

# Self-reported data and falls – What is behind this relationship?

## Background

According to the recent National Institute for Health and Care Excellence<sup>1</sup> quality standards, the assessment of fall risk and preventing falls should be multifactorial and include factors, among others, like falls history, self-assessment of functional ability, fear of falling and home hazards, analysis of gait, balance, mobility and lower extremities (LE) muscle strength. Concerning the self-reported data, some studies reported subjectivity and difficulty in extracting reliable information when using such methods. History and number of previous falls are often used as golden standards in fall risk assessment studies; however, this question is a source of misjudgement, in part, due to difficulty for an older person remember exactly how many times he/she has fallen in a past period of time.<sup>2</sup>

## Purpose

The study aimed to compare self-reported data and golden standard measures for assessing the risk of fall to verify the confidence of the self-reported data at predicting falls in community-dwelling adults by a quick and valid screening protocol.

## Methods

326 community-dwelling adults aged 50+ years were surveyed regarding demographics, history of fall, fear of falling, sedentary lifestyle, use of upper extremities to stand up from a chair, by self-reported questionnaire; and analysis of gait, balance, mobility and muscle strength, by golden standard measures for assessment of the risk of fall - 10 meters walking speed test<sup>3</sup>, 30 seconds sit-to-stand test, Timed Up & Go test<sup>4</sup> and grip strength<sup>5</sup> (Jamar®). Independent samples t tests were performed to compare groups. Data were analyzed using SPSS.20 for Windows.

## Results

The study comprised a sample of 326 community-dwelling adults with mean age 71,24± 11,12 years (68,1% female), 30,7% had at least one fall in the last year (fallers), 50,3% reported fear of fall, 47,9% had sedentary lifestyle, 37,1% used upper extremities assistance to stand up from a chair.

Table 1: Differences between groups regarding history of falls (last 12 months)

		n	M	SD	t	p
Grip Strength	Yes	100	20,30	6,89	-4,075	0,000
	No	226	24,04	9,15		
Timed Up and Go	Yes	100	11,67	9,41	0,740	0,460
	No	226	10,86	8,86		
30seconds Sit-to-Stand	Yes	100	8,51	4,58	-3,051	0,002
	No	226	10,23	4,72		
10m Walking Speed	Yes	99	1,24	0,52	-2,573	0,011
	No	225	1,40	0,52		

Those who reported **history of fall** demonstrated lower grip strength ( $p \leq 0,001$ ), lower LE strength ( $p = 0,002$ ), lower scores of gait speed ( $p = 0,011$ ) and lower balance compared with no-fallers. Those differences were statistically significant, except on the balance, measured by the Timed Up & Go test ( $p = 0,460$ ).

Table 3: Differences between groups regarding upper extremities assistance to stand up from a chair

		n	M	SD	t	p
Grip Strength	Yes	121	19,23	6,87	-6,586	0,000
	No	205	25,05	8,93		
Timed Up and Go	Yes	121	15,00	12,98	5,100	0,000
	No	205	8,81	4,06		
30seconds Sit-to-Stand	Yes	121	6,31	4,383	-11,369	0,000
	No	205	11,70	3,693		
10m Walking Speed	Yes	119	1,03	0,54	-8,870	0,000
	No	205	1,54	0,42		

Using the **upper-extremities to stand up from a chair** was associated with those with lower scores of gait speed ( $p \leq 0,001$ ), lower LE strength ( $p \leq 0,001$ ), balance ( $p \leq 0,001$ ) and grip strength ( $p \leq 0,001$ ).

Table 2: Differences between groups regarding fear of fall

		n	M	SD	t	p
Grip Strength	Yes	164	19,78	6,77	-6,953	0,000
	No	162	26,04	9,28		
Timed Up and Go	Yes	164	12,77	10,57	3,391	0,001
	No	162	9,43	6,76		
30seconds Sit-to-Stand	Yes	164	8,13	4,771	-6,384	0,000
	No	162	11,29	4,155		
10m Walking Speed	Yes	162	1,16	0,50	-6,916	0,000
	No	162	1,54	0,49		

Those who assumed **fear of falling** showed lower scores of gait speed ( $p \leq 0,001$ ), lower LE strength ( $p \leq 0,001$ ), lower balance ( $p \leq 0,001$ ) and lower grip strength ( $p \leq 0,001$ ) compared with those who had no fear of falling. All those differences were statistically significant.

Table 4: Differences between groups regarding sedentary lifestyle

		n	M	SD	t	p
Grip Strength	Yes	156	22,01	9,72	-1,750	0,081
	No	170	23,71	7,55		
Timed Up and Go	Yes	156	13,59	11,79	4,755	0,000
	No	170	8,83	4,27		
30seconds Sit-to-Stand	Yes	156	8,13	4,963	-5,984	0,000
	No	170	11,14	4,033		
10m Walking Speed	Yes	155	1,20	0,60	-5,001	0,000
	No	169	1,49	0,41		

**Sedentary lifestyle** also demonstrated association with lower scores of gait speed ( $p \leq 0,001$ ), lower LE strength ( $p \leq 0,001$ ) and lower balance ( $p \leq 0,001$ ) compared with non-sedentary. There was no difference between those groups regarding the grip strength.

## Conclusions

The findings suggest that self-reported data like sedentary lifestyles, fear of falling and use of upper extremities to stand up from a chair, obtained by simple questions, emerged as reliable information on risk factors for falling, measured by golden standards functional tests, namely Timed Up & Go, 30 Seconds Sit-to-Stand and 10m Walking Speed, grip strength associated to the question about fall history.

## Implications

On a practical level, several methods have been suggested for monitoring the occurrence of falls among the community-dwelling adults, including questions asking them to recall these events at several intervals. Face-to-face or telephone interviews, information obtained from the older adults have discrepancies in accurately recalling the occurrence of falls in previous periods, especially non-injurious falls<sup>6</sup>. Thus, self-reported data like sedentary lifestyles, fear of falling and use of upper extremities to stand up from a chair, obtained by simple and quick questions, can be used to complete the fall risk screening. Consequently, tailored preventive programs might be beneficial in reducing fall risk if they focus on walking speed, balance, upper and lower extremities strength training, complemented by the modification of sedentary lifestyles and strategies to reduce fear of falling.

## References

- <sup>1</sup>National Institute for Health and Care Excellence. *Falls: assessment and prevention of falls in older people*. Available from: <https://www.nice.org.uk/guidance/cg161> [Accessed 3rd October 2016].
- <sup>2</sup>Garcia PA, Dias JMD, Silva SLA, Dias RC. Prospective monitoring and self-report of previous falls among older women at high risk of falls and fractures: a study of comparison and agreement. *Braz J Phys Ther*. 2015;19(3):218-26. doi: 10.1590/bjpt-rbf.2014.0095.
- <sup>3</sup>Fritz S, Lusardi M. White paper: "walking speed: the sixth vital sign". *J Geriatr Phys Ther*. 2009;32(2): 2-5.
- <sup>4</sup>Centers for Disease Control and Prevention – CDC. *Algorithm for Fall Risk Assessment & Interventions*. Available from: <http://tinyurl.com/zsrubhx> [Accessed 14th May 2016].
- <sup>5</sup>Prato SCF, Andrade SM, Cabrera MAS, Dip RM, Santos HG, Dellaroza MSG, et al. *Frequency and factors associated with falls in adults aged 55 years or more*. *Rev Saude Publica*. 2017;51:37.
- <sup>6</sup>Hale WA, Delaney MJ, Cable T. Accuracy of patient recall and chart documentation of falls. *J Am Board Fam Pract*. 1993;6(3):239-42. PMID:8503294.

## Ethics approval

All research procedures were conducted under the Declaration of Helsinki.

## Acknowledgments

The authors acknowledge the financial support received from PT2020 project 3464 FallSensing: Technological solution for fall risk screening and falls prevention, co-funded by Centro2020, Norte2020 and European Structural & Investment Funds (ESIF) from European Union (EU)

