Brief Lower Body Functional Performance Questionnaire (Brief-LBFPQ) for independent older adults

Breve Questionário de Desempenho Funcional dos Membros Inferiores (Brief-LBFPQ) para idosos independentes

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Abstract

Introduction: The literature still lacks evidence about patient-reported outcome measures to fast screen the reduced physical performance of the lower body in older adults to be applied in any clinical setting as primary health care or without specific instruments in prevention campaigns, or even easy to be applied by phone. **Objective:** To develop a brief questionnaire to screen the lower body functional performance in community-dwelling older adults and to validate this new questionnaire with objective clinical tests. **Methods:** A convenience sampling of 221 community-dwelling older adults was included in this cross-sectional study. The validity between Brief-LBFPQ and objective tests such as gait speed, Timed-Up and Go test (TUG), 5-Time Stand-to-Sit test (5TSST), and step test were assessed by multinominal logistic regression. Internal consistency was determined using Cronbach's alpha and Test-retest reliability was determined using intraclass correlation coefficient (ICC) for numeral scale and Cohen's Kappa for ordinal scale. **Results:** Brief-LBFPQ was significantly associated with objective tests. All eight items from Brief-LBFPQ presented an absolute agreement with ICCs values above 0.7. Kappa values of Brief-LBFPQ items ranged from 0.6 to 0.83, showing substantial agreement and perfect agreement. **Conclusion:** Brief-LBFPQ could be very useful in general clinic settings as it provides earlier screening of functional impairment in independent older adults, and consequently may allow an earlier intervention approach.

Keywords: Geriatric assessment. Health status. Physical functional performance.

Resumo

Introdução: *A literatura ainda carece de evidências acerca de instrumentos de autorrelato para o rastreio rápido do prejuízo no desempenho físico dos membros inferiores em idosos, que possam ser aplicados em qualquer ambiente clínico, como na Atenção Básica à Saúde, e que não requeiram nenhum instrumento específico para campanhas de prevenção, ou mesmo de fácil aplicação por contato telefônico.* ***Objetivo:*** *Desenvolver um breve questionário para triagem do desempenho funcional dos membros inferiores em idosos da comunidade e validar este novo questionário com testes clínicos objetivos.* ***Métodos:*** *Uma amostra de conveniência de 221 idosos da comunidade foi incluída neste estudo transversal. A validade entre o Brief-LBFPQ e os testes objetivos como velocidade da marcha, Timed-Up and Go (TUG), teste de levantar e sentar 5 vezes (TLS5x) e teste do degrau foi avaliada pela regressão logística multinominal. A consistência interna foi determinada pelo alfa de Cronbach e a confiabilidade teste-reteste foi determinada pelo coeficiente de correlação intraclasse (CCI) para a escala numérica e o Kappa de Cohen para a escala ordinal.* ***Resultados:*** *O Brief-LBFPQ foi significativamente associado aos testes objetivos. Todos os oito itens do Brief-LBFPQ apresentaram concordância absoluta com valores de CCI acima de 0,7. Os valores de Kappa dos itens do Brief-LBFPQ variaram de 0,6 a 0,83, mostrando concordância substancial e concordância perfeita.* ***Conclusão:*** *O Brief-LBFPQ pode ser muito útil em diferentes ambientes clínicos, pois permite uma triagem precoce do comprometimento funcional em idosos independentes e, consequentemente, pode permitir uma abordagem de intervenção mais precoce.*

Palavras-chave: *Avaliação geriátrica. Nível de saúde. Desempenho físico funcional.*

Introduction

Functional capacity is characterized by the ability of the individual to conduct activities of daily living (ADL) independently,[1] or the ability to maintain the physical and mental skills necessary for an independent and autonomous life, despite the presence of comorbidities.[2,3] The poor performance of functional activities (i.e. walking, climbing stairs, sitting down, and standing up) has been related to lower limb muscle weakness (LLMW).[4–6] Several clinical tests have been recommended to assess LLMW, such as the 5-Time Stand-to-Sit test (5TSST),[7] gait speed, and step test, since there is an association between the impaired results of these tests and a reduction of lower limb muscle strength.[6,8]

Self-reported questionnaires are also used to assess the functional capacity of older adults. Among the available questionnaires, there are those for specific conditions such as the Lysholm Knee Scoring Scale (LKSS),[9] for patients with knee symptoms, and Western Ontario and McMaster Universities (WOMAC),[10] for patients with osteoarthritis. There are also those for the general population such as Functional Activity Questionnaire (FAQ),[11] Lower Extremity Functional Scale (LEFS),[12] Short Musculoskeletal Function Assessment (SMFA),[13] and 25-question Geriatric Locomotive Function Scale (GLFS-25).[14]

Despite the number of general self-reported questionnaires for functional capacity, the validity method of these questionnaires has not been performed through objective tests as those used to evaluate the aforementioned LLMW. Understanding the validity of functional questionnaires based on clinical tests may help health professionals (i.e., physiotherapists, physical educators, and occupational therapists) to elaborate physical exercise training centered on each patient's need. The convergent validity of SMFA, which has 46 items to assess the functional level of patients with musculoskeletal disorders, had an excellent correlation with health status through the Short Form-36 (SF-36).[15] The LEFS, with 20 items applicable to patients with musculoskeletal conditions, is correlated with SF-36.[16] The FAQ, with 34 items that include physical, psychological, social, and sexual function, days off because of health, and health satisfaction in adults and older adults, had convergent validity with Lawton and Brody scale, Mini-Mental State Examination, and executive function.[17] Additionally, the GLFS-25, with 25 items that assess lower limb function, also had convergent validity with Lawton and Brody scale.[14]

Despite these questionnaires have been widely used to evaluate functional capacity, there is still a lack of patient-reported outcome measures to fast screen the reduced physical performance of the lower body in older adults to be applied in any clinical setting as primary health care or without specific instruments in prevention campaigns, or even easy to be applied by phone.

Therefore, this study aimed to develop a brief questionnaire to screen the lower body functional performance in community-dwelling older adults and to validate this new questionnaire with objective clinical tests.

Methods

This cross-sectional study was conducted with 221 community-dwelling older adults from Ribeirão Preto, SP, Brazil. The participants were recruited based on convenience sampling. Individuals aged 60 years and older were invited to participate in the present study using informational letters and telephone contact based on the registration of older adults at primary health care units. The study was conducted between 2019 and 2020.

The general inclusion criteria were being 60 years or older and agreeing to participate in the study by giving written informed consent. After written informed consent, clinical tests were carried out in person by two trained professionals, in a single day. To this assessment, the ineligibility criteria were the presence of cardiovascular and neurological diseases, self-report of musculoskeletal conditions that could interfere with the performance in the functional test, complaints of dizziness, severe balance impairment, the use of psychotropic medication (e.g., neuroleptics or benzodiazepines), deficits of protective sensitivity in the feet,[18] and the presence of a cognitive impairment identified with the 10-Point Cognitive Screener (10-CS) according to the level of education.[19] The study was approved by the Human Research Ethics Committee of the Ribeirão Preto Medical School (CAAE: 62209916.5.0000.5440) and followed the Helsinki protocol for studies with humans. All participants gave written informed consent.

Physical function assessments

Physical function assessments were carried out in the Laboratory of Assessment and Rehabilitation of Equilibrium (L.A.R.E.) of the Department of Health Sciences at the Ribeirão Preto Medical School, Universidade de São Paulo, Brazil. The sociodemographic characteristics assessed were sex, age, stature, body mass, body mass index (BMI), and years of education. For these in-person assessments, convenience sampling was used, which included 221 participants.

The physical function assessments included Timed Up and Go (TUG), 5TSST, gait speed, and forward step test, which were performed in random order. Participants were asked to rest for at least 30 seconds between the trials. The TUG test is a clinical test widely used to assess balance and walking ability in older populations.[20] Participants were observed and timed in seconds, while they stood up from an armed chair, walked at their usual pace for a distance of three meters, turned 180 degrees, walked back to the chair and sat down. A reduced time to complete the test indicates a better performance. The test was repeated three times to obtain the mean. Although it is very simple, the TUG test is highly recommended, since it includes the basic everyday movements and daily life tasks (standing, walking, and turning) and contains valuable components.[20] The TUG has shown excellent test-retest reliability (ICC = 0.91 to 0.92).

The 5TSST is a clinical test that measures the time needed to stand up and sit down five times as fast as possible with arms crossed over the chest. Despite its apparent simplicity, going from a sitting to a standing position reflects an important skill in older people, which involves a sequence of multiple tasks. Also, the inability to perform the test may lead to institutionalization and impaired function and mobility in activities of daily living.[21] The test was repeated twice to obtain the mean. The 5TSST has shown excellent test-retest reliability (ICC = 0.81) and moderate validity to measure lower limb muscle function (r = -0.48 to -0.57).[22]

Gait speed (m/s) was assessed over 8 meters and the walking time was recorded. To eliminate the acceleration and deceleration components, the volunteers were instructed to begin walking 1.5 m before the beginning of the course and to finish 1.5 m after the end of the course, being 5 meters the real course of the test. The test was repeated three times and the mean of the gait speed of the three trials was used. The gait speed has good reliability (ICC = 0.88 to 0.97) and validity (r= 0.53 to 0.74) for community-dwelling older people according to Kim et al.[23]

The forward step test was performed by asking the volunteers to climb up the 10-cm step using the dominant lower limb and go down in front of the step with the contralateral lower limb as quickly as possible. The height of the step increased by 10 cm at each phase, reaching the maximum height of 50 cm. If the volunteer was not able to climb the requested step height, the height was decreased by 5 cm and a new attempt was made.[6] For each height requested, only one attempt was performed, and the final test score corresponded to the highest step that a participant could climb without assistance. The step test has shown excellent test-retest reliability (ICC = 0.94)[6] and moderate validity to measure knee extensor strength (r = 0.60).[24]

Questionnaire development and viability

The development phase of the Brief Lower Body Functional Performance Questionnaire (Brief-LBFPQ) involved the choice of the questions (Figure 1) that represent challenging tasks for the lower body, which are important for social inclusion and independence of older adults. It is important to reinforce that this questionnaire, different from other available questionnaires, has included an item related to the difficulty of getting up from the floor.

Therefore, the draft questionnaire with 8 questions was administrated to a sample of 66 community-dwelling older adults, as well as the choice of score in a pragmatic way, which included a scale using ratings of 0 (no difficulty), 1 (little difficulty), 2 (moderate difficulty) and 3 (much difficulty). The classification of the questionnaire was determined by the sum of the activities (0 = no impairment; 1-8 = mild impairment; 9-16 = moderate impairment; 17-24 = severe impairment).

Brief Lower Body Functional Performance Questionnaire (Brief-LBFPQ)

Can you perform the following tasks?	No difficult 0	Little difficult 1	Moderate difficult 2	Much difficult 3
1. Step up and step down on the bus				
2. Walk 800 meters				
3. Lay down, sit and stand up				
4. Get in and get out of the car				
5. Squat				
6. Get up from the floor				
7. Do household chores (to sweep, do the laundry, hang clothes to dry)				
8. Go up and down stairs				

Classification: 0 points = No impairment; 1-8 points = Mild impairment; 9-16 points = moderate impairment; 17-24 = Severe impairment.

Figure 1 - The Brief Lower Body Functional Performance Questionnaire (Brief-LBFPQ).

Validity of Brief-LBFPQ

The validation study was conducted in the remaining sample of 155 community-dwelling older adults who completed the in-person physical function assessments on day one. For this phase, the participants were contacted by phone at an interval of two weeks after the in-person assessments to answer the Brief-LBFPQ. The validity of this questionnaire was investigated by evaluating the validity of Brief-LBFPQ in association with other clinical tests, such as gait speed, TUG, 5TSST, and step test.

Internal consistency and test-retest reliability

To verify the internal consistency and test-retest reliability, the same 155 participants who responded to the Brief-LBFPQ by phone were recontacted with an interval of seven days, and the Brief-LBFPQ was administrated again. Although the sample was obtained by convenience, the size was greater than the minimum number proposed by the COSMIN checklist, which is greater or equal to 100 participants.[25] Therefore, the Brief-LBFPQ was applied twice by phone, with an interval of seven days between test and retest to analyze the internal consistency.

Statistical analysis

Sample characterization was provided as mean, standard deviation, frequency, and percentage. Validity was evaluated by multinominal logistic regression between the categories of Brief-LBFPQ (as dependent variables) and the scores of TUG test, 5TSST, gait speed,

and step test (as independent variables), and by the determination of the odds ratio and the respective 95% confidence interval (95%CI). Confounding variables (age, sex, BMI, years of education) were included in the multinominal logistic regression model to analyze whether these covariates could interfere with the association.

Internal consistency was assessed using Cronbach's alpha, and the chance correlated agreement reliability for one hundred and fifty-five participants at two time points was calculated using Cohen's unweighted Kappa statistic for the ordinal scale and Intraclass Correlation Coefficient (ICC) was applied for numerical scale. Cronbach's alpha was interpreted according to the scale of $\alpha \geq 0.9$ = excellent; $0.7 \leq \alpha > 0.9$ = good; $0.6 \leq \alpha > 0.7$ = acceptable; $0.5 \leq \alpha > 0.6$ = slightly acceptable; and $\alpha < 0.5$ = unacceptable. The Kappa coefficients were interpreted using the criteria outlined by Landis and Koch,[26] summarized as follows: < 0 (poor agreement); 0-0.2 (slight agreement); 0.21-0.40 (fair agreement); 0.41-0.60 (moderate agreement); 0.61-0.80 (substantial agreement); 0.81-1.0 (almost perfect agreement). In addition, the standard error of Kappa (SE) and the corresponding 95%CI for each Kappa value obtained were also computed. The statistical analysis was performed using the SPSS 15.0 (SPSS, Chicago, IL, USA). The level of significance was set at 5% ($p \leq 0.05$).

Results

Mean age, sex, weight , height and BMI are presented in Table 1.

In the first phase, Brief-LBFPQ was applied to 66 volunteers and 25 (33.3%) were classified as no impairment, 39 (52%) as mild impairment, two (2.7%) as moderate impairment, and no severe impairment was encountered.

Table 2 details the internal consistency and test-retest reliability for the data analysis of second phase of the estudy (n = 155). According to interpretations of Cronbach's α reliability coefficients, six items have excellent reliability and the other three dimensions have good reliability. Henceforth, ICC was used as a statistical tool to confirm the reliability of the items from Brief-LBFPQ. ICCs values above 0.7 were considered as high, which shows that all items from Brief-LBFPQ presented absolute agreement.

Table 1 - Characterization of the sample (n = 221)

Variables	Mean (SD)
Age (years)	68.4 (0.40)
Sex (% female)	84.10
Weight (kg)	69.9 (0.90)
Height (m)	1.5 (0.02)
BMI (kg/m^2)	28.2 (0.30)
Years of education	7.3 (0.30)
Clinical tests (n = 155)	
TUG (seconds)	9.1 (0.20)
Gait speed (m/seconds)	1.1 (0.02)
5TSST (seconds)	12.8 (0.20)
Step test (cm)	41.8 (0.70)

Note: SD = standard deviation; BMI = body mass index; TUG = Timed-up and Go; 5TSST = 5-Time Stand-to-sit test.

According to Kappa test-retest reliability, Kappa coefficient (K) demonstrated that step-up and step-down of the bus and the total score had almost perfect agreement. The items walk 800 meters, get-in and get-out of the car, get-up from the floor, households chores (sweep, do the laundry, hang clothes to dry) and go up and down stairs had substantial agreement. However, questions about lay-down, sit and stand-up and squat had moderate agreement.

In the second phase, after Brief-LBFPQ application in 155 participants, 63 older adults were classified as having no impairment, 68 as mild impairment, 20 as moderate impairment, and 4 as having severe impairment. Table 3 shows the mean and standard deviation of the objective tests (TUG, 5TSST, gait speed, step test, and step test normalized by participant stature) according to the categories of Brief-LBFPQ.

Validity analyzed by multinominal logistic regression between Brief-LBFPQ and scores of TUG, 5TSST, gait speed, and step test are presented in Table 4. With "no impairment" as a reference category in the statistical analysis, we could verify that mild impairment, moderate impairment, and severe impairment from Brief-LBFPQ have positive associations with TUG and 5TSST, and negative associations with gait speed and step test. After adjustments (i.e., age, sex, BMI, years of education), the associations between moderate impairment and severe impairment from Brief-LBFPQ and all clinical tests are maintained except for the mild impairment of Brief-LBFPQ and TUG and gait speed.

Table 2 - Test-retest reliability results for Brief-LBFPQ

Item n (%)	**Test** (n=155)				**Retest** (n=155)				K(SE)	95% CIk	p*	α	ICC	p#
	0	1	2	3	0	1	2	3						
1	40 (58)	7 (10)	8 (11)	10 (20)	37 (53)	11 (15)	7 (20)	10 (20)	0.83 (0.05)	0.7-0.9	<0.001	0.9	0.95 (0.92-0.97)	<0.001
2	45 (65)	4 (7)	6 (10)	10 (17)	40 (58)	8 (13)	8 (13)	9 (15)	0.74 (0.07)	0.6-0.8	<0.001	0.9	0.93 (0.83-0.95)	<0.001
3	58 (85)	2 (4)	4 (7)	1 (2)	53 (78)	5 (8)	5 (4)	2 (4)	0.60 (0.12)	0.3-0.8	<0.001	0.8	0.76 (0.64-0.84)	<0.001
4	48 (71)	9 (14)	7 (11)	1 (2)	44 (65)	13 (20)	5 (8)	3 (5)	0.70 (0.08)	0.5-0.8	<0.001	0.9	0.82 (0.72-0.88)	<0.001
5	30 (43)	15 (21)	8 (11)	16 (23)	34 (49)	14 (20)	9 (13)	12 (17)	0.60 (0.07)	0.4-0.7	<0.001	0.8	0.77 (0.65-0.85)	<0.001
6	16 (24)	18 (27)	11 (17)	20 (30)	17 (26)	16 (24)	11 (17)	21 (31)	0.80 (0.05)	0.6-0.9	<0.001	0.9	0.91 (0.86-0.94)	<0.001
7	48 (69)	9 (13)	8 (11)	4 (5)	47 (68)	11 (15)	6 (8)	5 (7)	0.80 (0.06)	0.6-0.9	<0.001	0.9	0.94 (0.9-0.96)	<0.001
8	16 (24)	18 (27)	11 (17)	20 (30)	17 (26)	16 (24)	11 (17)	21 (31)	0.78 (0.05)	0.6-0.9	<0.001	0.9	0.90 (0.84-0.93)	<0.001
Total score	10 (14)	37 (53)	12 (17)	10 (14)	8 (11)	40 (58)	12 (17)	9 (13)	0.81 (0.06)	0.6-0.9	<0.001	0.9	0.92 (0.88-0.95)	<0.001

Note: Brief-LBFPQ = Brief Lower Body Functional Performance Questionnaire; Item 1 = step up and step down on the bus ; Item 2 = walk 800 meters; Item 3 = lay down, sit and stand up; Item 4 = get in and get out of the car; Item 5 = squat; Item 6 = get up from the floor; Item 7 = do households chores (to sweep, do the laundry, hang clothes to dry); Item 8 = go up and down stairs. K = Kappa coefficient; SE = standard error of Kappa; CIk = confidence interval from Kappa coefficient; α = Cronbach's Alpha; ICC = intraclass correlation coefficient (95%CI). *p < 0.001 according to Kappa test-retest reliability; #p < 0.001 according to Cronbach's Alpha.

Table 3 - Functional tests according to categories of the Brief-LBFPQ

Variables	n	TUG (s)	Gait speed (m/s)	5TSST (s)	Step test (cm)	Step test (cm/ stature in cm)
No impairment	63	8.4 (1)	1.2 (0.2)	11.7 (1.8)	45.5 (7.1)	0.30 (0.04)
Mild impairment	68	9.2 (2)	1.1 (0.2)	13.0 (2.6)	41.5 (8.8)	0.27 (0.05)
Moderate impairment	20	10.2 (2)	1.0 (0.2)	14.5 (3.7)	33.7 (10.1)	0.22 (0.06)
Severe impairment	4	11.8 (1)	0.9 (0.1)	17.1 (3.4)	28.3 (2.8)	0.19 (0.02)

Note: Brief-LBFPQ = Brief Lower Body Functional Performance Questionnaire; n = sample number; TUG = Timed-up and Go; 5TSST = five-times stand-to-sit test. Results are presented in mean (standard deviation).

Table 4 - Association between the Brief-LBFPQ classifications and scores of TUG, 5TSST, gait speed and step test (n = 155)

	Brief - LBFPQ								
	Mild commitment			Moderate commitment			Severe commitment		
Unadjusted model	b	OR (95% CI)	p	b	OR (95% CI)	p*	b	OR (95% CI)	p*
TUG	0.23	1.26 (1, 1.5)	0.020*	0.45	1.57 (1.2, 2.0)	0.001	0.86	2.36 (1.4, 3,7)	<0.0001
5TSST	0.25	1.2 (1, 1.5)	0.003*	0.42	1.52 (1.2, 1.8)	<0.001	0.65	1.92 (1.4, 2.6)	<0.0001
Gait speed	-1.63	0.19 (0.04, 0.78)	0.020*	-4.93	0.007 (0.001, 0.9)	<0.001	-7.30	0.001 (0.09, 0.18)	0.0010
Step test	-0.06	0.93 (0.89, 0.98)	0.007*	-0.15	0.85 (0.8, 0.9)	<0.001	-0.19	0.82 (0.7, 0.9)	0.0010
Adjusted model[a]									
TUG	0.18	1.21 (0.9, 1.54)	0.100	0.59	1.80 (1.2, 2.5)	0.001	1.12	3.08 (1.4, 6.5)	0.0040
5TSST	0.22	1.24 (1, 1.4)	0.019*	0.44	1.56 (1.2, 2)	<0.001	0.69	2.01 (1.4, 2.8)	<0.0010
Gait speed	-1.39	0.24 (0.05, 1.16)	0.070	-6.28	0.002 (0.001, 0.04)	<0.001	-9.96	0.001 (0.09, 0.18)	0.0080
Step test	-0.05	0.94 (0.8, 1)	0.050*	-0.17	0.84 (0.7, 0.9)	<0.001	-0.20	0.81 (0.7, 0.9)	0.0010

Note: Brief-LBFPQ = Brief Lower Body Functional Performance Questionnaire; OR = odds ratio; CI: confidence interval; TUG = Timed Up and Go; 5TSST = five-time stand-to-sit test. aModel adjusted for age, sex, body mass index and years of education. *p < 0.05 according to the multinominal logistic regression analysis.

Discussion

The results of this study demonstrated that the Brief-LBFPQ was associated with lower limb physical function tests widely administrated in the older population. The validity properties of the questionnaire were confirmed through the significant associations with objective functional tests. Also, the Brief-LBFPQ internal consistency reliability was good to excellent.

Considering the participant's distribution among the four Brief-LBFPQ classifications, the results showed consistent associations between Brief-LBFPQ and functional tests. The functional clinical tests used in our study (TUG, 5TSST, gait speed, and step test) have been used in clinical practice for the evaluation of mobility limitations,[27] risk of falls,[20,27] frailty and disabilities,[28-30] and as an indirect assessment of lower limb muscle strength and power.[21,22] Importantly, upon adjustment, the mild impairment classification presented a significant association only with 5TSST and step test performances.

A possible explanation for this outcome may be the greater influence of lower limb muscle strength and power in the performance of these tests when compared to TUG and gait speed. In this sense, 5TSST and the step test can be more challenging in its execution, demanding more physical function performance of lower limbs, therefore, able to identify individuals with mild functional performance impairment.

According to our results, it is possible to observe that older adults classified as mild impairment have a deficit performance in only one test, i.e., the 5TSST, since a score of 13 seconds may be associated with sarcopenia diagnosis in the Brazilian population,[31] and with reduction of global muscle strength.[7] Older adults classified as moderate impairment presented a reduction in performance in two tests: they performed the 5TSST worse than those with mild impairment classification, and the step test (normalized by stature) which is associated with reduced lower limb muscle strength.[6]

Based on our results, it is possible to observe that worse impairment classification in the Brief-LBFPQ is also related to worse performance in clinical tests. And our results show that the Brief-LBFPQ can be used to identify older adults with mild impairment, those who already present a decline in 5TSST performance, with an appropriate performance in the other tests. In this line, the identification of mild impairment of lower body functional performance justifies referring older adults to a health promotion program and, consequently, may prevent them to get worse over time.

When comparing the Brief-LBFPQ with another available questionnaire to evaluate lower body function in a generic way, as the GLFS-25,[14] this questionnaire take more time to be applied, since includes 25 items, there is no correlation with physical function tests and also there is no question related to physical ability of getting up from the floor, as included in the questionnaire Brief-LBFPQ proposal. The rationale for adding the question "getting up from the floor" is to identify earlier the inability of older adults to perform this motor task. The inability to get up from the floor may be one of the first movement impairments that occur with aging and may be a red flag for further functional declines. However, many older adults don't realize that they already have difficulty getting up from the floor because it is not a usual motor task. In many cases, the older adults only realized the difficulty when they fall, and at that moment, greater physical and functional declines have already been installed.

The incapability of getting up from the floor after falling is associated with a long lying on the floor for more than an hour among older adults, which increases the risks of complications and death.[32] Falls are associated with not only physical consequences to older adults, but also psychological, such as fear of falling and inhibiting social activities.[32] Therefore, the early identification of this difficulty or inability to perform the movement of getting up from the floor and, consequently, improving this ability through physical exercises may help older adults to achieve successful aging.

The Brief-LBFPQ items showed excellent internal consistency and test-retest reliability. That indicates that the questionnaire contains relevant questions that may be used to identify the ability of older adults to perform challenging lower limb activities, which are relevant for social inclusion; to screen for early functional impairments in older adults; and there is the possibility to apply the questionnaire by phone.

This study presents some limitations. Because it used convenience sampling, it was not possible to standardize the volunteers by sex, age, BMI, and years of education. However, to prevent those characteristics to interpose into the results, those variables have been included in the statistical model as confounding variables. To increase the generalizability of our results, it is necessary to recruit older adults of different ages, mainly middle-old and oldest-old adults, since our sample included individuals with a mean age of 68.4 years, i.e., youngest-old adults. Also, the Brief-LBFPQ was developed to detect earlier physical function deficits in independent older adults, thus, future studies must evaluate the psychometric validity of Brief-LBFPQ in different populations, with different health conditions, i.e., oldest adults, Parkinson disease, frailty syndrome.

Conclusion

The usage of adequate functional assessment instruments in population inquiries can support strategies for providing effective care for older adults that privilege actions focused on the reality of this population group. In addition to this, our Brief-LBFPQ could be very useful in general clinic settings as it provides reliable information about the lower limb functional status of healthy older adults, enabling an earlier screening of function impairment, and consequently an earlier intervention approach. In advance, our study group is already assessing new data to elucidate the practical use of the Brief-LBFPQ that will be presented in future studies.

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Authors' contribution

NCRI: design, analysis and interpretation of data, writing of the manuscript. RCFJ: design, analysis and interpretation of data, manuscript review. JMP: conception, design, data collection, manuscript review. DCCA: conception, design, data interpretation, manuscript review. All authors approved the final version to be published.

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