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Validity and reliability of the integrated palliative care outcome scale (IPOS) in Korea: a multicenter study of terminally ill cancer patients

So-Jung Park[1†], Yujin Park[2†], Mira Han[3], Sun-Hyun Kim[4], In Cheol Hwang[5], Go-un Woo[6], Yoo Jeong Lee[7], Young Sung Kim[8], Hyun Jung Jho[1] and Yoon Jung Chang[9*]

Abstract

Background The Integrated Palliative care Outcome Scale (IPOS) is a key tool for assessing the quality of palliative care using patient-reported outcomes. This study aimed to culturally adapt and translate the IPOS to Korean and verify its psychometric properties for use in palliative care settings.

Methods The IPOS was translated and culturally adapted, followed by validation in 119 terminally ill cancer patients and 28 healthcare providers across six Hospice and Palliative Care Units from September 2023 to January 2024. Reliability was assessed using internal consistency, test-retest reliability, and inter-rater reliability. Concurrent validity was assessed using Spearman's correlation coefficients between the IPOS items and the corresponding EORTC QLQ-C15-PAL and the corresponding FACIT-Sp-12.

Results The Korean IPOS demonstrated good internal consistency, with Cronbach's alphas of 0.74 for patients and 0.81 for staff. The test-retest reliability showed moderate-to-good stability, with an intra-class correlation coefficient of 0.722 for the IPOS total score. Concurrent validity was supported by moderate correlations with the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 15 Palliative Care (EORTC QLQ-C15-PAL) and Functional Assessment of Chronic Illness Therapy-Spiritual Well-being Scale (FACIT-Sp-12). Known-group validity was demonstrated by significant differences in the IPOS scores across Phase of Illness.

Conclusion The Korean IPOS is reliable and valid for assessing palliative care outcomes. This validation supports its use in clinical practice and research and provides a robust framework for evaluating and improving palliative care delivery in Korea.

Keywords Palliative care, Patient-reported outcome measures, Integrated Palliative care Outcome Scale, Reliability, Validity, Psychometrics

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[†] So-Jung Park and Yujin Park contributed equally to this work.

*Correspondence:
Yoon Jung Chang
eunice.ncc@gmail.com

Full list of author information is available at the end of the article

Background

Palliative care is an interdisciplinary approach that improves the quality of life for patients who are facing life-threatening illnesses, as well as that of their families [1]. The need for palliative care has grown globally due to the aging population and increase in non-communicable diseases [2]. Previous studies have revealed that 38–74% of all deaths require palliative care [3, 4]. In South Korea, the government has actively supported Hospice and Palliative Care (HPC) since 2003 through various initiatives, including a pilot project for a payment system, the designation of HPC units (HPCUs) with government funding, the enactment of related laws, and public awareness campaigns. These efforts significantly increased the number of designated HPCUs from 19 (282 beds) in 2008 to 94 (1,603 beds) in 2023 [5]. Additionally, the utilization rate of HPC by terminal cancer patients rose from 7.3% of all cancer-related deaths in 2008 to 24.2% in 2022 [5]. In addition to this quantitative growth, achieving qualitative improvements in the delivery of palliative care for people with serious illnesses is important.

The importance of outcome measurement in improving the quality of palliative care has been emphasized globally [6]. Outcome measurements, specifically patient-reported outcome measures (PROMs), not only access and monitor palliative care but also position patients at the center of care, focusing on what matters most to them [7]. Additionally, PROMs are often used as a basis for obtaining funds from governments or commissioners [8]. The Integrated Palliative care Outcome Scale (IPOS) is a scale that was specifically developed to measure palliative care outcomes and represents a streamlined outcome measure that addresses the important concerns of patients and staff. It covers primary concerns, symptom experiences, emotional and existential well-being, sharing feelings with family, adequacy of information received, and practical challenges related to illness [9].

In Korea, a significant shift has occurred in healthcare from focusing solely on quantitative growth and evaluation to emphasizing qualitative improvements. As part of these efforts, the IPOS has been used to establish a patient-centered hospice service quality assessment system. The IPOS has been translated and validated in multiple languages, including German [10], French [11], Japanese [12], Czech [13], and Polish [14] demonstrating excellent reliability and validity through cognitive interviews and convergent validity assessments [13]. Therefore, this study aimed to translate and cross-culturally adapt the IPOS into Korean and assess the validity and reliability of the Korean version.

Methods

Translation and cross-cultural adaptation

We followed the European Organization for Research and Treatment of Cancer (EORTC) standard translation and validation guidelines [15] and the manual for cross-cultural adaptation and psychometric validation of the POS [16]. The original IPOS was translated into Korean by two independent bilingual translators—one expert in palliative care and the other non-clinical. After comparison and discussion between the translators, the consensus version of the scale was retranslated into English by two native English speakers who had not seen the original version. Subsequently, all translators, palliative care professionals, and research team members performed expert reviews. Finally, a cognitive interview was conducted with 16 patients and 7 palliative care professionals who discussed its comprehension, interpretability, and suggestions for improvement. All completed templates and questions were sent to the POS Development Team (King's College, London, UK) for proofreading and endorsement. Minor revisions and subsequent discussions have been made. This final version of the Korean translation of the IPOS was used for psychometric testing.

Study population

We conducted a multicenter observational prospective study. Six HPCUs were included in this study from September 2023 to January 2024. These HPCUs have been designated by the Ministry of Health and Welfare as hospice-specialized institutions that provide inpatient hospice care or consultation hospice services by a multidisciplinary healthcare team comprising physicians, nurses, and social workers. The inclusion criteria were being aged ≥ 19 years, having a diagnosis of terminal cancer, having a good comprehension of Korean, and having sufficient cognitive and physical capacity to enroll. Medical professionals providing hospice care in the six institutions were eligible to participate in this study.

The sample size was calculated using the sample-to-item ratio, which was used to estimate the required sample size according to the number of items analyzed. The sample size was applied using a ratio of 5 to 1 (subject to item ratio) for each item, following the recommendations of Gorsuch [17] and Hatcher [18]. The IPOS consists of 19 items, and the follow-up loss rate for hospice patient surveys was assumed to be approximately 30%. Therefore, we recruited 131 patients, and the IPOS for staff was completed by professionals independent of these patients.

Data collection procedures

Data were collected at two time points (T1 and T2) using the 3-day version of IPOS. Patients completed the

IPOS patient version along with the EORTC Quality of Life Questionnaire Core 15 Palliative Care (EORTC QLQ-C15-PAL) [19] and the Functional Assessment of Chronic Illness Therapy-Spiritual Well-being Scale (FACIT-Sp-12) [20] either independently or with the help of their caregivers or staff at T1. Patients who agreed to complete the retest during the T1 assessment and had similar conditions as determined by the staff were asked to complete the IPOS again (T2) after more than two days. The staff version of the IPOS was completed by the doctors or nurses in charge. In addition to the staff version of IPOS, data on the Eastern Cooperative Oncology Group (ECOG) performance status and the Phase of Illness were collected at T1. The Phase of Illness is a clinician-assessed measure that identifies clinically meaningful periods in a patient's condition. It categorizes patients into five phases—Stable, Unstable, Deteriorating, Terminal, and Bereavement—based on a holistic clinical assessment considering symptoms, functional status, and the needs of both the patient and their family or caregivers [21]. The patients' demographic and clinical data were collected through a chart review.

Measurements

The IPOS consists of 10 questions, with nine on the staff version, assessing physical, psychological, and spiritual well-being in addition to the provision of information and support [10]. Questions 2–9 encompassed Physical Symptoms (e.g., pain, shortness of breath, weakness, nausea, vomiting, poor appetite, constipation, sore mouth, drowsiness, and poor mobility), Emotional Symptoms (e.g., patient and family anxiety, depression, and feeling at peace), and Communication/Practical Issues (e.g., sharing feelings, information, and practical matters). Question 1 was a free-text response concerning the main problems faced, and Question 10 identified the respondents. These two items were not scored. Excluding these two items, the remaining 17 items were scored on a 5-point scale ranging from 0 to 4, resulting in a possible IPOS Total score between 0 and 68.

The EORTC QLQ-C15-PAL is a condensed 15-item version of the EORTC Quality of Life Questionnaire Core 30 (EORTC QLQ-C30), tailored for palliative care settings. It encompasses two multi-item functional scales (Physical and Emotional Functioning), seven symptom scales (i.e., fatigue, pain, nausea and vomiting, dyspnea, insomnia, appetite loss, and constipation), and one item that evaluates the overall quality of life. The functioning and symptom scales were scored on a 4-point scale from 1 (*not at all*) to 4 (*very much*), whereas the global quality of life item was rated on a 7-point scale from 1 (*very poor*) to 7 (*excellent*). The Korean version of this scale has been previously validated [22].

The FACIT-Sp-12 was designed to measure the spirituality of patients who have chronic and/or life-threatening illnesses [20]. It consists of 12 items, each rated on a 5-point scale from 0 (*not at all*) to 4 (*very much*), resulting in a total score ranging from 0 to 48. The tool is divided into three subscales, Meaning, Peace, and Faith, which together assess a patient's sense of meaning, inner peace, and the role of faith in their illness. While the Korean version of this scale has not undergone formal psychometric validation specifically for palliative care settings, it has been applied in several studies with Korean populations [23–25]. For instance, a 2017 study examined the correlation between spirituality and the survival of cancer patients and reported Cronbach's alphas of 0.88 for the total score and 0.82, and 0.91 for the Meaning/Peace and Faith subscales, respectively [25]. For the purposes of this study, the FACIT.org team granted permission to use the standard Korean version of FACIT-Sp-12.

Statistical analysis

We evaluated the validity and reliability of the Korean IPOS using standard methods [10, 12, 16, 26]. Descriptive statistics were used to summarize continuous variables as mean (standard deviation) and categorical variables as the frequency (%). For most variables, the proportion of missing data was less than 1%, with a maximum of 4.2%.

Reliability

Internal consistency was measured using Cronbach's alpha for the IPOS Total and Subscales. Using the criteria established in the original validation study, we set the threshold for good internal consistency at 0.6 to account for the multidimensional and nonredundant nature of the IPOS [10]. Test-retest reliability estimates the stability of the measures over a specific timeframe. We conducted a re-examination (T2) more than two days after the T1 assessment, following established recommendations from previous studies that suggest that this interval is optimal for evaluating palliative care patients, ensuring both clinical stability and reliable test-retest results [16, 27, 28]. The IPOS scores measured at T1 and T2 were evaluated using intraclass correlation coefficients (ICCs) and proportional agreement within one score (%) for each item. Inter-rater reliability was also assessed using ICCs and proportional agreement within one score (%), which was independently rated between the patient and staff. ICC values below 0.50 indicate low reliability, 0.50–0.75 indicate moderate reliability, 0.75–0.90 good reliability, and over 0.90 excellent reliability [29].

Validity

Concurrent validity was examined by calculating Spearman's correlation coefficients and the associated p-values between the IPOS items and the corresponding items on the EORTC QLQ-C15-PAL and FACIT-Sp-12. We established predetermined hypotheses regarding strong and moderate validity in which similar items were expected to show strong correlations (>0.70) [30], such as IPOS pain and EORTC QLQ-C15-PAL pain and between IPOS anxiety and depression and EORTC QLQ-C15-PAL Emotional Functioning. The concurrent validity of IPOS items was assessed moderate correlations (0.40–0.70), such as between IPOS Physical Symptoms and EORTC QLQ-C15-PAL individual symptoms and between IPOS feeling at peace and the peace subscale of FACIT-Sp-12. For items expected to differ, such as the psychological and emotional items of the IPOS compared to the Physical Functioning scale of the EORTC QLQ-C15-PAL, we anticipated low correlations (<0.20). We classified the participants into three groups based on their Phase of Illness (stable, unstable, or deteriorating) to evaluate the known-group validity. We then compared the mean scores of the IPOS Total and its subscales across the three groups using one-way ANOVA. If the ANOVA results indicated statistically significant differences ($p<.05$), post hoc comparisons were performed using Tukey's Honest Significant Difference (HSD) test to identify specific group differences.

Statistical significance was set at $p<.05$. All analyses were performed using SPSS Statistics ver24.0 (IBM SPSS Inc., Chicago, IL, USA) and R version 4.3.1 (R Development Core Team).

Table 1 Respondent demographic and clinical characteristics

Variable	*n*	%
Patient (*N* = 119)		
Hospital		
Inpatient Hospice	101	84.9
Consultation Hospice	15	12.6
Age, mean (SD)	69.2 (12.5)	
Gender (Men)	69	58.0
Marital Status		
Unmarried	9	7.6
Married	72	60.5
Widowed/Divorced	38	31.9
Education Level		
≤ High School	84	70.7
≥ College	34	28.6
Phase of Illness		
Stable	50	42.0
Unstable	45	37.8
Deteriorating	23	19.3
Dying	0	0
ECOG Performance Status		
≤ 2	23	19.3
3	70	58.8
4	26	21.9
Primary Cancer Diagnosis		
Gastrointestinal	40	33.6
Respiratory	24	20.2
Hepatobiliary	23	19.3
Genitourinary	12	10.1
Other	20	16.8
IPOS Completion		
Independently	50	42.0
With Family/Friends	30	25.2
With Staff	36	30.3
Staff (*N* = 28)		
Age, mean (SD)	41.4	7.5
Gender (Men)	7	5.9
Profession		
Physician	10	35.7
Nurse	18	64.3
Clinical practice in palliative care (years)		
< 5	3	10.7
5–10	9	32.1
≥ 11	16	57.1

IPOS, Integrated Palliative Care Outcome Scale; ECOG: Eastern Cooperative Oncology Group Performance Status

Note: Missing data are not explicitly reported in Table 1 but were taken into account in the analysis

Ethics

The study was conducted per the principles of the Declaration of Helsinki. Ethical approvals were obtained from the Ethics Committees of the six organizations involved in this study: the National Cancer Center (NCC2023-0269), Catholic Kwandong University International St. Mary's Hospital (IS23QIMI0050), Gachon University Gil Medical Center (GBIRB2023-304), Dongguk University Ilsan Hospital (2023-11-001), Korea University Guro Hospital (2023GR0394), and National Health Insurance Service Ilsan hospital (2023-08-004-001).

Results

Socio-demographic and clinical characteristics of the study population

Of the 131 patients who met the inclusion criteria, 12 were excluded because the patients did not provide sufficient responses by more than 50% of the required items on the EORTC QLQ-15-PAL or FACIT-Sp-12 questionnaires. Table 1 summarizes the characteristics of the 119 patients and 28 staff members who assessed those 119 patients (one medical staff member assessed multiple patients) from the six participating HPCUs. The patients had a mean age of 69.2 years; 58% were male, and 60.5% were married. The most common primary cancers were gastrointestinal (33.6%), respiratory (20.2%), and hepatobiliary (19.3%). Additionally, 42.0% of the patients were classified as being in a stable Phase of Illness, 37.8% as unstable, and 19.3% as deteriorating. The ECOG scores indicated that 80.7% of the patients had poor functional status (scores of 3 or 4). The IPOS completion rate showed that 42.0% of patients completed the questionnaire independently, while others required assistance from staff or family members. Of the staff, most were nurses (64.3%), and most had more than 5 years of experience in palliative care (89.2%).

Reliability

Table 2 presents the IPOS total and subscale scores for both patients and staff. The Cronbach's alpha for the IPOS total score at T1 was 0.74 for patients and 0.81 for staff, indicating good internal consistency for both groups. Most subscales also demonstrated good internal consistency, with Cronbach's alpha values exceeding 0.60, except for the IPOS Communication/Practical Issues for the staff, which had a Cronbach's alpha of 0.55.

Table 3 presents the results of the test-retest reliability for patients across T1 and T2, as well as the inter-rater agreement between patient and staff ratings at T1. Of the 119 patients who completed the initial assessment at T1, 67 (56.3%) participated in the retest at T2. The ICC of the IPOS Total score for patients was 0.722, while the ICCs were 0.717 for IPOS Physical Symptoms, 0.653 for IPOS Emotional Symptoms, and 0.732 for IPOS Communication/Practical Issues. For individual items, the reliability was highest for constipation (ICC=0.815), followed by pain (ICC=0.770), and weakness (ICC=0.754), indicating moderate to good reliability. The ICC for poor appetite was 0.382, which was lower than other individual items. The proportion of agreement within one score for each item was greater than 80%. No significant differences were found in all mean IPOS scores between the two time points for the patients.

For inter-rater reliability, most subscales and individual items, including the IPOS total, showed low-to-moderate agreement between patient and staff ratings. The mean difference between patient and staff ratings for overall IPOS Total and Physical Symptoms was significant ($p<.05$), with patients scoring higher than staff on both measures.

Validity

Table 4 presents the correlations between the IPOS and the EORTC QLQ-C15-PAL and FACIT-Sp-12 at T1. The IPOS total was moderately correlated with the Global Health Status/QOL and Emotional Functioning scales of EORTC QLQ-C15-PAL (rs=−0.527 and −0.562, respectively). The IPOS Physical Symptoms subscale was correlated with the individual items of the symptom scales, with correlations ranging from 0.145 to 0.474. The IPOS Emotional Symptoms demonstrated correlations with the Global Health Status/QOL and Emotional Functioning scales of the EORTC QLQ-C15-PAL and with the peace subscale of the FACIT-Sp-12 (rs=−0.482, −0.660, and −0.460, respectively). Supplementary Table 1 provides detailed correlations at the item level. Each item on the IPOS Physical Symptoms subscale correlated with the corresponding items on the EORTC QLQ-C15-PAL symptom scales. Anxiety, depression, and feeling at peace within the IPOS were significantly correlated with the Emotional Functioning scales of the EORTC QLQ-C15-PAL (rs=−0.626, −0.641, and −0.493, respectively), and correlations between IPOS Physical Symptoms subscale and related EORTC QLQ-C15-PAL items ranged from 0.528 to 0.865. The items for depression, feeling at peace, and information were also significantly correlated with FACIT-Sp-12 scores (rs=−0.442, −0.444, and −0.422, respectively).

We compared the mean scores of the IPOS Total and subscales across the different Phases of Illness to assess known-group validity (Fig. 1). The one-way ANOVA results showed statistically significant differences between the three groups for both the IPOS Total score (F=6.761, p=.011) and the IPOS Emotional Symptoms score (F=6.998, p=.008). Post hoc Tukey's HSD test indicated that the IPOS Total score for the deteriorating phase was significantly higher than that of the stable phase (p=.015). Similarly, the IPOS Emotional Symptoms score for the deteriorating phase was significantly higher than both the stable phase (p=.004) and the unstable phase (p=.013).

Table 2 Descriptive statistics and distribution for IPOS total and subscale scores at T1

Total and Subscale Scores	Subgroup[a]	# Items	Range	Mean	SD	α[b]
IPOS Total	Patients	17	8–57	29.57	8.94	0.74
	Staff		3–50	26.12	8.98	0.81
IPOS Physical Symptoms	Patients	10	6–38	18.12	6.10	0.67
	Staff		1–29	13.32	6.34	0.77
IPOS Emotional Symptoms	Patients	4	1–16	7.19	3.49	0.70
	Staff		1–15	7.94	3.11	0.79
IPOS Communication/Practical Issues	Patients	3	0–10	4.27	2.49	0.62
	Staff		0–10	4.86	2.21	0.55

IPOS: Integrated Palliative Care Outcome Scale

[a] Patient N=113, Staff N=117

[b] Cronbach's alpha coefficient of internal reliability

Table 3 ICC within patients and staff for test-retest reliability (T1 and T2) and inter-rater agreement between patient and staff ratings (T1)

	Test-Retest						**Inter-Rater**					
	Mean (SD)		***p*-value**[a]	**Proportion Agreement (%)**[c]	**ICC**	**95% CI**	**Mean (SD)**		***p*-value**[c]	**Proportion Agreement (%)**[d]	**ICC**	**95% CI**
	Patient T1 (*N* = 67)	**Patient T2 (*N* = 67)**					**By Patient (*N* = 111)**	**By Staff**[b] **(*N* = 111)**				
IPOS Total	29.78 (9.56)	28.67 (9.18)	0.305	-	**0.722**	0.549–0.829	29.66 (8.83)	25.99 (9.11)	**0.003**	-	0.343	0.050–0.547
IPOS Physical Symptoms	18.05 (9.56)	17.36 (6.05)	0.347	-	**0.717**	0.541–0.826	18.15 (5.99)	13.21 (6.39)	**< 0.001**	-	0.290	−0.112–0.539
IPOS Emotional Symptoms	7.22 (3.82)	6.91 (3.70)	0.505	-	**0.653**	0.435–0.787	7.25 (3.49)	7.95 (3.16)	0.122	-	0.151	−0.229–0.414
IPOS Communication/ Practical Issues	4.51 (2.47)	4.40 (2.51)	0.711	-	**0.732**	0.563–0.835	4.25 (2.47)	4.84 (2.25)	0.066	-	0.415	0.154–0.596
Items												
Pain	2.19 (1.29)	1.99 (1.19)	0.114	86.6	**0.770**	0.626–0.858	2.12 (1.24)	2.13 (1.07)	0.954	75.7	**0.595**	0.410–0.722
Shortness of Breath	1.37 (1.19)	1.33 (1.26)	0.742	83.6	**0.747**	0.587–0.844	1.40 (1.16)	0.94 (1.15)	**0.003**	73.9	0.458	0.200–0.632
Weakness	2.39 (1.31)	2.49 (1.09)	0.429	79.1	**0.754**	0.601–0.849	2.45 (1.23)	2.11 (1.06)	**0.027**	69.4	0.465	0.223–0.632
Nausea	0.84 (1.05)	0.73 (1.16)	0.472	88.1	**0.605**	0.357–0.757	0.84 (1.05)	0.53 (0.86)	**0.018**	84.7	**0.563**	0.355–-0.703
Vomiting	0.70 (1.13)	0.67 (1.16)	0.831	88.1	**0.672**	0.465–0.799	0.67 (1.11)	0.33 (0.77)	**0.010**	87.4	**0.689**	0.510–0.797
Poor Appetite	2.13 (1.24)	2.08 (1.27)	0.754	67.2	0.382	−0.011–0.621	2.23 (1.27)	1.77 (1.29)	**0.007**	62.2	0.256	− 0.065–-0.483
Constipation	2.03 (1.47)	1.97 (1.40)	0.670	85.1	**0.815**	0.698–0.886	1.93 (1.32)	1.38 (1.33)	**0.003**	67.6	**0.536**	0.293–0.691
Sore Mouth	1.88 (1.29)	1.64 (1.24)	0.088	80.6	**0.744**	0.585–0.843	1.92 (1.32)	0.93 (1.03)	**< 0.001**	57.7	0.278	−0.133–0.533
Drowsiness	1.97 (1.15)	1.93 (1.05)	0.732	86.6	**0.699**	0.509–0.815	2.05 (1.17)	1.04 (1.03)	**< 0.001**	58.6	0.190	−0.180–0.447
Poor Mobility	2.54 (1.09)	2.54 (1.12)	0.999	80.6	**0.628**	0.393–0.772	2.55 (1.08)	2.06 (1.35)	**0.003**	70.3	0.159	−0.193–0.412
Anxiety	1.46 (1.32)	1.51 (1.31)	0.787	76.1	**0.641**	0.415–0.780	1.38 (1.28)	1.94 (1.01)	**< 0.001**	60.4	0.090	-0.271–0.356
Family Anxiety	2.64 (1.30)	2.45 (1.20)	0.207	80.6	**0.667**	0.460–0.795	2.77 (1.21)	2.56 (1.07)	**0.018**	64.9	0.007	−0.440–0.317
Depression	1.46 (1.22)	1.42 (1.14)	0.784	82.1	**0.542**	0.251–0.719	1.45 (1.22)	1.51 (1.03)	0.678	75.7	0.317	−0.003–0.532
Feeling at Peace	1.66 (1.14)	1.54 (1.12)	0.454	77.6	**0.507**	0.197–0.697	1.66 (1.08)	1.94 (0.89)	**0.037**	74.8	0.325	0.027–0.533
Share Feelings	1.87 (1.28)	1.78 (1.18)	0.581	80.6	**0.595**	0.340–0.751	1.81 (1.22)	2.02 (1.12)	0.188	64.0	0.296	−0.020–0.515
Information	0.97 (0.85)	0.94 (0.92)	0.760	94.0	**0.749**	0.591–0.846	0.92 (0.94)	1.05 (0.80)	0.248	82.0	0.313	0.003–0.527
Practical Problems	1.67 (1.20)	1.69 (1.25)	0.925	79.1	**0.622**	0.382–0.768	1.52 (1.13)	1.77 (1.14)	0.111	78.4	**0.530**	0.317–0.676

IPOS: Integrated Palliative Care Outcome Scale; ICC: Intraclass Correlation Coefficient

[a] Paired *t*-test

[b] A total of 28 staff members assessed 111 patients

[c] Independent samples *t*-test

[d] Level of agreement within one score

Table 4 Concurrent validity of IPOS and EORTC QLQ-C15 PAL and FACIT-Sp-12 (T1)

	IPOS Total Score	IPOS Physical Symptoms	IPOS Emotional Symptoms	IPOS Communication/Practical Issues
EORTC QLQ-C15-PAL				
Global health status/QOL	**−0.527****	**−0.400****	**−0.482****	−0.239
Functional scales				
Physical Functioning	−0.238	−0.218	−0.165	−0.215
Emotional Functioning	**−0.562****	−0.303*	**−0.660****	−0.352**
Symptom scales				
Dyspnea	0.270*	0.257*	0.197	0.130
Pain	**0.556****	**0.467****	**0.526****	0.145
Insomnia	0.097	0.145	0.086	−0.096
Fatigue	**0.460****	**0.446****	0.347**	0.128
Appetite loss	**0.403****	**0.431****	0.236	0.164
Nausea and Vomiting	0.366**	**0.474****	0.120	0.035
Constipation	0.352**	**0.417****	0.103	0.095
FACIT-Sp-12				
Meaning	−0.312**	−0.190	−0.249*	−0.312**
Peace	**−0.448****	−0.292*	**−0.460****	−0.297*
Faith	−0.252*	−0.043	−0.240	−0.379**
Total	−0.399**	−0.187	−0.377**	**−0.425****

IPOS, Integrated Palliative Care Outcome Scale; EORTC QLQ-C15-PAL: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 15 Palliative Care; FACIT-Sp-12, Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being Scale

Bold values indicate concurrent validity, assessed by moderated correlations (0.4–0.7)

**p*<.01, ** *p*<.001

Note: Results are based on patient data (*N*=119)

Discussion

In this study, we translated and culturally adapted the IPOS patient and staff versions into Korean, specifically within the context of HPCUs. We established the scale's face and content validity as well as its acceptability through comprehensive cognitive interviews with patients and healthcare staff. Some concepts required more than a direct translation from English to Korean to ensure clarity and cultural relevance, making cognitive interviews with the patients and staff instrumental essential for the necessary adaptations.

Our study demonstrated that the Korean version of the IPOS exhibited good internal consistency for both patients and staff. Further, the subscale analysis revealed good reliability for the Physical and Emotional Symptom subscales. Although the IPOS Communication/Practical Issues subscale had a lower Cronbach's alpha value than the other subscales, other studies have reported similar difficulties when adapting the IPOS to different languages and cultural contexts [10, 31, 32]. These findings suggest that the Korean IPOS is a reliable tool for assessing palliative care outcomes and remains robust across various cultural contexts.

Furthermore, the test-retest reliability of the Korean IPOS showed that the IPOS total score and most items had moderate-to-good reliability between the two time points. Items such as pain, shortness of breath, weakness, and constipation showed particularly high agreement. Items such as "depression," "feeling at peace," and "sharing feelings" had lower ICC values but still demonstrated moderate reliability. These findings are consistent with those of previous studies reporting similar challenges with these specific items [10, 12]. The "poor appetite" item showed lower reliability compared to other items in the IPOS. In Korean culture, interpretations of "poor appetite" may vary depending on an individual's daily habits, emotional state, or health conditions. Although the term is widely understood, it may not fully reflect the nuances of the original phrase in the context of palliative care and is often associated with temporary factors such as stress. These interpretative differences should be acknowledged as an important cultural factor when interpreting test results.

Our study revealed that the inter-rater reliability between patient and staff ratings of the Korean IPOS was low to moderate. Only the items for pain, nausea, vomiting, and constipation showed moderate agreement, while the others demonstrated relatively low agreement. In the mean comparisons, medical staff rated the IPOS Total and Physical Symptoms lower than patients. These findings align with those of other studies adapting the IPOS to different languages and cultural contexts, which

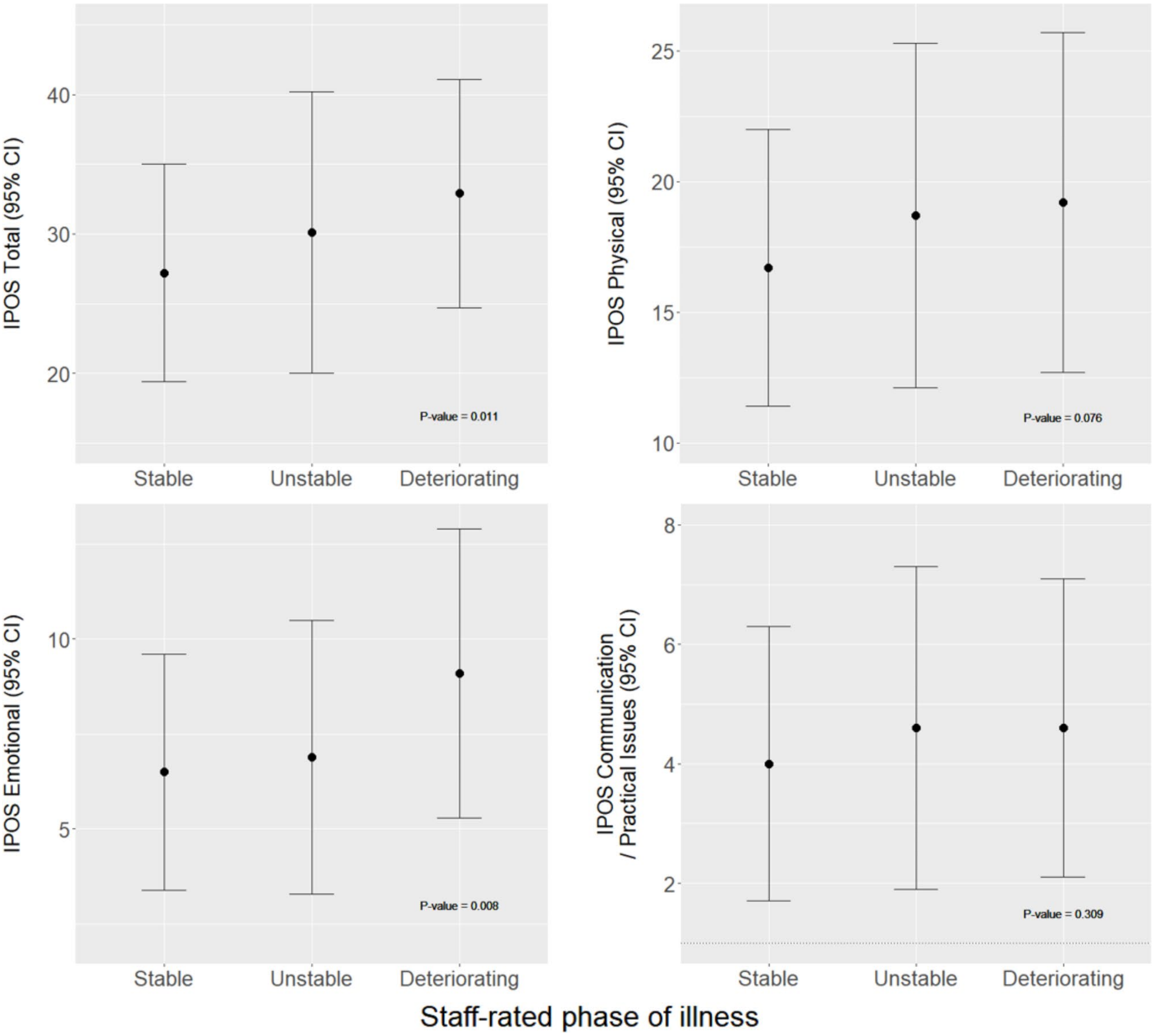

Fig. 1 Known-Group Comparisons: Patient-Reported Total and Subscale IPOS Mean Scores by Staff-Rated Phase of Illness. Note: Mean with 95% Confidence Intervals (CIs)

also found discrepancies between patients self-reports and healthcare provider assessments [31–33]. This highlights the importance of PROMs and the need to include patient assessments to better understand their needs and concerns.

The concurrent validity of the Korean IPOS was supported by its correlations with the EORTC QLQ-C15-PAL and FACIT-Sp-12. The moderate correlations between the IPOS total score and the Global Health Status/QOL and Emotional Functioning scales of the EORTC QLQ-C15-PAL suggest that the IPOS effectively captures the overall and emotional health status of patients. Strong correlations between the items assessing individual symptoms on the IPOS and the symptom scales of the EORTC QLQ-C15-PAL demonstrate its sensitivity to Physical Symptoms, aligning with the instrument's design. Similarly, correlations between the IPOS Emotional Symptom scales, as well as the peace subscale of the FACIT-Sp-12, emphasizes the scale's ability to comprehensively evaluate emotional and spiritual well-being. The lower correlations between the IPOS Communication/Practical Issues subscale and other scales align with findings reported in other cultural contexts, suggesting that this subscale addresses unique aspects of Communication/Practical Issues that are not commonly measured by other instruments [10, 13, 31, 32]. Robust concurrent validity across various settings reinforces the utility of the Korean IPOS in comprehensively assessing palliative care outcomes. In our study, the mean IPOS Total and Emotional Symptom scores significantly differed across the three Phase of Illness—stable, unstable, and deteriorating—with higher scores reflecting more severe conditions. These significant differences in scores highlight the sensitivity of the IPOS in capturing varying levels of illness severity, reinforcing its validity as a reliable tool for assessing patient conditions in palliative care settings.

Limitations

This study has some limitations. First, we did not use a global change question during the retest. However, using such a question introduces other limitations, as it may not account for changes in aspects unrelated to the patient's health [32]. In our study, the staff members responsible for patient care enrolled patients at T2, ensuring that only those with minimal changes in status were included. Second, our study had a limited sample size, which was insufficient to conduct a Confirmatory Factor Analysis (CFA). Previous studies using CFA have identified three distinct factors within the IPOS: Physical Symptoms, Emotional Symptoms, and Communication/Practical Issues [10, 32]. We adopted this approach to analyze the subscales. Future studies with larger sample sizes are required to determine the most accurate model for the study population. Finally, this study was conducted in hospice-specialized institutions that provided inpatient and consultation hospice services and included only cancer patients, as inpatient hospices in Korea are exclusively available to cancer patients. This limitation may have affected the generalizability of our findings. Future research should be conducted in various settings, including non-cancer patients, to enhance the generalizability of the results.

Conclusions

The Korean IPOS is a valid, reliable, and culturally appropriate tool for measuring palliative care outcomes, making it invaluable for both clinical assessments and research. Its ability to evaluate the impact of healthcare interventions can significantly enhance the quality of palliative care, ultimately leading to improved patient outcomes.

Abbreviations

ANOVA	Analysis of Variance
CFA	Confirmatory Factor Analysis
EAPC	European Association for Palliative Care
ECOG	Eastern Cooperative Oncology Group
EORTC	European Organization for Research and Treatment of Cancer
FACIT	Functional Assessment of Chronic Illness Therapy
HPC	Hospice and Palliative Care
HPCU	HPC units
HSD	Honest Significant Difference
ICC	Intraclass correlation coefficients
IPOS	Integrated Palliative care Outcome Scale
POS	Palliative care Outcome Scale
PROM	Patient-reported outcome measures

Supplementary Information

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Supplementary Material 1

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Author contributions

Conceptualization and design: SJP, YJP, and YJC; Methodology and formal analysis: SJP, YJP, and MRH; Data collection and investigation: PSJ, YJP, SHK, ICH, GUW, YJL, YSK, and HJJ; Writing – original draft: SJP and YJP; Writing – review and editing: all authors; Supervision: YJC.

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Data availability

The data that support the findings of this study are not openly available due to reasons of sensitivity and are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

All participants signed an informed consent form, and the study protocol was approved by the Institutional Review Board of National Cancer Center (NCC2023-0269); Catholic Kwandong University International St. Mary's Hospital (IS23QIMI0050); Gachon University Gil Medical Center (GBIRB2023-304); Dongguk University Ilsan Hospital (2023-11-001); Korea University Guro Hospital (2023GR0394); and National Health Insurance Service Ilsan hospital (2023-08-004-001).

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Author details

[1]Department of Hospice and Palliative Service, National Cancer Center, Goyang, Republic of Korea
[2]Healthcare Data Center, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea
[3]Department of Medical Research Collaborating Center, Seoul National University Boramae Medical Center, Seoul, Republic of Korea
[4]Department of Family Medicine, International St. Mary's Hospital, College of Medicine, Catholic Kwandong University, Incheon, Republic of Korea
[5]Department of Family Medicine, Gil Medical Center, Gachon University College of Medicine, Incheon, Republic of Korea
[6]Department of Internal Medicine, Dongguk University Medical Center, Goyang, Republic of Korea
[7]Department of Family Medicine, Korea University Guro Hospital, Seoul, Republic of Korea
[8]Department of Family Medicine, National Health Insurance Medical Center, Goyang, Republic of Korea
[9]National Cancer Survivorship Center, National Cancer Control Institute, National Cancer Center, 323 Ilsan-ro, Ilsandong-gu, Goyang-si Gyeonggi-do 10408, Republic of Korea

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