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Article

# Short Physical Performance Battery Psychometric Properties and Factor Structure in Institutionalized Spanish Older Adults

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**Abstract:** Background: In order to be used safely, accurately and reliably, measuring instruments in the health field must first be validated. The Short Physical Performance Battery (SPPB) tool is a widely used clinical assessment test that has been approved for usage across many nations, languages and demographics. Finding SPPB's psychometric properties for a sample of institutionalised older individuals was the aim of this research. Methods: Multicenter study of the psychometric properties of the Short Physical Performance Battery tool with a convenience sample of 194 institutionalized older adults. Reliability (internal consistency), validity (construct validity and convergent validity) tests were performed. Results: The results show a very good internal consistency, construct validity and convergent validity. In addition, the factorial structure of the SPPB is provided, which reflects that it is a unidimensional scale. Conclusions: In conclusion, the Short Physical Performance Battery is a valid and reliable tool for use with institutionalized older adults. Its use is recommended as part of the Comprehensive Geriatric Assessment for the evaluation of the physical or functional sphere. This study was not registered.

**Keywords:** Short Physical Performance Battery; comprehensive geriatric assessment; older adults; institutionalization; psychometric properties

## 1. Introduction

Comprehensive Geriatric Assessment (CGA) is a widely used tool that enables the detection of risk factors and provides a comprehensive assessment of older people in an integrated manner. It consists of four main sections: clinical, physical, mental, and social. Different and varied evaluation tools are used to provide a reliable measure of all parameters in a common language [1]. Among the data that are normally collected by the professionals of the elderly care centers through the VGI, and framed in the functional section, those referring to physical functioning stand out.

The physical performance of older people is closely related to the concepts of frailty, comorbidity, and sarcopenia. Physical performance tests are strongly associated with the onset of functional dependence; therefore, their use is advised to develop a risk assessment strategy that could identify subgroups of older people, independent in activities of daily living (ADL), who are at higher risk of functional dependence [2].

Within the lines of the European Innovation Partnership on aging, the prevention and early diagnosis of functional and cognitive impairment with interventions aimed at frailty is defined as a main line. In addition, the Framework Programme for Research and Innovation 2014-2020 (Horizon

2020) includes 6 sub-programmes on. The Innovative Medicines Initiative 2013 also plans the "development of innovative therapeutic interventions for physical frailty and sarcopenia, as a prototype geriatric indication" [3].

In the 1990s, the World Health Organization referred to active aging, which is defined as: "the process of optimizing opportunities for health, participation and security with the aim of improving quality of life as people age [3]. Thus, maintaining autonomy and independence throughout the years are primary objectives.

The Consensus Document on Frailty and Falls in Older People establishes inactivity as the most relevant frailty risk factor [3] and proposes the SPPB instrument as a screening tool for frailty and fall risk among older people.

Older adults who are frail may progress toward dependence and disability; this process follows a pattern beginning with impairment of mobility and flexibility, which subsequently progresses to difficulties in performing daily activities and eventually prevents the proper performance of basic activities of daily living.

Several simple tests of physical performance were strongly associated with the occurrence of functional dependence. These results support the potential use of physical performance tests to develop a risk assessment strategy that could identify subgroups of older people, independent in all activities of daily living (ADLs), who are at increased risk for functional dependence [2]. The SPPB is a standardized physical performance assessment instrument that is specifically designed to predict disability and is also capable of predicting adverse events, dependency, institutionalization, and mortality.

Other studies have confirmed its usefulness as a screening tool to detect the frailty syndrome in community-dwelling older adults [4–7]. However, a systematic review [8], determined that, although it is a reliable and valid tool for physical performance in older adults over 60 years old, it has limited scope and is more appropriate for frail older adults who can walk and are cognitively capable of following instructions. Additionally, it is not particularly sensitive to change, so it is a useful instant screening tool, but its usefulness is limited for long-term follow-up.

The psychometric characteristics of the scale have been studied in different places and populations, obtaining good results. There is scientific evidence of its validity [9,10]; reference values were established according to sex and 3 age groups (between 70 and 75, between 76 and 80, and over 80). The SPPB proved to be a valid and reliable tool in the assessment of physical fitness in Colombian older adults [11,12]; Norwegians [13,14], Brazilians [7] and Canadians [15]; in different pathologies such as cardiac [10,16], asthma [17], chronic obstructive pulmonary disease [18]; chronic kidney disease [19], multiple sclerosis<sup>20</sup>, among others; and in different contexts, especially in the hospital environment [10,21] y community [4,5]; however, studies in institutionalised older adults are not as common [22].

The SPPB scale has been found to be a useful tool for the assessment of lower extremity functioning in older adults and is a good predictor for numerous health outcomes such as ADL dependence, mobility difficulties, disability, hospitalisation, prolonged hospitalisation, institutionalisation and even death, as well as poorer quality of life [10,15,23–25].

A systematic review on performance-based physical function assessment in people living in the community concluded that the SPPB was the most recommended tool in terms of validity, reliability and responsiveness [26]. Another review [27] showed that speed or SPPB were the most valid, reliable and feasible tools for the assessment of physical performance in a home environment.

Despite all previous studies, the psychometric properties of the SPPB in institutionalised Spanish older adults had not been previously explored, which was the main objective of this study. In addition, three specific objectives for this research were established: 1) to determine the reliability of the SPPB scale; 2) to determine the construct validity of the SPPB scale; 3) to determine the convergent validity of the SPPB scale.

## 2. Materials and Methods

### 2.1. Participants

A total of 202 entries were recorded in a dossier prepared for this purpose and distributed to the participating centres, of which 8 were discarded because they were incorrectly completed or incomplete. Thus, the sample consisted of a total of 194 institutionalised older adult people in four residential centres: Burgos (n = 63); Aranda de Duero (n = 38); Salamanca (n = 76); San Sebastián de los Reyes (n = 17).

The geographical distribution of the sample is as follows:

- Province of Burgos (Spain): 63 in burgos city; and 38 in Aranda de Duero.
- Province of Salamanca: 76 in Salamanca coty.
- Province of Madrid: San Sebastián de los Reyes 17.

The ages of the participants are between 63 and 97 years old. As for the type of center in which the participants are admitted, all of them are residential centers. The ownership of the centers varies as follows: 156 are in privately owned centers and 38 in publicly owned centers.

### 2.2. Data collection

In order to obtain the sample, several centers managed by Grupo Norte were contacted. This is a business group dedicated to the management of care services for the elderly, among other activities. After signing a collaboration and confidentiality agreement document with the participating centers, the data collection necessary for this research was carried out. The Ethics Committee of the University of Burgos positively assessed the research plan in the IR 11/2018 Approval Committee.

Each of the participating centers performed the data collection thanks to the professionals of the multidisciplinary teams. The data, which are obtained through the participating centers as part of their routine documentation (each of these centers has its own approved data protection procedure in place, accordingly to legal requiremets) and sent to the investigating team after a process of anonymization; from this point on, they are always treated anonymously and in aggregate. Each of these centers has its own approved and current data protection procedure.

An anonymization procedure consisting of the following steps was established: 1st data collection, 2nd coding, 3rd introduction of the data into the statistical program, 4th data processing in the cross-sectional phase, and 5th custody of the anonymized data.

Therefore, non-probability and convenience sampling was performed, where no randomization procedure is carried out; this type of sampling is widely used in the health and social sciences. No sample calculation was performed and sampling errors were not taken into account.

The IBM SPSS-v5 (Statistical Package for the Social Sciences) software program was used for the statistical analysis.

### 2.3. Instruments

#### 2.3.1. Short Physical Performance Battery (SPPB or Guralnik Test)

It is a widely used performance test in geriatric medicine that has been validated in different study populations and is adjusted for age, sex and comorbidity. It is easy to use and does not require any equipment. The scale makes it possible to monitor follow-up over time and the evolution of the person; changes of 1 point in the SPPB are clinically significant. It is a useful tool for the assessment of mobility limitations [3].

This tool is divided in three sections: balance (0-4 points): in the standing, semi-tandem and tandem positions; walking speed (0-4 points): in 2.4 or 4 metres; getting up and sitting down in a chair five times (0-4 points). The established sequence must be respected and the administration time is between 6 and 10 minutes.

As normative values, scores can be between 0 and 12; so that 0 is the worst situation and scores below [10] indicate poor physical condition, frailty and high risk of falls [3]. The ViviFrail

multicomponent physical training programme for the prevention of frailty and falls in the over 70s proposes the following cut-off points [28]: severe limitation (dependent or disabled) SPPB 0-3; moderate limitation (frail) SPPB 4-6; mild limitation (prefrail) SPPB 7-9; and minimal limitation (autonomous or robust) SPPB 10-12.

### 2.3.2. Barthel Index

Published to assess and monitor progress in independence in self-care in patients with neuromuscular and/or musculoskeletal pathology admitted to chronic hospitals [29].

The British Geriatrics Society recommends its use for the assessment of basic ADLs in older patients and it is especially useful in rehabilitation units. It is administered in 5 minutes through direct observation and/or questioning of the person or their caregivers. It assesses ten basic activities and its total score ranges from 0 to 100 points (90 for wheelchair users). It has very good reproducibility with weighted kappa correlation coefficients of 0.98 intraobserver and higher than 0.88 interobserver [29]. And it has excellent internal consistency with a Cronbach's alpha of 0.90 - 0.92 [30]. It has cut-off points established in [3]: independence: 100; low dependence: 91-99; moderate dependence: 61-90; severe dependence: 21-60; and total dependence: <21.

### 2.3.3. Lawton & Brody Scale

Developed for the older population, institutionalised or not, to assess physical autonomy and instrumental ADLs and is frequently used. It assesses eight instrumental activities. It is a hetero-administered questionnaire in which the person or their carers are consulted with an administration time of 5-10 minutes.

It can be used for the assessment of the functional capacity of any person. Each area is scored according to the description that best corresponds to the subject so that each area scores a maximum of 1 point and a minimum of 0 points. The score ranges between 0 and 8 points where lower scores imply greater dependence.

It was translated, adapted and validated in Spanish, obtaining a high inter- and intra-observer reproducibility coefficient (0.94) [29] and a good inter-observer reliability coefficient, although it presents some problems of construct [3].

### 2.3.4. Global Deterioration Scale & Functional Assessment Staging (GDS-FAST)

It is an easy-to-use standardised tool that specifies the stage of clinical evolution of a patient. It is considered a "generalisable and widely applicable global measure for the assessment of cognitive impairment secondary to primary degenerative dementia [31]". It is widely used and is one of the most common classifications for the stages of Alzheimer's disease [32]. It consists of seven degrees of impairment (GDS 1 - GDS 7) in which both cognitive symptoms and functional impairments are assessed; it is the functional part that is of use in this research. At GDS 4 there is a deterioration of cognitive skills and functionally the ability to perform daily activities is affected. From GDS 5 onwards, the situation of the person being assessed means that he/she is no longer able to survive without assistance, i.e., he/she would be dependent for basic ADLs. The last two stages are further subdivided (SDG 6a - SDG 6e; and SDG 7a - SDG 7f) [32].

### 2.3.5. Downton Risk Fall Index

This scale consists of 11 items and is intended to measure the risk of falling. Each item can be scored 1 or 0. A total score of 3 or more is indicative of a high risk of falling. It is considered to have good content validity and is a useful instrument for the prediction of fall risk in the residential setting [33].

The Downton scale was developed for older adults in intensive care units. Subsequently, research was conducted in residential facilities for the elderly [33] which concluded that it is also a useful instrument for the prediction of fall risk in the residential setting. This study also showed a higher sensitivity at three months.

#### 2.4. Statistical analysis

First, a descriptive analysis of the sample was performed in such a way that the categorical variables were expressed as frequencies and percentages, while the quantitative variables were expressed as mean and standard deviation. After this, a normality analysis was performed for the quantitative variables with the Kolmogorof-Smirnof test, the result of which showed that the sample did not conform to normality ( $p > .05$ ).

Subsequently, we proceeded to the psychometric analysis of the SPPB scale, for which several actions were performed. First, for the reliability analysis, internal consistency was tested by means of Cronbach's alpha, correlations between the items and the total score, and the half-and-half test. For the validity analysis, construct validity was tested by means of an exploratory factor analysis, multi-dimensional scaling and the validity of known groups; and convergent validity by means of the correlation with the Barthel index, Lawton and Brody scale and GDS-FAST.

### 3. Results

The sample of 194 institutionalised older adult people has a mean age of 86.46 years ( $SD \pm 9.01$ ). Most of the participants are in a situation of dependency (46%) or frailty (43.8%).

Appendix A shows the descriptive data of for quantitative variables; Appendix B shows the descriptive data according to frequencies and percentages of the GDS-FAST and SPPB scale according to dependent, fragile, pre-fragile and robust score ranges [28].

#### 3.1. Results for Reliability analysis

##### 3.1.1. Results for Internal Consistency

- Results for Cronbach's alpha.

The obtained Cronbach's alpha was .86. Additionally, Cronbach's alpha for each of the items that were eliminated ranges from .77 to .85, and the overall corrected item correlation is always higher than .69.

- Correlations items - total score.

High correlations between each item of SPPB with each other were found, with correlation coefficients between .704 and .771 ( $p < .001$ ). Correlations between each item and the total score of SPPB were also high, with correlation coefficients between .839 and .940 ( $p < .001$ ).

- Half and Half

The reliability of the SPPB scale was also examined using the half-and-half test as shown in Table 1; a value indicating very good reliability.

**Table 1.** Reliability statistics half-and-half method.

	Part 1	Value	.851
		N of elements	2 <sup>a</sup>
Cronbach's Alpha	Part 2	Value	1.000
		N of elements	1 <sup>b</sup>
	N total of elements		3
Correlation between forms			.694
Spearman-Brown Coefficient	Equal Length		.819
	Unequal Length		.833
Guttman two halves coefficient			.701

a. The elements are: SPPB Balance, SPPB Speed. b. The elements are: SPPB Speed, SPPB GetUp.

### 3.2. Results for Validity analysis

#### 3.2.1. Results for Construct Validity

- Exploratory factor analysis

A principal components analysis with oblique rotation was performed as the correlations between the items were higher than .70 in all cases. None of the three items was eliminated as they were all grouped into a single factor with factor loadings between .858 and .905.

In the proposed solution, eigenvalues greater than 1 determined that the scale would be composed of a single (unidimensional) dimension. This explains 78.83% of the variance; the three items have factor loadings higher than .80 within the single factor and communalities higher than .73 (Tables 2–4). Since it is a one-dimensional scale, rotation is not carried out.

**Table 2.** Results for Exploratory Factor Analysis (Total variance explained).

Component	Initial eigenvalues			Sums of squared extraction of variances		
	Total	% of variance	% cumulative	Total	% of variance	% cumulative
1	2.365	78.832	78.832	2.365	78.832	78.832
2	.383	12.781	91.613			
3	.252	8.387	100.000			

Extraction method: principal component analysis.

**Table 3.** Exploratory Factor Analysis: Component Matrix.

	Component 1
SPPB Speed	.905
SPPB Balance	.899
SPPB GetUp	.858

SPPB: Short Physical Performance Battery. Extraction method: analysis of principal components. a. 1 extracted components.

**Table 4.** Exploratory Factor Analysis: Communalities.

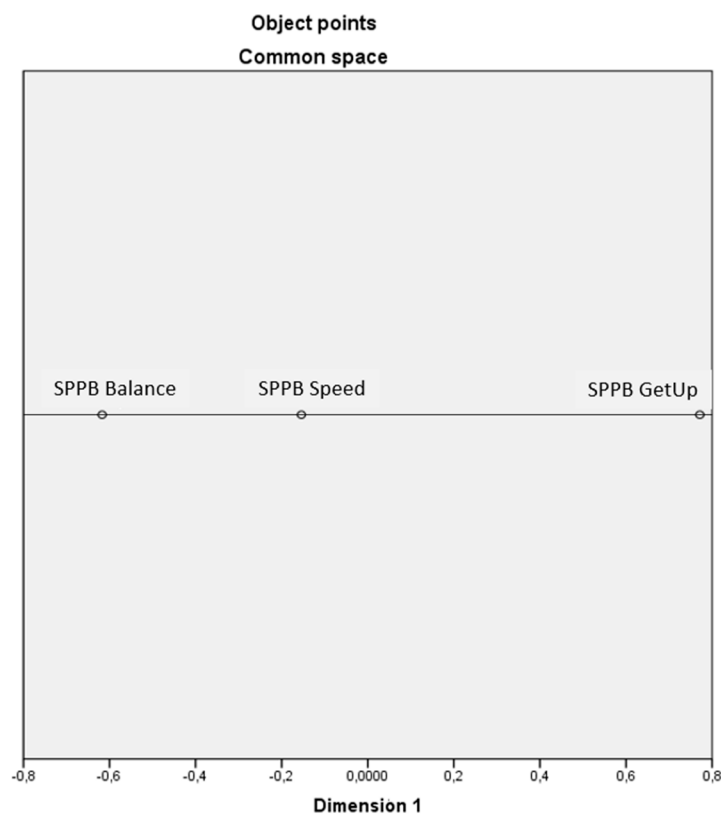
	Initial	Extraction
SPPB Speed	1.000	.809
SPPB Balance	1.000	.820
SPPB GetUp	1.000	.736

Extraction method: analysis of principal components. SPPB: Short Physical Performance Battery

Finally, a scale with a single dimension composed of three items is obtained. Barlett's test of sphericity was significant (282.48;  $g1 = 3$ ;  $p < .001$ ) and the Kaiser-Meyer-Olkin sample size adequacy indicator was appropriate (.726).

- Multidimensional scaling

The graph obtained from the multidimensional scaling analysis (Figure 1) shows that the SPPB is a one-dimensional scale; with final coordinates and distances shown in the Tables 5 and 6.



**Figure 1.** Multidimensional scaling graph.

**Table 5.** Multidimensional scaling: final coordinates.

	Dimension	
	1	2
SPPB Speed	-.617	.000
SPPB Balance	-.154	.000
SPPB GetUp	-.772	.000

SPPB: Short Physical Performance Battery.

**Table 6.** Multidimensional scaling: Matrix of distances.

	SPPB Speed	SPPB Balance	SPPB GetUp
SPPB Speed	.000		
SPPB Balance	.463	.000	
SPPB GetUp	1.389	.926	.000

SPPB: Short Physical Performance Battery.

The stress and fit measures show a very low stress index, so the proposed model is considered appropriate (Table 7).

**Table 7.** Multidimensional scaling: Stress and Adjustment Measures.

Normalised raw stress	.00000
Stress-I	.00000 <sup>a</sup>
Stress-II	.00000 <sup>a</sup>
S-Stress	.00000 <sup>a</sup>
Dispersion counted for (D.A.F.)	1.00000
Tucker's congruence coefficient	1.00000

PROXCAL minimises the normalised raw stress. a. Optimal scaling factor = 1.000.

- Validity of known groups

There is evidence associating a higher risk of falls with worse physical performance [34,35], which is why the falls risk variable is chosen for this analysis. Table 8 shows the existence of statistically significant differences in the SPPB score for the groups with and without falls risk.

**Table 8.** Comparison between known groups. Mann Whitney U test.

Variable	Median with risk of falling	Median without risk of falling	Mann Whitney U	Z	p-Value
SPPB Balance	1	3	2058.00	-6.73	<.001
SPPB Speed	1	2	2145.00	-6.49	<.001
SPPB GetUp	0	1	2379.00	-6.34	<.001
SPPB Total	2	6	1880.50	-7.10	<.001

SPPB: Short Physical Performance Battery.

### 3.2.2. Results for Convergent Validity

The scores of each SPPB item and its total score show significant correlation with ADL (Barthel Index), instrumental ADL (Lawton and Brody) and functionality (GDS-FAST) scores as shown in Table 9.

**Table 9.** Spearman Correlation SPPB - Barthel; Lawton and Brody; and GDS-FAST.

		Barthel	Lawton & Brody	GDS_FAST
SPPB Balance	Correlation coefficient	.794**	.298**	-.474**
	Sig. (bilateral)	<.001	<.001	<.001
	N	194	194	194
SPPB Speed	Correlation coefficient	.781**	.384**	-.472**
	Sig. (bilateral)	<.001	<.001	<.001
	N	194	194	194
SPPB GetUp	Correlation coefficient	.760**	.399**	-.452**
	Sig. (bilateral)	<.001	<.001	<.001
	N	194	194	194
SPPB Total	Correlation coefficient	.853**	.386**	-.516**
	Sig. (bilateral)	<.001	<.001	<.001
	N	194	194	194

GDS\_FAST: Global Deterioration Scale & Functional Assessment Stating; SPPB: Short Physical Performance Battery. \*\* Correlation is significant at the 0.01 level (bilat.).

## 4. Discussion

The descriptive statistics reveal that the study population is older people and that most of the participants are in a situation of dependency (46%) or frailty (43.8%) which is consistent with data reported by other studies [3,36]. The sample is therefore considered to be in line with the situation in residential care homes for older people and representative of this population.

This study shows a Cronbach's alpha coefficient of .863, which implies a good internal consistency of the scale if we take into account that alpha values between 0.7 and 0.8 are considered "good" [37]. In turn, it is also necessary to point out that a value above .90 would indicate that several items are measuring exactly the same thing (redundancy or duplication) [37], so we can consider that this is not the case with our scale. Taking also into account that the alpha values between .774 and

.851 with each deleted item and that the total correlation with the corrected items is greater than .69, we can also affirm that it is not necessary to delete any of the items that make up the scale.

The results obtained for the item-total score correlation show good homogeneity, i.e., the three items are part of a single construct [37]. Subsequently, in our analysis, this is confirmed by the results obtained in the factor analysis used for construct validity.

On the other hand, the internal consistency assessed by means of the half-and-half test obtains a result for the Spearman-Brown coefficient greater than .80, which means again and consistently together with the rest of the results a good internal consistency.

Based on the above, it can be affirmed that the SPPB scale has adequate internal consistency; that all its items are part of and are measuring the same construct and that the linear relationship between the sum of the scores of the items with the measured construct is fulfilled [37].

In terms of validity, it was decided to assess construct validity and contingent validity, but content validity was not assessed, although quantitative tools whose purpose is to collect information on the importance of a variable need to verify their content validity through an analysis of the concept expressed in the variable [38].

The most commonly used content validation processes involve the assessment of the scale items by a panel of experts, but, in this case, it is an instrument whose use has been recommended since the Consensus Document on Frailty and Falls [3] and is widely used by geriatric physicians [39], which gives it this de facto expert opinion. In addition, it is an instrument whose translation into Spanish has been used in other validation processes of its properties [9,11,23,40], so it is considered that this content validity process has already been carried out for this version of the tool.

As for construct validity, the exploratory factor analysis corroborated the version of the SPPB used in the literature and shows that it is composed of a single factor since the three items show a correct theoretical grouping with this single factor. Bartlett's test showed a good correlation between the variables ( $p < .001$ ), and the Kaiser-Meyer-Olkin sample size indicator also obtained an optimal result above 0.7 as stated by Carvajal et al. [38] (2011); Sánchez-Martínez et al. [41] (2019) or Garmendia [42].

The literature proposes several ways to determine the unidimensionality of an instrument, most of them using the variance explained by the first factor extracted. Thus, it is established that the amount of variance explained by the first factor should be for some authors higher than 20%, 30% or even 40% [43]; although there is no consensus. The present research meets this criterion in either case with a total variance explained by the first factor of 78.83%. However, and due to this variability of criteria among the authors, we proceeded to carry out a multidimensional scaling whose data corroborated that the SPPB is a unidimensional tool composed of three items.

In addition, to test construct validity, we also examined the existence of differences between two known subgroups, with and without risk of falls because there are numerous studies that relate them. We used the cut-off point proposed by the Downton scale of risk of falls, which indicates that scores equal to or greater than 3 are indicative of high risk of falls [33]. The results show that there are significant statistical differences between the groups of people with and without risk of falls both for the SPPB total score and for each of its items, results in concordance with other studies that relate falls and/or fall risk to the SPPB [35, 44–46] and, even that propose the SPPB as a good instrument in itself to measure the risk of falling [47] and to predict those falls [3].

The total score of the SPPB and each of its component items also have positive correlations with the scores from Barthel, Lawton, and Brody and negative correlations with the score from the GDS-FAST. This shows that the worse a person's physical performance, the more limitations they have for basic and instrumental ADLs as well as overall impairment, and that the scores from the various scales tend to converge in the same direction. The findings show that the SPPB has strong convergent validity for the sample because this link between the SPPB and ADLs has also been confirmed in previous research [48–50].

Its multicenter design and focus on a population with particular needs and features that call for proven evaluation tools should be acknowledged as positives. The findings provide extremely valuable information that enables us to suggest the use of the SPPB to evaluate the physical

capabilities of institutionalised older people. A blinding technique is indicated by the method by which the individuals in responsibility of data collection are distinct from those in charge of the statistical analysis of the data.

It is important to emphasise the study's shortcomings, which include the convenience sample it used and the absence of sample calculation or randomization. To corroborate these findings, more research along similar lines is needed.

## 5. Conclusions

The SPPB's Spanish version has proven to be a reliable and valid resource for geriatric specialists working in these types of facilities since it has strong validity and reliability for the assessment of the physical performance in institutionalised older adults.

The instrument was found to have good internal consistency as a sign of its reliability. The SPPB also exhibits strong convergent validity and strong construct validity for a unidimensional model.

The SPPB tool is advised for use as a component of the CGA for the evaluation of the physical or functional sphere, and it may also be a helpful marker for the beginning of frailty, dependence and fall risk.

**Author Contributions:** Conceptualization, M. S.-P., J.J. G.-B. and A. dS.-G.; methodology, M. S.-P., J.J. G.-B. and A. dS.-G.; software, M. S.-P.; J. F.-S., and J. M.-A.; validation, M. S.-P., J. F.-S., and J. M.-A.; formal analysis, M. S.-P., J. F.-S., and J. M.-A.; investigation, M. S.-P., A. G.-G. and J. G.-S.; resources, M. S.-P., and A. G.-G.; data curation, M.S.-P., E. M.- P., and J. F.-S.; writing—original draft preparation, M.S.-P., J.J.G.-B, and J. F.-S.; writing—review and editing, M.S.-P., A. G.-G., J. F.-S., and J. G.-S.; visualization, M.S.-P., J.J.G.-B., A.dS.-G., E.M.-P., A.G.-G., J. F.-S., J. M.-A., and J.G.-S.; supervision, M.S.-P., J.J.G.-B, and J. M.-A.; project administration, M. S.-P. and E. M.-P. All authors have read and agreed to the published version of the manuscript.

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**Institutional Review Board Statement:** This study was prospectively registered and approved by the Ethics Committee of the University of Burgos (IR 11/2018).

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**Conflicts of Interest:** The authors declare no conflict of interest.

**Public Involvement Statement:** Aim: the participants were included in the research with the objective of evaluating the psychometric properties of the scale. Methods: They participated voluntarily, the purpose and procedure of the study and their involvement in it were explained to them. The sample used was convenience, as it was accessible to researchers. Study results: the results of participants reporting include both positive and negative outcomes. Reflections/critical perspective: there were no relevant issues with public involvement.

**Guidelines and Standards Statement:** This manuscript was drafted against the STROBE for observational studies.

## Appendix A

### Appendix A. Descriptive data for quantitative variables.

	N	Minimum	Maximum	Mean	Standard deviation
SPPB Balance	194	0	4	1.81	1.52
SPPB Speed	194	0	4	1.57	1.33
SPPB GetUp	194	0	10	.86	1.28
SPPB Total	194	0	12	4.17	3.58

Barthel	194	0	100	58.61	32.97
Lawton & Brody	194	0	8	1.49	2.33
Downton	194	0	7	2.67	1.57

SPPB: Short Physical Performance Battery.

## Appendix B

Appendix B. Descriptive data for ordinal variables.

		Frequency	Percentage	Valid percentage	Cumulative percentage
GDS_FAST	GDS1	32	16.5	16.5	16.5
	GDS2	31	16.0	16.0	32.5
	GDS3	15	7.7	7.7	40.2
	GDS4	28	14.4	14.4	54.6
	GDS5	42	21.6	21.6	76.3
	GDS6A	29	14.9	14.9	91.2
	GDS7A	17	8.8	8.8	100.0
	Total	194	100.0	100.0	
SPPB	Dependent	91	46.9	46.9	46.9
	Frail	52	26.8	26.8	73.7
	Prefrail	33	17.0	17.0	90.7
	Robust	18	9.3	9.3	100.0
	Total	194	100.0	100.0	

GDS\_FAST: Global Deterioration Scale & Functional Assessment Staging; SPPB: Short Physical Performance Battery.

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