Tracking frailty in older adults with systemic arterial hypertension through different instruments

Samara Frantheisca Almeida Barbosa[1]
Fernando Alves Rocha[2]
Jônatas Vinicius Machado de Freitas[3]
Glaucia Cavalcante Oliveira[4]
Jair Almeida Carneiro[5]
Fernanda Marques da Costa[5]

Abstract

Objective: To compare the degree of agreement, correlation, and accuracy between the Edmonton Frail Scale (EFS) and the Clinical-Functional Vulnerability Index-20 (IVCF-20) instruments in older adults with systemic arterial hypertension (SAH). *Method*: Cross-sectional household study with older adults from Montes Claros, MG. This study included only individuals with SAH whose data were collected from November 2016 to February 2017. Sensitivity, specificity, and predictive values were determined. The Kappa statistic analyzed agreement and reliability, while the Pearson coefficient evaluated the correlation between the instruments. *Results*: A total of 281 individuals with hypertension were included in this study. It was found that the prevalence of frailty was 31.3% according to the EFS and 22.1% according to the IVCF-20. The Kappa statistic was 0.604, and the Pearson correlation coefficient was 0.621 ($p<0.001$). The accuracy was 84.34%. *Conclusion*: The EFS and IVCF-20 instruments verified moderate agreement and reliability, strong positive correlation, and good accuracy. The results confirm the importance of standardizing the instrument to assess frailty in older adults with hypertension. The appropriate assessment of frailty aims to provide care focused on prevention and promotion that can prevent worsening health status and complications of arterial hypertension.

Keywords: Health Vulnerability. Frailty. Frail older adult. Hypertension. Older adult Health.

[1] Universidade Estadual de Montes Claros, Programa de Pós Graduação em Ciências da Saúde. Montes Claros, MG, Brasil.

[2] Secretaria de Educação do Estado de Minas Gerais, departamento de educação básica. Taiobeiras, MG, Brasil.

[3] Universidade Estadual de Montes Claros, Departamento de Medicina. Montes Claros, MG, Brasil.

[4] Prefeitura de Montes Claros, Secretaria de Municipal de Saúde. Montes Claros, MG, Brasil.

[5] Universidade Estadual de Montes Claros, Centro de Ciências Biológicas e da Saúde e Centro Universitário FIPMoc/Afya, Programa Afycionados por Ciência. Montes Claros, MG, Brasil.

There was no funding for the execution of this work.

The authors declare that there is no conflict in the conception of this work.

Correspondence
Samara Frantheisca Almeida Barbosa
samarafrantheisca@yahoo.com.br

Received: October 30, 2023
Approved: April 29, 2024

http://dx.doi.org/10.1590/1981-22562024027.230245.en

INTRODUCTION

In the last decades, there has been a progressive decrease in mortality rates and fertility rates; consequently, the proportion of older adults in the world population has increased[1,2]. In Brazil, associated with aging, there has also been an increase in the frequency of chronic non-communicable diseases (NCDs)[3], with systemic arterial hypertension (SAH) standing out due to its high prevalence, low control rates, and elevated mortality[4].

Another concern of the older adult population is frailty syndrome, a gradual and multisystemic physiological dysregulation in which biological changes lead to symptomatic clinical failures, resulting in increased risk of disability and death[5-8]. Frailty and SAH often coexist in older adults. The association of these two conditions has a negative impact on health and diminishes the quality of life of these individuals[9]. It is noteworthy that the development of frailty is a complex phenomenon often associated with the aging process. The proper and early recognition of frailty enables healthcare to be directed towards preventive and restorative interventions. However, there is a growing number of instruments aimed at assessing frailty, as evidenced by a systematic review that identified and evaluated 51 instruments in this field[10].

Among these instruments, one multidimensional tool for community-dwelling older adults stands out: the Edmonton Frail Scale (EFS)[11]. This scale was developed by researchers at the University of Alberta in the city of Edmonton, Canada, with the use of Comprehensive Geriatric Assessment (CGA) for validation. The CGA is the most representative tool for assessing older adults, as it assesses overall complexity, not just frailty; however, its application is time-consuming and can only be administered by specialists[6,11]. Nevertheless, the EFS can be easily administered by healthcare professionals[11]. In Brazil, this scale was translated, adapted, and validated in 2009[12].

Another instrument used for detecting frailty is the Clinical-Functional Vulnerability Index-20 (IVCF-20), developed by researchers from the Federal University of Minas Gerais, also validated based on the score of the CGA. It was constructed in an interdisciplinary manner, with the participation of various professionals from geriatrics and gerontology, teams from Primary Health Care (PHC), Family Health Support Center teams, and PHC managers[13].

It is noteworthy that among the other instruments available for frailty research, some of them are impracticable for application by PHC professionals, as they demand multidimensional clinical data and/or require specific training[11]. For professionals working in PHC, it is important that the tool be quickly applicable and not require special training, such as the EFS[11] and the IVCF-20[13]. These instruments are comparable because both were constructed with the CGA as the basis for validation.

Previous psychometric studies compared the EFS and the IVCF-20 administered to older adults residing in the community in Belo Horizonte (Minas Gerais)[14] and Montes Claros (Minas Gerais)[15]. They found moderate agreement and significant positive correlation[14] for the former and moderate agreement and strong positive correlation[15] for the latter. Other studies have utilized different tools with community-dwelling older adults. An investigation conducted in Três Lagoas (Mato Grosso do Sul) found low to moderate agreement between the Subjective Frailty Assessment (SFA) and the IVCF-20 among community-dwelling older adults. A study conducted in Taguatinga, Brasília (Federal District), utilized the EFS and the Cardiovascular Health Study (CHS) frailty scale, revealing a moderate association and high sensitivity[17].

No literature was found comparing the EFS and the IVCF-20 specifically applied to community-dwelling hypertensive older adults. However, a study assessing the agreement between other frailty screening instruments, namely the Frailty Phenotype (mFP), Frailty index, and Study of Osteoporotic Fractures (SOF) index, found moderate to high concordance[18]. Assessments like these are important because the lack of agreement among frailty screening instruments and inconsistency in frailty measurement can lead to inadequate perceptions of the investigated outcomes[16].

Therefore, it is emphasized the importance for healthcare professionals and managers to reflect on the application and standardization of frailty tracking tools in PHC, in order to tailor individual therapeutic plans accordingly. Hence, this study aims to compare the degree of agreement, correlation, and accuracy between the EFS and IVCF-20 instruments in older adults with SAH.

METHOD

This is a cross-sectional study nested within a population-based household cohort, a subset of a larger research project on the health conditions of the older population in the municipality of Montes Claros[19]. The municipality where the study was conducted is a medium-sized city located in the North of Minas Gerais, Brazil, with an estimated population of 417,478 inhabitants[20].

A estimated population of 30,790 older adults (13,127 men and 17,663 women) residing in the urban region was considered, based on data from the 2010 census by the Brazilian Institute of Geography and Statistics (IBGE)[20]. Based on this, in order to estimate the prevalence of each health outcome investigated in the epidemiological survey, the sample size at the baseline of the study, which took place between May and July 2013, was calculated considering a confidence level of 95%, a conservative prevalence of 50% for unknown outcomes, and a sampling error of 5%. As this is a cluster sampling, the identified number was multiplied by a correction factor and a design effect (deff) of 1.5%, and increased by 15% for potential losses. The minimum number of older adults defined by the sample calculation was 656 individuals. The sample calculation was conducted for the larger study, and the population for the present study was extracted from it through a subset, thus a sample calculation based on the prevalence of frailty outcomes in older adults was performed.

The sampling process at baseline was probabilistic, by clusters, and in two stages. In the first stage, the sampling unit was the census tract, where, out of the 362 urban sectors in the municipality, 42 census tracts were randomly selected. In the second stage, the number of households was determined according to the population density of individuals aged 60 years or older; thus, sectors with a higher number of older adults had more households allocated. Consequently, 685 older adults were included in the study. Out of the 685 individuals evaluated at baseline, 92 refused to participate in the first wave of the study, 78 changed address, 67 were not found at home after three attempts, and 54 had passed away. Therefore, 394 older adults participated in this stage of the study, and among them, 281 were hypertensive, forming the sample for this study (Figure 1).

Data from the first wave of the study were collected between November 2016 and February 2017 by undergraduate students in nursing and medicine. All households of the interviewed older adults at baseline were eligible for this research. As losses included older adults who were unavailable during the three scheduled visits at different days and times, as well as those who changed address and those who passed away. The older adults who were unable to respond had assistance from family members or caregivers with the questionnaire questions, as indicated in the data collection instruments[11-13].

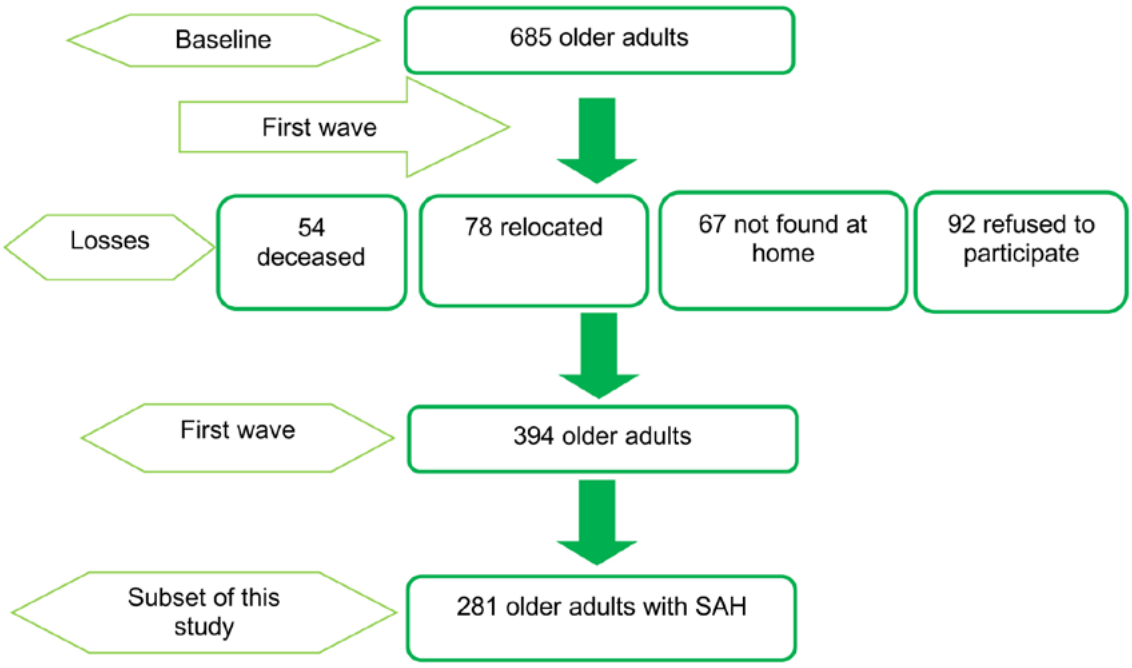

Figure 1. The Flowchart of data collection stages. Montes Claros, MG, 2016-2017.

Souce: Authors, 2023.

For sample characterization, social, demographic, and economic variables were employed, alongside morbidity features and health-related care characteristics. The variables were categorized as follows: sex (male x female), age group (up to 79 years x ≥80 years), marital status (with partner, including married and in a stable union x without partner, including single, widowed, and divorced), family arrangement (living alone x living with others), literacy (able to read x unable to read), education (up to four years of study x more than four years of study), personal income (yes x no), monthly family income (up to one minimum wage x more than one minimum wage), presence of self-reported chronic morbidities (heart disease, rheumatoid arthritis, and osteoporosis). Additionally, the following were assessed: presence of caregiver (yes x no), falls in the last 12 months (yes x no), and hospitalization in the last 12 months (yes x no). Anthropometric measurements were also conducted as requested in items of frailty scales to determine weight (kg), height (m), calf circumference (cm), hip circumference (cm), and waist circumference (cm).

To assess frailty in older adults, the EFS[11,12] and the IVCF-20[13] were employed. The EFS examines nine domains (cognition, health status, functional independence, social support, medication use, nutrition, mood, urinary continence, and functional performance), ordered in 11 items with scores ranging from 0 to 17. Scores ranging from zero to four indicate the absence of frailty; five and six suggest vulnerability to frailty; seven and eight indicate mild frailty; nine and 10 indicate moderate frailty; and a score of 11 or more points indicates severe frailty[11,12].

The IVCF-20 is a multidimensional tool comprising 20 assessment items containing eight conditions (age, self-perception of health, functional disabilities, cognition, mood, mobility, communication, and multiple comorbidities) predictive of clinical-functional decline in older adults[13]. The final score ranges from zero to 40, where zero to six points indicate older adults at low risk of clinical-functional vulnerability; seven to 14 points indicate moderate risk; and 15 or more points indicate high risk, potentially frail individuals[13].

In order to investigate the agreement and reliability between the EFS and IVCF-20 instruments, Kappa statistics were applied, considering the dichotomization of frailty (frail vs. non-frail). For the EFS, individuals with a final score ≤ 6 were considered non-frail, encompassing "non-frail" and "vulnerable" older adults, while those with a score ≥ 7 were considered frail, covering "mild," "moderate," and "severe" frailty[11,12]. For the IVCF-20, individuals with a final score < 15 were considered non-frail (robust older adults and moderate risk of frailty), while those with a score ≥ 15 were considered frail (high risk)[13].

The Kappa statistic result was interpreted as proposed by Landis and Koch[21]. The correlation between the instruments was verified through the Pearson coefficient[22], using the total scores of each instrument. For the analysis of the normality of the variables, the Kolmogorov-Smirnov test was used. In order to analyze the accuracy of the IVCF-20 relative to the EFS, sensitivity (S), specificity (E), positive predictive value (PPV), and negative predictive value (NPV) were calculated, considering the cases of false-positive, false-negative, true-negative, and true-positive.

The data interpretation was conducted considering sensitivity as the percentage of frail older adults correctly identified, and specificity was defined as the percentage of non-frail individuals correctly identified. Sensitivity and specificity values greater than 50% were deemed appropriate, with values ranging from 51% to 69% indicating poor/limited accuracy, while values above 70% represented good accuracy. A final significance level of 0.05 ($p < 0.05$) was considered in all analyses.

All participants were informed about the research and provided their consent by signing an Informed Consent Form. The research project was approved by the Research Ethics Committee of the Faculdades Integradas Pitágoras de Montes Claros, officially regulated, under the Substantiated Opinion of July 8, 2016, opinion number 1,629,395.

DATA AVAILABILITY

The entire dataset supporting the results of this study is available upon request to the corresponding author: Samara Frantheisca Almeida Barbosa.

RESULTS

This study included 281 hypertensive older adults. Among them, 196 (69.8%) were female. Regarding age, 213 (75.8%) were aged up to 79 years. The prevalent marital status was among those without a partner (single/separated/widowed) (n=148; 52.7%). Sample characteristics highlighted that 241 (85.8%) older adults did not live alone; 271 (96.4%) were literate; 221 (78.6%) had up to four years of education; 250 (89.0%) had their own income; and 73 (26.0%) had a monthly family income of up to one minimum wage.

Regarding associated pathologies and health status, 141 (50.2%) older adults had rheumatoid arthritis; 109 (38.8%) had osteoporosis, and 92 (32.7%) had cardiac issues. The majority of participants had a medical consultation in the last 12 months (n=261; 92.9%); did not experience falls in the last year (n=184; 65.5%), and did not have a caregiver (n=247; 87.9%).

In relation to frailty, 88 (31.3%) were considered frail according to the EFS, and 62 (22.1%) according to the IVCF-20. Table 1 shows the frequency distribution of EFS components, and Table 2 shows the frequency distribution of IVCF-20 components.

Table 1. Frequency distribution of components of the Edmonton Frail Scale (EFS) in community-dwelling hypertensive older adults (N=281). Montes Claros, MG, 2016-2017.

Components of the EFS	n (%)
Cognition (Clock-Drawing Test)	
Approved	52 (18.5)
Failed with minimal errors	36 (12.8)
Failed with significant errors	193 (68.7)
General health status (Hospitalization in the last 12 months)	
None	244 (86.8)
1 to 2	31 (11.0)
More than 2	6 (2.1)
Self-perceived health	
Excellent / Very good / Good	120 (42.7)
Fair	138 (49.1)
Poor	23 (8.2)
Functional independence (Activities needing assistance*)	
0-1	187 (66.5)
2-4	90 (32.0)
5-8	4 (1.4)
Social support (When needing help, can rely on someone)	
Always	238 (84.7)
Sometimes	39 (13.9)
Never	4 (1.4)
Medication use (5 or more)	
No	185 (65.8)
Yes	96 (34.2)
Forgets to take medication	
No	180 (64.1)
Yes	101 (35.9)
Nutrition (Weight loss)	
No	237 (84.3)
Yes	44 (15.7)
Mood (Feeling sad or depressed)	
No	206 (73.3)
Yes	75 (26.7)
Urinary incontinence	
No	205 (73.0)
Yes	76 (27.0)
Functional performance (Timed Up and Go test)	
0-10 seconds	65 (23.1)
11-20 seconds	146 (52.0)
More than 20 seconds	70 (24.9)

Source: Data collection, 2017. *The activities considered were: meal preparation (cooking), transportation (moving from one place to another), housekeeping (cleaning/tidying the house), shopping, using the telephone, doing laundry, managing money, taking medication.

Table 2. Frequency distribution of components of the Clinical-Functional Vulnerability Index (IVCF-20) in community-dwelling hypertensive older adults (N=281). Montes Claros, MG, 2016-2017.

Components of the IVCF-20		n (%)
Age (in years)		
60 to 74		162 (57.7)
75 to 84		89 (31.7)
≥ 85		30 (10.7)
Self-perceived health		
Health compared to others of your age		
Excellent / Very good / Good		155 (55.2)
Fair or Poor		126 (44.8)
Activities of Daily Living (ADL)		
IADL (Instrumental)		
Stopped shopping	Yes	72 (25.6)
	No	209 (74.4)
Stopped managing finances	Yes	57 (20.3)
	No	224 (79.7)
Stopped doing minor household chores	Yes	66 (23.5)
	No	215 (76.5)
ADL		
Stopped bathing independently	Yes	16 (5.7)
	No	263 (93.6)
Cognition		
Becoming forgetful	Yes	76 (27.0)
	No	205 (73.0)
Forgetfulness worsened in the last few months	Yes	52 (18.5)
	No	229 (81.5)
Forgetfulness hinders the performance of daily activities	Yes	44 (15.7)
	No	237 (84.3)
Mood		
Feeling down, sad, or hopeless in the last month	Yes	86 (30.6)
	No	195 (69.4)
Loss of interest or pleasure in activities that were once enjoyable, in the last month	Yes	58 (20.6)
	No	223 (79.4)
Mobility		
Reach, grip, and pinch		
Unable to raise arms above shoulder level	Yes	26 (9.3)
	No	255 (90.7)
Unable to handle or grasp small objects	Yes	34 (12.1)
	No	247 (87.9)
Aerobic and/or muscular capacity*		
Unintentional weight loss, BMI < 22 kg/m2, calf circumference < 31 cm, or gait speed (4m) > 5 seconds	Yes	45 (16.0)
	No	236 (84.0)

to be continued

Continuation of Table 2

Components of the IVCF-20		n (%)
Gait		
Difficulty walking that prevents daily activities	Yes	84 (29.9)
	No	197 (70.1)
Had two or more falls in the last year	Yes	97 (34.5)
	No	184 (65.5)
Sphincter continence		
Involuntary loss of urine or feces	Yes	91 (32.4)
	No	190 (67.6)
Communication		
Vision		
Vision impairment that prevents the performance of activities	Yes	63 (22.4)
	No	218 (77.6)
Hearing		
Hearing impairment that prevents the performance of activities	Yes	59 (21.0)
	No	222 (79.0)
Multiple comorbidities		
Polypathology Polypharmacy* ≥ 5 5 chronic diseases ≥ 5 daily medications Hospitalization in the last 6 months	Yes	83 (29.5)

Source: Data collection, 2017. *The IVCF-20 considers "Yes" if at least one item is marked, thus in this study presenting the highest score found among the items.

Upon performing the Kappa statistic, a concordance index of 0.604 (CI=0.053-10.41) was obtained between the instruments, as shown in Table 3. The Pearson correlation coefficient between EFS and IVCF-20 values yielded a value of 0.621 ($p<0.001$). Sensitivity, specificity, positive predictive value, and negative predictive value are displayed in Table 4.

Table 3. Agreement and reliability analysis for frailty classification according to the EFS and IVCF-20 instruments in hypertensive older adults (N=281). Montes Claros, MG, 2016-2017.

Instrument	Edmonton Frail Scale (EFS)			Kappa
	Without frailty n (%)	With frailty n (%)	Total n (%)	
IVCF-20				
Without frailty n(%)	184 (65.5)	35 (12.4)	219 (77.9)	0.604
Frailty n(%)	9 (3.2)	53 (18.9)	62 (22.1)	
Total n(%)	193 (68.7)	88 (31.3)	281 (100)	

Source: Data collection, 2017.

Table 4. Accuracy analysis for the classification of frailty, according to the EFS and IVCF-20 instruments in hypertensive older adults (N=281). Montes Claros, MG, 2016-2017.

Performance	Value (%)
Sensitivity	95.33
Specificity	60.22
Positive Predictive Value (PPV)	84.01
Negative Predictive Value (NPV)	85.48
Accuracy	84.34

Source: Data collection, 2017.

DISCUSSION

The present study demonstrated that, although frailty presented different proportions between the screening scales, there was moderate agreement and strong positive correlation between the EFS and IVCF-20 instruments. Additionally, there is a higher prevalence of frail older adults in the EFS tracking.

Older adults with a score equal to or greater than 15 on the IVCF-20 are considered frail. This data exhibits high sensitivity (greater than 90%) and specificity greater than 60%. High sensitivity is desirable since screening instruments should be sensitive enough to identify the majority of individuals with the frailty condition (true positives)[17]. The accuracy test showed that the IVCF-20 exhibits good accuracy, being considered an adequate tool for assessing frailty in older adults with SAH.

Regarding the prevalence of frailty (31.3% by EFS and 22.1% by IVCF-20), a study conducted in Beijing, China, demonstrates that older adults with hypertension showed a higher prevalence of frailty (15%) compared to those without hypertension (10.3%)[23]. It is worth noting that, for older adults in general, the proportion of frailty is lower than the findings of this study. Regarding frailty prevalence, a systematic review and meta-analysis conducted with research from Latin America and the Caribbean in 2016 found a total of 29 studies involving 43,083 individuals. The prevalence of frailty was 19.6% (95% CI: 15.4–24.3%), with variation from 7.7% to 42.6% in the reviewed studies[24]. In Brazil, the Brazilian Longitudinal Study of Aging (ELSI-Brazil), conducted from 2015 to 2016, selected 70 municipalities across the country's five major geographical regions and found that the prevalence of frailty was 13.5% for community-dwelling older adults[25]. For both studies, the frailty phenotype was utilized, which is defined based on five characteristics: weight loss, weakness, reduced walking speed, exhaustion, and low level of physical activity[26].

A study conducted in Basic Health Units in Belo Horizonte (Minas Gerais) with community-dwelling older adults obtained 24% classified as frail by the EFS and 12.6% classified as frail by the IVCF-20[14]. Research with the same target population conducted in Montes Claros (Minas Gerais) found 28.2% classified as frail by the EFS and 19.5% classified as frail by the IVCF-20[15]. Thus, it is suggested that SAH may contribute to the development of frailty. It is estimated that frail individuals with cardiovascular diseases have a worse prognosis, higher disability, falls, and fractures compared to non-frail older adults with hypertension[27,28].

These differences between the instruments and the percentages found in this study and in the consulted literature confirm the assumptions that frailty instruments based on subjective and objective measures capture different health-related parameters[18]. Therefore, the instrument used for screening should encompass a multidimensional character, increasing the chance of detecting frail older adults (greater sensitivity)[17]. It is worth noting that the instruments applied in this study have similarities among the components, which may justify the moderate agreement and strong positive correlation. However, the way they are assessed is different, which presumes the divergence in the percentages of frailty found. In the EFS and the IVCF-20, similar components are presented: Cognition; Self-perceived health; Functional

independence; and Mood. In the EFS, "General health status (Hospitalization in the last 12 months)" and "Medication use (5 or more)" are presented, which are included in the "Multiple Comorbidities" component in the IVCF-20, in addition to "Urinary incontinence" and "Nutrition" assessed under "Mobility".

The instruments present different ways of evaluating cognitive function. In the IVCF-20, it is assessed through memory, while in the EFS, the Clock-Drawing Test is used to assess cognition through executive functions and visuospatial abilities. In the clock drawing test, there was a high error rate in this study (68.7%), a factor that may contribute to the ESF identifying a higher prevalence of frailty among older adults with SAH. A study conducted with older adults from a Family Health Strategy Unit in Embu, São Paulo, found that some participants (18.8%) did not even respond to this topic of the EFS due to disinterest or difficulties in understanding and/or executing it. Among those who responded to the Clock-Drawing Test, the majority (69.9%) showed scores indicative of cognitive deficit[23]. As observed in this study, the majority of older adults have low educational attainment, which may be associated with this finding, since knowledge of numbers is necessary for understanding and reading the time [12,29,30].

Regarding self-perceived health, the majority of hypertensive older adults in this study rated their health as fair in the EFS and as excellent/very good/good in the IVCF-20. In this component, the EFS separates the items Fair from Poor, whereas in the IVCF-20 they are combined, which may influence individuals' responses and impact the frailty tracking assessment outcome, as they yield different scores. It is worth noting that self-perceived health is a global measure that encompasses the individual's physical, mental, and social well-being[29]. When positive, it can contribute to older adults' desire to remain active and independent in their daily activities. When negative, it may be related to declines in older adults' health and quality of life[27].

Regarding functional independence, in the EFS, it is assessed under this title and lists activities requiring assistance without grouping, whereas in the IVCF-20, they are divided into two topics: activities of daily living (ADLs) and instrumental activities of daily living (IADLs). Both instruments showed a predominance of older adults who were independent. Older adults with limited autonomy in performing ADLs have compromised quality of life and an increased risk of dependency, institutionalization, and premature death[28].

With regard to Mood, both instruments found a predominance of positive feelings among participants. Studies show that pre-frailty and frailty conditions may increase the number of depressive symptoms, especially among frail individuals, leading to poorer self-perceived health, decreased problem-solving ability, and impaired executive function performance [29,27,31]. A study conducted in China with community-dwelling older adults with SAH showed an association between frailty and depression in this population[28].

The majority of older adults with SAH in this study reported not having been hospitalized in the last 12 months for the EFS and assumed to be in the last six months for the IVCF-20, as the percentage for the "Multiple Comorbidities" item was also low. It is known that aging leads to loss of strength and muscle mass, affecting the range of motion of the lower limbs and predisposing individuals to falls or functional impairment[29], which may justify the findings of the present study.

Polypharmacy, assessed in both instruments, was denied by the majority of hypertensive older adults. In the EFS, it includes an assessment of forgetting to take medications, also denied by the majority in this research. However, considering older adults with hypertension, it is important to highlight that this population takes some type of medication and may encounter difficulties in using it, although not reported[29].

In addition to the aforementioned components, the EFS includes components not assessed in the IVCF-20, such as "Social Support" and "Functional Performance". Findings regarding social support demonstrated that the majority of older adults did not live alone and always had someone they could count on. This dimension can contribute to better health conditions by enabling the coping with stressful situations, besides making individuals feel loved and secure, which positively impacts the mental health quality of older adults[29].

The "Functional Performance" item requests that the older adult stand up and walk while timed. A study shows that frailty is associated with failure in the chair stand test and physical frailty in community-dwelling older adults with hypertension[26]. The relationship between blood pressure and mortality in older adults with SAH varies with walking speed, indicating that this item may be an effective measure to identify older adults at risk of negative outcomes from hypertension[7].

In the IVCF-20, components include Age, Mobility, Communication, and in "Multiple Comorbidities," it also assesses Multimorbidities themselves (≥5 chronic diseases), which are not included in the EFS.

With respect to age, the literature indicates data close to those found in this study, with a prevalence of frailty for individuals aged 60 to 74 years [8,12,27,28]. It is important to highlight that age affects the prognosis of an older adult with a prolonged diagnosis of SAH, due to possible structural and functional alterations induced by the disease in brain areas responsible for body movement, which may contribute to the development of frailty[18].

The "Mobility" component of the IVCF-20 includes reach, grip, and pinch; Aerobic and/or muscular capacity (which presents unintentional weight loss, BMI <22 kg/m^2, calf circumference <31 cm, or gait speed (4m) >5 seconds); Gait (calf circumference, difficulty walking capable of hindering daily activities, falls in the last year); and Sphincteric continence (urine or feces). From these items, the EFS presents Nutrition in isolation, which resembles Unintentional weight loss, and only urinary incontinence is assessed in sphincteric continence. Therefore, it is evident that grouping characteristics in the IVCF-20 that are assessed individually in the EFS may contribute to different frailty scores.

In "Multiple Comorbidities," it was found that, in association with SAH, the majority of older adults in this study did not have multimorbidity, but some of them had other chronic diseases, notably rheumatoid arthritis, osteoporosis, and heart problems. NCDs predispose older adults to increased clinical-functional vulnerability, as well as a greater likelihood of developing frailty[28].

Although there is no consensus on which instrument should be used to assess frailty among older adults, especially those with SAH, it is important for every healthcare professional assisting older adults to be familiar with frailty syndrome and its consequences[32].

Therefore, the choice of instrument should consider different scenarios (hospital, primary care, long-term care), the purpose of measurement, the qualification (physician, general practitioner, nurse, caregiver) of the interviewer, and the available time[10]. Furthermore, it is important to assess stratified norms according to educational level, considering that, according to data from the IBGE, in 2022, 5.2 million Brazilian older adults are illiterate[33]. A systematic review demonstrates that all instruments present advantages and disadvantages in sample composition regarding age and nationality, emphasizing the significance of comparing the results measured by these instruments among themselves[10], as in this study.

This study has limitations regarding the definition of SAH diagnosis, which was based on self-reporting by the older adult or their caregiver. However, the manner in which the sample was defined and its representativeness, coupled with the utilization of validated tools, are factors that contribute to the enhancement of knowledge for healthcare professionals.

CONCLUSION

It was observed that despite differences in the results for frailty among older adults with systemic arterial hypertension, the Edmonton Frail Scale and the Clinical-Functional Vulnerability Index-20 instruments demonstrated moderate to strong agreement and positive correlation. Additionally, a good accuracy of the Clinical-Functional Vulnerability Index-20 in relation to the Edmonton Frail Scale for the correct screening of frailty in older adults with systemic arterial hypertension was verified. Although there is moderate to strong agreement and positive correlation, it is noteworthy the need for standardization of the instrument to be used in a specific service to assess frailty in older

adults. It is recommended that further research be conducted with the same population, evaluating other variables such as blood pressure measurement and medication usage, in addition to employing alternative statistical analyses.

It is emphasized that the proper assessment of frailty enables the direction of primary healthcare services towards providing assistance aimed at preventing the deterioration of health status related to frailty and complications of systemic arterial hypertension through health prevention and promotion efforts.

AUTHORSHIP

- Samara F. A. Barbosa - conception, design, analysis and interpretation of data; drafting the manuscript and its critical revision; approval of the version to be published; and being accountable for all aspects of the work, ensuring that issues related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
- Fernando A. Rocha - drafting of the manuscript, critical revision, and approval of the version to be published.
- Jônatas V. M. Freitas - analysis and interpretation of data, and approval of the version to be published.
- Glaucia C. Oliveira - analysis and interpretation of data, and approval of the version to be published.
- Jair A. Carneiro - conception and design of the study; critical review of the manuscript; approval of the version to be published; and being accountable for all aspects of the work.
- Fernanda M. Costa - conception, design, analysis, and interpretation of data; critical review of the manuscript; approval of the version to be published; and being accountable for all aspects of the work, ensuring that issues related to the accuracy or integrity of any part of the work are appropriately addressed.

Edited by: Yan Nogueira Leite de Freitas

REFERENCES

1. Alves JED. A transição demográfica e a janela de oportunidade. São Paulo: Instituto Fernand Braudel de Economia Mundial; 2008. [Cited 2023 Jul. 5]. Available at: https://fernandonogueiracosta.files.wordpress.com/2010/08/transicao_demografica.pdf
2. United Nations. Department of Economic and Social Affairs. Population division. World Population Ageing 2019. New York, US: United Nations, 2020. [Cited 2023 Jul. 5]. Available at: https://www.un.org/en/development/desa/population/publications/pdf/ageing/WorldPopulationAgeing2019-Report.pdf.
3. Simões TC, Meira KC, Santos JD, Câmara DCP. Prevalências de doenças crônicas e acesso aos serviços de saúde no Brasil: evidências de três inquéritos domiciliares. Ciênc saúde coletiva. setembro de 2021;26(9):3991–4006. [Cited 2023 Jul. 5]. Available at: https://doi.org/10.1590/1413-81232021269.02982021
4. Barroso, WKS; Rodrigues, CIS; Bortolotto, LA; Mota-Gomes, MA; Brandão, AA; Feitosa, ADM et al. Diretrizes Brasileiras de Hipertensão Arterial – 2020. Arq Bras Cardiol. 2021; 116(3):516-658. [Cited 2023 Jul. 5]. Available at: https://doi.org/10.36660/abc.20201238
5. Campbell AJ, Buchner DM. Unstable disability and the fluctuations of frailty. Age Ageing. 1997; 26(4):315-318. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1093/ageing/26.4.315
6. Guasti L, Ambrosetti M, Ferrari M, Marino F, Ferrini M, Sudano I et al. Management of Hypertension in the Elderly and Frail Patient. Drugs Aging, 2022;39(10):763–772. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1007/s40266-022-00966-7
7. Liu P, Li Y, Zhang Y, Mesbah SE,Tongji, Ma L. Frailty and hypertension in older adults: current understanding and future perspectives. Hypertension Research, 2020;43(12): 1352–1360 [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1038/s41440-020-0510-5
8. Liu P, Zhang Y, Li Y, Li S, Li Y, Chen Y et al. Association of frailty with quality of life in older hypertensive adults: a cross-sectional study. Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation, 2021;30(8):2245–2253. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1007/s11136-021-02816-2

9. Ricci N, Silva Pessoa G, Ferrioli E, Dias RC, Rodrigues Perracini M. Frailty and cardiovascular risk in community-dwelling elderly: a population-based study. Clin Interv Aging. 2014;1677-1685. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.2147/CIA.S68642

10. Faller JW, Pereira DN, Souza S, Nampo FK, Orlandi FS, Matumoto S. Instruments for the detection of frailty syndrome in older adults: a systematic review. PloS One. 2019;14(4):e0216166. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1371/journal.pone.0216166

11. Rolfson DB, Majumdar SR, Tsuyuki RT, Tahir A, Rockwood K. Validity and reliability of the Edmonton Frail Scale. Age and Ageing. 2006;35(5):526-9. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1093/ageing/afl041

12. Fabricio-Wehbe SCC, Schiaveto FV, Vendrusculo TRP, Haas VJ, Dantas RAS, Rosalina Aparecida Partezani Rodrigues RAP. Cross-cultural adaptation and validity of the "Edmonton Frail Scale - EFS" in a Brazilian elderly sample. Revista Latino-Americana de Enfermagem, 2009;17(6):1043-1049. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/S0104-11692009000600018

13. Moraes EN, Carmo JA, Moraes FL, Azevedo RS, Machado CJ, Montilla DER. Clinical-Functional Vulnerability Index-20 (IVCF-20): rapid recognition of frail older adults. Revista de Saúde Pública, 2016; 50. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/S1518-8787.2016050006963

14. Ribeiro EG, Mendoza IYQ, Cintra MTG, Bicalho MAC, Guimarães GL, Moraes EN. Frailty in the elderly: screening possibilities in Primary Health Care. Rev bras enferm. 2021;75(2): e20200973. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/0034-7167-2020-0973

15. Carneiro JA, Souza ASO, Maia LC, Costa FM, Moraes EN, Caldeira AP. Frailty in community-dwelling older people: comparing screening instruments. Rev Saude Publica. 2020; 54:119. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.11606/s1518-8787.2020054002114

16. Melo BRS, Luchesi BM, Barbosa GC, Pott Junior H, Martins TCR, Gratão ACM. Agreement between fragility assessment instruments for older adults registered in primary health care. Rev Gaucha Enferm. 2022;43: e20210257. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/1983-1447.2022.20210257.en

17. Pinheiro HA, Bueno GAS, Fernandes LC, Menezes RL. Escala de Fragilidade de Edmonton: estudo de acurácia da detecção do idoso frágil. Movimenta, 2023;16(1):1-16. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.31668/movimenta.v16i1.13463

18. Coelho-Junior HJ, Uchida MC, Picca A, Calvani R, Landi F, Gonçalves IO, Rodrigues B, Bernabei R, Marzetti E. Frailty is not associated with hypertension, blood pressure or antihypertensive medication in community-dwelling older adults: A cross-sectional comparison across 3 frailty instruments. Experimental Gerontology 2021;146:111245. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1016/j.exger.2021.111245

19. Carneiro JA, Ramos GCF, Barbosa ATF, Mendonça JMG, Costa FM, Caldeira AP. Prevalência e fatores associados à fragilidade em idosos não institucionalizados. Rev. Bras. Enferm. 2016; 69(03): 435-442. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/0034-7167.2016690304i

20. Instituto Brasileiro de Geografia e Estatística. População estimada 2021 - Minas Gerais – Montes Claros. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2022 [Cited 2022 Oct. 22]. Available at: https://www.ibge.gov.br/cidades-e-estados/mg/montes-claros.html

21. Landis J, Richard KOCH, Gary G. The measurement of observer agreement for categorical data. Biometrics, 1977;33(1):159-174. [Cited 2023 Jul. 6]. Available at: https://pubmed.ncbi.nlm.nih.gov/843571/

22. Figueiredo Filho DB, Silva Júnior JA. Desvendando os Mistérios do Coeficiente de Correlação de Pearson (r). Revista Política Hoje, 2009; 18(1). [Cited 2023 Jul. 6]. Available at: https://periodicos.ufpe.br/revistas/index.php/politicahoje/article/view/3852/3156

23. Shi J, Tao Y, Chen S, Zhou Z, Meng L, Duan C, et al. Interaction between hypertension and frailty and their impact on death risk in older adults: a follow-up study. BMC Geriatr. 2024;24(1):187. [Cited 2024 Mar. 15]. Available at: https://doi.org/10.1186/s12877-024-04793-w

24. Mata FA, Pereira PP, Andrade KR, Figueiredo AC, Silva MT, Pereira MG. Prevalence of Frailty in Latin America and the Caribbean: A Systematic Review and Meta-Analysis. PLoS One. 2016;11(8):e0160019. [Cited 2023 Jul. 6]. Available at: https://10.1371/journal.pone.0160019

25. Andrade JM, Duarte YAO, Alves LC, Andrade FCD, Souza Junior PRB, Lima-Costa MF et al. Perfil da fragilidade em adultos mais velhos brasileiros: ELSI-Brasil. Rev Saude Publica. 2018;52 Supl 2:17s. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.11606/S1518-8787.2018052000616

26. Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J et al., Frailty in Older Adults: Evidence for a Phenotype. The Journals of Gerontology: Series A, 2001;56(3): M146–M157. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1093/gerona/56.3.M146

27. Oliveira PRC, Rodrigues VES, Oliveira AKL, Oliveira FGL, Rocha GA, Machado ALG. Fatores associados à fragilidade em idosos acompanhados na Atenção Primária à Saúde. Esc Anna Nery 2021;25(4):e20200355. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/2177-9465-EAN-2020-0355

28. Ma L, Zhang L, Sun F, Li Y, Tang Z. Frailty in Chinese older adults with hypertension: Prevalence, associated factors, and prediction for long-term mortality. Journal of clinical hypertension (Greenwich, Conn.), 2018;20(11): 1595–1602. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1111/jch.13405

29. Fernandes HC L, Gaspar JC, Yamashita CH, Amendola F, Alvarenga MRM, Oliveira MAC. Avaliação da fragilidade de idosos atendidos em uma unidade da estratégia saúde da família. Texto & Contexto Enfermagem, 2013;22(2): 423-431 [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/S0104-07072013000200019

30. Esteves CS, Oliveira CR, Lima MP, Valéria Gonzatti V, Irigaray TQ. Teste do Desenho do Relógio: Dados Normativos Para Idosos. Psico-USF 2022;27 (3): 477-487. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.1590/1413-82712027270306

31. Pinheiro HA, Mucio AA, Oliveira LF. Prevalência e fatores associados à síndrome da fragilidade no idoso do Distrito Federal Geriatr Gerontol Aging. 2020;14(1): 8-14. [Cited 2023 Jul. 6]. Available at: https://doi.org/10.5327/Z2447-212320201900072

32. Lourenço RA, Moreira VG, Mello RGB, Santos IS, Lin SM, Pinto ALF et al. Consenso Brasileiro de Fragilidade em Idosos: Conceitos, Epidemiologia e Instrumentos de Avaliação. Geriatr Gerontol Aging. 2018;12(2):121-35 [Cited 2023 Jul. 6]. Available at: https://cdn.publisher.gn1.link/ggaging.com/pdf/v12n2a10.pdf

33. Instituto Brasileiro de Geografia e Estatística. População estimada 2021 - Minas Gerais – Montes Claros. Rio de Janeiro: Instituto Brasileiro de Geografia e Estatística; 2022 [Cited 2024 Mar. 19]. Available at: https://agenciadenoticias.ibge.gov.br/agencia-noticias/2012-agencia-de-noticias/noticias/37089-em-2022-analfabetismo-cai-mas-continua-mais-alto-entre-idosos-pretos-e-pardos-e-no-nordeste