Fear of falls is associated with fear of COVID-19 in older adults

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BACKGROUND: Individuals with a perception of their fragile health can potentiate the fear of COVID-19.
AIM: We investigated the relationship between perceived functional capacity and fear of falls with fear of COVID-19 in older adults.
METHOD: Thirty older adults (60–75 years) participated in this study. We applied two questionnaires to assess functional capacity: the Independence in Activities of Daily Living and the Instrumental Activities of Daily Living Scale. We also administered two questionnaires for fear of falling: the Activities-Specific Balance Confidence Scale and Falls Efficacy Scale International. Finally, we used the Fear of COVID-19 Scale.
RESULTS: The results showed a significant correlation between fear of COVID-19 and the ABC Scale (r = 0.548, p = 0.002) and FES-I (r = 0.466; p = 0.009). Multiple linear regression analysis showed that the ABS Scale was the only predictor of fear of COVID-19 (p = 0.004).
CONCLUSION: Fear of COVID-19 was related to a worsening perception of functional balance and fear of falls in older adults, suggesting a greater vulnerability for those more afraid of falls.

KEYWORDS: SARS-CoV-2 | Fear | Older people | Balance | Falls

INTRODUCTION

Fear is a basic human emotion1. Fear is a central state that “links sets of stimuli to patterns of behaviors” (p. R79)2. Although related to fear, anxiety is distinct from fear. Anxiety is defined as “anticipatory affective, cognitive and behavioral changes in response to uncertainty about a potential future threat” (p. 489)3. During the COVID-19 pandemic, fear emerged as an important psychological behavior contributing to mental health problems4. People have been suffering from anxiety and stress due to the adversities and factors associated with the COVID-19 pandemic5,6. The prevalence of moderate-to-severe anxiety levels was about 30-40% in Brazilian and Chinese adults7,8. It was also observed that the female gender was associated with a more significant psychological impact and higher anxiety levels7,8.

Older adults are afraid of COVID-19, which is more evident in women8. The advent of COVID-19 has resulted in many deaths worldwide9. The worsening of the clinical status of the patient with COVID-19 may be due to some pre-existing comorbidities10, but advanced age is also considered a risk factor since older adults are more susceptible to clinical complications11.

It is unknown how fear in different domains relates to each other. In rehabilitation science, older adults are known to fear falling. Fear of falling is a lasting concern about falling, which can lead older people to avoid performing activities they can achieve12. Fear of falling is considered a risk factor for falls and a strong predictor of falls in older adults13. Interestingly, older female adults are more prone to falls than older male adults14 and women also exhibit more fear of falling than men15,16. Fear of falling is related to increased anxiety levels17,18, which in turn affects how these individuals control their movements19-21. As fear of COVID-19 also increases anxiety, individuals who are already more anxious due to fear of falling may also be more afraid of COVID-19.

In addition, degraded functional capacity may be associated with fear due to limitations and loss of independence in older adults.
It is also unknown how these limitations are related to fear in other domains. The transformation provided by the aging process changes functional capacity 22,23. Functional capacity is an individual’s actual or potential capacity to perform different activities and daily functional tasks 24. These tasks can be divided into activities of daily living (ADL) and instrumental activities of daily living (IADL). ADLs include dressing, bathing, toilet use, transferring, continence, and feeding 25. IADLs, on the other hand, are activities such as using the telephone, traveling, shopping, preparing meals, doing housework, carrying out finances, and controlling medication use 26. The functional capacity relates to the quality of life, in addition to being linked to physical and mental health 25,26.

Older adults who experience a fall tend to present physical and psychological aftereffects that can impair their functional capacity. This is evident by the greater dependence on the performance of functional activities after the occurrence of falls, causing older adults to be afraid of falling again and, with this, compromising the performance of these daily tasks, thus compromising their functional capacity even more 27. Therefore, given that the perception of fragile health can potentiate the fear of COVID-19, this study investigated the relationship between perceived functional capacity and fear of falling with fear of COVID-19 in older people. In addition, given that female older adults are more afraid of COVID-19, and have higher levels of anxiety and fear of falling than men 7,9,16,17, we compared male and female fear and functional capacity as a secondary aim. The presence of this relationship may attract great care and investment to reduce the effects of fear, thus improving the quality of life of older adults.

Fear of falling and fear of COVID-19 may affect the motor behavior of older adults as these fears may restrict their activities. As a consequence, physical and mental health may be compromised, leading to detrimental effects such as physical activity deprivation, social withdrawal, and loss of independence 28. In particular, reducing or abolishing physical activities will reflect in the older adults’ ability to perform daily motor skills. Hence, from a motor development standpoint, they can experience compensations in their motor behavior earlier than expected 29.

METHODS

Participants

Thirty older adults (15 women and 15 men) participated in the present study. They were invited by convenience and recruited through posters, care programs, and telephone contact. We included community-dwelling participants between 60 and 75 years who could understand the questions in the evaluative questionnaires. Older adults who were bedridden and unable to move independently were excluded from the study. The Research Ethics Committee of the School of Physical Education and Sport of Ribeirão Preto approved this study (process number: 49989721.2.0000.5659). All the participants signed a consent form before participating in the study.

We calculated the sample size for the correlation analysis using G*Power software (version 3.1.9.2), which indicated a sample of 29 individuals (α = 0.05, β = 0.80, effect size = 0.50, two-tailed analysis). We collected an equal number of male and female participants to balance our sample, totaling 30 participants.

Data were collected between November 09, 2021, and May 13, 2022. This period coincided with Brazil’s third wave of cases and deaths, according to data available at the Johns Hopkins University & Medicine Coronavirus Resource Center 10. Within this period, there was a peak of cases among all COVID-19 waves at the end of January 2022 (188,785 cases). In the third wave, the deaths peaked at the beginning of February 2022 (893 deaths). Altogether, these data indicate that the data collection period was a moment of great concern regarding COVID-19 in Brazil.

Procedures

Participants were initially asked about their age, height, body mass, and number of falls in the last six months. We administered five questionnaires to each participant, all validated and adapted to the Brazilian context and translated into Brazilian Portuguese. Interviews were conducted in the participants’ homes. We assessed functional capacity using two questionnaires: the independence in activities of daily living (Katz Index) and the Instrumental Activities of Daily Living (IADL) Scale. The Katz Index is an assessment based on the individual’s self-efficacy of independence or functional dependence in performing daily living activities 25. The Katz Index score ranges from 0 to 6 points, with 0 being independent and 6 being dependent on all evaluated functions 25,26. The IADL Scale is also an assessment of the self-efficacy of the functional capacity of older adults but is focused on IADL 26. The IADL Scale scores range from 7 to 21 points, with 7 being totally dependent and 21 being completely independent 26,31. We used two scales to assess fear of falling: the Activities-specific Balance Confidence Scale (ABC Scale) 32 and the Falls Efficacy Scale International (FES-I) 33. These scales assess the confidence level in performing activities of daily living without loss of balance or instability in their execution. The ABC Scale score ranges from 0 to 100, with 0 indicating no confidence and 100 meaning complete confidence 32,34. The FES-I score ranges from 16 to 64 points, with 16 indicating
no concern and 64 indicating extreme concern for falls. Finally, we applied the Fear of COVID-19 Scale (FCV-19S). The Fear of COVID-19 Scale scores ranges from 7 to 35, with 7 indicating the least fear and 35 indicating the greatest fear.

Statistical analysis

For each scale, we calculated the score for each participant. The results are presented as the mean and standard deviation. We performed t-tests for independent samples or Mann-Whitney tests (if the data were not normally distributed) to compare the results between women and men for each questionnaire. Spearman correlation analyses were also performed between the Fear of COVID-19 Scale and the other four scales to identify the association between functional capacity and fear of falling with fear of COVID-19. In addition, we performed a multiple linear regression analysis (stepwise method) to determine the predictors of fear of COVID-19. We used the following dependent variables: sex, Katz Index, IADL Scale, ABC Scale, and FES-I. The significance level was set at p<0.05. We used the Statistical Package for the Social Sciences (SPSS, version 17.0) for all statistical analyses.

RESULTS

Sample characterization

Table 1 presents the participants’ anthropometric, functional capacity, and fear data separated by sex. The results of t-tests and Mann-Whitney tests identified a significant difference between men and women in height, Fear of COVID-19 Scale, ABC Scale, and FES-I. Women were shorter and reported greater fear of COVID-19, less confidence in performing daily activities as assessed by the ABC Scale, and greater fear of falls than men based on the FES-I.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Women (n=15)</th>
<th>Men (n=15)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>67.8 ± 4.7</td>
<td>67.5 ± 4.1</td>
<td>0.870</td>
</tr>
<tr>
<td>Height (m)</td>
<td>1.5 ± 0.1</td>
<td>1.7 ± 0.1</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Body mass (kg)</td>
<td>68.4 ± 15.2</td>
<td>78.3 ± 18.5</td>
<td>0.108</td>
</tr>
<tr>
<td>Number of fallers §</td>
<td>4 (26.7%)</td>
<td>2 (13.3%)</td>
<td>0.369</td>
</tr>
<tr>
<td>Fear of COVID-19 Scale (pts)</td>
<td>16.3 ± 5.5</td>
<td>11.8 ± 4.9</td>
<td>0.015</td>
</tr>
<tr>
<td>Katz Index ¥</td>
<td>0: 13 (86.7%)</td>
<td>0: 15 (100%)</td>
<td>0.150</td>
</tr>
<tr>
<td>IADL Scale (pts)</td>
<td>20.5 ± 0.6</td>
<td>19.5 ± 1.9</td>
<td>0.376</td>
</tr>
<tr>
<td>ABC Scale (pts)</td>
<td>81.6 ± 9.8</td>
<td>95.1 ± 8.5</td>
<td>0.001</td>
</tr>
<tr>
<td>FES-I (pts)</td>
<td>23.6 ± 3.3</td>
<td>19.5 ± 4.8</td>
<td>0.003</td>
</tr>
</tbody>
</table>

| £ Absolute and relative frequencies. |
| § Independent t-test. |
| ¥ Mann-Whitney test. |
| † Values reported as absolute and relative frequencies of the participants' classifications (0: independent in all functions; 1: independent in all but one of the functions). |
Katz Index: Independence in Activities of Daily Living Index.
IADL Scale: Instrumental Activities of Daily Living Scale.
ABC Scale: Activities-specific Balance Confidence Scale.
FES-I: Falls Efficacy Scale International.

Correlation analyses

We found significant correlations between the Fear of COVID-19 Scale and the ABC Scale (r² = -0.548, p = 0.002) and FES-I (r² = 0.466, p = 0.009). Fear of COVID-19 was associated with worse confidence in balance and a greater fear of falling (Figure 1). Katz Index and IADL Scale did not correlate with the Fear of COVID-19 Scale.
Multiple regression analysis

Multiple linear regression was used to test if sex, Katz Index, IADL Scale, ABC Scale, and FES-I significantly predicted fear of COVID-19. The overall regression was statistically significant ($R^2 = 0.26$, $F_{1,28} = 9.87$, $p = 0.004$). We found that ABC Scale significantly predicted fear of COVID-19 ($\beta = -0.51$, $p = 0.004$). No other dependent variables were predictors of the fear of COVID-19.

Figure 1. Scatter plots between the Fear of COVID-19 Scale and confidence in balance on the ABC Scale (A) and the effectiveness of falls on the FES-I (B). Dotted lines indicate trend lines.

DISCUSSION

The main purpose of this study was to investigate the relationship between perceived functional capacity and fear of falls with fear of COVID-19 in older adults. To our knowledge, this is the first study that examined this relationship. Our results showed an association between fear of COVID-19 and fear of falling among older people. We also showed that ABC Scale was the only predictor of fear of COVID-19. The lack of confidence to perform balance activities was indicative of greater fear of COVID-19. One possible reason for this association between fear of falling and fear of COVID-19 would be the overall increase in anxiety levels in older adults who are afraid of falling. In addition, as a secondary assessment, we found that women were more fearful of falls and COVID-19 than men.

Fear of falling is associated with fear of COVID-19 in older people

The fear caused by a pandemic is a psychological consequence, as people live in a state of alertness and tension without a clear indication of future improvement. Consequently, individuals are afraid of their bodies, that is, how fragile they can be and how they can react to a viral infection, and, as a result, the fear of being contaminated by the virus is accentuated. In addition, fear of COVID-19 makes people more anxious. Similarly, fear of falling increases anxiety levels in older adults. Therefore, increased anxiety levels may mediate the association between fear of COVID-19 and fear of falling in older adults.

The association between fear of falling and fear of COVID-19 with higher anxiety levels reported in the literature is relevant since it may compromise motor behavior in older adults. It is known that anxiety adversely affects the control of different movements in healthy individuals and neurological patients. A literature review showed that increased anxiety impaired gaze control. When comparing neurological patients classified as low and high anxiety, those with high anxiety slowed down reaching movements and delayed maximum hand opening compared to those with low anxiety levels. In addition, older people with an increased risk of falling exhibited higher anxiety levels than older adults with a low risk of falling and, most importantly, higher anxiety levels correlated to earlier gaze transfer during an adaptive locomotion task performed at ground level. Anxiety can cause attentional bias for task-irrelevant stimuli, as observed in drivers submitted to an increased level of anxiety. Therefore, increased anxiety levels can distract people from the relevant stimuli, compromising their movement control.

The lack of confidence (i.e., low self-efficacy) to perform daily activities assessed by the ABC Scale was the only predictor of fear of COVID-19. Self-efficacy refers to a person’s belief in their capacity to execute different behaviors to achieve a goal. Self-efficacy is influenced by performance accomplishments in past experiences, observation of the experience of others, comments made by others about
your competency to perform different tasks, and emotional arousal elicited by stressful situations. Similarly, fear of COVID-19 is influenced by the belief one has about the capacity of their organism to react appropriately to virus infection. Therefore, the association between fear of falling and fear of COVID-19 could also be explained by a general, diminished self-perception of confidence or fragile health in older adults.

**Women were more afraid of falls and COVID-19 than men**

The comparisons between women and men showed that women reported greater fear of COVID-19, less confidence in performing daily activities as assessed by the ABC Scale, and greater fear of falls than men based on the FES-I. The greater fear of falls in women than men is in line with previous studies. According to Pohl et al., fear of falling occurs due to different aspects, such as personal factors, including age, education, nutrition, previous experiences and lifestyle, and accomplishment and participation in social activities. Women have higher levels of stress, anxiety, insomnia, and depression compared to men when exposed to chronic stress situations. In addition, women have a greater negative self-perception of health than men, which may make women feel more fearful than men. Therefore, our findings corroborate the literature, since women obtained higher scores than men for fear of falls and fear of COVID-19, as already demonstrated in the study by Broche-Pérez et al. People apprehensive about COVID-19 and fear of falling may restrict their activities. This restriction is potentially detrimental and adversely impacts physical and mental health, contributing to increased risk of falls and loss of independence.

**Limitation**

This study was not conducted without limitations. First, we did not assess the cognitive status of our participants through specific screening tests (e.g., Mini-Mental State Examination or Montreal Cognitive Assessment). We only asked our participants about their health status; none reported any cognitive-related problems. In addition, the fact that we evaluated community-dwelling older adults makes it less probable to have individuals with severe cognitive issues. Second, we evaluated healthy older adults. Thus, our results do not necessarily generalize to all older adults, although those with neurological conditions who are more afraid of falls may also be more afraid of COVID-19.

**CONCLUSION**

The results of the present study allow us to conclude that fear of COVID-19 is related to a worsening in the perception of functional balance and fear of falls in older adults, which suggests a perception of greater vulnerability for those who are more afraid of falls. Additionally, women were more fearful of COVID-19 and falls than men. These findings reinforce the need for more comprehensive intervention programs for older adults focusing on motor aspects and psychological factors to improve their quality of life. Reducing fear has the potential to improve balance confidence in older adults. Future studies could address the benefits of these comprehensive intervention programs.

**REFERENCES**


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