Reliability and Concurrent Validity of the Palliative Outcome Scale, the Rotterdam Symptom Checklist, and the Brief Pain Inventory

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Abstract

Background: Some domains of the questionnaires used to measure symptoms and quality of life (QOL) in patients with advanced cancer seem to measure similar dimensions or constructs, so it would be useful for clinicians to demonstrate the interchangeability of equivalent domains of the questionnaires in measuring the same constructs.

Objective: This study investigated the reliability and concurrent validity of the Palliative Outcome Scale (POS), the Rotterdam Symptom Checklist (RSCL), and the Brief Pain Inventory (BPI), used to measure symptom control in patients with advanced cancer.

Design: This was an evaluative study.

Setting/Subjects: Subjects were patients with advanced cancer attended by Spanish primary care physicians.

Measurements: Secondary analysis was performed of 117 outpatients who completed the POS, BPI, and RSCL at two different times, with an interval of 7 to 10 days. Bland and Altman analyses and plot, repeatability coefficient, as well as Spearman correlations were carried out.

Results: There were 117 included patients. Mean age was 69.4 (11.5) years, gender was 60% male, 37.6% completed only elementary school, diagnoses were mainly digestive and lung cancer, with a low functional rate and presence of oncologic pain. First and second questionnaire rounds showed significant correlations and agreement. Agreement was shown between pain intensity of BPI and pain and physical scales of RSCL, and between physical symptoms of RSCL and of POS, with significant correlations in equivalent dimensions.

Conclusion: BPI, POS, and RSCL have shown adequate reliability and moderate concurrent validity among them.

Introduction

THE CARE OF PATIENTS with advanced cancer implies a shift from cure and control of the disease to the management of symptoms and maintenance of quality of life (QOL). Mularski and colleagues have recommended the evaluation of interventions in palliative care (PC) using a conceptual model which includes patient condition specific, patient-reported outcomes and caregiver-reported outcomes. Symptom control and QOL are the two most relevant outcome domains recommended in the management of patients requiring PC.[1]

A systematic review about symptom prevalence in patients with incurable cancer found that five symptoms (fatigue, pain, lack of energy, weakness, and appetite loss) occurred in more than 50% of the patients at different times of their illness, among 37 more symptoms.[2] Considering that QOL is the main objective of PC and that symptoms of cancer patients are predictors of QOL, it seems convenient to have appropriate questionnaires to help clinicians in making clinical decisions taking into account the patient's perspective.[3]

A large variety of QOL questionnaires are appropriate for use in PC, but at present there is no agreement on which of them are the best instrument to use.[4,5] Among the recommendations proposed for measuring outcomes in randomized prospective trials in PC, especially stressed have been to use and to expand the testing of existing instruments for validity and reliability across diseases, settings, and populations.[6]

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In a previous study performed by the authors[7] to assess the clinical effectiveness of online versus traditional training in PC of primary care physicians, questionnaires were administered to patients to measure their symptom control and QOL through the short version of the Brief Pain Inventory (BPI)[8] and the Rotterdam Symptom Checklist (RSCL)[9] and to capture their global PC concerns though the Palliative Outcome Scale (POS).[10]

These questionnaires, internationally recommended because of their adequate psychometric properties to assess the impact of symptoms and QOL upon patients with advanced cancer,[1,5,11] have been previously used to assess the effectiveness of the PC in Spanish clinical settings.[7,8,12]

The short version of the BPI (pain items) and RSCL showed, in a previous study, moderate or good correlation (mainly with psychological and global QOL scales of the RSCL).[9] According to our knowledge, the current validity between BPI, RSCL, and POS has not been studied yet in patients with advanced cancer requiring PC in primary care.

Some domains of these questionnaires measure similar dimensions, BPI measures pain, RSCL measures symptoms and overall QOL, while POS also measures physical symptoms and psychological distress in addition to QOL. Taking into account that the questionnaire's comparisons in a primary care setting in a PC population are absent in the scientific literature, the evaluation of the concurrent validity among these questionnaires will increase knowledge about their psychometric properties and interchangeability of equivalent domains.

The first aim of the study was to describe the reliability and the criterion validity of the POS and also the concurrent validity with equivalent domains of the RSCL and the BPI questionnaires. A secondary objective was to study the concurrent validity between equivalent domains of the RSCL and the BPI.

Methods

Participants and setting

The methodology for the first stage of the study has been previously described.[7] Briefly, during 2009 an online course on PC versus traditional training was performed in Spanish primary care physicians to assess the impact on control symptoms, QOL, and also caregiver satisfaction. Physicians from 136 primary health centers from all 17 Spanish health regions participating in that study enrolled consecutive patients with advanced cancer requiring PC. The mean number of patients recruited in each primary health center was two patients (range 1–3), who completed the questionnaires if they were able to read and write and give informed consent. Patients with Karnofsky score (PS)[13] <20, cognitive impairment (>3 errors in the Pfeiffer's scale),[14] and attended by a specialized palliative team were excluded. Variables included age, gender, level of education classified into six levels, type of cancer, other diseases, treatments received, oncologic pain, and time of treatment for pain, Karnofsky score, and patients' awareness of their condition (complete, partial, does not know). The data here presented are a secondary analysis focused on the concurrent validity of the questionnaires used in our previous study, which was already sent for publication.

Measurements

When enrolling patients, physicians registered patient variables and provided the patient with the POS, the BPI, and the RSCL for them to complete during the next three days. The patients again completed the three questionnaires after 7–10 days to evaluate the change of scores as a psychometric property of the questionnaires to measure change.

The POS[10] is a multidimensional questionnaire with 10 items, scored in a Likert scale of 0–4 (0 reports the best score, and 4 the worst score). Its structure has shown two factors: psychological well-being and quality of care. Besides, three items are analyzed independently: pain control, family anxiety, and symptoms.[15] For this study, item 9 (wasted time waiting for tests while in-hospital) was not included, as this is out of context within the primary care setting.

The BPI[8] is a multidimensional questionnaire including 21 items, 11 of which are grouped into two scales: pain intensity (4 items measuring pain at its worst, pain at its least, pain on the average, and pain right now) and pain impact (7 items measuring pain impact on general activity, mood, walking ability, normal work, relations with other people, sleep, enjoyment of life). The measurement scale ranges from 0 (no pain / does not interfere with daily life) to 10 (pain as bad as you can imagine / completely interferes with daily life).

The RSCL[9] is a generic cancer questionnaire including 39 items, grouped in four scales (score 0–100): physical symptoms, psychological symptoms, daily life activities, and overall QOL. It provides a score for each scale and subscale (fatigue, pain, gastrointestinal, and chemotherapy). High scores represent a worse QOL, except for activity, which is interpreted the other way around. The chemotherapy subscale was not used in this study, as it was deemed useless for patients with no active treatment.[16]

Statistical analyses

All patients have been considered as a single group, differentiating between first and second completions. BPI and POS scales were converted into a 0–100 scale. Means and SDs were calculated for patient characteristics. To determine test-retest reliability, the Spearman's correlation coefficient was calculated between the first and second measurements. A correlation >0.8 is described as strong, correlation <0.5 as weak. Additionally, to determine agreement, the coefficient of repeatability was calculated and Bland and Altman analyses and plots were made in which the mean difference between the first and second measurements with corresponding 95% CI and 95% limits of agreement (LOA) were presented.[17,18]

To determine concurrent validity among POS, BPI, and RSCL in the symptom domains, the following comparisons were made according to the objectives of the study:

The first objective: pain on POS with pain intensity on BPI; feel good and total score on POS with pain impact on BPI; pain on POS with pain on RSCL; symptoms on POS with physical on RSCL; psychological well-being on POS with psychological on RSCL; total score on POS with global on RSCL.

The second objective: pain intensity on BPI with pain and physical on RSCL; and pain impact on BPI with physical, global, and fatigue on RSCL.

Bland and Altman analyses were performed, through ANOVA, between equivalent domains of questionnaires with repeated measurements. Two different variances were
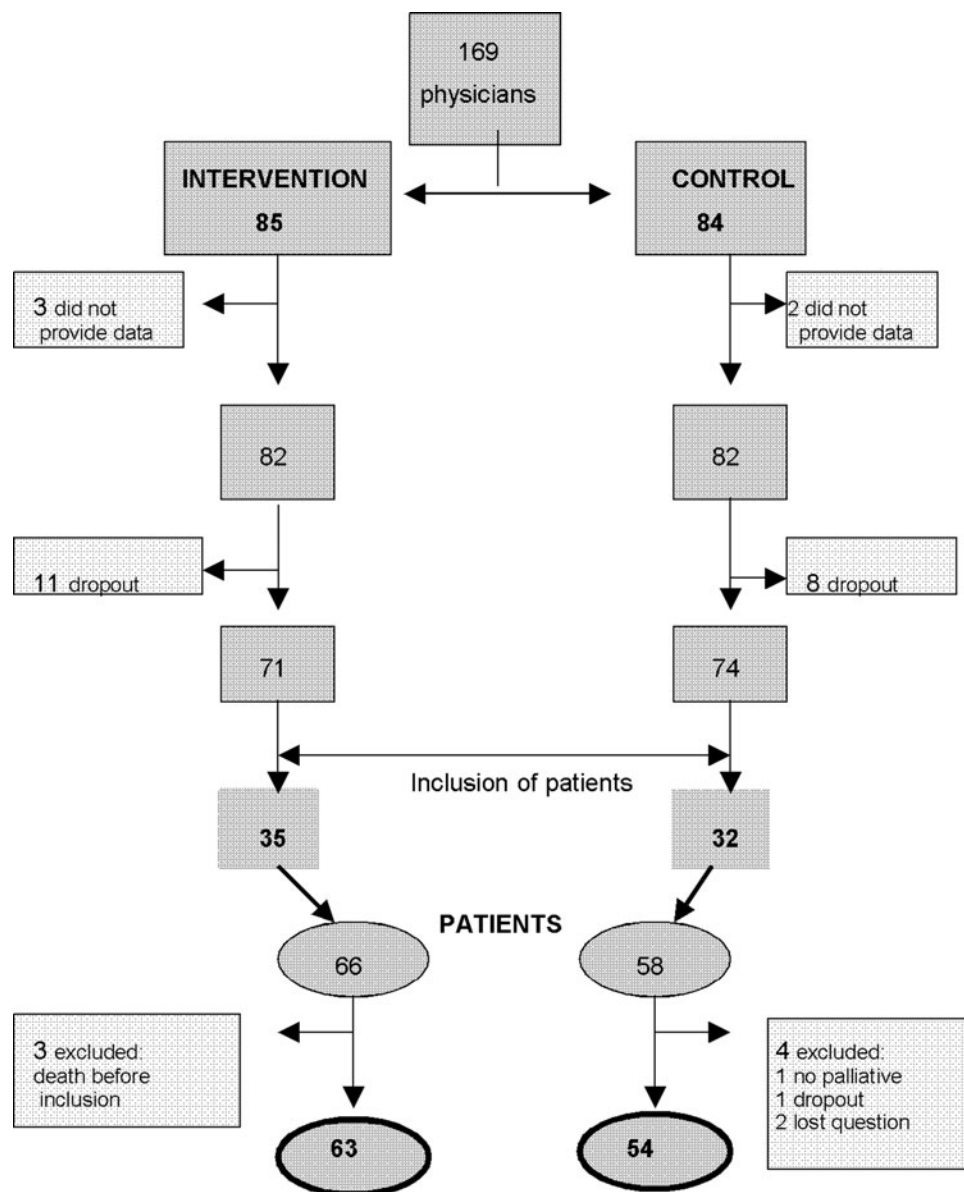
FIG. 1. Physicians and patients participation flowchart in the primary study.

estimated: within and between subjects, to found the LOA and determine whether bias occurred.[18] The LOA contains the difference between measurements by the two questionnaires for 95% of pair measurements on similar individuals. The 95% CI of the mean difference between two questionnaires should contain zero in order to exclude lack of agreement.

SPSS 18.0 (SPSS Inc., Chicago, IL) was used for analysis and MedCal for Windows 12.1.4 for plots performance; $p < 0.05$ was considered to be significant value.

Results

Participant characteristics

A total of 169 primary care physicians from 136 primary health centers were included in the primary study. After exclusions, 164 remained, of which 19 dropped out leaving 145 physicians. Of these, 67 from 51 primary health centers of the

original 136, enrolled a total of 124 patients, from which 7 dropped out for different reasons, leaving 117 patients for analysis (see Figure 1). Out of 117 included patients, 11 (9.5%) did not complete all questionnaires. Sixty percent of patients were men, mean age 69.4 (11.5 SD) years; 37.6% had an elementary school education. Digestive and lung cancer, 56.4%; PS < 50, 57.3%; presence of oncology pain, 67.5%; requiring home care, 72%; and 51.3% were fully aware of their disease diagnosis (see Table 1). Patients self-completing the questionnaires, 22.3%; needing help from a relative, 42.7% and from a physician, 35.5%.

Reliability

The test-retest is shown in Table 2. The Bland and Altman analyses showed that zero lies within the 95% CI of the mean difference between the first and second measurement of the POS, BPI, and RSCL except for marginal values in family

TABLE 1. PATIENT CHARACTERISTICS

Characteristic	Patients, N=117 (%)
Men	70 (60.0)
Mean age, years (SD)	69.4 (11.5)
Education	
- Literacy	42 (36.0)
- Elementary school	44 (37.6)
- Secondary education	15 (12.8)
- Professional training	5 (4.3)
- Undergraduate degree	6 (5.1)
- High school diploma	5 (4.3)
Cancer type	
- Digestive tract	37 (31.6)
- Lung	29 (24.8)
- Prostate	10 (8.5)
- Larynx	7 (6.0)
- Breast	5 (4.3)
- Other	29 (24.8)
Radiotherapy	35 (30.0)
Chemotherapy	62 (53.0)
Karnofsky score ≤50	67 (57.3)
Oncologic pain	79 (67.5)
Time of pain treatment in days, mean (SD), range	127 (222.0) 1–1345
Opiates[a]	79 (67.5)
- Sustained-release morphine	23 (19.6)
- Short-acting morphine	17 (14.5)
- Fentanyl patch	30 (25.6)
- Short-acting fentanyl	9 (7.7)
- Sustained-release oxycodone	4 (3.4)
- Short-acting oxycodone	2 (3.0)
- Hydromorphone	3 (2.6)
- Buprenorphine	3 (2.6)
- Tramadol	15 (12.8)
Constipation prevention in opiate treatment	29 (36.7)
Analgesics (acetaminophen, metamizol)	47 (40.2)
Diagnosis knowledge	
- Completely	60 (51.3)
- Partially	48 (41.0)
- No knowledge	9 (7.7)
Home care	84 (71.8)
Diseases	
- Cardiovascular	82 (70.1)
- Diabetes and endocrines	54 (46.1)
- COPD	23 (19.7)
- Osteoarthritis	23 (19.7)
- Gastrointestinal	10 (8.5)
- Other	52 (44.4)
Other treatments[a]	
- Antisecretory drugs	53 (45.3)
- Cardiovascular	36 (30.8)
- Antidepressives/anxyolitics	38 (32.5)
- Corticoids	36 (30.8)
- Antianorexicos	9 (7.7)
- NSAIDs	14 (12.0)
- Other	40 (35.5)

[a]percentage exceeds 100%.
SD, standard deviation; COPD, Chronic Obstructive Pulmonary Disease; NSAIDs, antiinflammatory nonsteroid.

anxiety of POS and pain of RSCL, indicating no bias. Total agreement with life worthwhile and feel good of POS was found. The LOA shows the limits of 95% of differences (mean of differences ±1.96*SD) including the 95% CI for the lower and the upper LOA. These intervals were wide, reflecting the variation of the differences; for example, when the first measurement of psychological well-being on POS is compared with the second measurement, the 95% LOA lie between −30.4 and 26.8, with the zero into the 95% CI of the mean difference between measurements (mean difference −1.8, 95% CI −4.6, 1.1), indicating that the limits appear to fit the data well (see Figure 2).

The repeatability coefficient value of 29.2 shows that the probability of detecting a test-retest increase in the psychological well-being 29.2 scores in the test population is only 2.5%. The most stable items or scales were life worthwhile, feel good, psychological well-being, total score of POS, and physical of RSCL. All the Spearman's correlation coefficients were high and significant. The items with the higher correlations between first and second measurements were, for POS, psychological well-being (0.8), life worthwhile (1), feel good (1), practical matters (0.7), and total score (0.7); for BPI, pain intensity (0.8) and pain impact (0.8); and for RSCL, activity (0.8) and psychological (0.7).

Concurrent validity

Table 3 shows comparison of items and total score of POS with equivalent domains on BPI and RSCL and repeated measurements with the difference between measurements by the questionnaires, compared two by two, for 95% of pair measurements on similar individuals. It is shown that zero lies within the 95% CI of the mean difference between symptoms on POS and physical on RSCL, and between pain intensity on BPI and pain and physical on RSCL, indicating no bias. When symptoms on POS is compared with physical domain on RSCL, the 95% LOA lie between −42.4 and 39.7. When pain intensity on the BPI is compared with pain on RSCL, the 95% LOA lie between −38.0 and 40.3. When pain intensity on BPI is compared with physical on RSCL, the 95% LOA lie between −33.5 and 37.1. In all other comparisons, zero doesn't lie within the 95% CI of the mean difference, indicating bias. Figure 3 shows that when pain impact on BPI is compared with physical on RSCL, the 95% LOA lie between −25.6 and 69.3, with zero out of the 95% CI of the mean difference between both domains (mean difference 21.8, 95% CI 17.4, 26.3), indicating lack of agreement. The limits don't appear to fit the data well.

All the Spearman's correlation coefficients were high and significant. The dimensions with the higher correlations were between pain intensity on BPI and pain on POS (0.7); pain impact on BPI and total score on POS (0.7); psychological on RSCL and psychological well-being on POS (0.6) and patient anxiety on POS (0.7).

Discussion

In this study including advanced cancer patients requiring PC provided by primary care physicians in Spain, secondary analysis of POS, BPI, and RSCL questionnaires has shown that all the questionnaires presented an adequate test-retest reliability and agreement, with marginal values in family anxiety on POS and pain on RSCL and good internal consistency. In

TABLE 2. PALLIATIVE OUTCOME SCALE, BRIEF PAIN INVENTORY, AND ROTTERDAM FIRST MEASUREMENTS
AGREEMENT AND CORRELATION WITH SECOND MEASUREMENTS

Item/scale	95% LOA (95% CI)	Mean difference between measurements (95% CI for bias)	Repeatability coefficient	Spearman correlation[a]
Palliative Outcome Scale (POS)				
Psychological well-being	−30.4 (−25.4; −35.3) 26.8 (21.9; 31.8)	−1.8 (−4.6; 1.1)	29.2	0.8
Quality of care	−33.5 (−39.5; −27.4) 35.2 (29.2; 41.3)	0.9 (−2.6; 4.4)	35.0	0.7
Pain	−40.4 (−47.9; −32.8) 48.4 (40.9; 55.9)	4.0 (−0.3; 8.4)	45.2	0.6
Symptoms	−46.3 (−54.4; −38.1) 50.0 (41.9; 58.2)	1.9 (−2.8; 6.6)	49.1	0.5
Family anxiety	−50.1 (−59.7; −50.6) 61.3 (51.7; 70.9)	5.6 (0.0; 11.1)	56.8	0.5
Patient anxiety	−44.6 (−36.7; −52.4) 47.4 (39.6; 55.3)	1.4 (−3.1; 6.1)	46.9	0.7
Given information	−48.2 (−39.2; −57.1) 55.0 (46.1; 64.0)	3.4 (−1.7; 8.6)	52.7	0.5
Share feelings	−46.1 (−38.3; −53.8) 44.7 (36.9; 52.4)	−0.7 (−5.2; 3.8)	46.3	0.6
Life worthwhile	0	0	0	1
Feel good	0	0	0	1
Practical matters	−44.5 (−37.0; −52.2) 42.1 (34.6; 49.6)	−1.2 (−5.5; 3.1)	44.2	0.7
Total score	−21.5 (−17.5; −25.4) 22.2 (18.3; 26.1)	0.4 (−1.9; 2.6)	22.3	0.7
Brief Pain Inventory (BPI)				
Pain intensity	−27.3 (−22.4; −32.2) 28.4 (23.6; 33.3)	0.5 (−2.3; 3.4)	28.4	0.8
Pain impact	−35.0 (−28.7; −41.3) 35.8 (29.4; 42.1)	0.4 (−3.2; 4.0)	36.1	0.8
Rotterdam Symptom Checklist (RSCL)				
Physical	−20.2 (−16.5; −23.9) 22.7 (19.1; 26.4)	1.3 (−0.8; 3.4)	21.9	0.7
Psychological	−38.7 (−32.4; −45.0) 34.9 (28.5; 41.2)	−1.9 (−5.5; 1.7)	37.5	0.7
Activity	−31.4 (−25.1; −37.6) 41.5 (35.3; 47.0)	5.1 (1.5; 8.7)	37.2	0.8
Global	−42.8 (−35.6; −50.0) 39.1 (31.9; 46.3)	−1.8 (−6.0; 2.3)	41.8	0.7
Fatigue	−29.5 (−24.3; −34.7) 31.1 (25.9; 36.3)	0.8 (−2.2; 3.8)	30.9	0.7
Pain	−26.6 (−21.5; −31.6) 32.5 (27.3; 37.7)	2.9 (0.0; 5.9)	30.1	0.7
Gastrointestinal	−27.3 (−22.3; −32.2) 30.6 (25.7; 35.6)	1.7 (−1.2; 4.5)	29.5	0.6

[a]All the values are significant ($p < 0.01$).
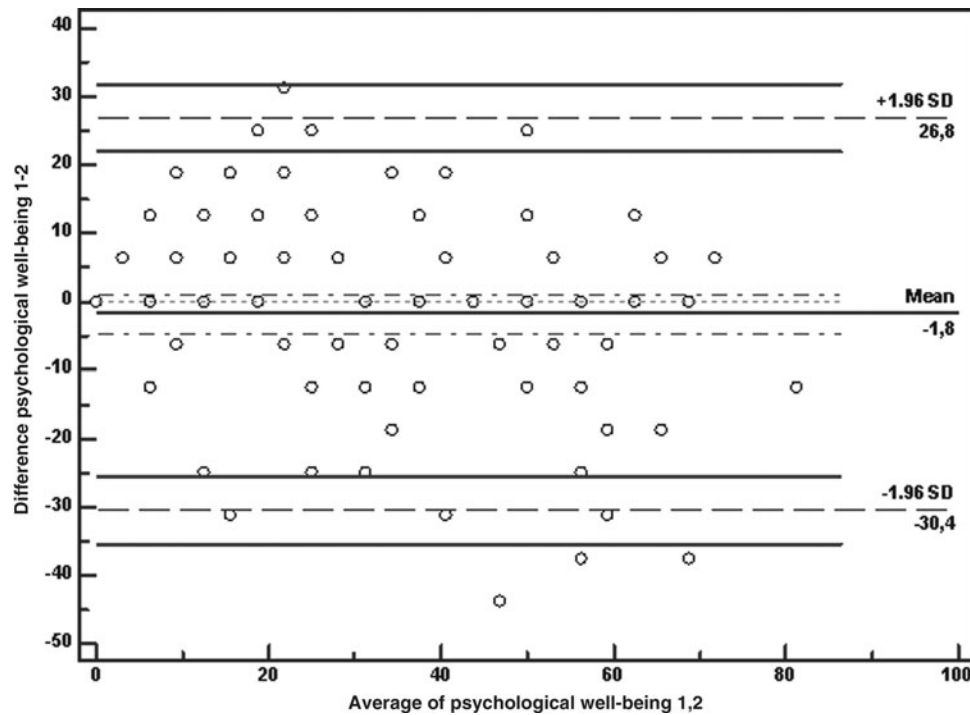CI, confidence interval.

FIG. 2. Bland-Altman plot of first and second measurements of Psychological well-being on POS.
Note: The figure shows the limits of 95% of differences (mean of differences ±1.96* SD) including the 95% CI for the lower and the upper LOA.

TABLE 3. PALLIATIVE OUTCOME SCALE AGREEMENT AND CORRELATIONS WITH BRIEF PAIN INVENTORY
AND ROTTERDAM BRIEF PAIN INVENTORY AGREEMENT AND CORRELATION WITH ROTTERDAM

Scale 1	Scale 2	95% LOA (95% CI)	Mean difference between measurements (95% CI for bias)	Spearman correlation[a]
Pain on POS	Pain intensity on BPI	−48.7 (−42.5; −54.9) 27.0 (20.7; 33.2)	−10.9 (−14.4; −7.3)	0.7
	Pain on RSCL	−59.2 (−51.5; −67.0) 36.6 (28.9; 43.8)	−11.3 (−15.7; −7.0)	0.5
Feel good on POS	Pain impact on BPI	−37.7 (−27.7; −47.0) 82.7 (72.7; 92.7)	22.5 (16.7; 28.3)	0.4
Symptoms on POS	Physical on RSCL	−42.4 (−35.7; −49.0) 39.7 (33.0; 40.3)	−1.3 (−5.2; 2.5)	0.5
Psychological well-being on POS	Psychological on RSCL	−27.1 (−21.0; −33.3) 48.6 (42.5; 54.7)	10.7 (7.2; 14.3)	0.6
Total score on POS	Global on RSCL	−23.2 (−19.5; −6.9) 64.0 (57.7; 70.3)	25.4 (21.8; 29.0)	0.6
	Pain impact on BPI	−29.3 (−23.5; −35.1) 64.8 (59.0; 70.6)	17.7 (14.4; 21.1)	0.7
Pain intensity on BPI	Pain on RSCL	−38.0 (−31.6; −44.5) 40.3 (33.9; 46.7)	1.1 (−2.6; 4.8)	0.5
	Physical on RSCL	−33.5 (−27.7; −39.2) 37.1 (31.3; 42.9)	1.8 (−1.5; 5.2)	0.5
Pain impact on BPI	Physical on RSCL	−25.6 (−17.4; −32.9) 69.3 (61.1; 76.6)	21.8 (17.4; 26.3)	0.6
	Global on RSCL	−56.1 (−48.1; −64.1) 40.4 (32.4; 48.4)	−7.8 (−12.5; −3.2)	0.6
	Fatigue on RSCL	−38.3 (−31.2; −46.5) 53.3 (45.7; 60.9)	7.2 (2.8;11.6)	0.6

[a]All the values are significant ($p < 0.01$).
BPI, Brief Pain inventory; CI, confidence interval; POS, Palliative Outcome Scale; RSCL, Rotterdam Symptom Ckecklist.

relation to concurrent validity, agreement was only found between symptoms on POS and physical on RSCL, and between pain intensity on BPI and pain and physical domains on RSCL. However, all the correlations among questionnaires were significant and with high values. This high correlation does not mean that the questionnaires agree, due to the fact that the correlation measures the strength of a relation between two variables, not the agreement between them. The correlation is dependent on the range of the measurement and the variability among subjects—the more variable the sub-jects, the greater will be the correlation. These features are quite acceptable in the study of test-retest reliability, where the correlation can be regarded as an index of the information content of the measurement, but in the context of comparing two methods of measurement this approach is less convinc-ing.[19] In this study, high correlation (0.7) between pain in-tensity on BPI and pain on POS, for example, seems to be in poor agreement.

The questionnaires used measure different domains. In particular, POS is designed to capture all palliative concerns,
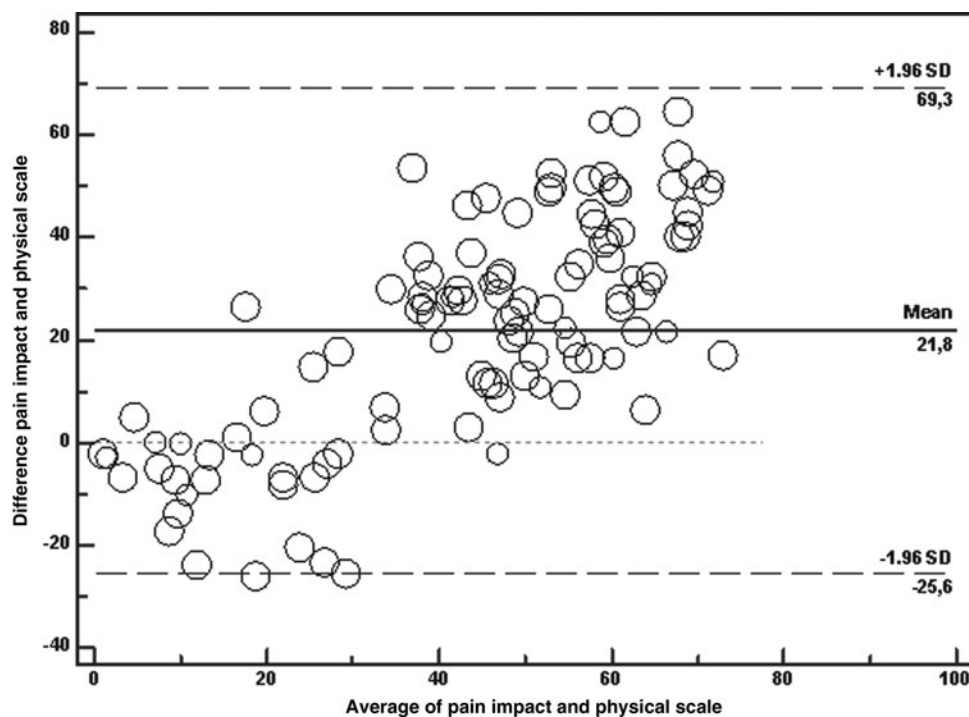

FIG. 3. Bland-Altman plot of Pain impact (BP) and Physical scale (RSCL) with multiple measurements per subject. Note: The figure shows that when pain impact on BPI is compared with physical on RSCL, the 95% LOA lie between −25.6 and 69.3 with zero out of the 95% CI of the mean difference between both domains.

not just symptoms and related domains; BPI measures pain and its impact on the patient's life; and RSCL addresses symptoms and QOL. It is unlikely that the questionnaires will agree exactly, by giving the identical result for all the individuals; so the comparison of the difference between the two questionnaires against their mean will show how much a questionnaire is likely to differ from the other. The magnitude of the difference that is acceptable is a clinical decision.[18] However, the 95% CI of the mean difference between two questionnaires should contain zero in order to exclude lack of agreement. In accordance to this, symptoms on POS shows good agreement with physical on RSCL, and pain intensity on BPI shows good agreement with pain and physical on RSCL. All the other comparisons among equivalent domains of questionnaires show low agreement. To our knowledge this is the first time that the analysis of symptoms on POS shows a concurrent validity with physical on RSCL. All the other domains and items on POS are not interchangeable with RSCL or BPI.

Comparisons of these results with scientific literature data are very few. We have found concurrent validity data by means of correlation coefficients for BPI with RSCL, but not between the POS and the BPI or the RSCL. No results of questionnaire agreement have been found.

In the study by Badía and colleagues,[8] the concurrent validity for both BPI dimensions was correlated with the physical, psychological, activity, and global scales of RSCL, with similar values to those obtained in our study, except for the correlation between physical and pain intensity, where the value was lower (0.28).

Although the RSCL was originally intended for use in cancer patients receiving active treatment, it was also used in advanced cancer patients, proving to be more useful as an instrument for physical and psychological symptom control than as an instrument for QOL measurement.[12] The Spanish version of the RSCL has been validated by the authors of this study in patients with terminal cancer, showing good psychometric properties.[9,16]

Regarding BPI, pain intensity and impact are highly correlated as has been shown in previous studies.[8,21] However for clinical trials in cancer patients it has been proposed to combine these two dimensions to form an overall summary score leading to a more simplified instrument with the aim of reducing the variety of existing multidimensional pain measurement tools.[21] Other recommended questionnaires, translated into Spanish, to measure QOL in patients with advanced cancer are the EORTC QLQ-C30 and EORTC QLQ-C15-PAL[24] questionnaires. EORTC QLQ-C30, a generic oncology questionnaire, has shown to be valid and reliable to measure QOL in patients with advanced cancer.[22,23] The EORTC QLQ-C15-PAL[24] questionnaire is a brief version of the QLQ-C30 for the measure of QOL in terminal patients with cancer, whose Spanish translation was published after this study was designed. In addition, there is no consensus yet on which is the best instrument to measure QOL in patients with advanced cancer.[4,5]

One limitation of this study comes from the secondary analysis of the basic study designed to compare symptom control for patients with advanced cancer, who were treated by physicians receiving online training or traditional training in PC. No significant differences were observed in symptom control for patients in both groups; therefore the whole set of questionnaires by all patients has been analyzed, observing the first or second completion times. Another limitation is that the number of patients included was not as expected in spite of the adequate number of physicians included; patients with cognitive impairment were excluded as well as those followed directly by the palliative team.

On the other hand, one of the strengths of the current study is that participants were patients from the whole country attended by primary care physicians, with specific characteristics (mainly men around 70 years of age, poorly educated, with low PS, treated with opiates and receiving PC at home) in whom the questionnaires have been very scarcely documented.

The practical implications of the study are that the questionnaires show an acceptable reliability in patients with advanced cancer receiving PC in a primary care setting, and that the physical scale of RSCL could be interchangeable by symptoms on POS, and pain intensity on BPI could be interchangeable by pain and physical on RSCL. Future research should expand the testing of these instruments in other patients receiving PC in different settings to confirm the results shown in this study.

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Author Disclosure Statement

No competing financial interests exist.

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