Original Article

Validation of the Spanish translation Sheffield Profile for Assessment and Referral for Care (SPARC-Sp) at the Hospital Universitario San Jose of Popayan, Colombia

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Abstract

Objectives. We determined the validity and reliability of the Spanish translation Sheffield Profile for Assessment and Referral for Care (SPARC-Sp) questionnaire to identify the palliative care (PC) needs of patients with chronic noncommunicable diseases (NCDs) in Colombia.

Methods. We developed a cross-sectional observational study of scale assessment in adults with the aim of determining the validity and reliability of the SPARC-Sp questionnaire to identify the PC needs of patients with NCDs receiving outpatient or inpatient care at the Hospital Universitario San Jose of Popayan – ESE, Colombia, from 2021 to 2022.

Results. We applied a questionnaire consisting of demographic, clinical data, and SPARC-Sp to 507 participants. The constructed model explained 75% of the variance with an adequate fit according to the root mean square residual (0.03), the comparative fit index (0.98), and acceptable reliability (McDonald's total omega 0.4–0.9). Opportunities for improvement are the reformulation and inclusion of particular words to improve the representativeness and clarity of the domains of communication and information, religious, and spiritual issues.

Significance of results. This research represents the first validation of SPARC in Spanish. SPARC-Sp is an instrument that allows initiating a conversation of the patient's main needs through a systematic assessment of the patients' main needs. Its psychometric validation demonstrated good fit and acceptable reliability.

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Introduction

According to the World Health Organization, in 2022, chronic noncommunicable diseases (NCDs) caused 41 million deaths worldwide, amounting to 74% of all deaths; 77% of these deaths occurred in low- and middle-income countries (Organización Mundial de la Salud 2022b). In Colombia, between 2012 and 2016, 69–83% (124,988 adults) of deaths were attributed to NCDs and potentially required palliative care (PC) (Calvache et al. 2020). PC services in Colombia are primarily available in main cities (Calvache et al. 2020), with a significant lack of offer in rural areas, compounded by other barriers such as limited supply of healthcare, lack of awareness among policymakers, health professionals, the general community, myths, cultural and social barriers framed by beliefs about death and dying well, and issues surrounding opioid drugs (Organización Mundial de la Salud 2022a). Health professionals, patients, and relatives associate PC with death and abandonment, leading to delays in accessing services (Cuadrado 2018; Gempeler et al. 2021; Kaasa et al. 2018). Poor communication of patients' wishes for treatment and objectives and preferences for care were recently shown to be associated with increased suffering among Colombian cancer patients (Arango-Gutiérrez et al. 2023).

The Sheffield Profile for Assessment and Referral for Care (SPARC) instrument, designed in 2008 to identify holistic care needs and facilitate early referral to PC, and is widely used in the United Kingdom (Ahmed et al. 2009). During its development process, patients and healthcare professionals concluded that SPARC can be applicable to patients with acute illnesses or chronic conditions and it is useful for the decision-making process (Hughes et al. 2015). SPARC consists of 56 items across 8 domains including communication and information, physical symptoms, psychological issues, religious and spiritual symptoms, independence

and activity, family and social life, treatment issues, and personal issues. It asks about the degree of concern or discomfort in 4 categories (not at all, a little, quite a lot, and a very much) (Ahmed et al. 2009).

The face validity of the original English version of SPARC was assessed through cognitive interviews, emphasizing the emotional impact of psychological, religious, and spiritual issues (Ahmed et al. 2009). SPARC has been translated into Polish, Korean, and traditional Chinese. The linguistic, content, construct, and reliability validation of these translations were assessed in Poland (Leppert et al. 2012), South Korea (Kwon et al. 2021), and Taiwan (Tsai et al. 2023). We recently translated and adapted SPARC to Colombian Spanish in the Colombian context (SPARC-Sp) (2024). In this work, we present the validity and reliability of the SPARC-Sp questionnaire to identify the PC needs of patients with NCDs at the Hospital Universitario San Jose de Popayan in Colombia.

Methods

The linguistic and cultural validation of SPARC tool to the Colombian Spanish are described in detail elsewhere (2024). The present study determines the validity and reliability of the SPARC-Sp instrument to assess holistic PC needs in patients with NCDs attended to at the Hospital San Jose of Popayan between 2021 and 2022 through a descriptive observational cross-sectional scale assessment study including factor analysis to evaluate internal consistency, relationship to other variables, consequences, and reliability of the test.

Population, patient recruitment, and data collection

Content-based evidence
To estimate the extent to which the items were related to the construct, multidisciplinary groups comprising patients, caregivers, family members, health professionals, administrative staff, and allied health and social care professionals, from different departments including rural and urban areas of Colombia (2024) were formed. Attendees were recruited through social networks (email, WhatsApp) and personal acquaintances as part of a research project.

Evidence based on internal structure, relationship with other variables, and consequences of the test
Adult patients with a diagnosis of NCD who received outpatient or inpatient care between 2021 and 2022 at the Hospital Universitario San Jose (HUSJ) of Popayan in Colombia were eligible to participate. We excluded patients with symptomatic brain metastasis, uncontrolled psychological conditions, cognitive impairment, and those unable to effectively communicate with the researcher. Following the guideline of including 5–10 people for each item in a factor analysis (Ruiz-Morales and Gómez-Restrepo 2015), and allowing for about 10% of participants with incomplete answers, our envisaged sample size was to include about 550 patients to reach 500 patients with complete answers (Ruiz-Morales and Gómez-Restrepo 2015).

Six trained research assistants (1 head nurse, 2 anesthesiology residents, 1 internist, 1 medical student, and 1 dietitian) recruited the patients and applied the study questionnaire including SPARC-Sp (supplementary file 1 for the questionnaire in English). Eligible patients could attend to the (i) medical or surgical inpatient wards,

(ii) daytime outpatient services of the pain management service, or (iii) daytime oncology outpatient service – all of them at HUSJ. The questionnaire was administered on paper; in case the participant required assistance in filling out the forms, for example, in case of poor reading skills, the research assistants read the questions aloud to the participant. The answers of the paper formats were subsequently transcribed into REDCap. To improve the data quality, 2 researchers performed the transcription and quality analysis, checking the completeness of the record and reviewing the clinical history for the corresponding information.

To perform the descriptive analysis of results, we described demographic and clinical variables such as gender, age, area of origin, educational level, diagnosis, comorbidities, and treatment. Patients were stratified into 5 groups based on disease categories, frequency of the diagnosis, comorbidities, and their relationship to the requirement for PC, as endorsed by thematic experts (EdV, JAC). The groups consisted of (i) cardiovascular disease, which included diabetes, chronic obstructive pulmonary disease, (ii) cancer, (iii) musculoskeletal and neurological diseases, (iv) multimorbidity, and (v) other diseases.

Study measurements

We applied the SPARC-Sp instrument validated in Spanish (2024). We compared the scores of the domain of functionality against other instruments, including (Hernández-Quiles et al. 2017), SARC-F (Slowness, Assistance waking, Rising from chair, Climbing stairs, and Falls) (Cruz-Jentoft et al. 2019), the Karnofsky Performance Status Scale (KPS) and, for cancer patients only, the ECOG scale (Eastern Cooperative Oncology Group) (Schag et al. 1984).

Analysis

The analyses evaluated validity in terms of evidence based on the content, internal structure, relationship to other variables, and consequences of the test (American Educational Research Association et al. 2014). SPARC-Sp assigns a score from 0 to 3 (not at all to very much) reflecting the patient's discomfort or discomfort with a given need. Although clinical behavior after implementation of SPARC-Sp indicates that scores of any individual item above 3 require referral for PC, for validation purposes the total score, obtained by summing the scores of each item, was used, as in previous validations (Kwon et al. 2021; Leppert et al. 2012).

To assess the content-based evidence of the test, we designed a questionnaire asking participants to score the relevance of the inclusion of the SPARC-Sp items and domains on the construct of holistic care needs in the abovementioned multidisciplinary group of professionals, patients, and caregivers (English model of the questionnaire in supplementary file 2). This questionnaire included 51 Likert-type questions about the items relevance and was applied through SurveyMonkey (2022). We used the Aiken's V coefficients as a measure to determine the proportion of judges who had a positive assessment of the SPARC-Sp items assessed, which represents the relevance of revising or eliminating the items (Martin-Romera and Molina Ruiz 2017).

To evaluate the internal structure of SPARC-Sp, we performed an exploratory factor analysis (EFA) applying a factor analysis of axes or main factors (20). We used the eigenvalue to retain the factors (University of California 2022) and an oblique promax rotation (Finch 2006; Hair and Gómez Suárez 2010). We estimated the root mean square residual (RMSR) to assess the amount of fit error

Table 1. Aiken's *V* coefficients for each item

Domain	Item	Aiken	IC 95%	N
Comunication and information	1	0.95	0.66–0.98	21
	2	0.82	0.41–0.84	21
	3	0.9	0.56–0.94	21
	4	0.9	0.56–0.94	21
	5	0.86	0.51–0.90	21
	6	0.95	0.67–0.98	21
	7	0.84	0.43–0.86	20
Physical symptoms	1	1	0.80–1	19
	2	0.95	0.65–0.98	19
	3	0.96	0.72–0.99	19
	4	0.97	0.72–0.99	19
	5	0.93	0.65–0.98	19
	6	0.96	0.71–0.99	18
	7	0.94	0.71–0.99	18
	8	0.97	0.72–0.99	19
	9	0.97	0.72–0.99	19
	10	0.96	0.65–0.98	19
	11	0.95	0.72–0.99	19
	12	0.97	0.72–0.99	19
	13	0.97	0.72–0.99	19
	14	0.99	0.72–0.99	19
	15	0.95	0.65–0.98	19
	16	1	0.79–1	18
	17	1	0.80–1	19
	18	0.95	0.72–0.99	19
	19	0.91	0.65–0.98	19
	20	0.96	0.65–0.98	19
	21	0.96	0.65–0.98	19
Physchological issues	1	0.91	0.60–0.96	19
	2	0.93	0.65–0.98	19
	3	0.93	0.65–0.98	19
	4	0.93	0.65–0.98	19
	5	0.93	0.65–0.98	19
	6	0.93	0.65–0.98	19
	7	0.93	0.65–0.98	19
	8	0.93	0.65–0.98	19
	9	0.96	0.65–0.98	19
Religious and spiritual issues	1	0.89	0.46–0.89	18
	2	0.83	0.41–0.86	18
Independence and activity	1	0.99	0.71–0.99	18
	2	0.91	0.64–0.98	18
	3	0.96	0.64–0.98	18

(Continued)

Table 1. (*Continued.*)

Domain	Item	Aiken	IC 95%	N
Family and social issues	1	0.94	0.64–0.98	18
	2	0.93	0.64–0.98	18
	3	0.93	0.64–0.98	18
	4	0.88	0.58–0.96	18
Treatment issues	1	0.93	0.64–0.98	18
	2	0.96	0.64–0.98	18
Personal issues	1	0.72	0.09–0.69	9
	2	0.67	0.05–0.70	7
	3	0.86	0.56–0.97	14

between the observed data and the values estimated by the model; values below 0.05 reflect a good fit (Shi et al. 2018). The comparative fit index (CFI) indicates the quality of the model fit compared to the null model (no factors or correlations between variables), values of 0.95 and above reflect a good model fit (van Laar and Braeken 2021). In addition, the communalities (h2*) were assessed to determine the amount of variance of an observed variable that is explained by a set of underlying common factors (Hogarty et al. 2005; Taherdoost et al. 2020).

Due to the characteristics of the construct of "holistic palliative care needs," there is no criterion for validation. However, we could assess the correlation between the SPARC-Sp domain of *independence and activity* and its total score with other instruments close to these domains as SARC-F, Karnofsky, and ECOG using Spearman's correlation coefficient (American Educational Research Association et al. 2014).

We evaluated the evidence based on the consequences of the test, indicating that the application of SPARC-Sp may generate other consequences beyond the identification of holistic needs in PC (American Educational Research Association et al. 2014). For this evaluation, we determined whether patients with comorbidities have higher SPARC-Sp scores than patients without comorbidities. This assessment was made by the Mann–Whitney *U* test.

For the internal consistency assessment, we estimated McDonald's total omega, which indicates the proportion of the total variance of the scores to which differences between participants can be attributed and not to measurement error (Ventura-León 2017). All analyses were performed using R; we used the packages cli, tidyr, dplyr, psych, polycor, ggcorrplot, GPArotation, spearman CI, and gglpot2 (Bernaards and Jennrich 2005; Csárdi 2023; de Carvalho 2018; Fox 2022; Kassambara 2022; Revelle 2023; Rizopoulos 2006; Wickham 2016; Wickham et al. 2023a, 2023b).

The protocol of this project was evaluated and approved by the Ethics Committee at the Hospital Universitario San Jose, Popayan, Colombia (8.2.9–92/031). All included patients and participants confirmed their voluntary and informed participation by signing informed consent forms.

Results

Content-based evidence

A total of 37 participants participated in the evaluation of the content-based evidence: 48% of them (*n* = 13) were nurses, 22%

Table 2. Clinical and demographic characteristics of the population

Variable	Cardiovascular disease, diabetes mellitus, COPD $n = 209$ (%)	Cancer $n = 50$ (%)	Musculoskeletal, neurological diseases $n = 23$ (%)	Combination of comorbidities $n = 208$ (%)	Other diseases $n = 17$ (%)	Total $N = 507$ (%)
Gender						
Female	92 (44)	26 (52)	18 (78)	133 (64)	14 (82)	283 (56)
Male	117 (56)	24 (48)	5 (22)	75 (36)	3 (18)	224 (44)
Age						
Minimum	18	24	28	20	25	18
Median	71	61	60	66	40	66
Mean	69	60	57	65	44	65
Maximum	95	84	75	94	63	95
Religion						
Catholic	185 (89)	40 (80)	18 (78)	165 (79)	5 (29)	413 (82)
Christian	16 (8)	7 (14)	4 (17)	26 (12)	1 (5)	54 (11)
Agnostic	2 (1)	1 (2)	0	0	3 (18)	6 (1)
Atheist	0	1 (2)	0	1 (1)	4 (24)	6 (1)
Other	6 (3)	1 (2)	1 (4)	16 (8)	4 (24)	28 (5)
Educational level						
None	19 (9)	7 (14)	9 (39)	43 (21)	4 (24)	82 (16)
Primary	95 (45)	19 (38)	3 (13)	93 (45)	5 (29)	215 (42)
Secondary	82 (39)	16 (32)	5 (22)	47 (23)	1 (6)	151 (30)
Technical	6 (3)	4 (8)	4 (17)	12 (6)	3 (18)	29 (6)
University	7 (3)	4 (8)	2 (9)	13 (6)	4 (24)	30 (6)
Geographical area						
Urban	126 (60)	31 (62)	14 (61)	137 (66)	8 (47)	316 (62)
Rural	83 (40)	19 (38)	9 (39)	71 (34)	9 (53)	191 (38)
Transport time (hours)						
Minimum	0.03	0.08	0.08	0.02	0.08	0.02
Median	0.5	0.5	0.3	0.4	0.5	0.3
Media	0.9	0.6	0.5	0.8	1.3	0.5
Maximum	15.2	4	1.5	8	7	0.8
Stage						
I		2 (4)				2 (4)
II		11 (22)				11 (22)
III		8 (16)				8 (16)
IV		18 (36)				18 (36)
Not applicable		3 (6)				3 (6)
Unknown		8 (16)				8 (16)
Type of treatment						
Chemotherapy		22 (44)				22 (44)
Radiotherapy		9 (18)				9 (18)
Palliative care		15 (30)				15 (30)

(Continued)

Table 2. (*Continued.*)

Variable	Cardiovascular disease, diabetes mellitus, COPD n = 209 (%)	Cancer n = 50 (%)	Musculoskeletal, neurological diseases n = 23 (%)	Combination of comorbidities n = 208 (%)	Other diseases n = 17 (%)	Total N = 507 (%)
Surgery		15 (30)				15 (30)
Immuno therapy		2 (4)				2 (4)
Alternative therapies		6 (12)				6 (12)
None		7 (14)				7 (14)
ECOG						
0		11 (9)				11 (9)
1		30 (24)				30 (24)
2		30 (24)				30 (24)
3		31 (25)				31 (25)
4		12 (10)				12 (10)
5		2 (2)				2 (2)
Not assessable		9 (7)				9 (7)
Karnofsky						
20	0	4 (8)	1 (4)	1 (1)	0	6 (1)
30	1 (1)	2 (4)	0	4 (1)	0	7 (1)
40	4 (1)	2 (4)	3 (13)	17 (8)	0	26 (5)
50	22 (11)	8 (16)	1 (4)	21 (10)	2 (12)	54 (11)
60	18 (9)	6 (12)	1 (4)	26 (12)	0	51 (11)
70	26 (12)	7 (14)	5 (22)	36 (17)	2 (12)	76 (15)
80	51 (24)	5 (10)	4 (17)	50 (24)	2 (12)	112 (22)
90	66 (32)	12 (24)	7 (30)	36 (17)	2 (12)	123 (24)
100	21 (10)	4 (8)	1 (4)	17 (8)	9 (53)	52 (10)
SARC-F						
0	34 (16)	5 (10)	1 (5)	21 (10)	7 (41)	68 (13)
1–3	81 (39)	19 (38)	10 (43)	65 (31)	6 (35)	181 (36)
> 4	94 (45)	26 (52)	12 (52)	122 (59)	4 (24)	258 (51)
SPARC (Communication and information issues)						
0	1 (1)	1 (2)	0	1 (1)	0	3 (1)
1	22 (11)	4 (8)	2 (9)	10 (4)	0	38 (7)
2	44 (21)	11 (22)	10 (43)	48 (23)	4 (24)	117 (23)
3	49 (23)	11 (22)	5 (22)	44 (21)	5 (28)	114 (22)
4	52 (25)	7 (14)	2 (9)	51 (25)	4 (24)	116 (23)
5	27 (13)	10 (20)	3 (13)	35 (17)	2 (12)	77 (15)
6	10 (5)	5 (10)	1 (4)	17 (8)	1 (6)	34 (7)
7	4 (1)	1 (2)	0	2 (1)	1 (6)	8 (2)
SPARC (Physical symptoms)						
0–21	157 (75)	24 (48)	18 (78)	151 (73)	7 (41)	357 (70)
22–42	51 (24)	24 (48)	4 (17)	56 (26)	10 (59)	145 (29)
43–63	1 (1)	2 (4)	1 (5)	1 (1)	0	5 (1)
> 64	0	0	0	0	0	0 (0)

(*Continued*)

Table 2. (Continued.)

Variable	Cardiovascular disease, diabetes mellitus, COPD $n = 209$ (%)	Cancer $n = 50$ (%)	Musculoskeletal, neurological diseases $n = 23$ (%)	Combination of comorbidities $n = 208$ (%)	Other diseases $n = 17$ (%)	Total $N = 507$ (%)
SPARC (Psychological issues)						
0–9	186 (89)	39 (78)	17 (74)	154 (74)	11 (65)	407 (80)
10–18	23 (11)	10 (20)	5 (22)	48 (23)	6 (35)	92 (18)
19–27	0	1 (2)	1 (4)	6 (3)	0	8 (2)
SPARC (Religious and spiritual issues)						
0–2	189 (90)	37(74)	21 (92)	171 (82)	12 (71)	430(85)
3–4	19 (9)	12 (24)	1 (4)	36 (17)	4 (24)	72 (14)
5–6	1 (1)	1 (2)	1 (4)	1 (1)	1 (5)	5 (1)
SPARC (Independence and activity)						
0–3	107 (51)	17 (34)	11 (48)	96 (47)	5 (30)	236 (47)
4–6	83 (40)	24 (48)	5 (22)	76 (36)	4 (24)	192 (38)
7–9	19 (9)	9 (18)	7 (30)	36 (17)	8 (46)	79 (16)
SPARC (Family and social issues)						
0–4	159 (76)	35 (70)	13 (57)	153 (74)	10 (59)	370 (73)
5–8	45 (22)	13 (26)	8 (35)	40 (19)	5 (29)	111 (22)
9–12	5 (2)	2 (4)	2 (8)	15 (7)	2 (12)	26 (5)
SPARC (Treatment issues)						
0–2	147 (70)	21 (42)	14 (61)	136 (65)	10 (59)	328 (65)
3–4	57 (27)	19 (38)	5 (22)	50 (24)	2 (12)	133 (26)
5–6	5 (3)	10 (20)	4 (17)	22 (11)	5 (29)	46 (9)
SPARC (Personal issues)						
0	10 (5)	3 (6)	1 (4)	20 (10)	1 (6)	35 (7)
1	13 (6)	4 (8)	0	16 (8)	0	33 (7)
2	19 (9)	10 (20)	3 (13)	25 (12)	1 (6)	58 (11)
3	16 (8)	6 (12)	3 (13)	22 (11)	2 (12)	49 (10)
4	29 (14)	4 (8)	2 (9)	23 (11)	1 (6)	59 (12)
5	32 (15)	4 (8)	2 (9)	28 (13)	1 (6)	67 (13)
6	30 (14)	9 (18)	4 (17)	25 (12)	4 (24)	72 (14)
7	41 (20)	5 (10)	3 (13)	24 (12)	5 (29)	78 (11)
8	19 (9)	5 (10)	5 (22)	25 (12)	2 (12)	56 (15)
SPARC (Total score)						
0–41	141 (67)	15 (30)	11 (48)	109 (52)	5 (29)	281 (55)
42–82	67 (32)	33 (66)	10 (44)	93 (45)	11 (65)	214 (42)
83–138	1 (1)	2 (4)	2 (8)	6 (3)	1 (6)	12 (3)

COPD = chronic obstructive pulmonary disease, SPARC = Spanish translation Sheffield Profile for Assessment and Referral for Care, SARC-F = Slowness, Assistance waking, Rising from chair, Climbing stairs, and Falls, ECOG = Eastern Cooperative Oncology Group.

($n = 6$) physicians, 19% ($n = 5$) other health professionals ($n = 5$), 15% ($n = 4$) patients, 7% ($n = 2$) caregivers, 4% ($n = 1$) user representatives, and 4% ($n = 1$) decision-makers. All items presented an Aiken's *V* coefficients >0.5, reflecting that the items adequately represent the content domain (Table 1).

Evidence based on internal structure

A total of 522 individual patients answered the questionnaire for the scale assessment study, but 15 of them left at least one SPARC-Sp question unanswered. Consequently, data from participants
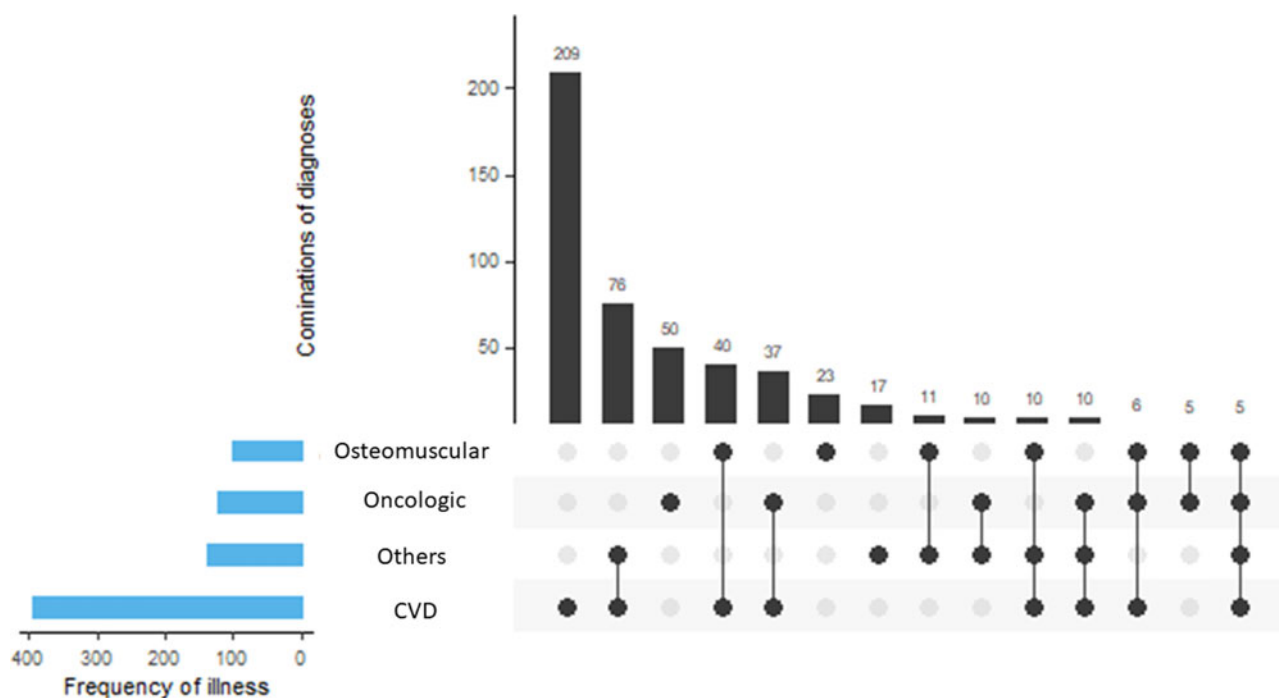
Figure 1. Frequency of diseases (CVD, oncology, musculoskeletal and others) and intersections of comorbidities.
CVD: cardiovascular disease. The blue bars represent the frequency of each of the disease groups (CVD, other, oncological, musculoskeletal). The black bars represent the frequency of the intersection of a comorbidity and the dots specify the diseases with which this intersection occurs. For example, the graph shows that 390 patients had CVD as a main disease or comorbidity (blue bar), 209 of them had CVD as the only or main disease and 76 participants had CVD and "other pathologies," 50 had oncological disease and 40 had musculoskeletal disease and CVD.

were available for analysis. The clinical and demographic characteristics of this population are described in Table 2.

Patients were stratified into 5 groups based on logical clinical categories (rather than specific mechanisms). The results of this ranking with their frequency and different intersections that make up the group of comorbidities are presented in Figure 1.

Factorial analysis (Table 3) established 12 factors and 45 of the 56 initial items represented the best solution, explaining 75% of the variance (Table 4). Four items had high communalities (E2, E3, B8, and G2), 41 items had moderate to low communalities and 7 items had low communalities (A1, A5, A7, B5, B7, B15, and B18).

Seven underlying domains were identified: (i) a "sadness" domain linked psychological issues and religious and spiritual issues about thoughts about death or dying; (ii) a "functional limitations" domain linked physical symptoms, uncontrolled symptoms, and personal issues related to needing help with personal issues; (iii) a "communication needs" domain which includes physical symptoms such as dry and sore mouth, and personal issues about requiring other support and financial issues; (iv) a "gastrointestinal symptoms" domain; (v) a domain on communication with health professionals; (vi) a domain on "respiratory symptoms and anxiety," and (vii) "cognitive symptoms."

This factor analysis excluded items with low factor loadings (<0.3). Within these items were identified: communication with religious or spiritual advisor or counsellor, communication with family, pain, headache, bowel disturbances (constipation, diarrhea, and incontinence), bladder disturbances, sleeping at night, weight loss or gain, feeling that everything is an effort, and unmet spiritual needs. Both the RMSR (0.03) and the CFI (0.98) reflect a good model fit (van Laar and Braeken 2021). The model explained 75% of the observed variance (Table 4).

Evidence based on the relationship with other variables

SARC-F had a low correlation with the independence and activity domain (0.31; IC 95%: 0.22; 0.30) and with the SPARC-Sp total score (0.35; IC 95%: 0.27; 0.43). The ECOG scale showed low correlations with SPARC-Sp total score (0.20; IC 95%: − 0.09; 0.49), where the higher the level of functionality in cancer patients, the higher the score in the domain of independence and activity (0.31; IC 95%: 0.03; 0.61). Karnofsky had a low negative correlation with the independence and activity domain (−0.25; IC 95%: −0.34; −0.16) and the SPARC-Sp total score (−0.36; IC 95%: −0.44; −0.28). As the functionality determined by Karnofsky decreases (100 points: normal, 0: deceased), the needs for this domain and the holistic needs in PC increased.

Evidence based on the consequences of the test

Based on the comorbidity group (Figure 1), we evaluated whether patients with more than one disease had higher SPARC-Sp scores. The median SPARC-Sp score in patients with comorbidities (40 points) was significantly higher than those without comorbidities (36 points) (Difference 4 points, $p = 0.002$).

Assessment of the internal consistency of the instrument

The reliability for each domain of the original SPARC-Sp structure is described in Table 5. The domains with the lowest reliability were communication and information and religious issues; these domains also presented low factor loadings and were regrouped or excluded in the EFA (Table 5). The remaining domains showed adequate reliability (total omega: 0.7–0.9).

Table 3. SPARC factor loadings after exploratory factor analysis

Dominio	Name	Item	Factor loadings	h2*
1	**Personal issues**	H2: Talking to other professionals about your illness or treatment	0.430	0.44
		H3: More information about your illness	0.675	0.50
		H4: More information about your care	0.802	0.54
		H5: More information about your treatment	0.819	0.58
		H6: More information about other types of support	0.577	0.60
		H7: More information about financial matters	0.576	0.56
		H8: More information about other people	0.438	0.39
2	**Psychological issues**	B12: Feeling of weakness	0.351	0.50
		B13: Feeling tired	0.329	0.52
		B19: Changes in appearance	0.430	0.35
		B20: Restless or agitated	0.746	0.49
		C1: Feeling anxious	0.741	0.50
		C2: Feeling sad	0.621	0.57
		C3: Feeling confused	0.492	0.53
3	**Independence and activity**	E1: Losing independence	0.712	0.56
		E2: Changes in their ability to carry out daily activities such as toileting, bathing or going to the toilet	0.927	0.78
		E3: Changes in your ability to carry out household chores such as cooking or housekeeping	0.906	0.81
		F2: You are concerned about the effect your illness has on your family and others.	0.316	0.39
4	**Sadness**	C2: Feeling sad	0.320	0.57
		C4: Difficulty concentrating	0.302	0.53
		C5: Feeling lonely	0.359	0.36
		C7: Feeling that life is not worthwhile	0.834	0.55
		C8: Thinking about ending it all	0.766	0.44

(Continued)

Table 3. (Continued.)

Dominio	Name	Item	Factor loadings	h2*
		D1: Thoughts or worries about death, dying, or passing away	0.324	0.36
5	**Functional limitations**	B12: Feeling of weakness	0.338	0.50
		B13: Feeling tired	0.315	0.52
		B15: Feeling sleepy during the day	0.498	0.30
		B16: Loss of appetite	0.564	0.44
		B18: Difficulty swallowing or swallowing	0.319	0.28
		B21: Uncontrolled symptoms	0.352	0.36
		H1: Help with personal matters	0.367	0.46
6	**Communication needs**	A5: Talking to social work	0.322	0.15
		A7: Talking to other people	0.593	0.24
		B4: Dry mouth	0.452	0.42
		B5: Mouth pain	0.372	0.17
		H6: More information on other types of support	0.369	0.60
		H7: More information about financial matters	0.341	0.56
7	**Gastrointestinal symptoms**	B8: Feeling sick with nausea	0.921	0.76
		B9: Feeling sick with vomiting	0.952	0.70
8	**Family and social life**	F1: Feeling that others don't understand what you want	0.444	0.35
		F3: Lack of support from your family or others	0.876	0.62
		F4: Need more help than your family or others can give you	0.764	0.55
9	**Treatment**	G1: Treatment side effects	0.764	0.58
		G2: Long-term effects of treatment	0.938	0.80
10	**Communication with health personnel**	A1: Attending doctor or physician	0.323	0.17
		A2: Nurse at the health post	0.771	0.49
		A3: Hospital nurse	0.672	0.52

(Continued)

Table 3. (*Continued.*)

Dominio	Name	Item	Factor loadings	h2*
11	**Respiratory symptoms and anxiety**	B6: Shortness of breath	0.707	0.47
		B7: Coughing	0.604	0.32
		D1: Thoughts or worries about death, dying, or passing away	0.317	0.36
12	**Cognitive symptoms**	B2: Memory loss	0.566	0.39
		C4: Difficulty concentrating	0.542	0.53

SPARC = Spanish translation Sheffield Profile for Assessment and Referral for Care.
h2*: communalities.

The reliability per McDonald's total omega of the new SPARC-Sp structure was higher than the original structure except for communication with health personnel (total omega: 0.46), cognitive symptoms (total omega: 0.56) and respiratory symptoms and anxiety (total omega: 0.57) (Table 6).

Discussion

This is the first validation of SPARC in the Spanish language in the Colombian clinical context based on the answers of 507 patients with NCDs. According to the participants in the multidisciplinary group, all the domains included in SPARC-Sp are relevant to the concept of holistic care needs assessment (Aiken's *V* coefficients >0.5) (Merino-Soto 2018). The EFA yielded a large number of factors (12 factors). The model explained 75% of the variance, and the RMSR (0.03) and the CFI (0.98) indicate a good fit of the model to the observations. This high proportion of explained variance may be partially due to the large number of factors extracted (Peterson 2000), and the very good model fit may be partly due to the large sample size, the high number of variables, and the dependence relationships between the variables (van Laar and Braeken 2021). Eleven items had low factor loadings (<0.3) due to the frequency in the distribution of responses, which did not allow for any discrimination (40). We identified mainly moderate to low communalities (0.4–0.7), indicating highly sensitive solutions (Hogarty et al. 2005).

The EFA retained some of the original SPARC-Sp domains (personal issues, family and social issues, and treatment). Other domains had a different conformation, which could improve their representativeness and potential applicability. New domains related to sadness included items from the psychological and religious and spiritual domains. This domain was coined "depression" as it represents symptoms concerning this pathology (sadness, difficulty concentrating, loneliness, feeling that life is not worth living, thoughts about ending everything and worries about death, dying, or passing away) (Tolentino and Schmidt 2018). The domain "functional limitations" refers to the reduced ability to perform daily activities and maintain independence as a result of alterations in anatomical, psychological, physiological, emotional, or mental structure or function (Ballesteros 2017).

A new domain emerged, which we named "communication needs," and was related to the necessity to talk to social workers and other professionals, as well as the need of information about financial matters, other types of support and physical symptoms such as xerostomia and mouth pain. Although it may come as a surprise to observe such physical symptoms in the communication domain, the salivary hypofunction has a direct link to difficulties in talking: it has been associated with clinical changes in vocal effort, phonation, and communication (Roh et al. 2006). Another domain linked to communication with health professionals was identified,

Table 4. Determination of variance explained by SPARC-Sp

Assessment*	F2	F1	F3	F7	F8	F12	F4	F9	F10	F5	F6	F11
Standard deviation	3.88	2.59	2.15	1.82	1.52	1.44	1.35	1.25	1.15	1.11	1.08	1.06
Variance ratio	0.27	0.12	0.08	0.06	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02
Cumulative proportion	0.27	0.39	0.47	0.53	0.57	0.61	0.64	0.67	0.69	0.71	0.73	0.75

*F2: personal issues, F1: psychological issues, F3: independence and activity, F7: depression, F8: functional limitations, F12: communication needs, F4: gastrointestinal symptoms, F9: family and social life, F10: treatment, F5: communication with health personnel, F6: respiratory symptoms and anxiety, F11: cognitive symptoms. SPARC-Sp = Spanish translation Sheffield Profile for Assessment and Referral for Care.

Table 5. Reliability per McDonald's total omega for each SPARC-Sp domain

Estimates	A	B	C	D	E	F	G	H
Total omega	0.53	0.86	0.85	0.38	0.88	0.72	0.82	0.88

*A: communication and information, B: physical symptoms, C: psychological issues, D: religious and spiritual issues, E: independence and activity, F: family and social life, G: treatment-related issues, H: personal issues, H: personal issues. SPARC-Sp = Spanish translation Sheffield Profile for Assessment and Referral for Care.

Table 6. Reliability per McDonald's total omega for each domain of the new SPARC-Sp structure

Estimates	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
Total omega	0.83	0.94	0.78	0.65	0.77	0.67	0.92	0.78	0.82	0.46	0.57	0.56

*F1: personal issues, F2: independence and activity, F3: psychological issues, F4: depression, F5: functional limitations, F6: communication needs, F7: gastrointestinal symptoms, F8: family and social life, F9: treatment, P10: communication with health staff, F11: respiratory symptoms and anxiety, F12: cognitive symptoms. SPARC-Sp = Spanish translation Sheffield Profile for Assessment and Referral for Care.

which includes communication with physicians or nurses. The EFA results fragmented the physical symptoms into new domains such as gastrointestinal symptoms (nausea and vomiting), respiratory symptoms, and anxiety (shortness of breath, coughing, thoughts about death, dying, or passing away) and cognitive symptoms (memory loss and difficulty concentrating). The greatest opportunities for improvement were the lack of representativeness of the items in relation to the construct assessed in the domains of religion and spirituality. Similar to the Korean SPARC validation, multiple taboos, and obstacles about death, dying, and passing away may have limited responses to these items (Kwon et al. 2021).

The newly identified domains reveal constructs that may be interesting for research purposes, particularly if they can later be confirmed by other studies. However, it was decided not to change the structure of SPARC-Sp according to these domains for several reasons: (i) it may be very burdensome for patients to answer who domains related to depressive feelings and communication needs; (ii) some items are related to more than one of these domains; (iii) changing SPARC-Sp according to these domains will hamper international comparisons with the same instrument in other countries. Moreover, the question order in the original SPARC has a logic for the patients (communication and information, physical, psychological, religious, and spiritual symptoms; independence and activity; family and social life; treatment and personal issues) and keeping the items in the original SPARC order "spreads" the questions throughout the questionnaire, but the underlying domains can still be analyzed.

We expected weak correlations between the SPARC-Sp total score or the independence and functional domain with ECOG and Karnofsky. The very heterogeneous population of patients in our study may have diluted potential stronger correlations within subgroups. Moreover, the domain of independence and activity of SPARC-Sp measures similar but not equal constructs. Furthermore, ECOG and Karnofsky scales are assessed by clinicians. Previous research into measurement of care needs using other instruments suggested that patient-provided assessment results in lower (poorer) scores compared to those provided by healthcare staff (Kelly and Shahrokni 2016).

For the purpose of this validation, the Korean (Kwon et al. 2021) and Taiwanese (Tsai et al. 2023) validation of SPARC used the FACT-G (the Functional Assessment of Cancer Therapy scale) instrument (Cella et al. 1993). FACT-G includes physical, emotional, social/family, and functional domains for cancer patients, which correlated well with the domain of independence and functionality (Kwon et al. 2021; Tsai et al. 2023). As our sample included many NCD patients without a cancer diagnosis, FACT-G could not be used. We observed a weak correlation with SARC-F assessment and the total score of SPARC-Sp (rho: 0.35, 95% IC: 0.27; 0.43, $p < 0.001$) and independence and activity domain (rho: 0.31, 95% IC: 0.22; 0.30, $p < 0.001$) and for our study 51% of participants presented sarcopenia (SARC-F $\geq$ 4).

Persons with multiple comorbidities (41% of our population) had higher SPARC-Sp scores, indicating more holistic PC needs. Previous research suggests that comorbidities may occur within the natural history of disease, where the symptomatology of comorbidities may concomitantly lead to more holistic needs in PC (Luo et al. 2019).

Previous validations of SPARC assessed reliability using Cronbach's alpha, determining good reliability for the domains of independence and activity, treatment, physical and psychological symptoms (Kwon et al. 2021). Our research using McDonald's

omega also showed acceptable reliability (0.7–0.9) for these domains. We identified low reliability for the domain of religious and spiritual themes, similar that in previous validations (Kwon et al. 2021; Leppert et al. 2012) as well as for the communication and information domain – a domain not previously assessed in other SPARC-Sp validations. For the religious and spiritual themes, participants of the content-based evidence study suggested the inclusion of access to spiritual support, spiritual companionship, and peace of mind (2024).

This research had multiple limitations; it was conducted in a single hospital in Colombia, so the generalizability of the information does not represent the Colombian context, especially in areas with a higher level of urbanization and education. Although we had a large sample size that included diverse NCDs, the heterogeneity of the PC needs of each of these and the small number of patients with specific pathology groups such as cancer, could limit the correlations of the SPARC-Sp domain of independence and functionality with other functionality scales, as well as the low correlations between SPARC-Sp and tumor stage.

The construct of holistic needs in PC does not have a gold standard for its evaluation, therefore, the evaluation of evidence based on the relationship with other variables was an approximation to one of the domains, nor was it possible to implement other scales to assess evidence based on convergence and divergence. Neither the reliability related to the time of application, also called test–retest, nor the reliability related to the subject was evaluated due to the impossibility of performing a second application of the instrument because of the variability linked to the patient's clinical condition – the SPARC-Sp score could change rapidly due to deterioration (or improvement) in the patient's particular situation.

This validation of SPARC in the NCD population and in Spanish showed a high reliability of the instrument and to propose its internal structure, which we hope will be an input for future research with comparable populations. We hope that SPARC-Sp will help guide the holistic identification of needs in PC, but future research is needed to adapt and validate this modification of SPARC-Sp to other forms of administration considering the low educational level of the population and the integration of relevant contextual domains.

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