

RESEARCH

Open Access



# Views and experiences of older people taking part in a safe-falling training program: Lessons learned from the FALLing Safely Training (FAST) trial

Anna Zanotto<sup>1\*</sup>, Tobia Zanotto<sup>1,2,3</sup>, Neil B. Alexander<sup>4,5</sup> and Jacob J. Sosnoff<sup>2,3,6</sup>

## Abstract

**Background** While falls are the leading cause of accidental injury among older people, the current fall prevention strategies have not resulted in a remarkable reduction in fall rates. An alternative novel approach, teaching older adults how to fall safely to prevent injury, has been recently implemented in the FALLing Safely Training (FAST) trial. The current study aimed to explore the views and perceptions of older people about their participation in the safe-falling training program.

**Methods** Focus groups were conducted with eight community-dwelling older adults (age range: 66 to 76 years, five females) at risk of falling who completed the FAST program. Two focus groups involving four participants each were conducted. Recordings were transcribed verbatim and analyzed using thematic analysis.

**Results** Three themes were identified following the analysis: (1) *Before the training*; with subthemes: *Previous fall prevention strategies* and *Motivation to participate*. Motivations to take part in the training included worries about falling, an awareness of an increased risk of falling, and a desire to decrease the chances of sustaining an injury. (2) *Training itself*; with subthemes: *General impressions of the training* and *Learning the techniques*. Older people highlighted that the training was well-designed and executed. (3) *Going forward*; with subthemes: *Training increased confidence*, *Incorporating in a community setting*, and *Proposing improvements to the study*. It was reported that the training enhanced participants' confidence about falling without injury. Incorporating the training into a community context was discussed, and suggestions for program enhancements were made. The individual nature of the training was valued, but participants also provided suggestions for how they would see the program taking place successfully in small groups.

**Conclusions** The results indicated that the safe-falling training was acceptable to older adults. The perceived ability to fall without injury was reported to have increased. Individuals who experienced a fall after the training ended reported being able to use the techniques learned in their daily life. The findings have implications for the training to be refined and implemented in the community.

\*Correspondence:

Anna Zanotto  
azanotto@kumc.edu

Full list of author information is available at the end of the article



© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/>.

**Trial registration** The article is linked to a randomized controlled trial registered at <http://ClinicalTrials.gov> (NCT05260034).

**Keywords** Falls, Training, Older people, Qualitative methods, Focus groups

## Background

Falls are the leading cause of accidental injury and death among older people and a significant public health challenge [1]. Most interventions designed to minimize fall-related injuries in at-risk older adults focus on fall prevention [2], but the results are inconsistent [3]. Currently, the fall prevention research evidence has not translated into a remarkable reduction in fall-related injury [4]. Older people continue to fall, with one in three adults aged 65 years or older living in the community falling each year [5]. Of those who fall, up to 30% sustain a serious injury and may require hospitalization [6, 7]. A novel alternative to adopting traditional fall prevention approaches is to teach older adults a series of movement patterns that reduce fall-related impact forces and allow for safe landing, thereby preventing injury [8]. Our previous pilot study results involving healthy older adults showed that participants were able to decrease hip acceleration by 33% and head acceleration by 54% during experimentally induced falls following a training of protective movement strategies [9]. Other groups have explored incorporating falling techniques into fall prevention programs in working-age adults, for example the Judo4balance exercise program [10, 11].

The Falling Safely Training (FAST) study is a randomized controlled trial designed to teach older adults at risk of falling strategies to fall safely and therefore minimize the risk of injury (NCT05260034) [12]. The FAST program is relatively unique compared to other fall prevention interventions as its aim is to reduce fall related injuries when falls cannot be avoided. The end goal of the safe-falling training program is to implement the intervention in the community. To achieve this goal and to help inform future refinements of the safe-falling training, it is crucial to employ qualitative research methods and evaluate the views of the participants who completed the FAST program. Utilizing qualitative methods is essential to recognize the ‘how’ and ‘why’ behind the (in)effectiveness of an intervention [13, 14]. Qualitative research also offers a unique contribution in the process of research translation [15], so that patient care and clinical practice can benefit [16]. Qualitative studies show that health practitioners face substantial barriers in the implementation of fall prevention practices [17]. For example, a study by Elskamp et al. [18] provided insight into the reasons why older people frequently refuse to participate in fall prevention trials. Evaluating participants’ attitudes towards interventions to assess acceptability is a necessary component for their long-term success,

along with evaluating their effectiveness [19]. Acceptability is defined as a multi-faceted construct relating to how individuals perceive the intervention to be appropriate based on their anticipated and experienced emotional and cognitive responses to the intervention [20]. Levels of acceptability are known to greatly affect how likely participants are to adhere to, and benefit from, an intervention [21]. According to the theoretical framework of acceptability (TFA) [20], there are several elements which allow for a robust assessment of healthcare interventions: affective attitude, burden, perceived effectiveness, self-efficacy, ethicality, intervention coherence, and opportunity costs. TFA was therefore used in the current study as a guide towards potential refinement of the FAST intervention, as well as evaluation of the extent to which the intervention can be sustained over time.

There is a need to explore the views of participants who completed the FAST program so that the training can be refined and enable implementation in the community. The aim of this study was to understand the views and perceptions of older people who participated in the safe-falling training on the acceptability, appeal, feasibility, and suitability of future delivery of the program.

## Methods

### Study design

To evaluate participant acceptability and inform future refinements of the safe-falling training program, we explored the experiences of participants randomized to the intervention arm of the FAST study using a qualitative approach. Focus groups were deemed a suitable methodology as they allow the researcher to hear the respondents’ answers and facilitate group discussion, wherein the interaction between participants is an essential feature [22]. Focus groups allow for the respondents to exchange their ideas, to help remember and articulate issues which they might not have remembered to mention otherwise in an individual interview [22]. The study protocol has been approved by the University of Kansas Medical Center institutional review board (IRB) (STUDY00147362) and the research was carried out in accordance with the Declaration of Helsinki. All participants provided written informed consent prior to attending the focus group. The study is reported in line with the Consolidated criteria for Reporting Qualitative research (COREQ) framework [23].

### Study sample

Participants were community-dwelling older adults (age  $\geq 65$  years) at risk of falling who completed the training program. Briefly, the main inclusion criterion was being at risk of injurious falls, as indicated by meeting at least one of the following criteria, consistent with the Strategies to Reduce Injuries and Develop Confidence in Elders (STRIDE) trial: (1) report of two or more falls in the last year, (2) history of fall-related injury in the past year, or (3) concerns of falling due to problems with walking or balance [3]. Full details on participant eligibility can be found in the previously published study protocol [12]. Eleven participants completed the safe-falling training. Two participants did not complete the last retention assessment and were not asked to participate in the focus group. Nine participants were invited by phone, and eight agreed to take part in the focus groups. Two focus groups involving four participants each were conducted. The adherence rate in the studied sample was 100%.

### Training program

FAST program aims to teach older people how to fall safely and therefore minimize fall-related injuries. The FAST program consists of a total of eight individual sessions (twice a week for 30 min) of progressive training of safe-falling movement strategies taught by a trainer with experience in martial arts. In Week 1, participants did exercises in the supine position (e.g. rolling from side to side or slapping arms on the mat). In Week 2, they progressed to exercising from a sitting position (e.g. rolling on a side or on the back from a sitting position). In Weeks 3 and 4, exercises progressed to a kneeling and standing position (e.g. rolling backwards on the back from standing position). For full details on the training please refer to the study protocol [12]. Participants underwent a series of experimentally induced falls in a laboratory setting at baseline, after the 4-week intervention, and three months after the intervention, with the purpose of assessing head and hip movement during the falls measured through motion capture. As part of the baseline assessment, participants reported demographic information and completed the 16-item Activities-specific Balance Confidence scale (ABC) [24] as a measure of individuals' confidence in performing various activities without losing balance. Items are rated on a scale from 0 to 100, where a score of zero represents certainty of falling or becoming unstable and a score of 100 indicates complete confidence in balance ability. Further information on the intervention procedure is outlined in the study protocol [12].

### Data collection

The first author (AZ), an experienced qualitative researcher with a background in psychology who was

not involved in the training delivery, conducted both focus groups. Focus groups were conducted face-to-face in a small conference room at the University of Kansas Medical Center. The focus group questions were open-ended and covered participants' prior expectations, their perceptions and experiences with the training program, the perceived benefits and limitations, and their thoughts about implementing the program in a community setting. The focus groups lasted  $\sim 60$  min, were audio recorded using a digital recorder and transcribed verbatim. Transcripts were anonymized, with any personally identifiable information removed and an ID allocated to each participant.

### Data analysis

Focus group data were analyzed using thematic analysis [25]. The analysis was performed using Dedoose software (Version 9.2.6). The goal of thematic analysis is to identify themes, or patterns, in the data that are important and to interpret and make sense of the data. First, the researcher (AZ) familiarized herself with the data by reading and re-reading the transcripts. Next, line-by-line analysis was conducted, and a set of codes was identified based on the meanings and patterns observed in the data. Codes were collated and grouped into initial themes. The themes were then reviewed and revised until they captured the main trends in the data. Finally, the themes were formulated into a narrative with a set of quotes from participants to support each theme. While the first author led the analysis and theme development, review and revision took place with consultation from all co-authors. Details of the inductive coding process, as well as respective themes and subthemes which were constructed, are available in [Supplementary Material](#). The TFA [20] was then adopted to aid the interpretation of the findings.

## Results

### Participant characteristics

In total, eight older adults at risk of falling who completed the FAST program took part in focus group discussions. Five participants were female. Age ranged from 66 to 76 years old, with an average of 71.9 years. Half of the participants had fallen at least once in the year prior to taking part in the intervention. Scores on the ABC scale ranged from 76.4 to 99.7%, with a mean score of 86.4%. Full demographic and background information for the sample can be found in [Table 1](#).

### Themes

The results of the analysis provided insight into the participants' experiences *leading up to*, *during*, and *following the training*. Participants described the fall-related injury prevention techniques which they used prior to taking part in the study. Next, respondents shared

**Table 1** Participant demographic data

Participant ID	Age	Gender	Marital Status	Number of falls in the past 12 months	ABC scores at baseline
P1	75	Female	Married	0	94.3%
P2	75	Male	Married	1	99.7%
P3	76	Male	Married	1	78.8%
P4	70	Female	Married	0	76.4%
P5	66	Female	Married	4	80.9%
P6	73	Female	Widowed	0	76.6%
P7	69	Male	Married	2	88.8%
P8	71	Female	Widowed	0	95.3%

their motivations to participate in the training program. Reports on the actual training covered views on acceptability and how the skills were perceived to be learned. It was determined that the training increased confidence in relation to potential future falls. It was discussed how to incorporate the training in a community context, and suggestions for program enhancements were made. Table 2 presents a synopsis of the themes and subthemes, along with exemplary quotations from the respondents. Each subtheme is covered in detail in the sections that follow, along with quotes that provide supporting evidence.

#### Previous fall prevention strategies

Participants described a range of strategies that they used to prevent falls and fall-related injuries prior to taking part in the safe-falling training program. Most of them highlighted slowing down and being more cautious in their daily activities as the main approaches they adopted. They reported recognizing the impact of aging on their balance and the related risk of falling.

*I think I'm probably more cautious as I get older, taking my time a little more and being a little more cautious on stairs, especially. I'm more likely to hold onto the handrail than I was, you know, five, ten years ago. (P6)*

Some participants had fallen before taking part in the study, and this experience made them more aware of the risk. Older adults in the study reported having an awareness of their own limitations associated with aging. They also pointed out that they now recognize the risks in the environment and adjust accordingly, for example, by avoiding going out in icy conditions.

*I just had an awareness of falling, especially with my kind of falls. So, as I go up that second flight of stairs, lift that leg. And I'm constantly repeating that in my head, remember to do that. (P1)*

The participant above reported having an internal dialogue, reminding herself to lift the affected leg while

walking up the stairs or holding the handrail. Many respondents also reported exercising regularly as a way of preventing falls and fall-related injuries. Overall, older adults in the study had an awareness of how aging affects their risk of falling and adopted some strategies to prevent falls.

#### Motivation to participate

A range of motivations for taking part in the training were reported. For some, curiosity about the program was one of the motivating factors. For others, it was an awareness of the increased risk of falling due to balance issues or having a family member or a friend affected by a condition that increases the risk of falling.

*It's going to be a matter of when rather than if, probably I'll fall as I age. (P3)*

Many reported worrying about falling, especially due to having a history of falls and related injuries.

*I'm kind of the same type thing of, you know, worrying about falling, because I have fallen walking my dog, tripping on the sidewalk and that kind of thing, and so I just kind of want to know about being aware and then just kind of have a handle or prepare myself for, you know. (P8)*

In both quotes above, the participants acknowledged that they have a higher chance of falling in the future and that they wanted to prepare themselves. The awareness of falls potentially leading to complications motivated the participants to take part in the training program to help avoid the negative consequences. Especially seeing the more serious complications, such as brain injury in the example of the quote below, were emphasized as having a strong impact on the participants.

*My brother-in-law developed vertigo, and he fell one time and had an eight inch gash in his skull, in his head, staples, and he never was very good after that. [...] After seeing that kind of fall I'm oh my gosh,*

**Table 2** Overview of themes and subthemes

Theme	Subtheme	Definition	Representative Quotations
Before the training	Previous fall prevention strategies	Strategies used by the participants to prevent falls and injury prior to the training.	<i>I try to slow down. And you have to do that, or you do, I believe, fall more than you should. (P1)</i> <i>I'm way more cautious now than I was [...] Just with age. I am more methodic, you know, as I'm going down the stairs, or I think about it more than I did when I was younger. (P5)</i>
	Motivation to participate	Reasons motivating to take part in the training and feelings about starting.	<i>I have fallen and torn a rotator cuff, things like that, so I thought I want to stop doing that, so if you can teach me how to stop doing that, or at least try and fall safer so that I don't injure myself. (P4)</i> <i>At least to learn how to fall safer so you don't get injuries like that. (P1)</i>
Training itself	General impressions of the training	Overall experience of the training, including length, frequency, the team, and appreciation that safety was taken seriously.	<i>I definitely would [encourage others] just because again the experience was so positive, not only learning techniques on how to fall, but just the experience of being involved with a group of professionals who did such a good job. And throughout the whole process, other than just the techniques of falling, it was just an enjoyable experience. (P7)</i> <i>I appreciated also [trainer] with every fall, he was always making sure are you comfortable. Our safety was at his utmost concern. (P5)</i>
	Learning the techniques	Perceptions of the content of the training sessions and learning the techniques.	<i>It was nice to learn the proper procedure because it's hard to change old habits. It was nice to, you know, try to think about what I was doing or what would happen and that type of thing, and just try to condition me to do it properly. (P8)</i> <i>So that was my big takeaway, just try to protect that head. (P3)</i>
Going forward	Training increased confidence	Training increased confidence, including being able to use the techniques during falls which occurred after the sessions finished.	<i>But maybe I feel a little more confident that if I fall, I'm not going to hit my head. If I fall backwards, I'm probably most likely not going to hit my head. (P5)</i> <i>That's why I think this [training] is making me a little more aware of just trying to... what to watch for and then, you know, at least a little more confident that hopefully if I fall, I know which way to fall. Especially if I'm going backwards or sideways. (P8)</i>
	Incorporating in a community setting	Aspects to consider when incorporating in a community setting, including a preference for the individual over group format.	<i>Like people have talked about, falling is a growing concern as you grow older, so I think most people would be very interested. (P7)</i> <i>I don't think a group basis would work. You needed that one-on-one to really... He was paying so close attention to every movement that, if there were two or three people going at one time, there would have been things missed. I just don't think that would have worked at all. (P6)</i>
	Proposing improvements to the study	Suggestions for improving the program in the future.	<i>I think that goes back to the community training. Again, offering the Safe Fall, you know, having fall safer in conjunction with the strength and balance, or a tai chi, or a yoga, or... (P4)</i> <i>Well, I think most falls at our age are really... you're tripping when you fall. You're tripping over something or you're tripping over your own feet. And that's what lends it to, because you already have that forward momentum going, and then it's just going to propel you forward. So, it would be nice to have the forward... just some mechanics of it involved in it. (P5)</i>

*can you do that much falling, can you do that much damage? (P1)*

Some older people in the study reported wanting to help others by participating in research. However, several participants reported they wished they had been randomized to the control group. The rationale presented for this was that the balance training would improve overall balance and strength, which would then reduce the risk of falling.

*I wanted to be in the other one because I thought it would—I thought they can't teach me how to fall. (P4)*

*I mean, if you didn't have the technique, but you had better balance if you fall, you know, would you do it the same way as you were trained. (P3)*

### General impressions of the training

All participants reported an overall positive experience with the training. One of them described the classes as 'enlightening', stating she was looking forward to participating every time. Individuals enjoyed interacting with the trainer and other study team members.

*It was nice, the personal interaction with everybody. Everybody was super supportive and helpful. [...] it was very enjoyable working with people. And they made it easy to enjoy being involved in the process. (P7)*

The short, repetitive nature of the sessions was also appreciated. The number of sessions was described as just right, allowing for consolidation of the skills before moving on to learning new techniques.

*I'm glad it was only 30 min. (P6)*  
*One of the things I appreciated about the training was that [trainer] was so consistent every week on how he introduced it and explained what you're going to do. Every week it was the same, I mean, almost to the letter, so it was very easy to retain the information because he was so consistent in the way he presented what we were going to learn and the process. It really made it very easy to retain and to learn. (P7)*

Individual training sessions allowed for accommodating personal needs, for example, allowing for rest periods if there was such a need. Participants also appreciated the importance of safety being taken seriously during the assessments and training sessions.

### Learning the techniques

Participants described how they learned the safe-falling techniques in the context of changing old habits, for example, having the urge to extend the hand out when falling instead of tucking in. They reported appreciating the slow buildup of learning the correct falling procedure.

*It was kind of nice building slowly because for me doing too much at one time, would maybe start to have it wrong, and then to, you know. So just learning a little at a time, and how to apply it each time kind of was a nice sequence. (P8)*

In particular, learning the importance of preventing head injury was highlighted as the biggest takeaway from the sessions.

*And for me, a fall, I guess I don't worry so much about a broken bone because I think oh, a broken bone will mend. But I learned more about a head injury, and so I really liked that aspect of it, that, you know, when he talked to us about tucking our chin under when we fell, to kind of, to minimize the chance of our head hitting the floor or whatever surface it is. (P5)*

Participants discussed the importance of receiving individual feedback on their performance from the trainer. They discussed how the concepts became intuitive once they learned them. For one individual, the techniques were a refresher from what she learned when snow skiing. Overall, the techniques learned were thought to be useful and relevant for the participants.

### Training increased confidence

Anxiety decreased for the older individuals during the second set of experimentally induced falls, which were performed as part of the post-training assessment. One person reported not being sure whether she was going to return for the second assessment after feeling anxious during the first set of falls. However, the training increased her confidence, so much so that she decided to return.

*I felt more confident whenever I did the evaluation [fall] the second time than I did the first time. (P5)*

Participants reported falling in a safer way during the post-training assessment. Especially, several of them emphasized that they were able to protect their head.

*I did fall, in my opinion, safer. My head did not go back on that second assessment. (P4)*

The use of techniques became intuitive, which allowed the older adults to use them during the second experimentally induced set of falls.

*We had practiced it so many times in the lab that it came more, I mean, it just kind of came naturally to tuck as I fell. (P5)*

One person reported feeling as if she failed during the second assessment falls, because she wanted to be able to incorporate all the techniques she had learned and “perform well”. Over and above being able to use the techniques learned during the second assessment fall, participants reported that the training raised their overall awareness of safety, which resulted in them paying more attention to environmental hazards. It also increased participants’ confidence in landing safely should a fall occur in their daily lives.

*I feel a little more confident that if I fall I’m not going to hit my head. If I fall backwards I’m probably most likely not going to hit my head. (P5)*

Those who did fall accidentally following the training reported being able to use some of the techniques.

*Because I think I literally, you know, it all happened so fast, I think I did bend my knees a little bit. (P4)*

They reported not being able to use all of the techniques that they learned and attributed this to how fast and unexpected falls occur in real life.

#### **Incorporating the training program into a community setting**

One of the aspects highlighted during the focus group discussions was the value of incorporating the training into a community setting. Older people provided examples of settings where they would see this as beneficial, for instance, retirement communities.

*I don’t know how you would incorporate some of the things we did, but I can see the value of what we do in those exercise classes, to tie that in. That would be a challenge exactly how you would do it, but I see the benefit of incorporating. (P3)*

They highlighted several challenges that would need to be overcome. First, participants had a strong preference for individual over group-based sessions. Reasons for this included the one-to-one attention of the trainer and providing individualized feedback without feeling intimidated in front of others, the short duration of the sessions, and a focus on safety.

*I think it would wind up maybe resulting in some injuries, just because you couldn’t be with that person, you know, with each person one-on-one. And people retain things at different rates, so in a group setting one person might require all of his attention, which I think would be maybe detrimental to the rest of the group. (P5)*

Secondly, the safety concerns of bringing the class to a community setting were discussed. All respondents greatly valued that the risk of injury was brought to a minimum during the training, and they worried that all of the precautions would not be possible to incorporate in the community. For example, they expressed concerns about the potential lack of initial screening (including a bone density test, underlying health conditions increasing the risk of injury, etc.), while also recognizing that these are the people who need the safe-falling training the most.

*I do wonder about if you...maybe when they did the assessment, or not the assessment, but consideration you couldn’t have like a hip replacement or a knee replacement or those things, but as you go forward, those are some of the people that really need it. (P2)*  
*I think the hardest thing about doing a group session would be injury. (P5)*

Some solutions were offered, for example, using thick mats or having medical approval to participate. Respondents suggested that future participants could also focus on learning the movements from the seated position and that the most important aspect was learning the mechanism of the fall so that it came naturally or intuitively. Overall, it was concluded that the benefits of bringing the training to the community would outweigh the risks, and the challenges could be overcome.

*I understand what you’re saying in terms of the bone density. On the other hand, that was for research purposes. I think it would still be helpful to get it out in the community. I think the net positive would still be there, where you’re still training people how to fall to minimize. I mean, maybe I don’t know how much injury percentage you’re willing to put up with in order to get more people trained, but I think it would still be positive to help people in the community learn how to fall more safely. (P7)*

Other suggestions included having more than one trainer during the group sessions to still be able to provide one-to-one feedback on the falls. Lastly, the camaraderie of having the sessions on a group basis was brought up as



valuable and something that could be encouraging to participants.

*But watching other people who have the same limitations that we do, because we, you know, are more advanced age, then it might be beneficial to watch other people. And sometimes there's that camaraderie about encouraging people in a group setting, too. So if it were a group setting and we weren't all falling at the same time, but kind of taking turns, but if you could keep it to still maybe 45 min at the most, you wouldn't be falling for the whole 45 min, you'd be taking turns. But I think in a small group setting I think it would work just fine. (P5)*

In summary, despite recognizing challenges to be overcome, participants saw bringing the safe-falling training to a community setting as important.

#### **Proposing improvements to the study**

Older people suggested possible improvements to the training program for future deliveries. The first proposed recommendation was to combine the safe-falls program with balance training or other exercise classes.

*Maybe if they start the sessions with a balance training that leads into the fall lessons. I think that would—they kind of go hand-in-hand to me. (P1)*

Respondents explained that this would help with motivation to take part, as people usually look for exercise classes in the community. Providing instructional videos was another suggestion, while still combining it with a one-to-one falling session with the trainer. Second, participants indicated that a refresher follow-up session would be useful, or at least hearing back from the study team to remind them about the techniques learned. It was suggested that such refresher classes could be taken on a group basis. Some participants indicated that they would see value in starting the program at an earlier age. Finally, most indicated that they would like to learn how to fall forward.

*For me I think falling forwards is probably a more common occurrence, so I said I would...or doing it again, or maybe a different study, learning how to fall forward. Now when I said that he gave me some tips and showed me a few things about falling forward, but I think falling forward is a more common occurrence. (P7)*

Those who asked about it during the training sessions were provided with verbal explanations by the trainer, and they indicated that hearing about the mechanics of a

forward fall was useful. They proposed that receiving tips or suggestions on falling forward should be incorporated in the future.

#### **Discussion**

The current study aimed to explore the views and perceptions of community-dwelling older adults at risk of falling about their participation in the safe-falling training program. The results indicate that the FAST intervention was acceptable and, notably, was reported to increase the participants' subjective feelings of confidence about falling without injury. Motivations to take part in the training included an awareness of one's own risk of falling and worries about falling, as well as a desire to decrease the chances of sustaining an injury. Participants highlighted that the training was well-designed and executed. An overall positive experience was reported by all individuals. One of the most important techniques that participants reported learning was how to protect the head during a fall. They reported increased confidence to better perform the post-intervention experimentally induced falls in the laboratory, as well as use the learned techniques during falls that occurred in everyday life after the program ended. While the participants appreciated the individual nature of the training, they recognized the value of taking the training to a community setting and provided suggestions for how they would see the program taking place successfully in small groups.

Following the analysis, the most salient aspects of the participants' narratives were evaluated through the lens of the TFA [20]. The results of the current study were appraised in relation to the first four out of seven component constructs of the TFA, namely: affective attitude, burden, perceived effectiveness, self-efficacy.

Affective attitude refers to how people feel about the intervention, both in anticipation of and during participation. Prior to taking part, individuals worried about sustaining an injury during a fall, either because of their prior injury or hearing about friends' or family members' injuries. While most were keen and motivated to learn the safe-falling techniques, some participants felt hesitant about taking part. This study provides insight into the potential reasons for disinterest and unwillingness to attend such training, namely skepticism about its' effectiveness and preference for balance training and improving overall strength. Previous research by Elskamp et al. [18] attempted to explain why older people frequently refuse to participate in fall prevention trials, with safety concerns being one of the reasons. The current findings emphasize that participants appreciated feeling safe during the intervention, which has implications for future delivery. While it is widely recognized that trials promoting physical activity in older adults frequently experience low interest and recruitment rates [26, 27], future



research should examine these hesitations further, particularly in relation to fall prevention interventions. Importantly, after the participation ended, all individuals felt the value of the training, reported it as highly enjoyable and useful. Affective attitudes towards the program were also supported by the positive views of the trainer and the study team. This finding is in line with previous research suggesting that the professional help of the trainer and encouraging personal exchanges with the team contribute to older people's attitudes and attendance in exercise classes [28–30].

Perceived self-efficacy, relating to the individuals' confidence that they can perform the required behaviors, is one of the most crucial elements of the acceptability of an intervention [20]. For the safe-falling intervention, participants reported not only high confidence in performing the techniques during the training but also being able to apply them in daily life. Participants who had a fall after the program ended reported that they were able to use the techniques learned and avoided injury. Moreover, although the intervention was not aimed at reducing fear of falling directly, the results also emphasized the increase in confidence in preventing a fall-related injury. This is important because previous research demonstrates that concern about falling, especially if it is perceived as outside of individuals' control, can contribute to an increased risk of falls and subsequent injury [31].

The number, duration, and frequency of the sessions were perceived well. These aspects relate to the burden of participation as another factor in the acceptability construct derived by Sekhon et al. [20]. The amount of effort that was needed to participate was described as just right. Older adults reported appreciating that safety concerns were taken seriously during the training. Despite their initial hesitation caused by the experimentally induced falls, they felt safe while training. The last component construct of acceptability evaluated here, perceived effectiveness, relates to the extent to which the intervention was perceived to have achieved its purpose [20]. The structure of the program was well received, and similarly to the findings of Reicherzer and colleagues [30] who evaluated the acceptability of an exercise program, the repetitious nature of the sessions was reported to help with learning and remembering the movements. Overall, participants reported that the intervention was well aligned with its intended purpose.

Several suggestions were highlighted regarding the implementation of the safe-falling program in a community setting and future refinements. Specifically, safety concerns, including the use of protective equipment and screening for injury risk, were raised. Preference was given to a small class setting so that receiving one-on-one feedback from the trainer was still possible. The preference for individual training is in line with the results from

Barmantloo et al. [32], who assessed personal preferences for fall prevention interventions in older adults and found that a larger proportion preferred to exercise alone versus in a group. Finally, the importance of learning how to fall forward was stressed. Forward falls are indeed dangerous and happen frequently [33], so this is an important aspect to be addressed in future research.

### Strengths and limitations

The current study does not come without limitations. One of them is a small sample size, which was due to the sample size of the FAST intervention. This limits the extent to which saturation could be verified. However, as eight out of nine participants who completed the entire safe-falling training took part in the focus groups, the views of the majority of those who had undergone the program are captured here. Another limitation is that the diversity of the sample was limited, with an underrepresentation of ethnic minorities, which limits the transferability of the results to a wider population. Moreover, because the inclusion criteria for the FAST study included, for example, normal bone density and the ability to walk independently, individuals who are most at risk of injury due to a fall were not represented in the current study. One of the strengths was that the focus groups were facilitated by a researcher who was not involved in any earlier parts of the training, which allowed the participants to be open about the weaknesses of the program as well as its benefits. A further asset is relating the findings to a theoretical framework [20]. Last but not least, the choice of study method as focus groups was especially important in the current study, as participants have undergone the same training program and were therefore able to exchange their thoughts about it, which led to obtaining rich data.

### Conclusion

The results of the current study, which aimed to examine the views of older adults who completed the FAST program, indicated that the safe-falling training was overall acceptable. Themes provided insight into the participants' experiences *leading up to, during, and following the training*, with subthemes including previous fall prevention strategies used, motivation to take part, general impressions of the training and learning the techniques, and suggestions proposed for going forward. The results indicate that perceived effectiveness was high, with confidence in one's ability to fall without injuring themselves believed to have increased. The perceived burden of participation was low, as individuals appreciated the training being well-designed and executed and enjoyed interacting with the trainer and the study team members. Older adults who fell after the training ended reported being able to use the techniques learned. The findings have

implications for the training to be refined and implemented in the community.

### Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12877-024-05382-7>.

Supplementary Material 1

Supplementary Material 2

### Acknowledgements

The authors would like to thank study participants for their time, insights, and engagement in the research process. We also thank Emilia Potts, research coordinator in the Mobility and Falls Lab, who supported the conduct of this study.

### Author contributions

AZ, JJS: development of the semi-structured interview guide for the focus groups. AZ, JJS: study organization. AZ: conduction of focus group interviews. AZ: data analysis. AZ, TZ, JJS: draft of manuscript. AZ, TZ, NBA, JJS: critical revision of the manuscript. All authors have read and approved the final manuscript.

### Funding

This work is supported by a research grant from the National Institutes of Health (1R21AG073892-01) awarded to JJS and a Faculty Practice Grant from the School of Health Professions at University of Kansas Medical Center awarded to AZ. The funders have no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

### Data availability

The data used and/or analyzed during the current study are available from the corresponding author on reasonable request.

### Declarations

#### Ethics approval and consent to participate

Ethical approval for the FAST trial was obtained from the Institutional Review Board of the University of Kansas Medical Center which follows the policy and mandates of the Declaration of Helsinki. For the FAST trial, as well as for the focus group study, all participants provided written informed consent.

#### Consent for publication

Not applicable.

#### Competing interests

The authors declare no competing interests.

#### Author details

<sup>1</sup>Department of Occupational Therapy Education, School of Health Professions, University of Kansas Medical Center, Kansas City, KS, USA

<sup>2</sup>Mobility Core, University of Kansas Center for Community Access, Rehabilitation Research, Education and Service, Kansas City, KS, USA

<sup>3</sup>Landon Center on Aging, University of Kansas Medical Center, Kansas City, KS, USA

<sup>4</sup>VA Ann Arbor Healthcare System Geriatric Research, Education and Clinical Center (GRECC), Ann Arbor, MI, USA

<sup>5</sup>Division of Geriatric and Palliative Medicine, Department of Internal Medicine, University of Michigan, Ann Arbor, MI, USA

<sup>6</sup>Department of Physical Therapy, Rehabilitation Science, and Athletic Training, School of Health Professions, University of Kansas Medical Center, Kansas City, KS, USA

Received: 14 May 2024 / Accepted: 16 September 2024

Published online: 11 October 2024

### References

- US Preventive Services Task Force. Interventions to Prevent Falls in Community-Dwelling older adults: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2018;319(16):1696–704.
- Cameron ID, Dyer SM, Panagoda CE, Murray GR, Hill KD, Cumming RG, et al. Interventions for preventing falls in older people in care facilities and hospitals. *Cochrane Database Syst Rev*. 2018;9(9):CD005465.
- Bhasin S, Gill TM, Reuben DB, Latham NK, Ganz DA, Greene EJ, et al. A Randomized Trial of a multifactorial strategy to prevent serious fall injuries. *N Engl J Med*. 2020;383(2):129–40.
- Day L, Donaldson A, Thompson C, Thomas M. Integrating proven falls prevention interventions into government programs. *Aust N Z J Public Health*. 2014;38(2):122–7.
- Gillespie LD, Robertson MC, Gillespie WJ, Sherrington C, Gates S, Clemson L et al. Interventions for preventing falls in older people living in the community. *Cochrane Database Syst Rev* [Internet]. 2012 [cited 2024 Apr 17];(9). <https://www.cochranelibrary.com/cdsr/doi/https://doi.org/10.1002/14651858.CD007146.pub3/full>
- Burns ER, Stevens JA, Lee R. The direct costs of fatal and non-fatal falls among older adults — United States. *J Saf Res*. 2016;58:99–103.
- Lord SR, Sherrington C, Cameron ID, Close JCT. Implementing falls prevention research into policy and practice in Australia: past, present and future. *J Saf Res*. 2011;42(6):517–20.
- Hsieh KL, Sosnoff JJ. A Motor Learning Approach to reducing fall-related injuries. *J Mot Behav*. 2021;53(5):663–7.
- Moon Y, Bishnoi A, Sun R, Shin JC, Sosnoff JJ. Preliminary investigation of teaching older adults the tuck-and-roll strategy: can older adults learn to fall with reduced impact severity. *J Biomech*. 2019;83:291–7.
- Arkkukangas M, Bääthe KS, Ekholm A, Tonkonogi M. A 10-week judo-based exercise programme improves physical functions such as balance, strength and falling techniques in working age adults. *BMC Public Health*. 2021;21(1):744.
- Arkkukangas M, Strömquist Bääthe K, Hamilton J, Ekholm A, Tonkonogi M. Feasibility of a novel Judo4Balance – fall preventive exercise programme targeting community-dwelling older adults. *J Frailty Sarcopenia Falls*. 2020;05(03):47–52.
- Zanotto T, Chen L, Fang J, Bhattacharya SB, Alexander NB, Sosnoff JJ. Minimizing fall-related injuries in at-risk older adults: the falling safely training (FAST) study protocol. *Contemp Clin Trials Commun*. 2023;33:101133.
- Finnegan S, Bruce J, Seers K. Life after falls prevention exercise – experiences of older people taking part in a clinical trial: a phenomenological study. *BMC Geriatr*. 2021;21(1):91.
- Corbin J, Strauss A. *Basics of qualitative research: Techniques and procedures for developing grounded theory*, 3rd ed. Thousand Oaks, CA, US: Sage Publications, Inc; 2008. xv, 379 p. (Basics of qualitative research: Techniques and procedures for developing grounded theory, 3rd ed).
- Bottorff JL. Knowledge translation: where are the qualitative health researchers? *Qual Health Res*. 2015;25(11):1461–2.
- Kitson AL, Harvey G. Methods to Succeed in Effective Knowledge translation in clinical practice. *J Nurs Scholarsh*. 2016;48(3):294–302.
- van Rhyn B, Barwick A. Health practitioners' perceptions of falls and fall Prevention in Older people: a metasynthesis. *Qual Health Res*. 2019;29(1):69–79.
- Elskamp ABM, Hartholt KA, Patka P, Van Beeck EF, Van Der Cammen TJM. Why older people refuse to participate in falls prevention trials: a qualitative study. *Exp Gerontol*. 2012;47(4):342–5.
- Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci*. 2011;6(1):42.
- Sekhon M, Cartwright M, Francis JJ. Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. *BMC Health Serv Res*. 2017;17(1):88.
- Hommel KA, Hente E, Herzer M, Ingerski LM, Denson LA. Telehealth behavioral treatment for medication nonadherence: a pilot and feasibility study. *Eur J Gastroenterol Hepatol*. 2013;25(4):469.
- Kitzinger J. The methodology of Focus groups: the importance of interaction between research participants. *Sociol Health Illn*. 1994;16(1):103–21.
- Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19(6):349–57.
- Powell LE, Myers AM. The activities-specific balance confidence (ABC) Scale. *J Gerontol Ser A*. 1995;50A(1):M28–34.

25. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77–101.
26. Normansell R, Holmes R, Victor C, Cook DG, Kerry S, Iliffe S, et al. Exploring non-participation in primary care physical activity interventions: PACE-UP trial interview findings. *Trials*. 2016;17:178.
27. Haynes A, Sherrington C, Wallbank G, Wickham J, Tong A, Kirkham C, et al. Using self-determination theory to understand and improve recruitment for the coaching for healthy ageing (CHANGE) trial. *PLoS ONE*. 2021;16(11):e0259873.
28. Lindelöf N, Karlsson S, Lundman B. Experiences of a high-intensity functional exercise programme among older people dependent in activities of daily living. *Physiother Theory Pract*. 2012;28(4):307–16.
29. Keay L, Saich F, Clemson L, Middlemiss L, Johnson J, Tumanik H, et al. Feasibility and acceptability of orientation and mobility instructors delivering the LiFE falls prevention program to older people with vision impairment. *Int J Orientat Mobil*. 2017;7(1):22–33.
30. Reicherzer L, Kramer-Gmeiner F, Labudek S, Jansen CP, Nerz C, Nystrand MJ, et al. Group or individual lifestyle-integrated functional exercise (LiFE)? A qualitative analysis of acceptability. *BMC Geriatr*. 2021;21(1):93.
31. Ellmers TJ, Wilson MR, Norris M, Young WR. Protective or harmful? A qualitative exploration of older people's perceptions of worries about falling. *Age Ageing*. 2022;51(4):afac067.
32. Barmantloo LM, Olij BF, Erasmus V, Smilde D, Schoon Y, Polinder S. Personal preferences of participation in fall prevention programmes: a descriptive study. *BMC Geriatr*. 2020;20(1):185.
33. Robinovitch SN, Dojnov A, Komisar V, Yang Y, Shishov N, Yu Y, et al. Protective responses of older adults for avoiding injury during falls: evidence from video capture of real-life falls in long-term care. *Age Ageing*. 2022;51(12):afac273.

### **Publisher's note**

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.