually Impaired OLder people's Exercise programme for falls prevention (VIOLET): A feasibility study protocol. BMJ Open ;6(8):e011996.
21. Dipietro L, Caspersen CJ, Ostfeld AM, Nadel ER. A survey for assessing physical activity among older adults.', Medicine and science in sports and exercise 1993;25(5):628-42.
22. Machado M, Tavares C, Moniz-Pereira V, Andre H, Ramalho F, Veloso A, Carnide F. Validation of YPAS-PT-The Yale Physical Activity Survey for Portuguese Older People', Science Journal of Public Health 2016;4(1):72-80.
23. Roos, E. M., Brandsson, S. and Karlsson, J. Validation of the foot and ankle outcome score for ankle ligament reconstruction. Foot and Ankle International 2001;22(10):788-794.
24. Domingues F, Esteves J, Pereira JP. Contributo para a Adaptação e Validação do Instrumento de Medida, Foot And Ankle Outcome Score (FAOS), para a realidade Portuguesa. Revista Portuguesa de Fisioterapia no Desporto 2008;2(1):23-32.
25. Yardley L, Beyer N, Hauer K, Kempen G, Piot-Ziegler C, Todd C. Development and initial validation of the Falls Efficacy Scale-International (FES-I). Age and Ageing 2005;34(6):614-619.
26. Figueiredo D, Santos, S. Cross-cultural validation of the Falls Efficacy Scale-International (FES-I) in Portuguese community-dwelling older adults. Archives of Gerontology and Geriatrics 2017;68:168-173.
27. Powell LE, Myers AM. The Activities-Specific Balance Confidence (ABC) scale', Journals of Gerontology - Series A Biological Sciences and Medical Sciences 1995;50A(1):M28-M34.

28. Branco P. Validation of the Portuguese Version of the "Activities-specific Balance Scale- ABC". *Revista da Sociedade Portuguesa de Medicina Física e de Reabilitação* 2010;19(2):20-25.
29. Menz HB, Dufour AB, Katz P, Hannan MT. Foot Pain and Pronated Foot Type Are Associated with Self-Reported Mobility Limitations in Older Adults: The Framingham Foot Study. *Gerontology*. 2016;62(3):289-95.
30. Palos GR, Mendoza TR, Mobley GM, Cantor SB, Cleland CS. Asking the community about cutpoints used to describe mild, moderate, and severe pain. *Journal of Pain* 2006;7(1):49-56.
31. Muchna A, Najafi B, Wendel CS, Schwenk M, Armstrong DG, Mohler J. Foot Problems in Older Adults Associations with Incident Falls, Frailty Syndrome, and Sensor-Derived Gait, Balance, and Physical Activity Measures. *Journal of the American Podiatric Medicine Association* 2018;108(2):126-139.
32. Shumway-Cook A, Brauer S, Woollacott M. Predicting the probability for falls in community-dwelling older adults using the Timed Up & Go Test. *Physical Therapy* 2000;80(9):896-903.
33. Weiner DK, Duncan PW, Chandler J, Studenski SA. Functional reach: a marker of physical frailty. *Journal of the American Geriatrics Society* 1992; 40(3):203-7.
34. Jones CJ, Rikli RE, Beam WC. A 30-s chair-stand test as a measure of lower body strength in community-residing older adults. *Research Quarterly for Exercise and Sport* 1999;70(2):113-19.
35. Jones CJ, Rikli RE, Max J, Noffal G. The reliability and validity of a chair sit-and-reach test as a measure of hamstring flexibility in older adults. *Research Quarterly for Exercise and Sport* 1998;69(4):338-43.
36. Lamb SE, Jørstad-Stein EC, Hauer K, Becker C; Prevention of Falls Network Europe and Outcomes Consensus Group. Development of a common outcome data set for fall injury prevention trials: the Prevention of Falls Network Europe consensus. *Journal of the American Geriatrics Society* 2005;53(9):1618-22.
37. Campbell AJ, Robertson MC, Gardner MM, Norton RN, Tilyard MW, Buchner DM. Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. *British Medical Journal* 1997;315(7115):1065-1069.
38. Skelton D, Dinan S, Campbell M, Rutherford O. Tailored group exercise (Falls Management Exercise - FaME) reduces falls in community-dwelling older frequent fallers (an RCT). *Age and Ageing* 2015;34(6):636-639.
39. Iliffe S, Kendrick D, Morris R, Masud T, Gage H, Skelton D et al. Multicentre cluster randomised trial comparing a community group exercise programme and home-based exercise with usual care for people aged 65 years and over in primary care. *Health Technology Assessment* 2014; 18(49):vii-xxvii, 1-105.
40. Hawley-Hague H, Horne M, Skelton DA, Todd C. Older Adults' Uptake and Adherence to Exercise Classes: Instructors' Perspectives. *Journal of Aging and Physical Activity* 2016;24(1):119-28.
41. Miikkola M, Lantta T, Suhonen R, Stolt M. Challenges of foot self-care in older people: A qualitative focus-group study. *Journal of Foot and Ankle Research* 2019; 12:5.
42. Bunn F, Dickinson A, Barnett-Page E, McInnes E. A systematic review of older people's perceptions of facilitators and barriers to participation in falls-prevention interventions. *Ageing and Society* 2008;28(4):449-472.
43. Dickinson A, Horton K, Machen I, Bunn F, Cove J, Jain D, Maddex T. The role of health professionals in promoting the uptake of fall prevention interventions: A qualitative study of older people's views. *Age and Ageing* 2011;40(6):724-30.
44. Adams N, Skelton DA, Howel D, Bailey C, Lampitt R, Fouweather T et al. Visually Impaired OLder people's Exercise programme for falls prevenTion (VIOLET): a feasibility study. *BMC Geriatrics* 2018;18(1):307.
45. Espanha R, Ávila P, Mendes V. Literacia em Saúde em Portugal - Relatório Síntese', p. 44, 2016. <http://www.gulbenkian.pt> [Accessed 24 Aug 2019]
46. McAuley E, Szabo A, Olson EA. self efficacy: Implications for physical activity, function and functional limitations in older adults'. *American Journal of lifestyle Medicine* 2013;5(4):1-15.
47. Robinson L, Newton JL, Jones D, Dawson P. Self-management and adherence with exercise-based falls prevention programmes: a qualitative study to explore the views and experiences of older people and physiotherapists. *Disability and rehabilitation* 2014;36(5):379-86.
48. Bruce J, Lall R, Withers EJ, Finnegan S, Underwood M, Hulme C et al. A cluster randomised controlled trial of advice, exercise or multifactorial assessment to prevent falls and fractures in community-dwelling older adults: Protocol for the prevention of falls injury trial (PreFIT). *BMJ Open* 2016;6(1):e009362.
49. Bjerk M, Brovold T, Skelton DA, Bergland A. A falls prevention programme to improve quality of life, physical function and falls efficacy in older people receiving home help services: Study protocol for a randomised controlled trial. *BMC Health Services Research* 2017;17(1):1-9.
50. Pettersson B, Wiklund M, Janols R, Lindgren H, Lundin-Olsson L, Skelton DA, Sandlund M. Managing pieces of a personal puzzle" - Older people's experiences of self-management falls prevention exercise guided by a digital program or a booklet. *BMC Geriatrics* 2019;19(1):43.
51. Mickle KJ, Caputi P, Potter JM, Steele JR. Efficacy of a progressive resistance exercise program to increase toe flexor strength in older people. *Clinical Biomechanics* 2016;40:14-19.
52. PORDATA - Base de dados de Portugal Contemporâneo. Fundação Francisco Manuel dos Santos. [https://www.pordata.pt/Portugal/População+residente+com+15+a+64+anos+e+65+e+mais+anos+por+nível+de+escolaridade+completo+mais+elevado+\(percentagem\)-2266](https://www.pordata.pt/Portugal/População+residente+com+15+a+64+anos+e+65+e+mais+anos+por+nível+de+escolaridade+completo+mais+elevado+(percentagem)-2266) [Accessed 19 Aug 2019].
53. Sandlund M, Pohl P, Ahlgren C, Skelton DA, Melander-Wikman A, Bergvall-Kåreborn B, Lundin-Olsson L. Gender perspectives on views and preferences of older people on exercise to prevent falls: a systematic mixed studies review. *BMC Geriatrics* 2017;17(1):58.
54. De la Vega L. Considerations about Translation: Strategies About Frontiers. In Liamputpong P. (ed.) *Handbook of Research Methods in Health Social Sciences*. Chapter 93, pp-1617-1638. 2019. Singapore: Springer Nature
55. Bennett PJ, Patterson C, Wearing S, Baglioni T. Development and validation of a questionnaire designed to measure foot-health status. *Journal of the American Podiatric Medicine Association* 1998;88:419-28.