

## The relationship between the risk and fear of falling in older women participating in social project

### *Relação entre risco e medo de queda em idosas participantes de um projeto social*

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#### ABSTRACT

**Objective:** To verify the relationship between risk and fear of falling in older women participating of social projects. **Methods:** Cross-sectional study, conducted with 59 older women participating in a social project offered by the city of Cianorte-PR. To assess the fear of falling, the FES-1-BRASIL was used. To assess gait mobility and risk of falling, the Timed Up & Go (TUG) test was applied. Descriptive statistics (frequency, percentage, mean and standard deviation), the Kolmogorov-Smirnov test, independent student's t test and Pearson's correlation were used for data analysis, with a significance of  $p < 0.05$ . **Results:** the older women had a moderate to high risk of falling. The analysis of the elderly women's fear of falling evidenced a mean score of  $27.4 \pm 6.91$ . Regarding mobility and balance, it was found that the average time to perform the TUG was  $11.6 \pm 2.9$  seconds. Women under 70 years of age who had been in the project for more than three years had less fear and lower risk of falling ( $p = 0.039$  and  $p = 0.001$ , respectively). The following significant correlations were found ( $p < 0.05$ ): fear of falling with time of participation in the project ( $r = -0.42$ ); risk of falling with age ( $r = 0.29$ ) and fear of falling ( $r = 0.56$ ). **Conclusion:** From the results obtained, we concluded that age and time of participation in the project seem to be intervening factors in the fear and risk of falling among the elderly women. It is noted that the women under 70 years of age and those with more extended participation in the social project had less fear and risk of falling. In addition, it was possible to observe that the he risk of falling is directly associated with the fear of falling.

**Keywords:** Accidental Falls, Motor Activity, Women, Aged

#### RESUMO

**Objetivo:** Verificar a relação entre o risco e o medo da queda em idosas participantes de um projeto social. **Métodos:** Estudo transversal, realizado com 59 idosas participantes de um projeto social ofertado no município de Cianorte-PR. Para avaliar o medo de cair foi utilizada a FES-1-BRASIL. Para avaliação da mobilidade da marcha e risco de queda foi aplicado o teste Timed Up & Go (TUG). Para análise dos dados foi utilizado a estatística descritiva (frequência, percentual, média e desvio padrão), o teste de Kolmogorov-Smirnov, teste t de Student independente e a correlação de Pearson, sendo adotada a significância de  $p < 0,05$ . **Resultados:** Idosas apresentaram risco moderado a alto de cair. Ao analisar o medo de cair das idosas, observou-se o escore médio de  $27,4 \pm 6,91$ . Já ao avaliar a mobilidade e equilíbrio de idosos através do TUG, verificou-se que o tempo médio foi de  $11,6 \pm 2,9$  segundos. As idosas mais jovens e que estavam há mais de três anos no projeto apresentaram menor medo de cair e menor risco de queda ( $p = 0,039$  e  $p = 0,001$ , respectivamente). Foram encontradas as seguintes correlações significativas ( $p < 0,05$ ): medo de cair com tempo de participação no projeto ( $r = -0,42$ ); risco de queda com a idade ( $r = 0,29$ ) e medo de cair ( $r = 0,56$ ). **Conclusão:** A partir dos resultados obtidos, concluiu-se que a idade e o tempo de participação no projeto parecem ser fatores intervenientes no medo de cair e no risco de quedas das idosas. Ressalta-se que as idosas mais jovens e com maior tempo de participação no projeto apresentaram menor medo e risco de cair. Além disso, foi possível observar que quanto maior o risco de queda, maior o medo de cair.

**Palavras-chave:** Acidentes por Quedas, Atividade Motora, Mulheres, Idoso

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#### Conflict of interest

None

Submitted: April 25th, 2022

Accepted: May 25th, 2023

#### How to cite

Silva IC, Oliveira DV, Nascimento Júnior JRA, Fidelix YL, Nogueira C, Bennemann RM, et al. The relationship between the risk and fear of falling in older women participating in social project. Acta Fisiátr. 2023;30(2):124-128.

DOI: 10.11606/issn.23170190.v30i2a196937

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Instituto de Medicina Física e Reabilitação - HCFMUSP



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## INTRODUCTION

Human aging is a process that generates biopsychosocial changes.<sup>1</sup> Reduction of gait speed, difficulty in carrying objects, and the disability to climb stairs and to stand up from a sitting position are examples of such changes.<sup>2</sup> These shifts also interfere with posture, gait, and balance, contributing to falls.<sup>2</sup>

Falls are one of the significant issues that damage the health of the elderly once they cause disability, mobility reduction, social life withdrawal, and even risk of death. These matters are prevalent and costly in the elderly population.<sup>3</sup> A fall is considered the sum of physiological, psychosocial, and environmental factors jeopardizing the patient's balance.<sup>4</sup> A study conducted in Pelotas/RS, Brazil, showed that a third of the older adults included had at least one fall one year prior to their research and that 12% eventually had a broken bone due to the fall.

The history or increased risk of falls can lead to fear of falling,<sup>6</sup> restricting daily activities and impairing their social life.<sup>7</sup> It is known that the fear of falling is also present among the elderly who do not have a history of falls.<sup>8-10</sup> A study conducted with non-institutionalized elderly found that the prevalence of fear of falling was present in 95.2% of the sample, even though 65.9% of them had not fallen in the previous 12 months.<sup>11</sup>

The reduction of falls and, consequently, the prevention of injuries among the elderly living in the community can be achieved by physical exercise programs.<sup>12,13</sup> However, there is a literature gap regarding the regular practice of recreational physical activity by the elderly public enrolled in community projects. Participation in social projects provides the elderly with a moment of leisure, communication, and fun, in addition to allowing the improvement of psychomotor and cognitive functions.<sup>14</sup>

Therefore, it is crucial to demonstrate the current profile of older adults who join social projects and whether there is an association between risk and fear of falling in this population.

## OBJECTIVE

This study aims to establish the association between risk and fear of falling among the female elderly of a social project. A secondary objective is to demonstrate the fear and risk of falling as a covariable of the sociodemographic profile of the participants.

## METHOD

This quantitative and cross-sectional study was approved by an Ethics Review Board under registration CAAE: 26707419.3.0000.5539.

A non-probabilistic convenience sample of 59 elderly women, aged between 60 and 83 years, participants of the social project "Juventude Cumulada" from the Vidigal and São Lourenço districts were included. The Sport and Leisure Administration of Cianorte City, Paraná State, Brazil, regularly sponsors the social project. Women without any self-reported medical condition that hindered their participation in performing the tests were included.

The project provided the participants with targeted activities, such as stretching, Newcomb ball, adapted basketball, and board games. A physical education professional conducted these activities once or twice a week. A sociodemographic questionnaire designed by the authors was used to assess the

sociodemographic and participation profile of the participants.

This assessment tool collected data regarding age, marital status, schooling, income, time of participation in the project, and history of falls. The Brazilian adapted Falls Efficacy Scale (FES-I-BRAZIL) was used to assess the fear of falling. The scale consists of 16 questions, and the answer options range from (1) "Not at all concerned," (2) "Somewhat concerned," (3) "Fairly concerned," and (4) "Very concerned." These points generate a score between 16 and 64 points. The higher the score, the greater the fear of falling.<sup>15</sup>

The Timed Up & Go (TUG) test assessed the participant's risk of falling. A stopwatch was used to record the time the participants took to get up from a chair (from the leaning position), walk along a three meter straight path up to a marker on the ground, turn 180°, walk back towards the chair, and sit down again in the initial position with their back leaning on the backrest of the chair.

A measuring tape, a digital stopwatch, and a chair with a backrest of 43 to 50 cm were used on this test. The elderly women were classified as "without risk of falling" executed the TUG within 10 seconds, whereas those with moderate or high risk of falling performed the test in 11 to 20 seconds or 20+ seconds, respectively.<sup>16</sup>

Prior to the elderly participation, authorization was granted from the Juventude Acumulada, the responsible party for the districts of São Lourenço and Vidigal. The elderly who agreed to participate in the research signed the Informed Consent Form. Data collection was conducted by the researchers between May and July of 2019. All the evaluation tools lasted an average of 10 minutes per participant.

The descriptive and inferential data analysis was performed using the SPSS 23.0 statistical pack. Frequency and percentage were used as descriptive measures for categorical variables. Regarding numeric variables, data normality was determined according to the Kolmogorov-Smirnov test and asymmetry and kurtosis analysis. As the data were normally distributed, the Mean ( $\bar{x}$ ) and Standard Deviation (SD) were used to measure central tendency and data dispersion.

The comparison of fear of falling (FES) and risk of falling (TUG) as a function of sociodemographic variables was performed with the independent Student's t-test. The associations between age, practice time, fear of falling (FES), and risk of falling (TUG) were tested with Pearson's correlation coefficient  $r$ . The cutoff points adopted for the correlations were  $r < 0.40$ , weak correlation;  $r < 0.70$ , moderate correlation; and  $r > 0.70$ , strong correlation.<sup>17</sup> The significance of  $p < 0.05$  was adopted for all analyses.

## RESULTS

Fifty-nine older women with a mean age of  $69.56 \pm 5.39$  years were included. Most participants were under 70 years old (54.2%), married (61.0%), with incomplete elementary education (57.6%), and had a monthly income of one to two minimum wages (83.1%).

The results emphasize the prevalence of participants who joined the project for less than three years at inclusion (64.4%), with no history of falls in the previous six months (67.8%), and moderate to high risk of falling (74.6%) (Table 1).

The fear of falling analysis evidenced a mean score of  $27.4 \pm 6.91$ . Regarding mobility and balance, the participants performed the TUG test in  $11.6 \pm 2.9$  seconds (Table 2).

**Table 1.** Patient profile

Variables	Frequency	%
<b>Age group (years)</b>		
Below 70	32	54.2
Above 70	27	45.8
<b>Marital Status</b>		
Married	36	61
Unmarried	23	39
<b>Schooling</b>		
Illiterate	4	6.8
Incomplete elementary school	34	57.6
Complete elementary school	21	35.6
<b>Income</b>		
1 to 2 minimum wages	49	83.1
Above 2 minimum wages	10	16.9
<b>Project participation time</b>		
1 to 3 years	38	64.4
Above 3 years	21	35.6
<b>History of falls</b>		
Yes	19	32.2
No	40	67.8
<b>Risk of falls</b>		
Low	15	25.4
Moderate / High	44	74.6

**Table 2.** Timed Up and Go total

TUG	n	%	Mean ± SD
Total (seconds)	59	100	11.6 ± 2,9
Below 10s – No risk of falls	23	38.98	9.08 ± 0.87
11s to 20s – Moderate risk of falls	35	59.32	12.85 ± 1.92
Above 20s – High risk of falls	1	1.69	-

TUG, Timed Up & Go test; s, seconds; SD, standard deviation

When comparing the fear of falling assessment (FES) and the risk of falling (TUG) according to sociodemographic profile (Table 3), there was a significant difference regarding the age group ( $p= 0.039$  and  $p= 0.018$ , respectively) and time of participation in the project ( $p= 0.001$  and  $p= 0.047$ , respectively).

Notably, participants under 70 years old who had been in the project for more than three years had less fear of falling and a shorter time to perform the TUG test, i.e., less risk of falling.

Regarding the correlation between age, practice time, fear of falling assessment (FES), and the risk of falling (TUG) (Table 4), the following significant correlations were found ( $p<0.05$ ): FES with practice time ( $r= -0.42$ ); and TUG with age ( $r= 0.29$ ) and FES ( $r= 0.56$ ). Interestingly, such correlations ranged from weak ( $r<0.40$ ) to moderate ( $r<0.70$ ).

**Table 3.** Comparison of fear of falling and mobility according to patients' profile

GROUPS	Fear of falling (FES)	P	Mobility / Risk of falling (TUG)	P
	Mean ± SD		Md (Q1-Q3)	
<b>Age group (years)</b>				
Below 70	25.59 ± 5.55	<b>0.039*</b>	10.75 ± 2.55	<b>0.018*</b>
Above 70	29.37 ± 8.13		12.56 ± 3.03	
<b>Marital Status</b>				
Married	27.22 ± 7.47	0.893	11.44 ± 3.17	0.666
Unmarried	27.48 ± 6.50		11.78 ± 2.49	
<b>Schooling</b>				
Illiterate/Incomp. Elem.	28.58 ± 7.74	0.065	11.82 ± 2.92	0.398
Complete elem.	25.05 ± 4.98		11.14 ± 2.89	
<b>Income</b>				
1 to 2 minimum wages	27.53 ± 7.25	0.619	11.76 ± 3.04	0.299
Above 2 minimum wages	26.30 ± 6.20		10.70 ± 1.95	
<b>Project participation time</b>				
1 to 3 years	29.63 ± 7.55	<b>0.001*</b>	12.13 ± 3.26	<b>0.047*</b>
Above 3 years	23.14 ± 3.20		10.57 ± 1.75	
<b>History of falls</b>				
Yes	28.74 ± 7.19	0.292	12.0 ± 2.54	0.444
No	26.65 ± 6.97		11.38 ± 3.07	

\*Statistically significant difference -  $p<0.05$  (Independent Student t-test); Incomp. Elem., Incomplete elementary school; SD, standard deviation

**Table 4.** Correlation between age, Project participation time, fear of falls (FES), and mobility/risk of falls (TUG) of the participants

Variables	Age	Participation time	FES	TUG
Age	-	0.01	0.23	0.29*
Participation time		-	-0.42*	-0.22
FES			-	0.56*
TUG				-

\*Statistically significant correlation ( $p<0.05$ ) –Pearson correlation coefficient,  $r$

## DISCUSSION

This study was designed to determine the association between the risk and the fear of falling among the elderly women participating in a social project. The main findings of the study indicated that 1) women under 70 years old and those who joined in the project for a longer time had less fear and risk of falling; 2) patients above 70 years of age had a greater risk of falling; and 3) the risk of falling is positively associated with the fear of falling.

The fear of falling can be a protective factor when the elderly are more careful not to be exposed to falling, but it can also be a risk in itself as it may cause limitation and insecurity.<sup>18</sup> Our results evidenced that patients under 70 years of age had less fear and risk of falling, and this may be associated with minor biopsychosocial changes of the aging process, such as

decreased muscle mass and strength, which worsen with advancing age, compared to older subjects. In addition, most studies emphasize that increased age is one of the aspects that cause the fear of falling, as advanced age imposes functional reductions to perform routine activities. Such functional losses are perceived by the elderly and may generate a sense of low self-efficacy and fear of falling.<sup>9,19</sup>

As the human body ages, several changes are perceived. A process of physiological decline, bone density and muscle mass reduction, postural instability, visual and auditory impairment, and increased medication consumption, among other issues including environmental and sociodemographic factors, are initiated. All of these health-related aspects cause risks that can result in falls.<sup>1,20</sup> Regarding sociodemographic factors, a study by Rosa et al.<sup>21</sup> found that the chance of death due to falls among the elderly is significantly higher in females aged 69 years or above. Elderly of white ethnicity and widowers or singles are also prone to fatal outcomes due to falls. Such findings strengthen the importance of identifying those more exposed to falls and the consequent associated outcomes.

A lower fear and risk of falling was observed among the participants who had participated in the social project for a longer time. It is known that the fear of falling is related to restricting physical activity, which partly explains the high prevalence of a sedentary lifestyle in the elderly. The lack of regular physical activity reduces mobility and balance, increasing the risk and fear of falling.<sup>9,18</sup>

A study conducted with older women participating in weekly training sessions of a University extension project evidenced that, among active older women, gait speed, cadence, and stride length were significantly higher and that they had lower prevalence and fear of falling (22% for both variables) when compared to sedentary elderly women (58% and 70%, respectively).<sup>22</sup>

The risk factors primarily associated with falls are the history of falls, use of medication, and strength, gait, and balance disorders.<sup>23</sup> The use of medication and functional disorders can be improved with the regular practice of physical activities, causing a reduction in the number of falls in this population.<sup>24</sup>

A recent systematic review showed that interventions with functional and balance exercises, performed for 3 hours a week, reduced the rate of falls by 42% compared to the control group.<sup>25</sup>

Another study with a game-based interactive physical-cognitive intervention, carried out for 12 weeks, proved effective for reducing the risk of falls and improving cognitive function in community-dwelling elderly.<sup>26</sup>

Such information emphasizes the need to have the elderly enrolled in physical activity programs, especially collectively, once community groups may provide a feeling of vitality, diminishing feelings of depression, fear, loneliness, and abandonment.<sup>27</sup> The present study also identified that the risk of falling is directly associated with the fear of falling. A greater fear of falling can be the cause of social isolation, restricting activities of daily living.

Such isolation can generate a vicious cycle as the reduction in daily activities diminishes the stimulation of the musculoskeletal system, reducing muscle strength and functional capacity, consequently increasing the risk of falls and, again, limiting activities of daily living.<sup>28</sup> The increased risk of falling and the fear of falling can trigger negative effects on the functional capacity and the psychological aspects of community-dwelling elderly. These issues can induce self-reports of

depression, lower self-efficacy concerning falls, lower walking speed, and worse self-perception of health.<sup>29</sup>

Some assessments were self-reported by the participants via questionnaire, which can be considered a limitation of our study. Nonetheless, self-reported data are assumed to be satisfactory, given the known compatibility of information extracted from self-declared data.

Another limitation is the limited sample representing a single city in the southern region of Brazil, reducing the possibility of the result generalization for the Brazilian population. Also, this study did not consider individual characteristics, such as the practice of physical activities, other than the project they were part of. The absence of such data may have influenced the performance of the tests.

At last, this study shows the results of a cross-sectional design, evaluating the elderly in a single moment, restraining the inference of causality among the variables. Therefore, future research should replicate the study in patients from other regions of the country, with more objective assessments, in a longitudinal study design.

## CONCLUSION

Based on the results herein, it is evidenced that age and time of participation in the social project seem to be intervening factors in the fear and risk of falling among female elderly. It is meaningful that the women under 70 years of age and those with more extended participation in the projects had less fear and risk of falling. In addition, it was possible to observe that the risk of falling is directly associated with the fear of falling.

From a practical standpoint, emphasis should be given to developing intervention strategies on regular practice of physical activity to prevent falls and reduce the fear of falling within this population. Future studies are needed to determine how different interventions, including games and recreational activities, may affect female elderly's fear and risk of falling.

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