2019

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This article was originally published as:
Mascarenhas, M., Hill, K. D., Barker, A., & Burton, E. (2019). Validity of the Falls Risk for Older People in the Community (FROP-Com) tool to predict falls and fall injuries for older people presenting to the emergency department after falling. *European Journal of Ageing, Early View (Online First)*.

Original article available here:
10.1007/s10433-018-0496-x

European Journal of Ageing

Validity of the Falls Risk for Older People in the Community (FROP-Com) tool to predict falls and fall injuries for older people presenting to the emergency department after falling.

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Acknowledgements

RESPOND research staff, particularly Dr Renata Morello for her assistance with the RESPOND data; the participants of the RESPOND research study; Ms Angela Jacques and Dr Robyn Fary.

Funding

This project was funded under the Australian National Health and Medical Research Council's Partnership Projects funding scheme (project number APP1056802) with financial and in-kind contributions from the following partner organisations: Health Strategy and Networks Branch, Strategic Policy and Planning, Department of Health WA; Aged and Continuing Care Directorate, Department of Health WA; Royal Perth Hospital; Curtin University; The University of Western Australia; The Royal Perth Hospital Medical Research Foundation; Sir Charles Gairdner Hospital (SCGH) Are Rehabilitation and Aged Care Falls Specialist Program; Injury Control Council of Western Australia; The George Institute for Global Health; The Alfred Hospital; Monash University; Integrated Care, Victoria Department of Health.

(Word count:3312)

Abstract

The aims of this study were to (1) externally validate the accuracy of the Falls Risk for Older People–Community (FROP-Com) falls risk assessment tool in predicting falls, and (2) undertake initial validation of the accuracy of the FROP-Com to predict injurious falls (requiring medical attention) in people aged ≥60 years presenting to Emergency Departments (EDs) after falling. Two hundred and thirteen participants (mean age=72.4 years; 59.2% women) were recruited (control group of a randomised controlled trial). A FROP-Com assessment was completed at a home visit within two weeks of ED discharge. Data on falls and injurious falls requiring medical attention were collected via monthly falls calendars for the next 12-months. Predictive accuracy was evaluated using sensitivity and specificity of a high risk FROP-Com classification (score≥19) in predicting a fall, and injurious falls requiring medical attention. Fifty percent of participants fell, with 60.4% of falls requiring medical attention. Thirty-two percent were classified as high, 49% as moderate and 19% low falls risk. Low sensitivity was achieved for the FROP-Com high risk classification for predicting falls (43.4%) and injurious falls (34.4%), although specificity was high (79.4% and 78.6% respectively). Despite the FROP-Com's low predictive accuracy, the high fall rate and high falls risk of the sample suggest that older people who fall, present to ED and are discharged home are at high risk of future falls. In high falls risk populations such as in this study, the FROP-Com is not a valid tool for classifying risk of falls or injurious falls. Its potential value may instead be in identifying risk factors for falling to direct tailoring of falls prevention interventions to reduce future falls.

Key Words

Accidental falls, Geriatric assessment, Older adults, Risk factors, External validity.

Introduction

The prevalence of falls amongst the older population (≥65 years) is a serious public health issue (DeGrauw et al. 2016; Heinrich et al. 2010). Studies have reported between 25-33% of older adults living in the community fall each year (Peel 2011; Shumway-Cook et al. 2009; Zimba Kalula et al. 2015). A fall is defined as "an event resulting in a person coming to rest inadvertently on the ground, floor or other lower level" (WHO 2016). Falling is frequently associated with negative physical and psychological outcomes for the individual (Rubenstein 2006). Injuries sustained from falling can affect an older person's ability to function in the community, and increase their chances of institutionalisation and risk of death (Stevens et al. 2008). Besides physical injuries, older people often develop a fear of falling which may cause reduced activity, leading to deconditioning and weakness, further increasing their risk of falling (Talley et al. 2014). The high incidence of falls also creates substantial costs for the health care system (AIHW 2012). A review of falls related costs in Australia estimated $AUD648 million was spent between 2007-08 (AIHW 2012). This figure is likely to be an under-estimate, as individual State Government costs per annum have been reported at $560 million in New South Wales (Watson et al. 2010), and $237 million in Victoria (Vu et al. 2014).

The Emergency Department (ED) is an important point of interaction between the health care system and older fallers, as falls account for between 15-30% of all ED presentations for older people (Samaras et al. 2010) in the United States, France and Taiwan. Of the older population who present to ED following a fall, those discharged back into the community have a high risk of falling again (Bloch et al. 2009; Salter et al. 2006). Therefore, the ED presentation is an ideal time to screen and assess an individual's risk factors for falling and provides an opportunity to commence implementation of interventions where applicable (Close et al. 2012; Kalula et al. 2006). However, research from Canada and Australia suggests that the majority of this population receive inadequate care to manage future risks of falling (Salter et al. 2006; Waldron et al. 2011).

Falls risk assessment tools are recommended for use in falls prevention guidelines, and can be used to identify an older person's risk factors for falling and to direct interventions targeted at identified risk factors in order to reduce an individual's risk of falling (Australian Commission on Safety and Quality in Health Care 2009; National Centre for Injury Prevention and Control 2015; National Institute for Health and Care Excellence 2013; Registered Nurses' Association of Ontario 2005). Falls risk assessment tools have been reported in different settings including: the community, acute hospital care, rehabilitative care and residential care (Lee et al. 2013). The availability of multiple falls risk assessment tools, and the variety of settings, poses a question of choosing the most appropriate tool for the desired setting (Lee et al. 2013). Many assessment tools have limited clinical relevance when used outside the setting for which they were originally developed, for example, a tool used to assess falls risk in a residential care setting may not be appropriate for older people living in the community (Myers 2003). To determine a tool's suitability to a setting, each tool should be evaluated for validity and reliability within that setting (Barker et al. 2011; Russell et al. 2008). Additionally, the external validation of a tool can further promote a tool's use within a given setting, as it increases generalisability of the tool in the wider community (Haines et al. 2007). External validity can be defined as "the extent to which the results of a study can be generalised to other populations, environmental conditions, or times" (Portney and Watkins 1993, p. 141). According to Haines and colleagues (2007) external validation addresses the wider issue of generalisability, through the collection of new data from the same type of population but utilising a different sample making the validation data set independent of the original data set and the characteristics of the original location. External validation of a falls risk assessment tool involves analysing the tool's pre-determined cut-off score for validity using a sample independent to the original validation study (Haines et al. 2007). This is an important, but not always considered aspect of falls risk assessment tool validity.

The Falls Risk for Older People – Community version (FROP-Com) is a multi-factorial falls risk assessment tool designed for the community setting (Russell et al. 2008). The tool consists of 28 questions that assess 13 risk factors in order to determine a falls risk score and status (Russell et al. 2008). The original validation study (published in 2008) for the FROP-Com tested predictive accuracy in a sample of community dwelling older people who had a fall-related ED presentation and were discharged directly home following ED care (Russell et al. 2008). The study reported clinical value in the FROP-Com predicting future falls using a cut-off score ≥ 19, where sensitivity was 71.3% and specificity 56.1% (Russell et al. 2008). Although the FROP-Com has demonstrated moderate predictive accuracy in predicting falls in a sample admitted to ED due to a fall and then being discharged home, it has yet to be externally validated using a similar setting (i.e. ED presentation due to fall and then discharged home). The external validation of the FROP-Com can provide additional value to the tool by increasing our understanding of its generalisability for this setting, and further reinforce the tool's clinical relevance for a different sample (Haines et al. 2007). This study had two aims, firstly to externally validate the accuracy of the FROP-Com in predicting falls in community dwelling older people who have fallen and presented to ED and were discharged home. Given the detrimental outcome of injurious falls for older people, the second aim was to determine the predictive accuracy of the FROP-Com to predict injurious falls requiring medical attention for older community dwelling people who have presented to the ED due to a fall. The predictive accuracy of the FROP-Com for injurious falls for people presenting to the ED after a fall has not been reported previously.

Methodology

Study Design, Participants and Recruitment

The study design was a prospective cohort study that utilised the control group of the 'RESPOND', randomised control trial . RESPOND aimed to evaluate the effectiveness of a multifactorial intervention to prevent falls for older people presenting to ED following a fall and being discharged home, and was conducted from April 2014 to July 2016 (Barker et al. 2015). The control group received no additional falls management intervention other than the usual care delivered at the ED and elsewhere (unrelated to the study intervention). Care received in the ED, or triggered by the ED staff as part of 'usual care' commonly consisted of a multidisciplinary assessment, referral to other health professionals and services, and/or a post discharge telephone contact from the nurse. Participants for RESPOND were recruited in the ED at the Alfred Hospital in Melbourne and Royal Perth Hospital in Perth (Australia). During their ED admission, participants were screened for demographic, medical, and cognitive status related to the study's inclusion and exclusion criteria (see below). Verbal and written consent were then obtained for those meeting study criteria. Two hundred and thirteen participants completed the study, (average age 72.4 years, SD:8.3, and 59.2% were women (n=126)). The participant characteristics for faller/non faller status are presented in Table 1. Ethics approval was obtained from the Alfred Health (HREC 439/13), Royal Perth Hospital (REG 13-128), Curtin University Human Research Ethics Committee

(HR2014/43) and Monash University Human Research Ethics Committee (MUHREC CF13/3869-201300). The clinical trial was registered with the Australian New Zealand Clinical Trials Registry (ACTRN12614000336684). Details of the recruitment process can be found in the RESPOND study protocol (Barker et al. 2015).

Inclusion Criteria

Participants were adults aged between 60 and 90 years who presented at the participating hospital EDs after a fall, and were planned to be discharged home from the hospital within 72 hours of admission.

Exclusion Criteria

Exclusion criteria for the RESPOND study were: hospital length of stay longer than 72 hours, discharge from the ED to residential care, receiving palliative care, suffering a terminal illness, requiring hands on assistance to walk, inability to use a telephone (because of the nature of the RESPOND intervention), cognitive impairment (Mini Mental State Examination<23), and a history of social aggression or psychosis. Participants who lived more than 50 km from either hospital were excluded as data collection methods required home visits. All participants in the RESPOND study intervention group were excluded from this secondary study, as the intervention was designed to reduce the future risk of falls (one of the outcomes being predicted).

Falls Risk for Older People – Community Version (FROP-Com)

The FROP-Com is a comprehensive, multifactorial falls risk assessment tool for use in the community setting. It consists of 28 questions that capture 13 risk factors (see https://www.nari.net.au/resources/health-professionals/falls-and-balance). The 13 risk factors include: history of falls and falls injuries, medications (e.g. sedatives and anti-coagulators), medical (health) conditions associated with increased risk of falls (e.g. arthritis, Parkinson's Disease, stroke, cardiac conditions, diabetes, osteoporosis), sensory loss (vision and somatosensory) and feet and footwear. Also included is cognitive status, continence, nutritional status (including recent change in weight), alcohol intake, environment (e.g. steps, lighting), functional behavior (e.g. fear of falling or risk taking behaviour), functioning (e.g. activities of daily living), balance, gait safety, and physical activity (National Ageing Research Institute (NARI)). Most questions are graded on a scale of 0-3, for example, question 1 asks how many falls a person has had in the last 12 months: score 0 for no falls; 1 for one fall; 2 for two falls; and 3 for three or more falls (National Ageing Research Institute (NARI)) although several questions (sensory loss, feet and footwear, incontinence, and nocturnal incontinence) are dichotomous (0 indicates falls risk factor not present, 1=falls risk factor present). Once each question is graded, they are added together to a FROP-Com total (overall) score. The tool is used to identify individual falls risk factors to be addressed for an individual, as well as providing an overall risk score (high falls risk scores are scores greater than or equal to 19) (Russell et al. 2008).

Initial validation of the FROP-Com was undertaken by Russell and colleagues (Russell et al. 2008) in a sample of older people presenting to the ED after a fall, but discharged home. Their study reported high retest reliability, and moderate predictive validity in predicting falls in the future 12 months. The FROP-Com has subsequently been reported as discriminating high levels of falls risk in people with Alzheimer's disease

(Suttanon et al. 2013a), and in older people receiving informal care at home (Meyer et al. 2012). The FROP-Com has been shown to significantly correlate with the Functional Gait Assessment in stroke patients (Price and Choy 2018), has been used as a reference tool for other falls risk screening processes in the ED (Tiedemann et al. 2013) and has been used to evaluate falls risk among Indigenous Australians (Hill et al. 2016). The FROP-Com has also been shown to be responsive to falls prevention interventions (Suttanon et al. 2013b; Williams et al. 2010).

Data Collection

Participants had their assessment conducted by a registered health care professional (HCP) within approximately two weeks of discharge from hospital in their home. Data collected during the RESPOND baseline assessment home visit included participant profile data such as age, sex, social history, past falls history, falls efficacy (Falls Efficacy Scale International [FES-I] short form) (Kempen et al. 2008), the FROP-Com assessment, and information about any clinical recommendations made by the Emergency Department staff to reduce falls risk as part of routine care. Medical (health) conditions associated with falls risk, and number of prescribed medications were collected as part of the FROP-Com assessment. Falls and injurious falls data were reported by participants prospectively through self-report monthly calendars for 12-months post recruitment and verified through a monthly follow up phone call by Research Assistants. Participants completed the monthly calendar and then mailed it to the RESPOND research team using reply-paid envelopes. Participants were also telephoned monthly by research assistants to verify the information recorded on the calendars. Data on injurious falls requiring medical attention was verified by audit of hospital data (e.g., hospital records, x-ray reports). All fractures were verified by x-ray reports.

Data Analysis

Descriptive statistics for participant characteristics were summarised using SPSS v24 (IBM Corp. 2016). Comparisons were made between faller and non-faller groups using χ^2 and Fisher exact tests for categorical comparisons, and Mann-Whitney U and t-tests for ordinal and continuous data respectively. Statistical significance was determined at $p<0.05$.

Prior to analysing the data the following binary variables were created 1) participants who had fallen or not fallen (i.e. 0=not fallen; 1=fallen) and 2) participants who had an injurious fall or not (i.e. 0=no injurious fall, 1=injurious fall). An injurious fall was defined as a fall that resulted in the participant requiring medical attention for their injuries. A binary variable was also created to indicate low-moderate, or high falls risk status of participants based on FROP-Com overall scores at baseline. Scores <19 were categorised as low-moderate risk of falling and scores ≥19 were categorised as high risk of falling, to allow for comparison with the original FROP-Com validity study (Russell et al. 2008). Participants were then grouped according to predicted risk status based on their FROP-Com score (high versus low-moderate falls risk) and the relevant outcome variable at follow-up (i.e. faller/non-faller or injury/no-injury) as follows:

True positive (TP): Predicted high risk, positive outcome (fall; fall injury requiring medical attention) during the follow-up

False positive (FP): Predicted high risk, negative outcome (no fall; no fall injury requiring medical attention) during the follow-up

False negative (FN): Predicted low-moderate risk, positive outcome (fall; fall injury requiring medical attention) during the follow-up

True negative (TN): Predicted low-moderate risk, negative outcome (no fall; no fall injury requiring medical attention) during the follow-up.

Sensitivity (TP/(TP+FP)) and specificity (TN/(FN+TN)) of the FROP-Com with respect to observed faller/non-faller and injury/no injury status were calculated for both the FROP-Com binary (low-moderate versus high risk – cut-off score ≥19) and FROP-Com total (continuous) variable. Sensitivity and specificity scores above 70% are recommended for good predictive accuracy and clinical relevance (Myers 2003). Sensitivity and specificity data were used to plot Receiver Operating Characteristic (ROC) curves (data points based on sensitivity/1-specificity). Area under the ROC Curve (AUC) was used as another indicator of predictive accuracy of the FROP-Com for classifying fallers and injured fallers requiring medical attention. To choose the most appropriate cut-off point for classifying high risk, the score with the highest Youden's index (sensitivity + specificity -1) score (Youden 1950) that also had sensitivity above 70% was utilised for each outcome (Russell et al. 2008).

Results

The mean FROP-Com score for all participants was 16.6 (SD:5.6), indicating moderate risk of falling in the future.. A significantly greater proportion of fallers self-reported health conditions of arthritis, and stroke, compared to non-fallers. One hundred and six participants (49.8%) reported falling in the 12-month follow-up period. The average FROP-Com score for fallers was 17.8 (SD=5.7), which was significantly higher than for non-fallers (15.5, SD=5.2) (p-value=0.002).

[insert Table 1 here]

The FROP-Com assessment taken at baseline in this study classified 68 participants (31.9%) as high risk for falling (score≥19), and 145 (68.1%) as low-moderate risk of falling (score <19). Of the high risk participants (n=68), 46 (67.6%) reported having at least one fall in the 12-month follow-up period. Of those participants with high falls risk (FROP-Com≥19), there was a significantly greater proportion of fallers (67.6%) than non-fallers (32.4%), (p-value ≤ 0.001).

A sensitivity of 43.4% and a specificity of 79.4% was found using the cut-off score of ≥19 for high risk to predict future falls. The positive predictive value (PPV) was 67.6%, and the negative predictive value (NPV) was 58.6%. The AUC for the FROP-Com cut-off score ≥19 was 0.633 (95%CI: 0.559-0.708). Youden's Index was highest (.23) with the cut-off score of 17/18. At this score sensitivity was 50.9% and specificity 72.0%. A cut-off point of 15 yielded sensitivity >70% (70.8%), although specificity was low (41.1%). The number of fallers and non-fallers and associated sensitivity and specificity for each FROP-Com score as a cut-off are reported in Table 2.

[insert Table 2 here]

Of the 106 participants who reported falling, 64 (60.4%) had an injurious fall that required medical attention, reported and verified via medical record audit. Of this group, 22 (34.4%) participants had a FROP-Com high risk classification. Twenty two of the 31 participants with a high FROP-Com falls risk score (71.0%) had a fall requiring medical attention. Participant characteristics for fallers requiring medical attention/no-medical attention are presented in Table 3.

[insert Table 3 here]

The sensitivity and specificity of a FROP-com high risk classification in predicting an injurious fall requiring medical attention was 34.4% and 78.6% respectively, with a PPV of 71.0% and NPV of 44.0%. The AUC using a FROP-Com cut-off ≥19 to predict injurious falls requiring medical attention was 0.604 (95%CI: 0.493-0.715). Youden's Index was highest (.20) with the cut-off point at 14/15, where sensitivity was 65.6% and specificity 52.4%. A cut-off point of 13/14 yielded clinical relevance, where sensitivity was 71.9%, but specificity was 42.9%. The number of fallers requiring medical attention for each FROP-Com score are reported in Table 4.

[insert Table 4 here]

Discussion

This external validation study found that using the recommended cut-off score of ≥19 (Russell et al. 2008) for the FROP-Com falls risk assessment has limited sensitivity (43.4%) to predict falls in the subsequent 12 months for community dwelling older people who had a fall-related ED presentation and were discharged home. This finding of lower prediction accuracy when external validation studies are conducted relative to the primary validation study in which cut-off scores for risk were defined, is consistent with what has been reported for other falls risk assessment tools used for hospital in-patient settings, community and residential care settings (Haines et al. 2007; Myers 2003; Oliver et al. 2004; Perell et al. 2001; Scott et al. 2007). The variance in results between the initial and external validation studies highlights the importance of external validation studies in order to determine the optimal cut-off score and the associated prediction accuracy for a specific falls risk assessment tool in a given setting (Altman et al. 2009; Haines et al. 2007). The results from our study suggest an optimal cut-off score of ≥15 indicating high falls risk has a sensitivity of 70.8% (but a low specificity of 41.1%). This level of accuracy to predict future falls is limited.

The FROP-Com has not previously been investigated to evaluate its predictive accuracy for falls injuries (requiring medical attention), and this outcome has rarely been evaluated in other falls risk assessment tools previously. One study using the Berg Balance Scale reported sensitivity of 29% for predicting injurious falls when using the widely recommended cutoff for increased falls risk on this scale (≤45) (Muir et al. 2008). Our results highlight that the same cutoff as recommended for predicting falls on the FROP-Com (≥19) had even poorer prediction accuracy for injurious falls than for falls. The limited ability of the FROP-Com to predict an injurious fall outcome is potentially due to the tool being designed to assess fall risk factors, not injury risk factors. Risk factors specific to fall related injuries in older people have included osteoporosis, anticoagulation medications, diabetes, smoking, age, and environmental hazards (Bleijlevens et al. 2010; Lukaszyk et al. 2016;

Toyabe 2014; Yau et al. 2013). Although some of these risk factors for falls injuries are included in the FROP-Com assessment (e.g., diabetes, osteoporosis and anti-coagulation medications), they are proportionately a small component or weighting towards the overall FROP-Com score (NARI. 2016). Previous studies predicting injurious falls in the hospital setting have found good results using the combination of falls risk assessment and injury risk assessment (Toyabe 2014). Future studies aimed at predicting an injurious fall outcome in the community setting should incorporate a greater weighting of injury risk factors in isolation, or a more even weighting with falls risk factors during the assessment process.

In the context of the limited predictive accuracy of the FROP-Com (for both predicting future falls and falls injuries (requiring medical attention), and the high falls risk and the high proportion of fallers in the subsequent 12 months among older fallers presenting to ED, it is worth considering if a prediction tool is necessary in this setting. Instead, perhaps all fallers presenting to the ED should be considered at increased risk of future falls (which is supported by the average FROP-Com score of 16.6). In such a high risk population, rather than using the FROP-Com (or other similar falls risk assessment tools) to predict risk of future falling, use of the tool may be better directed to the identification of specific falls risk factors relevant to the individual. By doing so, the implementation of relevant targeted falls interventions can be triggered, or referrals made, based on the identified risk factors. The latest Cochrane Review on falls prevention in the community setting highlighted that multifactorial interventions (based on a risk assessment and targeted intervention delivery) are effective in reducing the rate of falls (Gillespie et al. 2012). Given the positive results of previous research using the FROP-Com in other samples with high falls risk (e.g., stroke, arthritis, care recipients, older people presenting to EDs after a fall) (Hill et al. 2016; Meyer et al. 2012; Price and Choy 2018; Suttanon et al. 2013a), there would be value in evaluating the use of the FROP-Com to tailor falls prevention interventions to individual risk profiles to reduce falls among this high risk population.

The strengths of this study include the two sites for recruitment of participants in different states of Australia to increase the generalisability of the results. The self-reported data collection methods for falls using the gold standard prospective monthly falls calendar approach (Hannan et al. 2010), and the verification of fall injuries requiring medical attention from health care providers optimised the accuracy of the falls injury data collected. An additional strength includes the prospective external validation study design as it supports the interpretation of results outside the original validation study. Limitations of this study include that the FROP-Com data were collected at the initial home visit, approximately 2 weeks after discharge home from the ED. It is possible that some risk factors may have changed during this time span, which may have affected prediction accuracy. Finally, it is important to note that the results of this study are in the context of older people living in the community who are at high risk of falling (those presenting to ED after a fall), and may not be generalisable to other community dwelling older adults who are not at high risk of falling.

Conclusion

This external validation study shows low predictive accuracy using a high risk FROP-Com classification (cut-off ≥19) to predict the event of a fall for community dwelling older people who had fallen, presented to the ED and were discharged home. It was also found that using a FROP-Com high risk status to predict an injurious fall requiring medical attention was poor, suggesting falls risk assessment tools may not be suitable for predicting injury risks. Future studies aimed at predicting this outcome should consider including a combination of injury risk and falls risk items in their assessments. Although accurate classification of this sample as high or low risk of falling was limited, the event of falling and presenting to ED itself is likely to indicate an individual is a high risk of falling in the future. The usefulness of the FROP-Com in this high falls risk population (i.e. older community dwelling adults presenting to ED after a fall) may instead be to identify individual risk factors to provide direction for fall prevention interventions.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

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Table 1. Participant characteristics of faller/non-faller status over the 12 month follow-up period.

	Total	Fallers	Non-fallers	p-value
Participants, n (%)	213 (100.0)	106 (49.8)	107 (50.2)	
Age (years) Mean (SD)	72.4 (8.3)	73.3 (8.6)	71.6 (7.9)	0.133
Sex				0.934
- **Men n (%)**	87 (40.8)	43 (49.4)	44 (50.6)	
- **Women n (%)**	126 (59.2)	63 (50.0)	63 (50.0)	
Number medications n (%)				0.454
- **No medications**	20 (9.4)	9 (8.5)	11 (10.3)	
- **1-2 medications**	36 (16.9)	14 (13.2)	22 (20.6)	
- **3 medications**	32 (15.0)	16 (15.1)	16 (15.0)	
- **4 or more medications**	125 (58.7)	67 (63.2)	58 (54.2)	
SELF-REPORTED HEALTH CONDITIONS				
- **Arthritis - Yes (%)**	102 (47.9)	64 (60.4)	38 (35.5)	≤0.001*
- **Respiratory conditions - Yes (%)**	44 (20.7)	25 (23.6)	19 (17.8)	0.294
- **Parkinson's Disease - Yes (%)**	2 (0.9)	1 (0.9)	1 (0.9)	0.995
- **Diabetes - Yes (%)**	37 (17.4)	19 (17.9)	18 (16.8)	0.832
- **Neuropathy - Yes (%)**	8 (3.8)	6 (5.7)	2 (1.9)	0.146
- **Cardiac - Yes (%)**	66 (31.0)	37 (34.9)	29 (27.1)	0.218
- **Stroke - Yes (%)**	22 (10.3)	16 (15.1)	6 (5.6)	0.023*
- **Neuro (other) - Yes (%)**	28 (13.1)	12 (11.3)	16 (15.0)	0.433
- **Lower limb amputee - Yes (%)**	1 (0.5)	0 (0)	1 (0.9)	0.318
- **Osteoporosis - Yes (%)**	34 (16.0)	18 (17.0)	16 (15.0)	0.686
- **Vestibular - Yes (%)**	12 (5.6)	5 (4.7)	7 (6.5)	0.564
Quality of life score (EQ5-D) Mean (SD)	71.3 (18.3)	68.9 (19.0)	73.6 (17.3)	0.066
FES-I score Mean (SD)	11.6 (5.1)	11.6 (4.2)	11.7 (5.8)	0.922
FROP-Com total Mean (SD)	16.6 (5.6)	17.8 (5.7)	15.5 (5.2)	0.002*

FROP-Com Low (0-11) - N (%)	40 (18.8)	14 (13.2)	26 (24.3)	0.038*
FROP-Com Moderate (12-18) - N (%)	105 (49.3)	46 (43.4)	59 (55.1)	0.087
FROP-Com High (≥19) - N (%)	68 (31.9)	46 (43.4)	22 (20.6)	≤0.001*

SD = standard deviation, Neuro = neurological condition, EQ5-D = EuroQol five dimensions questionnaire, FES-I = falls efficacy – International scale (short form), FROP-Com = Falls risk for older people assessment tool community version, *p-value: <0.05.

Table 2: Sensitivity and specificity of the scores from the 'Falls Risk for Older People - Community Version' assessment tool (FROP-Com) for predicting falls in the 12 month follow-up period.

FROP-Com Overall Score	**Number of fallers**	**Number of non-fallers**	**Sensitivity (%)**	**Specificity (%)**
5	0	0	100.0	0.0
6.5	1	0	99.1	0.0
7.5	2	1	97.2	0.9
8.5	2	4	95.3	4.7
9.5	4	8	91.5	12.1
10.5	2	4	89.6	15.9
11.5	3	9	86.8	24.3
12.5	3	10	84.0	33.6
13.5	5	6	79.2	39.3
14.5	9	2	70.8	41.1
15.5	8	10	63.2	50.5
16.5	6	13	57.6	62.6
17.5	7	10	50.9	72.0
18.5	8	8	43.4	79.4
19.5	6	4	37.7	83.2
20.5	7	4	31.1	86.9
21.5	7	5	24.5	91.6
22.5	5	0	19.8	91.6
23.5	2	1	17.9	92.5
24.5	6	2	12.3	94.4
25.5	2	0	10.4	94.4
26.5	4	3	6.6	97.2
28	2	1	4.7	98.1
29.5	2	1	2.8	99.1
30.5	1	0	1.9	99.1
32	1	0	0.9	99.1
36.5	1	0	0.0	99.1
41	0	1	0.0	100.0
Total number	106	107		

Table 3. Participant characteristics for fallers requiring medical attention/no medical attention status over the 12 month follow-up period.

	Fallers medical attention	Fallers no medical attention	p-value
Participants n (%)	64 (60.4)	42 (39.6)	
Age (years) Mean (SD)	71.8 (8.2)	72.9 (8.5)	0.542
Gender			0.219
- **Men n (%)**	29 (67.4)	14 (32.6)	
- **Women n (%)**	35 (55.6)	28 (44.4)	
Number medications n(%)			0.454
- **No medications**	9 (8.5)	11 (10.3)	
- **1-2 medications**	14 (13.2)	22 (20.6)	
- **3 medications**	16 (15.1)	16 (15.0)	
- **4 or more medications**	67 (63.2)	58 (54.2)	
SELF-REPORTED HEALTH CONDITIONS			
- **Arthritis - Yes (%)**	31 (48.4)	22 (52.4)	0.691
- **Respiratory conditions - Yes (%)**	14 (21.9)	5 (11.9)	0.191
- **Parkinson's Disease - Yes (%)**	0 (0.0)	1 (2.4)	0.215
- **Diabetes - Yes (%)**	9 (14.1)	9 (21.4)	0.323
- **Neuropathy - Yes (%)**	2 (3.1)	0 (0.0)	0.247
- **Cardiac - Yes (%)**	24 (37.5)	11 (26.2)	0.226
- **Stroke - Yes (%)**	8 (12.5)	4 (9.5)	0.636
- **Neuro (other) - Yes (%)**	10 (15.6)	5 (11.9)	0.591
- **Lower limb amputee - Yes (%)**	0 (0)	0 (0.0)	NA
- **Osteoporosis - Yes (%)**	12 (18.8)	10 (23.8)	0.53
- **Vestibular - Yes (%)**	5 (7.8)	2 (4.8)	0.536
Quality of life score (EQ5-D) Mean (SD)	71.9 (18.9)	71.8 (19.9)	0.965
FES-I score Mean (SD)	11.6 (6.2)	12.1 (5.4)	0.696

FROP-Com total Mean (SD)	17.0 (5.5)	15.0 (5.5)	0.075
FROP-Com Low - N (%)	9 (14.1)	12 (28.6)	0.067
FROP-Com Moderate - N (%)	33 (51.6)	21 (50.0)	0.875
FROP-Com High - N (%)	22 (34.4)	9 (21.4)	0.152

SD = standard deviation, Neuro = neurological condition, EQ5-D = EuroQol five dimensions questionnaire, FES-I = falls efficacy – International scale (short form), FROP-Com = Falls risk for older people assessment tool community version, *p-value: <0.05.

Table 4: Sensitivity and specificity of the scores from the 'Falls Risk for Older People – Community Version' (FROP-Com) for predicting injurious falls requiring medical attention over the 12 month follow-up period.

FROP-Com Overall Score	**Injurious falls medical attention**	**Falls no medical attention**	**Sensitivity (%)**	**Specificity (%)**
5	0	0	100.0	0.0
6.5	1	0	98.4	0.0
7.5	0	2	98.4	4.8
8.5	1	3	96.9	11.9
9.5	2	3	93.8	19.0
10.5	2	2	90.6	23.8
11.5	3	2	85.9	28.6
12.5	6	2	76.6	33.3
13.5	3	4	71.9	42.9
14.5	4	4	65.6	52.4
15.5	8	1	53.1	54.8
16.5	3	4	48.4	64.3
17.5	4	4	42.2	73.8
18.5	5	2	34.4	78.6
19.5	5	0	26.6	78.6
20.5	2	0	23.4	78.6
21.5	2	4	20.3	88.1
22.5	1	0	18.8	88.1
23.5	1	0	17.2	88.1
24.5	3	3	12.5	95.2
25.5	0	1	12.5	97.6
26.5	4	0	6.3	97.6
28	2	0	3.13	97.6
29.5	1	1	1.6	100.0
31	1	0	0.0	100.0
Total number	64	42		