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Original Article

Agreement between six frailty assessment tools in Colombian seniors: SABE Colombia

Concordancia entre seis herramientas de tamización de fragilidad en personas mayores colombianas: SABE Colombia

Concordância entre seis instrumentos de triagem de fragilidade em pessoas idosas colombianas: SABE Colômbia

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ABSTRACT

Introduction. Frailty is a clinical predictor of adverse outcomes in seniors. Multiple tools have been designed to help health care personnel screen, diagnose and monitor this condition. This study evaluated the level of agreement between 6 frailty assessment tools. **Methodology.** A secondary cross-sectional survey of the SABE Colombia population-based study. The prevalence of frailty

was assessed according to 6 tools: FRAIL, Study of Osteoporotic Fractures (SOF); gait speed (GS); Short Physical Performance Battery (SPPB); Modified Frailty Index (mFI), and Clinical Frailty Scale (CFS). McNemar's test was used to compare the proportions of tool scores, and Cohen's kappa coefficient was used to assess agreement. **Results.** In the overall sample, the prevalence of frailty varied between 9.1% and 62.7%. The lowest prevalence was in FRAIL, while the highest was in gait speed. From the simultaneous assessment of 2,336 seniors, only two medium agreements were observed in the 6 tools (SOF vs GS, $\kappa=0.21$ $p<0.001$; and FRAIL vs CFS $\kappa=0.27$ $p<0.001$), as well as one moderate agreement (SOF vs SPPB, $\kappa=0.54$ $p<0.001$). **Discussion.** The variation in prevalence was expansive between the tools, and little agreement was observed between them, even those with the same focus (physical frailty, FRAIL and SOF and physical performance, GS and SPPB).



VIGILADA MINEDUCACIÓN

Author Contributions

JGS participated in conceptualization, data curation, formal analysis, methodology, visualization, writing (original draft) and review/editing. MLM participated in conceptualization, data curation, statistical analysis, methodology, visualization, writing (original draft) and review/editing. All authors reviewed and approved the submitted version.

Conclusions. This study's findings suggest that most of the studied tools actually assess different aspects of frailty and do not have a medium or moderate level of agreement.

Keywords:

Frailty; Aged; Triage; Geriatric Assessment; Comorbidity; Polypharmacy; Prevalence; Functional Status

RESUMEN

Introducción. La fragilidad es una variable clínica predictora de desenlaces adversos en las personas mayores. Se han diseñado múltiples herramientas que permiten al personal de salud hacer el cribado, diagnóstico y seguimiento de esta condición. El presente estudio evaluó la concordancia entre 6 herramientas de tamización de fragilidad. **Metodología.** Indagación de corte transversal secundario del estudio poblacional SABE Colombia. Se evaluó la prevalencia de fragilidad según 6 herramientas: FRAIL, Estudio de Fracturas Osteoporóticas (SOF); velocidad de la marcha (VM); Bateria Corta de Desempeño Físico (SPPB); Índice de Fragilidad Modificado (mFI), y Escala Clínica de Fragilidad (CFS). Se utilizó el test de McNemar para comparar las proporciones de los resultados de las herramientas y el coeficiente de kappa de Cohen para evaluar la concordancia. **Resultados.** En la muestra total la prevalencia de fragilidad varió entre 9.1% y 62.7%, siendo la más baja evaluada por FRAIL, y la más elevada por velocidad de la marcha. En 2,336 personas mayores que se evaluaron simultáneamente, en las 6 herramientas se observaron solamente dos concordancias medianas (SOF vs VM, $\kappa=0.21$ $p<0.001$; y FRAIL vs CFS $\kappa=0.27$ $p<0.001$) y una concordancia moderada (SOF vs SPPB, $\kappa=0.54$ $p<0.001$). **Discusión.** La variación de prevalencia fue amplia entre las herramientas y se observó pocas concordancias entre las herramientas, incluso entre las que tienen el mismo enfoque (fragilidad física, FRAIL y SOF y desempeño físico, VM y SPPB). **Conclusiones.** Los hallazgos del presente estudio sugieren que la mayoría de las herramientas estudiadas en realidad evalúan diferentes aspectos de fragilidad y no tienen mediana o moderada concordancia.

Palabras clave:

Fragilidad; Adulto Mayor; Triage; Evaluación geriátrica; Comorbilidad; Polifarmacia; Prevalencia; Estado Funcional.

RESUMO

Introdução. A fragilidade é uma variável clínica que prediz desfechos adversos em pessoas idosas. Diversas ferramentas foram desenvolvidas para permitir que os profissionais de saúde realizem o rastreamento, o diagnóstico e o acompanhamento dessa condição. Este estudo avaliou a concordância entre seis ferramentas de triagem de fragilidade. **Metodologia.** Estudo transversal secundário do estudo populacional SABE Colômbia. A prevalência de fragilidade foi avaliada por meio de seis instrumentos: FRAIL, Estudo de Fraturas Osteoporóticas (SOF); velocidade da marcha (VM); Bateria Curta de Desempenho Físico (SPPB); Índice de Fragilidade Modificado (mFI); e Escala Clínica de Fragilidade (CFS). O teste de McNemar foi utilizado para comparar as proporções dos resultados dos instrumentos, e o coeficiente kappa de Cohen foi utilizado para avaliar a concordância. **Resultados.** Na amostra total, a prevalência de fragilidade variou entre 9.1% e 62.7%, sendo a mais baixa avaliada pelo FRAIL e a mais elevada pela velocidade da marcha. Em 2.336 idosos avaliados simultaneamente, foram observadas apenas duas concordâncias médias entre os seis instrumentos (SOF vs. VM, $\kappa = 0.21$ $p < 0.001$; e FRAIL vs. CFS, $\kappa = 0.27$ $p < 0.001$) e uma concordância moderada (SOF vs. SPPB, $\kappa = 0.54$ $p < 0.001$). **Discussão.** A variação de prevalência foi ampla entre os instrumentos, e observaram-se poucas concordâncias entre eles, mesmo entre aqueles com o mesmo foco (fragilidade física, FRAIL e SOF, e desempenho físico, VM e SPPB). **Conclusões.** Os resultados do presente estudo sugerem que a maioria dos instrumentos estudados avalia, de fato, diferentes aspectos da fragilidade e não apresenta concordância moderada ou moderada.

Palavras-chave:

Fragilidade; Idoso; Triagem; Avaliação Geriátrica; Comorbidade; Polimedicação; Prevalência; Estado Funcional

Introduction

Frailty has been established as a fundamental pillar within comprehensive geriatric assessments, as it helps identify an individual's vulnerability (1). It is one of the most useful elements both for research and for defining therapeutic plans, interventions, health planning and resource allocation (2), relegating chronological age to

second place as a prognostic predictor.(3). In addition, assessing it is strategically relevant in the field of public health because it offers valuable tools for designing preventive programs and organizing services aimed at promoting health (4). The underlying pathophysiology of frailty is complex and multifactorial, involving various systemic levels and specific components, as detailed in Table 1.

Table 1. Pathophysiological levels of the frailty syndrome

Pathophysiological level	Components	Functional description
Molecular and cellular level	Mitochondrial dysfunction Oxidative stress DNA damage Telomere shortening Maladaptive DNA methylation	Cellular alterations that compromise the body's capacity for maintenance and repair
Systemic level	Chronic low-grade inflammation Energy imbalance Anabolic deficiency Neurodegeneration	General physiological changes that alter homeostasis, muscle mass, immune and neurological response.
Clinical-functional level	Reduced mobility Cognitive impairment Loss of independence	Observable phenotypic expressions of frailty that affect autonomy and quality of life

Source: prepared by the authors

Multiple tools have been designed for their operation, which has made it difficult to compare prevalence, clinical trial results and clinical decisions (5). An additional challenge lies in the divergent definitions, different measures and cut-off points used by each instrument. Many of them are not practical for community settings (6). This may generate inaccurate information about who requires specialized care in specific domains and create variations in the clinical interpretation of pathophysiological processes associated with frailty (7).

The prevalence of frailty on a global level varies widely depending on the instrument used to measure it, as well as the region that is assessed (8). It can range from 3.9% to 59.4% for frailty, and from 13.4% to 71.6% for pre-frailty (9). This condition shows a direct association with age, with a marked increase after 75 years of age (10).

Moreover, the overall incidence has been estimated at 43.4 cases of frailty and 150.6 cases of pre-frailty per 1,000 people per year, and it is higher in women (11).

In Colombia, evidence with respect to frailty in the senior population in the community is still limited (12,13). Recently, a study in five cities in the country, based on the FRAIL scale, reported a prevalence of 9.6% frailty and 60.8% pre-frailty (14). However, when assessed by Fried's criteria, the prevalence was 17.9% for frailty and 63.3% for pre-frailty (15). To date, no national studies have been published that simultaneously compare multiple validated tools for frailty assessments in a community setting.

The objective of this study was to identify frailty using different assessment tools: FRAIL, Study of Osteoporotic Fractures (SOF), gait speed (GS), Short Physical Performance Battery (SPPB), Modified Frailty Index (mFI) and Clinical Frailty Scale (CFS) and to assess the agreement between the results obtained from frailty assessments in the Colombian population.

Methodology

Population/Study Design

This study is a cross-sectional analytical study based on secondary data from the SABE Colombia study, which is part of the National System of Population Studies and Surveys for Health. This was the first study exclusively for seniors in Colombia residing in homes (not in institutions), which was conducted between 2014 and 2015. The methods used, statistical sampling, data quality control and response rate have been previously published and are available at <https://www.minsalud.gov.co/salud/publica/epidemiologia/Paginas/Estudios-y-encuestas.aspx> (16-19).

The SABE Colombia participants were selected following a multistage probability sampling design, in order to achieve a representative sample of Colombian seniors. The total sample size was 23,694 people (18). Persons aged 60 years or older who were able to communicate with the research team, and who provided written informed consent, were included. Those with a total score of less than 13 on the Minimental test were excluded (20). All participants were interviewed, and their responses were recorded on tablets, while printed versions of the survey were applied and then digitized in some circumstances due to insecurity and lack of access to the internet to upload the surveys. All data were collected and managed using a database program designed specifically for SABE Colombia (Synkron, folder synchronization) (16-19).

A proprietary database was created with the variables needed to apply the 6 frailty assessment tools: 2 tools that assess physical frailty - FRAIL (10) and SOF (11); 2 tools that measure physical performance - GS (12) and SPPB (13); 1 tool that assesses cumulative deficit - mFI (14) and the last one, which is a tool based on clinical judgment - CFS (15). Individuals who failed to begin or complete the different objective tests, such as the chair test (the main

cause of exclusion in this study) and gait speed, were excluded. A total of 4,704 elderly persons were excluded from analysis with the FRAIL scale because of the absence of data on some of the required variables or because their answers corresponded to the categories “do not know” or “no answer.” 19,650 individuals were excluded from the SOF scale because they did not attempt the chair test, did not complete it, or had inconsistent values. In the case of the Clinical Frailty Scale (CFS), 7,878 participants were excluded because of missing information on one or more of the considered variables. With respect to the Modified Frailty Index (mFI), 309 individuals were excluded for similar reasons.

For the gait speed test, 2,058 records corresponding to participants who did not attempt the exercise, did not complete it or presented inconsistent data were eliminated. Finally, 19,326 people were excluded from the Short Physical Performance Battery (SPPB) because they had not completed one or more of the three tests that comprise it or because of invalid data in those assessments.

SABE Colombia has prior approval from the Institutional Human Ethics Review Committee of the Faculty of Health of Universidad del Valle (minutes No. 09-014 and 011-015) and from the Bioethics Committee of Universidad de Caldas (code CBCS-021-14). In addition, this study was approved by the Ethics Committee of the Faculty of Medicine of Universidad Nacional (minutes No. 004, B.FM. 1002-CE-0047-23).

Data Analysis

Characterization variables are presented as means and standard deviations, or as a proportions of their percentage. The frequency of frailty was calculated for each tool that was studied. In order to evaluate the degree of correlation and agreement between the results of the tools, they were categorized as dichotomous, into frail and not frail. In addition, when the tool presented the possibility of classification as pre-frailty, this category was grouped as not frail. For the agreement assessment, only people who presented complete data for the application of the 6 tools concomitantly were included. McNemar's test was used to compare proportions of tool scores and Cohen's kappa coefficient was used to assess agreement, interpreting kappa values up to 0.20 agreement as insignificant, 0.21-0.40 agreement as medium, 0.41-0.60 agreement as moderate, and >0.60 agreement as substantial. All analyses were performed with Statistical Package for Social Sciences® (SPSS) version 25. Amounts where $P < 0.05$ were considered statistically significant.

Results

A total of 23,694 data of seniors were analyzed and distributed in different subsamples according to the studied tools. Of these, 2,336 people submitted complete data for the application of the 6 tools concomitantly (Figure 1).

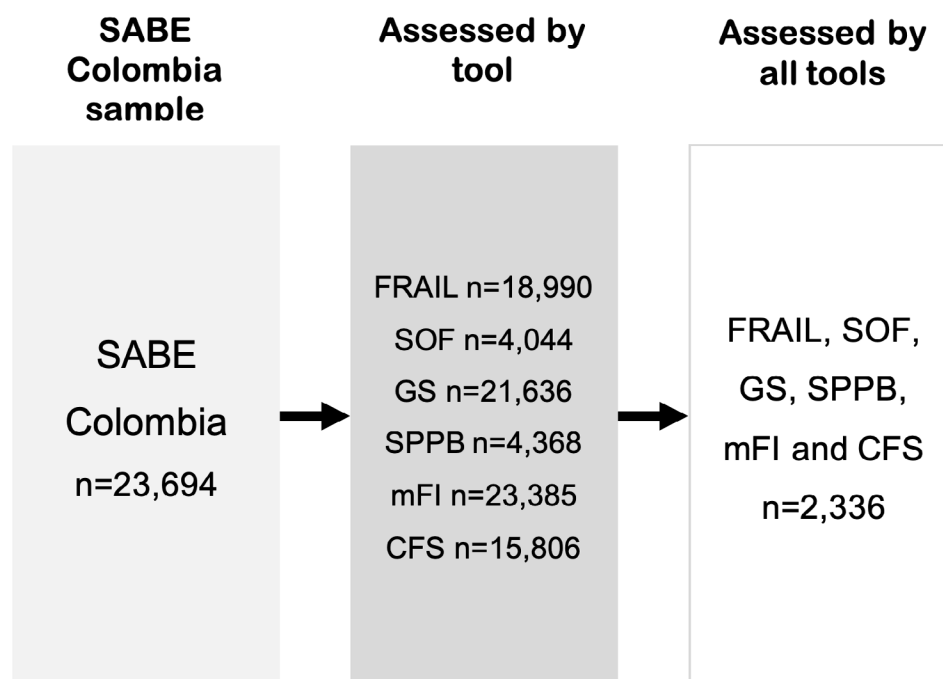


Figure 1. Sample and subsamples of seniors assessed by different frailty assessment tools

Source: prepared by authors

The sociodemographic and health characteristics of the frail population identified with the 6 studied frailty assessment tools are presented in Table 2. By any of the measures of frailty that were used, the population was

mainly female, from socioeconomic strata 1 and 2, with a low level of education. The most frequent chronic diseases among the frail population were high blood pressure, dyslipidemia and diabetes mellitus.

Table 2. Sociodemographic and health characteristics of the frail population identified according to 6 frailty assessment tools

Characteristics	FRAIL n= 1722	SOF n = 1713	GS n= 13570	SPPB n = 1863	mFI n = 9776	CFS n = 5312
Age	73.1(8.2)	70.1 (7.0)	71.0 (7.9)	72.0 (7.6)	71.4 (7.3)	76.7 (9.0)
Gender						
Female	1275 (63.5)	1082 (63.2)	4819(35.0)	1245 (66.8)	3241(33.2)	3254 (61.3)
Stratum						
1	719 (41.8)	575 (33.6)	6142(42.3)	650(34.9)	3763(38.4)	2333 (43.9)
2	660 (38.3)	741 (43.3)	5139(37.9)	795 (42.7)	3931(40.2)	1970 (37.1)
3	280 (16.3)	340(19.8)	1924(14.17)	359 (19.3)	1746(17.8)	844(15.9)
4	52 (3.0)	43(2.5)	287(2.1)	49 (2.6)	268(2.7)	140(2.6)
5	11 (0.6)	14 (0.8)	78(0.57)	10 (0.5)	68(0.69)	25 (0.5)
Live alone	2201 (9.3)	170 (9.9)	1201 (8.9)	163 (8.7)	816 (8.3)	276 (5.2)
Level of education						
None	330 (19.2)	226 (13.2)	3384 (24.9)	348 (18.7)	2143 (21.9)	1622 (30.5)
Elementary incomplete	784 (45.5)	745 (43.5)	5791 (42.7)	821 (44.1)	4068 (41.6)	2210 (41.6)
Elementary completed	311 (18.1)	329 (19.2)	2163 (15.9)	335 (18.0)	1622 (16.6)	782 (14.7)
Secondary incomplete	171 (9.9)	218 (12.7)	1186 (8.7)	190 (10.2)	967 (9.9)	362 (6.8)
Secondary completed	55(3.2)	90(5.3)	460 (3.4)	72 (3.9)	397 (4.1)	145(2.7)
Others (technical, technologist university, postgraduate)	67 (3.9)	9 8 (5.2)	534 (3.6)	89 (5.2)	531 (5.5)	140 (2.7)
Marital status						
Married	607 (35.2)	678 (39.6)	4716(3.7)	700 (37.6)	3430(35.0)	1714 (32.3)
Common law marriage	213 (12.4)	234 (13.7)	2033(15.0)	217 (11.6)	1284(13.1)	625 (11.8)
Divorced	177 (10.3)	207 (12.1)	1479(10.9)	202 (10.8)	1049(10.7)	403 (7.6)
Widowed	553 (32.1)	415 (24.2)	3857(28.5)	535 (28.7)	2978(30.)	1988 (37.4)
Single	171 (9.9)	179 (10.4)	1481(11.0)	209 (11.2)	1031(10.5)	580 (10.9)
SAH	1275 (74.0)	975 (56.9)	7813 (57.6)	1105 (59.3)	8288 (84.7)	3426 (64.5)
Diabetes	551 (32.0)	295 (17.2)	2414 (17.8)	344 (18.5)	3313(33.88)	1048 (19.7)
Cancer	131 (7.6)	93 (5.4)	597 (4.4)	94 (5.0)	577 (5.9)	303 (5.7)
Pulmonary disease	407 (23.6)	175 (10.2)	1496 (11.0)	200 (10.7)	1979 (20.2)	861 (16.2)

AMI	524 (30.4)	229 (13.4)	1988 (14.6)	275 (14.8)	2905(29.11)	1049 (19.7)
CVA	183 (10.6)	54 (3.2)	632 (4.7)	79 (4.2)	968(9.70)	504 (9.5)
Arthritis	978 (56.7)	519 (30.3)	3887 (28.6)	564 (30.3)	3574(36.6)	1679 (31.6)
Osteoporosis	551(32.0)	216 (12.6)	6339 (46.7)	255 (13.7)	2199 (22.4)	869 (16.4)
Cholesterol	1044 (60.6)	866 (50.6)	6339 (46.7)	923 (49.5)	5852 (59.9)	2463 (46.4)
Triglycerides	836 (48.5)	663 (38.7)	4793 (35.3)	713 (38.3)	4690 (48.0)	1865 (35.1)
Mental illness	309 (17.9)	149(8.7)	1274 (9.4)	183 (9.8)	1256 (12.8)	681 (12.8)

SAH: systemic arterial hypertension; AMI: acute myocardial infarction; CVA: ischemic cerebrovascular attack.

Source: prepared by the authors

A variable prevalence of frailty was identified according to the tool that was used. A higher prevalence was observed using GS, which is a tool that assesses physical

performance. Meanwhile, a lower prevalence was observed using FRAIL, which assesses physical frailty (Figure 2).

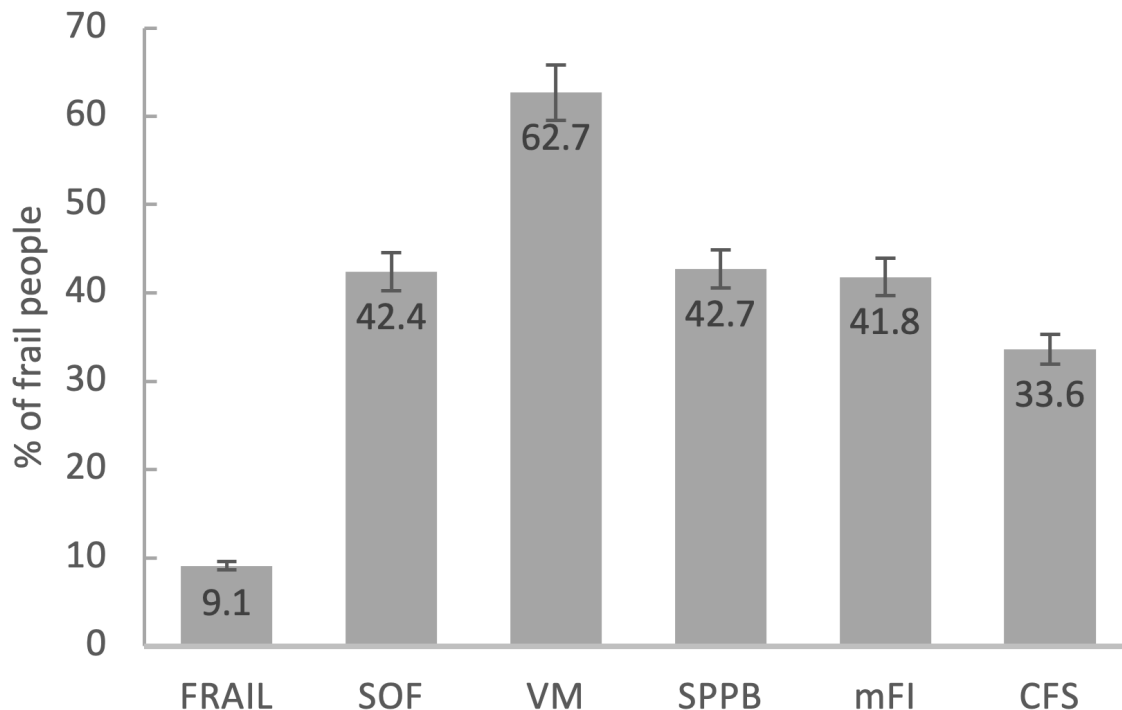


Figure 2. Prevalences of frailty (95% confidence interval) assessed by the 6 studied tools

SOF: Study of osteoporotic fractures; GS: gait speed; SPPB: Short physical performance battery; mFI: modified frailty index; CFS: Clinical frailty scale.

Source: prepared by authors

Two medium agreements were observed (SOF vs GS, $\kappa=0.21$ $p<0.001$; and FRAIL vs CFS $\kappa=0.27$ $p<0.001$), as well as one moderate agreement (SOF vs SPPB,

$\kappa=0.54$ $p<0.001$) between the evaluated tools (Figure 3 and Table 3).

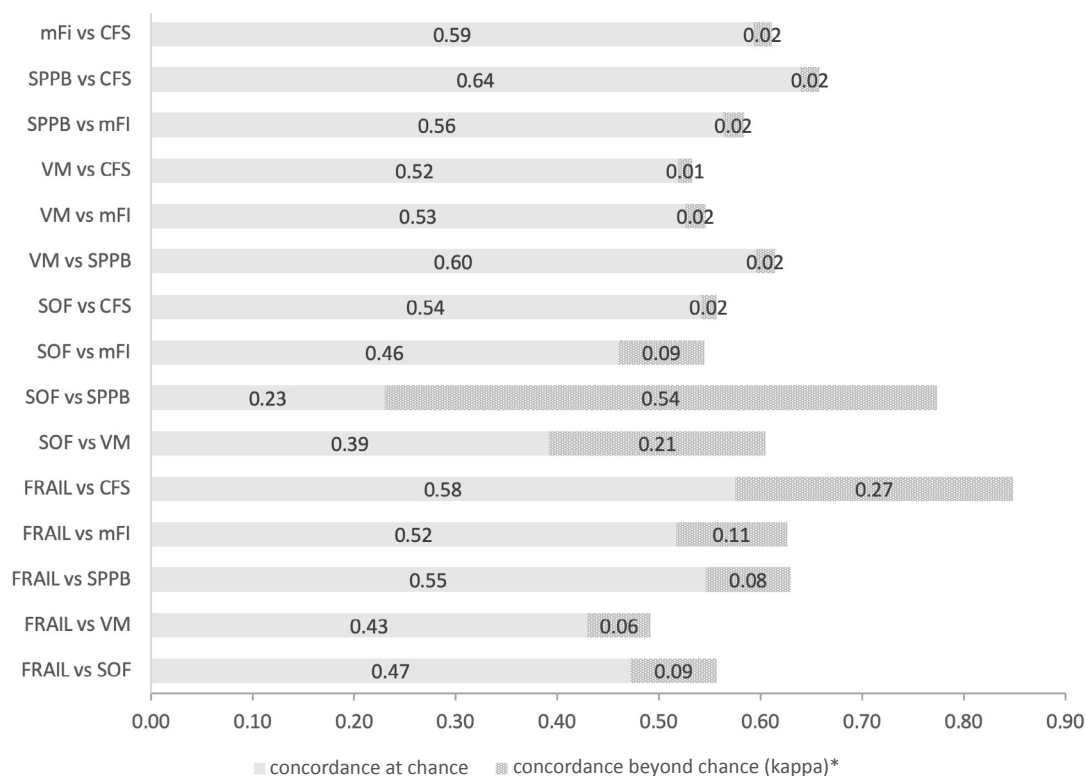


Figure 3. Cohen's kappa coefficient to assess agreement between 6 frailty assessment tools (n = 2,336).
*All kappa coefficients presented $p < 0.001$. vs: versus, SOF: Study of osteoporotic fractures; GS: gait speed; SPPB: Short physical performance battery; mFI: modified frailty index; CFS: Clinical frailty scale.
Source: prepared by authors

Table 3. Agreement between 6 frailty assessment tools (n=2,336)

Tools	SOF		GS		SPPB		mFI		CFS	
	Not frail	Frail	Not frail	Frail	Not frail	Frail	Not frail	Frail	Not frail	Frail
FRAIL										
Not frail	1197	1018	1044	1171	1386	829	1360	855	1894	321
Frail	15	106	16	105	34	87	18	103	33	88
McNemar	< 0.001		< 0.001		< 0.001		< 0.001		< 0.001	
SOF										
Not frail			675	537	1052	160	764	448	1052	160
Frail			385	739	368	756	614	510	875	249
McNemar			< 0.001		< 0.001		< 0.001		< 0.001	
GS										
Not frail					789	271	688	372	948	112

Frail	631	645	690	586	979	297
McNemar	< 0.001		< 0.001		< 0.001	
SPPB						
Not frail			913	507	1274	146
Frail			465	451	653	263
McNemar			< 0.001		< 0.001	
mFI						
Not frail					1198	180
Frail					729	229
McNemar					< 0.001	

McNemar: McNemar test.

Source: prepared by the authors

Discussion

The main findings of this study were the medium and moderate agreements between tools measuring physical frailty (FRAIL and SOF) with tools assessing physical performance (GS and SPPB), as well as the judgment-based tool (CFS). It is important to highlight that there was also a lack of agreement between tools that have the same focus, such as FRAIL and SOF (which measure physical frailty) and GS and SPPB (which measure physical performance).

SOF presented agreement with the two tools that measure physical performance (SOF vs GS, $\kappa=0.21$ $p<0.001$; SOF and SPPB ($\kappa=0.54$ $p<0.001$). Physical performance is a central aspect of physical frailty, as measured by SOF (21), reason why these results indicate that this tool fulfills (with medium and moderate agreement) the objective of assessing this aspect in Colombian seniors. Frailty, as determined by SOF, is associated with risk of falls, fractures and mortality, and it is a valid tool for the community setting (21,22).

In the overall sample, SOF and SPPB presented the closest prevalence of frailty (42.4% and 42.7%, respectively), while GS had the highest observed prevalence (62.7%). Although GS is associated with physical frailty and adverse outcomes (23), it is likely that it generates an overestimation of frailty because GS is the only objective measurement. On the other hand, the other studied

tools have at least 3 evaluation components, which allow analyzing other relevant aspects in identifying this syndrome.

FRAIL also measures physical frailty, but unlike the SOF, it does not have any measure of physical performance among its evaluation components. It is based solely on referral data. This tool presented medium agreement with the CFS ($\kappa=0.27$ $p<0.001$), which is a tool based on clinical judgment. Although they consist of different assessment components, both are tools composed of subjective assessments of functional status (21). In a multicenter study conducted in 5 European countries, medium agreement between FRAIL and CFS in seniors in primary care was also observed ($\kappa=0.40$, $p<0.05$) (24).

It is worth noting the lack of agreement between tools with the same focus, such as FRAIL and SOF (which measure physical frailty), GS and SPPB (which measure physical performance), as well as the lack of agreement between the cumulative deficit tool mFI and all the evaluated tools and between the judgment-based tool CFS and the physical performance tools GS and SPPB. In disagreement with this finding, Oviedo-Briones et al. (24) observed medium agreement between mFI and CFS in seniors in primary care ($\kappa=0.23$, $p<0.05$) (24).

The study by Ocampo-Chaparro et al. (15) evaluated physical frailty using Fried's phenotype as a tool based on data from SABE Colombia (15) and found a prevalence

of 17.9%. This diverges from the prevalences observed in this study, in which, after applying 5 tools, the observed prevalences were higher. The only tool with a lower prevalence than that of Ocampo-Chaparro et al. was FRAIL (9.1%). This can be explained by the fact that FRAIL originally classified its results into not frail, pre-frailty and frail. By dichotomizing its results, pre-frailty persons, representing 87.4% (n=16,611), were categorized as not frail, which may contribute to underestimating the prevalence. The prevalence with FRAIL in the present study is similar to that which Oviedo-Briones et al. found, at 8.7% in primary care (24).

There was a higher prevalence of frailty in the female population across most tools. The average for FRAIL was 63.5%, SOF 63.2%, CFS 61.3%, and SPPB 66.8%, which is consistent with the global literature, identifying female gender as a key factor influencing not only the aging trajectory but also the course of frailty (23). This difference can be explained both by a more constant and progressive decrease in lean body mass and muscle strength in women (24), as well as by a longer life expectancy (15). Only two tools, mFI and GS, showed greater frailty in the male population, which differs from the global literature if we consider that the former tool corresponds to a multidomain scale and the latter to an objective test. This leads us to think that the considerable number of eliminated data explains these differences and that the low female representation in the case of gait speed is due to an inability to perform the test, which would place the majority of older Colombian women in the frail population group.

A higher prevalence of frailty was found in strata 1, 2 and 3 for the different tools evaluated. It has already been shown in systematic reviews that poverty has direct and indirect effects on the level of frailty (25), and this association can be explained by the serious consequences that a poor economic situation has on an individual's health and well-being and on the way they age in general (26). In addition, completed secondary education and higher education are the most infrequent levels of education among the frail population, which coincides with previous descriptions. They have identified the influence of level of education on social vulnerability, physical frailty, poor health status and lower long-term survival (27,28).

A high coexistence of frailty and chronic diseases was found. High blood pressure was the most frequent, followed by dyslipidemia, arthritis and diabetes mellitus, with a significant coexistence of frailty and mental illness. A meta-analysis showed a prevalence of multimorbidity of 72% in frail individuals and a prevalence of frailty 16% among multimorbid individuals, suggesting a bidirectional association (29).

As a recommendation, frailty is considered a syndrome that deserves systematic detection through the different available tools (1), perhaps requiring recalibration of both the cut-off level and the relative weight assigned to each variable in each scale to avoid producing biased estimates.

Conclusions

There is medium to moderate agreement between the SOF physical frailty tool and the physical performance tools (GS and SPPB), and medium agreement between the FRAIL physical frailty tool and the CFS judgment-based tool. However, there is no agreement between the mFI cumulative deficit tool and any of the studied tools, nor between the physical performance tools and the CFS judgment-based tool, reason why they cannot replace each other.

Conflicts of interest

The authors declare that they have no conflicts of interest.

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References

1. Kim DH, Rockwood K. Frailty in Older Adults. *N Engl J Med* [Internet]. 2024;391(6):538-48. doi: <https://doi.org/10.1056/NEJMra2301292>
2. Howlett SE, Rutenber AD, Rockwood K. The degree of frailty as a translational measure of health in aging. *Nat Aging* [Internet]. 2021;1(8):651-65. doi: <https://doi.org/10.1038/s43587-021-00099-3>
3. Salignon J, Rizzuto D, Calderón-Larrañaga A, Zucchelli A, Fratiglioni L, Riedel CG, et al. Beyond Chronological Age: A Multidimensional Approach to Survival Prediction in Older Adults. *The Journals of Gerontology* [Internet]. 2023;78(1):158-66. doi: <https://doi.org/10.1093/gerona/glac186>
4. Gilardi F, Capanna A, Ferraro M, Scarcella P, Marazzi MC, Palombi L, et al. Frailty screening and assessment tools: a review of characteristics and use in Public Health. *Ann Ig* [Internet]. 2018;30(2):128-39. doi: <https://doi.org/10.7416/ai.2018.2204>
5. Faller JW, do Nascimento-Pereira D, de Souza S, Nampo FK, de Souza Orlandi F, Matumoto S. Instruments for the detection of frailty syndrome in older adults: A systematic review. *PLoS ONE* [Internet]. 2019;14(4):e026166. doi: <https://doi.org/10.1371/journal.pone.0216166>

6. Sison SDM, Shi SM, Kim KM, Steinberg N, Jeong S, McCarthy EP, et al. A Crosswalk of Commonly Used Frailty Scales. *J Am Geriatr Soc* [Internet]. 2023;71(10):3189-98. doi: <https://doi.org/10.1111/jgs.18453>
7. Junius-Walker U, Onder G, Soleymani D, Wiese B, Albaina O, Bernabei R, et al. The essence of frailty: A systematic review and qualitative synthesis on frailty concepts and definitions. *Eur J Intern Med* [Internet]. 2018;56:3-10. doi: <https://doi.org/10.1016/j.ejim.2018.04.023>
8. Strandberg TE, Nieminen T. Future Perspectives on the Role of Frailty in Cardiovascular Diseases. *Adv Exp Med Biol* [Internet]. 2020;149:152. doi: https://doi.org/10.1007/978-3-030-33330-0_14
9. Boucham M, Salhi A, El-Hajji N, Gbenonsi GY, Belyamani L, Khalis M. Factors associated with frailty in older people: an umbrella review. *BMC Geriatr* [Internet]. 2024;24:737. doi: <https://doi.org/10.1186/s12877-024-05288-4>
10. To TL, Doan TN, Ho WC, Liao WC. Prevalence of Frailty among Community-Dwelling Older Adults in Asian Countries: A Systematic Review and Meta-Analysis. *Healthcare* [Internet]. 2022;10(5):895. doi: <https://doi.org/10.3390/healthcare10050895>
11. Ofori-Asenso R, Chin KL, Mazidi M, Zomer E, Ilomaki J, Zullo AR, et al. Global Incidence of Frailty and Prefrailty Among Community-Dwelling Older Adults: A Systematic Review and Meta-analysis. *JAMA Netw Open* [Internet]. 2019;2(8):e198398. doi: <https://doi.org/10.1001/jamanetworkopen.2019.8398>
12. Gómez-Montes JF, Curcio-Borrero CL, Henao GM. Fragilidad en ancianos colombianos. *Rev Médica Sanitas* [Internet]. 2012;15(4):8-16. Available from: <https://revistas.unisanitas.edu.co/index.php/rms/article/view/445>
13. Ramírez-Ramírez JU, Cadena-Sanabria MO, Ochoa ME. Aplicación de la Escala de fragilidad de Edmonton en población colombiana. Comparación con los criterios de Fried. *Rev Esp Geriatr Gerontol* [Internet]. 2017;52(6):322-5. doi: <https://doi.org/10.1016/j.regg.2017.04.001>
14. Arboleda VH, Muñoz-Rodríguez DI, Segura A, Segura-Cardona A, Robledo-Marín CA, Cardona D, et al. Perfil de fragilidad en personas mayores, de cinco ciudades de Colombia, 2021. *Medicina UPB* [Internet]. 2025;44(1):21-30. doi: <https://doi.org/10.18566/medupb.v44n1.a03>
15. Ocampo-Chaparro JM, Reyes-Ortiz CA, Castro-Flórez X, Gómez F. Frailty in older adults and their association with social determinants of Health. The SABE Colombia Study. *Colomb Med* [Internet]. 2019;50(2):89-101. doi: <https://doi.org/10.25100/cm.v50i2.4121>
16. Ministerio de Salud y Protección Social de Colombia. Documento metodológico Encuesta Nacional de Salud, Bienestar y Envejecimiento SABE Colombia [Internet]. Bogotá; Minsalud: 2018. Available from: <https://www.minsalud.gov.co/sites/rid/Lists/BibliotecaDigital/RIDE/VS/ED/GCFI/doc-metodologia-sabe.pdf>
17. Ministerio de Salud y Protección Social de Colombia - Departamento Administrativo de Ciencia Tecnología e Innovación, COLCIENCIAS. Universidad del Valle y Universidad de Caldas. SABE Colombia: Situación de Salud, Bienestar y Envejecimiento en Colombia. 2016. Available from: <https://www.minsalud.gov.co/salud/publica/epidemiologia/paginas/estudios-y-encuestas.aspx>
18. Ortega-Lenis D, Mendez F. Survey on Health, Well-being and Aging. SABE Colombia 2015: Technical report. *Colomb Med* [Internet]. 2019;50(2):128-138. doi: <https://doi.org/10.25100/cm.v50i2.4557>
19. Gómez F, Corchuelo J, Curcio CL, Calzada MT, Mendez F. SABE Colombia: Survey on Health, Well-Being, and Aging in Colombia - Study Design and Protocol. *Curr Gerontol Geriatr Res* [Internet]. 2016;7910205. doi: <https://doi.org/10.1155/2016/7910205>
20. Rosselli D, Ardila A, Pradilla-Ardila G, Morillo L, Bautista L, Rey O, et al. The mini-mental state examination as a diagnostic selection test for dementia: a colombian population study. *Rev Neurol* [Internet]. 2000;30(5):428-432. doi: <https://doi.org/10.33588/rn.3005.99125>
21. Ensrud KE, Ewing SK, Taylor BC, Fink HA, Stone KL, Cauley JA, et al. Frailty and Risk of Falls, Fracture, and Mortality in Older Women: The Study of Osteoporotic Fractures. *The Journals of Gerontology* [Internet]. 2007;62(7):744-51. doi: <https://doi.org/10.1093/gerona/62.7.744>
22. Binotto MA, Lenardt MH, Rodríguez-Martínez MDC. Physical frailty and gait speed in community elderly: a systematic review. *Rev Esc Enferm USP* [Internet]. 2018;52:e03392. doi: <https://doi.org/10.1590/s1980-220x2017028703392>
23. Oviedo-Briones M, Rodríguez-Laso Á, Carnicero JA, Cesari M, Grodzicki T, Gryglewska B, et al. A Comparison of Frailty Assessment Instruments in Different Clinical and Social Care Settings: The Frailtools Project. *J Am Med Dir Assoc* [Internet]. 2021;22(3):607.e7-607.e12. doi: <https://doi.org/10.1016/j.jamda.2020.09.024>
24. Youn HM, Lee HJ, Lee DW, Park EC. The impact of poverty transitions on frailty among older adults in South Korea: findings from the Korean longitudinal study of ageing. *BMC Geriatr* [Internet]. 2020;20:139. doi: <https://doi.org/10.1186/s12877-020-01522-x>
25. Takatori K, Matsumoto D. Social factors associated with reversing frailty progression in community-dwelling late-stage elderly people: An observational study. *PLoS One* [Internet]. 2021;16(3):e0247296. doi: <https://doi.org/10.1371/journal.pone.0247296>

26. Jia B, Wang Z, Zhang T, Yue X, Zhang S. Prevalence of social frailty and risk factors among community-dwelling older adults: A systematic review and meta-analysis. *Arch Gerontol Geriatr* [Internet]. 2024;123:105419. doi: <https://doi.org/10.1016/j.archger.2024.105419>
27. Dou X, Yao L, Xu H, Yan R, Dai N, He Q. Association between physical frailty and social support in community-dwelling older adults: A systematic review. *Arch Gerontol Geriatr* [Internet]. 2025;133:105826. doi: <https://doi.org/10.1016/j.archger.2025.105826>
28. Umegaki H. Frailty, multimorbidity, and polypharmacy: Proposal of the new concept of the geriatric triangle. *Geriatr Gerontol Int* [Internet]. 2025;25(5):657-62. doi: <https://doi.org/10.1111/ggi.70046>
29. Van-Iersel MB, Olde-Rikkert MGM. Frailty Criteria Give Heterogeneous Results When Applied in Clinical Practice. *J Am Geriatr Soc* [Internet]. 2006;54(4):728-9. doi: https://doi.org/10.1111/j.1532-5415.2006.00668_14.x