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Comparing EQ-5D-5L and IPOS among residents with malignant tumors in a community home hospice: a longitudinal study

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Abstract

Background In community home hospices, limited medical staff and high workloads necessitate measurement models that objectively and effectively capture the needs of residents with malignant tumors. This study compares the measurement properties and feasibility of the EuroQol 5-Dimension 5-level (EQ-5D-5L) and Integrated Palliative care Outcome Scale (IPOS), primarily used in palliative care, as only few studies have compared their measurement properties and feasibility based on their actual application in home hospice care.

Methods Two-wave longitudinal data were collected from 2021 to 2023 at a community home hospice in Japan from a sample of 120 residents diagnosed with malignant tumors. Residents completed both the EQ-5D-5L and IPOS upon admission. Data were collected at three main time points: the initial admission date, one week after admission, and when residents' conditions changed. This study evaluates the feasibility and measurement properties of EQ-5D-5L and IPOS, including ceiling and floor effects, correlations among domains, and responsiveness.

Results The EQ-5D-5L demonstrated high feasibility, whereas the IPOS had moderate feasibility with a higher missing data rate. Both scales had low ceiling and floor effects. The EQ-5D-5L showed low responsiveness, while the IPOS showed moderate responsiveness. Anxiety and the emotional domains of the IPOS or EQ-5D-5L scores were insignificantly correlated. Participants who did not complete the IPOS had significantly lower EQ-5D-5L scores.

Conclusions The EQ-5D-5L may be slightly more suitable for the primary screening of needs in this setting owing to its higher feasibility. In contrast, the IPOS is an excellent tool when it is important to comprehensively and deeply capture the needs of individuals over time. We note that when selecting or using different measures, one must consider the specific characteristics of each measure.

Keywords Palliative care, Patient reported outcome measures, Hospice care, Quality of life, Integrated Palliative care Outcome Scale, EuroQol 5-Dimension 5-level

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Background

Palliative care is considered essential in healthcare, especially with an aging population and increased chronic diseases and malignant tumors [1, 2]. According to the World Health Organization (WHO), the global population aged 60 and over will reach 2.1 billion by 2050, highlighting the growing need for person-centered palliative care in community settings [3].

Community-home hospices play a critical role in ensuring that residents in their final stages of life can live with compassion and dignity in familiar environments [4, 5]. In Japan, these facilities provide person-centered nursing and caregiving for older individuals with terminal-stage cancer or intractable diseases, integrating medical care and support to create a comfortable, home-like environment. Evidently, community-based palliative care interventions address the complex needs of residents with advanced diseases, such as terminal malignancies, while maintaining their quality of life (QoL) [6, 7]. These interventions also help reduce hospital stays and emergency room visits [8, 9], enhance cost-effectiveness [10, 11], and increase the likelihood of residents spending their end of life at home [12].

Collecting information directly from residents is essential to understanding their needs and providing person-centered care. Accordingly, effective methods for obtaining this information are being actively explored [13]. International guidelines, such as those from the European Association for Palliative Care, recommend incorporating patient-reported outcome measures to assess and improve the quality of palliative care [14]. The EuroQol 5-Dimension 5-Level (EQ-5D-5L) [15] and the Integrated Palliative Care Outcome Scale (IPOS) [16, 17] are key tools in palliative care. The EQ-5D-5L is widely used in health economic evaluations and provides a quantifiable measure of QoL [15]. In contrast, the IPOS was explicitly developed to address physical, psychological, social, and spiritual dimensions unique to palliative care patients, aiming to detect symptoms and improve care quality based on evaluation [16, 17]. Understanding the characteristics of these tools to detect symptoms, change measurement, and improve care quality is essential for selecting appropriate evaluation instruments.

The EQ-5D-5L is an internationally recognized standard tool for assessing health-related QoL (HRQoL) across various healthcare settings, including palliative care [18–20]. It quantifies HRQoL by evaluating five dimensions: mobility (MO), self-care (SC), usual activities (UA), pain/discomfort (PD), and anxiety/depression (AD). Despite its simplicity, reliability, and validity, its ability to capture the complex needs of palliative care residents has been debated [15, 21]. Conversely, the IPOS is recognized as an international scale for evaluating factors specific to palliative care, including physical symptoms, emotional well-being, and spiritual concerns [22–25]. However, few studies have compared the measurement properties and feasibility of IPOS and EQ-5D-5L based on their actual application in home hospice care.

In community-home hospices, efficient and practical quality-of-care evaluations are required to respond promptly to changes in residents' conditions, provide palliative medical care, and offer comprehensive family support, all within the constraints of limited staff resources [26–28]. Furthermore, the relationship between the measurement items of these two scales remains insufficiently understood. Therefore, this study compares the measurement properties and feasibility of EQ-5D-5L and IPOS among residents with terminal-stage malignancies in community-home hospices. Specifically, it evaluates how these tools enable symptom detection and monitoring changes, aiming to guide the selection of appropriate evaluation instruments for specific purposes based on their measurement properties.

This study is significant in that it empirically examines the measurement properties of the EQ-5D-5L and IPOS within the same population of residents with terminal-stage malignancies in community-home hospices. Although the two instruments were developed for different purposes, they are often used together in clinical practice. In resource-constrained settings, selecting appropriate tools to assess patients' conditions and needs requires comprehensive understanding of the dimensions captured by each instrument, their responsiveness, and ease of administration. Rather than determining which tool is superior, this study aims to provide a foundation for interpreting and utilizing the resulting data more practically and contextually appropriately. The findings are expected to improve the quality of palliative care practice and related research.

Methods

This two-wave longitudinal study compares the measurement properties of two widely used assessment tools, the EQ-5D-5L and IPOS. The study was conducted at a community-home hospice in Japan from November 2021 to December 2023, with data collected in a real-world practice setting.

Participants

The participants included all residents of the home hospice during the study period. The inclusion criteria were: (1) residents admitted between November 2021 and December 2023, and (2) residents with at least one EQ-5D-5L or IPOS data point at admission. Participants were excluded if staff deemed them unfit for the study owing to dementia or mental illness that impaired communication.

Facility nurses and caregivers collected data. To ensure data accuracy, researchers conducted an orientation covering the study's objectives, procedures, and evaluation scales. Physical paper-based questionnaires were used, and residents completed them independently whenever possible. When residents faced difficulties, staff conducted interviews to record their responses. The surveys were conducted as part of daily practice and communication by the staff, who determined the environment, administration order, and other conditions to suit the residents' needs.

Initial data and baseline information were collected at admission. The first follow-up was conducted one week after admission using the IPOS manual, during which EQ-5D-5L data were collected simultaneously. Subsequent data collection (after the second follow-up) was performed when facility staff had deduced that residents had undergone physical or mental condition changes. These changes included, for example, a decline in activity levels owing to disease progression or noticeable emotional changes.

Outcome measures

The residents' HRQoL was evaluated using the EQ-5D-5L. EQ-5D-5L comprises five dimensions: mobility (MO), self-care (SC), usual activities (UA), pain/discomfort (PD), and anxiety/depression (AD). Each dimension is rated on a 5-point scale ranging from 1 (no problems) to 5 (extreme problems). Additionally, the EQ-5D-5L allows for the calculation of QoL scores using a country-specific conversion table. In this study, the QoL score for the Japanese setting was calculated using the R package "Eq. 5 d" in R version 4.3.3 [18, 20].

The IPOS is a comprehensive evaluation scale for assessing person-centered outcomes in palliative care and covers six key areas: physical symptoms, anxiety, peace, sharing feelings with loved ones, information, and practical problems. Each item is rated on a 5-point scale ranging from 1 (no problem at all) to 5 (very severe problem), based on the degree of symptoms or emotional burden of the resident. The Japanese version of the IPOS has been developed and validated, and the scale was used in accordance with the manual [23, 29].

Data analysis

The EQ-5D-5L index score was calculated using a conversion table that accounted for Japanese cultural considerations. For the IPOS, total scores for the relevant items were calculated based on the guidelines, and composite scores were calculated for each conceptual domain. Cases with missing data were excluded from the study. Data analysis began with a descriptive analysis of participants' demographic characteristics. Subsequently, the analyses were conducted in the following order: description of scores, analysis of ceiling and floor effects, analysis of the scales' responsiveness, and correlation analyses. Following Terwee et al.'s criteria, ceiling and floor effects were determined to be present if 15% or more of the respondents reported the highest or lowest scores [30]. Responsiveness analysis involved comparing baseline and follow-up scores to evaluate the ability of the EQ-5D-5L and IPOS to detect changes over time or in response to clinical interventions. Cohen's d and Guyatt's responsiveness index were used to assess responsiveness. Correlation coefficients were calculated to evaluate the relationships between the scores of EQ-5D-5L and IPOS items.

If the results of IPOS or EQ-5D-5L were biased, subgroup analyses were performed based on score ranges. Quantitative data were analyzed using the Kruskal–Wallis and Wilcoxon rank-sum tests, while categorical data were analyzed using the chi-square test. All statistical analyses were performed using R version 4.3.3, with the significance level set at $p < 0.05$.

Ethics approval

All participants provided written informed consent. The study was approved by the Yokohama City University Life Science and Medical Research Ethics Committee. (reference number F220400048).

Results

Out of the initially recruited 150 individuals, 120 participants (80%) who met the eligibility criteria as residents with malignant tumors were included in the analysis. Table 1 presents the demographic characteristics of the participants.

Table 2 presents EQ-5D-5L baseline and follow-up assessment results. The scale demonstrated a very high response rate across all items, with a maximum missing data rate of 6.25% (AD item at Follow-up 2).

Table 3 presents IPOS baseline and follow-up assessment results. Missing data rates varied across items, with particularly high missing data rates observed at follow-up 2 for "Friends and Family's Anxiety regarding patient's condition" and "Sharing Feelings with Family and Friends." Physical symptoms tended to have lower missing data rates. Most items showed an increase in scores from baseline to follow-up 2.

The ceiling effect of the EQ-5D-5L was relatively low (2.52%), indicating that few residents achieved the highest possible score and that the full range of the scale was appropriately utilized. The floor effect was also low (3.36%), with few residents scoring at the lowest possible level. These findings indicate that the EQ-5D-5L is a useful measure for broadly assessing the health status

Table 1 Participant demographics at baseline ($n = 120$)

Characteristics	Median	min, max
Age (Baseline)	78.0	55 – 97
Length of Stay (days)	22.5	0 – 763
EQ-5D-5L index score (Baseline Score)	0.309	−0.026 – 1
IPOS total score (Baseline Score)	22	0 – 85
	n	%
Sex	120	100
Male	62	51.7
Female	58	48.3
Cancer's Primary Site		
Lung/Pleura	32	26.7
Stomach	16	13.3
Colon	14	11.7
Pancreas	10	8.3
Breast	9	7.5
Other	39	32.5

Table 2 Baseline and follow-up assessments of EQ-5D-5L

	n	%
Sex	120	100
Male	62	51.7
Female	58	48.3
Cancer's Primary Site		
Lung/Pleura	32	26.7
Stomach	16	13.3
Colon	14	11.7
Pancreas	10	8.3
Breast	9	7.5
Other	39	32.5

of residents. Additionally, the analysis of skewness (0.72) and kurtosis (0.20) suggested that the score distribution was close to normal. Particularly, the low kurtosis indicated a relatively flat distribution with few extreme values, suggesting that the EQ-5D-5L may yield consistent results across residents.

In contrast, the IPOS demonstrated slightly higher ceiling (3.36%) and floor (5.04%) effects compared with the EQ-5D-5L. However, these effects remained very low, indicating that there was no substantial skew in the score distribution. The skewness (1.77) and kurtosis (4.21) of the IPOS scores indicated a more skewed distribution than that of the EQ-5D-5L. Particularly, the high kurtosis suggested the presence of extreme values and a distribution concentrated around a specific peak.

Table 4 presents Cohen's d and Guyatt's responsiveness values for the scales. The EQ-5D-5L showed low responsiveness, which turned negative at follow-up 2. These results suggest that the EQ-5D-5L has limited ability to capture changes in residents' health status over the follow-up period. In contrast, the IPOS showed significantly increased Cohen's d and Guyatt's responsiveness values at follow-up 2, suggesting that the IPOS may be more sensitive in detecting changes in residents' symptoms over time.

Table 4 presents Cohen's d and Guyatt's responsiveness values. The EQ-5D-5L showed low responsiveness at follow-up 2, with negative values recorded. In contrast, the IPOS showed increased Cohen's d and Guyatt's responsiveness values at follow-up 2.

Table 5 presents the correlational analysis results of the domains in the EQ-5D-5L and IPOS, which indicate generally high correlations between the domains. Particularly, the five EQ-5D-5L domains showed moderate to high correlations with the IPOS domains "Physical Symptoms" and "Practical Problems."

In contrast, the IPOS domains "Anxiety" and "Sharing Feelings with Family and Friends" were not sufficiently correlated with the EQ-5D-5L domains. Notably, the IPOS "Anxiety" domain showed a high correlation with other IPOS domains, such as "Physical Symptoms" (0.6047; $p < 0.01$), suggesting that the IPOS may be more effective in evaluating information related to residents' anxiety, concerns, and the sense of reassurance provided by sufficient explanations from healthcare professionals.

Table 6 presents information of participants' completion of the IPOS at baseline. Seventy-one participants (59.2%) completed the baseline IPOS measurements, while 49 participants (40.8%) had missing responses in at least one item. The demographic characteristics and QoL were compared between the two groups.

The Mann–Whitney U test revealed insignificant differences between the two groups in age, length of stay, sex distribution, or cancer's primary site. The median age for the non-completion group (75 years, range 55–92) was slightly lower than that of the completion group (79 years, range 57–97); however, this difference was statistically insignificant ($p = 0.0734$). Similarly, no significant differences were observed in the length of stay ($p = 0.1562$) or the distribution of the cancer's primary site ($p = 0.3181$–0.8646).

However, participants who did not complete the IPOS had significantly lower EQ-5D-5L index scores (median 0.2450, range −0.026 to 0.748) than their counterparts (median 0.3300, range −0.026 to 1.0; $p = 0.0130$). Although this is a slight difference, it suggests that participants with poorer health status may be less likely to complete the IPOS.

Table 3 Baseline and Follow-up Assessments of IPOS

Domain	Item	Baseline ($n = 117$)		Follow-up 1 ($n = 84$)		Follow-up 2 ($n = 49$)	
		Mean (SD)	Missing (%)	Median (IQR)	Missing (%)	Median (IQR)	Missing (%)
Physical Symptoms	Pain	1.55 (1.49)	5 (4.27)	1.57 (1.42)	2 (2.38)	2.16 (1.58)	5 (10.20)
	Shortness of Breath	1.23 (1.48)	5 (4.27)	1.02 (1.39)	1 (1.19)	1.53 (1.62)	5 (10.20)
	Weakness or Lack of energy	1.74 (1.40)	6 (5.12)	1.74 (1.44)	3 (3.57)	2.45 (1.28)	6 (12.24)
	Nausea	0.70 (1.40)	3 (2.56)	0.65 (1.28)	3 (3.57)	0.95 (1.55)	5 (10.20)
	Vomiting	0.56 (1.36)	3 (2.56)	0.41 (1.16)	2 (2.38)	0.67 (1.46)	2 (4.08)
	Poor Appetite	1.85 (1.73)	9 (7.69)	1.52 (1.68)	0 (0.00)	2.30 (1.46)	4 (8.16)
	Constipation	1.40 (1.40)	12 (10.25)	1.13 (1.43)	4 (4.76)	1.53 (1.43)	5 (10.20)
	Sore or Dry Mouth	1.56 (1.47)	7 (5.98)	1.45 (1.38)	2 (2.38)	1.87 (1.48)	7 (14.28)
	Drowsiness	1.48 (1.51)	5 (4.27)	1.52 (1.48)	2 (2.38)	1.87 (1.46)	5 (10.20)
	Poor Mobility	2.36 (1.38)	5 (4.27)	2.08 (1.34)	0 (0.00)	2.50 (1.34)	4 (8.16)
Anxiety	Anxiety about Illness or Treatment	1.96 (1.55)	14 (11.96)	1.84 (1.58)	7 (8.33)	2.42 (1.43)	9 (18.36)
	Friends and Family's Anxiety regarding patient's condition	2.61 (1.70)	22 (18.80)	2.19 (1.82)	13 (15.47)	3.15 (1.65)	16 (32.65)
	Depression	1.77 (1.57)	15 (12.82)	1.61 (1.54)	7 (8.33)	2.28 (1.57)	9 (18.36)
Feeling at Peace	Feeling at Peace	1.69 (1.44)	15 (12.82)	1.77 (1.60)	7 (8.33)	2.04 (1.36)	9 (18.36)
Sharing Feelings	Shared Feelings with Family and Friends	1.71 (1.79)	25 (21.36)	1.85 (1.86)	15 (17.85)	2.71 (1.94)	16 (32.65)
Information	Received Sufficient Information	1.64 (1.73)	19 (16.23)	2.07 (1.84)	6 (7.14)	2.33 (1.57)	12 (24.48)
Practical Problems	Have Practical Problems regarding illness been addressed?	1.26 (1.43)	19 (16.23)	1.57 (1.68)	6 (7.14)	1.90 (1.72)	14 (28.57)

Table 4 Responsiveness of EQ-5D-5L and IPOS

	Follow-up1	Follow-up2
EQ-5D-5L		
Cohen's d	0.1209	−0.1225
Guyatt's responsiveness	0.1258	−0.1314
IPOS		
Cohen's d	−0.0691	0.2942
Guyatt's responsiveness	−0.0688	0.3068

Discussion

This study explores the use of the EQ-5D-5L and IPOS in the home hospice setting, evaluating their feasibility and measurement properties, including ceiling and floor effects, responsiveness, and correlations between the individual domains of each scale. To our knowledge, this is the first study to compare the measurement properties of the EQ-5D-5L and IPOS in a Japanese home hospice setting.

Feasibility

The analysis in this study reveals that the EQ-5D-5L had very few missing data points, with only 1 − 2% missing data at any time point from baseline through all follow-ups, demonstrating its high reliability as a measurement tool [31, 32]. This finding is consistent with those of previous studies that showed that the EQ-5D-5L has excellent feasibility across various resident populations [33]. Previous studies highlight that a small number of items allows for rapid assessment, and the simplicity and clarity of the questions facilitate quick and accurate responses [34]. Additionally, the use of a five-point scale for assessing QoL may reflect residents' HRQoL more accurately [34]. This suggests that the small number of items helps minimize the burden on terminally ill residents who may be experiencing significant physical and psychological distress, making it a highly feasible measurement tool in such settings. Considering that home hospice residents with malignant tumors may have limited time and physical strength owing to advanced disease and end-of-life symptoms such as pain and nausea, the high feasibility of the EQ-5D-5L observed in this study indicates this scale's appropriateness for evaluating HRQoL in this setting [35].

The IPOS is also a reliable and valid tool with cross-cultural adaptation and translation into multiple languages [36–42], and the scale is validated in various settings [43–46]. However, the analysis in this study shows that items related to psychological and emotional factors,

Table 5 Correlation analysis of individual domains between IPOS and EQ-5D – 5L

	MO	SC	UA	PD	AD	physical symptoms	Anxiety	Feeling at Peace	Sharing Feelings	Information	Practical Problems
EQ-5D_MO	1**	0.8163**	0.8290**	0.2877*	0.2131*	0.2727**	0.1556	0.2606**	0.0069	0.1460	0.2901**
EQ-5D_SC	0.8163**	1**	0.8180**	0.2864**	0.2571**	0.2597**	0.1188	0.2869**	0.1165	0.2597**	0.2935**
EQ-5D_UA	0.8290**	0.8180**	1**	0.3108**	0.3020**	0.2887**	0.1725	0.2948**	0.0504	0.1798	0.3283**
EQ-5D_PD	0.2877**	0.2864**	0.3108**	1**	0.6295**	0.3713**	0.3350**	0.4268**	0.0581	0.2063*	0.3012**
EQ-5D_AD	0.2131*	0.2571**	0.3020**	0.6295**	1**	0.3915**	0.3973**	0.7055**	0.2608*	0.2881**	0.4470**
IPOS_physical symptoms	0.2727**	0.2597**	0.2887**	0.3713**	0.3915**	1**	0.6047**	0.6537**	0.3224**	0.4194**	0.6521**
IPOS_Anxiety	0.1556	0.1188	0.1725**	0.3350**	0.3973**	0.6047**	1**	0.6784**	0.3426**	0.3838**	0.5179**
IPOS_Feeling at Peace	0.2606**	0.2869**	0.2948**	0.4268**	0.7055**	0.6537**	0.6784**	1**	0.3948**	0.4738**	0.6225**
IPOS_ Sharing Feelings	0.0069	0.1165	0.0504	0.0581	0.2608*	0.3224**	0.3426**	0.3943**	1**	0.5001**	0.6242**
IPOS_Information	0.1460	0.2597**	0.1798*	0.2063*	0.2881**	0.4194**	0.3838**	0.4738**	0.5001**	1**	0.5960**
IPOS_Practical Problems	0.2901**	0.2935**	0.3283**	0.3012**	0.4470**	0.6521**	0.5179**	0.6225**	0.6242**	0.5960**	1**

MO Mobility, *SC* Self-care, *UA* Usual activities, *PD* Pain discomfort, *AD* Anxiety/depression

* $p < 0.05$ ** $p < 0.01$

Table 6 Baseline Characteristics of Participants: Completed vs. Not Completed IPOS

Characteristics	Completed ($n = 71$)		Not Completed ($n = 49$)		
	Median	**min, max**	**Median**	**min, max**	***p-values***
Age (Baseline)	79	57 – 97	75	55 – 92	0.0734
Length of Stay (days)	23	1 – 763	16	0 – 324	0.1562
EQ-5D-5L index score (Baseline Score)	0.3300	−0.026 – 1	0.2450	−0.026 – 0.748	0.0130*
	Completed ($n = 71$)		**Not Completed ($n = 49$)**		
Characteristics	Median	min, max	Median	min, max	*p-values*
Age (Baseline)	79	57 – 97	75	55 – 92	0.0734
Length of Stay (days)	23	1 – 763	16	0 – 324	0.1562
EQ-5D-5L index score (Baseline Score)	0.3300	−0.026 – 1	0.2450	−0.026 – 0.748	0.0130*

Categorical data were analyzed using the Chi-square test, and continuous data were analyzed using the Wilcoxon rank-sum test

* $p < 0.05$

particularly those concerning anxiety and empathy, had high missing data rates (maximum 32% for an individual item). Several reasons could explain this, including the possibility that the IPOS items require residents to recall their care experiences and reassess their interactions with other people, making it difficult for them to answer immediately [39].

Previous cross-cultural adaptation studies indicate that residents may not immediately comprehend the content of IPOS questions [39]. Furthermore, it has been reported that completing the survey can take between 7.7 and 11.24 min [39]. Notably, previous surveys that introduced IPOS assessments into medical facilities showed that the completion rate of the IPOS was between 15.4% and 37.2%, with an IPOS utilization rate of approximately 41.4% among residents [47]. In community home hospices, where nursing and caregiving staff numbers may be more limited than in acute care facilities, utilizing a 19-item scale, such as the IPOS, which includes free-text fields, could pose practical challenges. Additionally, previous studies point out discrepancies between healthcare providers and residents in IPOS assessments, which could affect the reliability of the evaluation results when resident and healthcare provider assessments are contradictory [47].

In this study, the EQ-5D-5L scores of participants who did not complete the IPOS assessment were significantly lower, suggesting that these participants might tend to have a poorer health status, potentially influencing missing data. This implies that the IPOS may not accurately capture the conditions of particularly ill residents [48]. A study in China reported that the general population's mean EQ-5D-5L index score was 0.83 and 0.79 among individuals at the early stages of malignant tumor diagnosis [49]. In comparison, the mean score of participants unable to complete the IPOS assessment in this study was 0.24, suggesting that they likely had a much higher severity level in their health conditions.

This finding indicates that completing the full IPOS may be difficult for patients with higher levels of severity. Nonetheless, the IPOS is not entirely dependent on full self-reporting; even when direct responses from patients are complex, healthcare professionals can utilize the IPOS as a complementary framework for assessment. These characteristics indicate that the IPOS is a reliable and flexible instrument for conducting comprehensive and practical needs assessments in palliative care settings.

Responsiveness

The EQ-5D-5L showed only slight responsiveness, with minimal changes observed during the follow-up period. This suggests that the EQ-5D-5L may not have adequately captured significant health status changes in the terminal-stage population residing in home hospices. Previous studies report that compared with other scales, the EQ-5D-5L does not demonstrate superior sensitivity to changes [50], but has shown adequate responsiveness in other settings [51, 52], causing ongoing debates about its responsiveness. This study compares data between admission and one week after, following the same timing as the IPOS measurements. However, the limited measurement period might have contributed to the lack of sensitivity in the EQ-5D-5L. Similarly, the validity of reevaluating the IPOS within one week has also been debated [39].

In this context, although the EQ-5D-5L and IPOS were administered simultaneously, the EQ-5D-5L, which evaluates physical functioning and limitations in daily activities, may have been less sensitive to changes over the short one-week observation. The EQ-5D-5L assesses aspects such as physical function and activity restrictions

that are relatively objective and less subject to rapid fluctuation, making it more suitable for long-term follow-up rather than detecting short-term changes. In contrast, the IPOS targets more subjective and potentially variable elements, such as psychological and emotional aspects (e.g., anxiety and worries), as well as physical symptoms, which may be more responsive to short-term fluctuations. Additionally, the IPOS recommends reassessment when needed, allowing greater flexibility in capturing changes over shorter periods. Other reports indicate that while the IPOS is sensitive to detecting changes, the average completion rate for questionnaires is only 58%, with at least 14% of respondents reporting resistance to weekly evaluations [49], highlighting the importance of designing feasible measurement intervals.

The IPOS showed small effect sizes at the initial follow-up, but small to moderate effect sizes at the subsequent follow-up, suggesting that it may be more sensitive to the gradual worsening of symptoms in the terminal-stage population. This may be because the IPOS accurately captures the scores of 10 items related to physical symptoms [53] and additional mental aspects, such as empathy and worries, that are not covered by the EQ-5D-5L, providing a broader understanding of hospice residents' conditions [24]. Considering that residents with malignant tumors tend to experience gradual deterioration in their condition, it is crucial to accurately capture these changes to implement appropriate symptom management and care approaches.

Correlation analysis

Correlation analysis between individual domains of the EQ-5D-5L and the IPOS revealed significant correlations across many items, indicating general conceptual consistency between the two scales. Particularly, strong correlations were observed between the EQ-5D-5L concepts related to physical health and the IPOS evaluation of physical symptoms.

However, the IPOS domains on "anxiety" and "sharing feelings with family and friends" had low correlations with the EQ-5D-5L domains, suggesting that these psychological and emotional concepts are distinctive and not shared with the EQ-5D-5L. Residents with malignant tumors have been reported to experience worsening physical symptoms, anxiety, difficulties in daily life, and social isolation during the terminal stages [54, 55]. Specifically, the "anxiety/depression" item in the EQ-5D-5L assesses the severity of anxiety and depression using a simple five-level scale with content that is relatively general and abstract. In contrast, the IPOS item related to "feeling anxious" captures more concrete and multifaceted aspects, such as concerns about illness and treatment, relationships with family and friends, and low mood. Therefore, the IPOS may capture more nuanced and broader aspects of anxiety that are specific to palliative care, which could explain the lack of significant correlation between the two scales. Furthermore, the IPOS enables healthcare professionals to supplement their observational perspectives and effectively monitor patients' symptoms [56]. It also facilitates communication and information sharing within care teams, supporting the consistent delivery of care that aligns with patients' needs [56]. Particularly, in response to the rapid symptom changes observed during the terminal phase, the IPOS helps develop comprehensive care plans that address physical as well as psychological and social aspects.

Implications for regional practice and future research

The EQ-5D-5L, with its high feasibility and broad applicability, is considered a useful tool for assessing general HRQoL. It may be particularly efficient and feasible when residents' symptoms are stable. In contrast, the IPOS, with its sensitivity to psychological and emotional factors, is expected to be particularly useful in environments that focus on palliative care and mental health. However, the feasibility of using the IPOS poses challenges. It is suggested that clinical judgment and strategic use of both tools, employing the EQ-5D-5L when symptoms are stable and the IPOS for more detailed assessments of psychological and emotional changes, may be necessary. Additionally, it is important to consider socioeconomic factors such as financial burden and regional disparities in access to healthcare resources when selecting and applying these tools appropriately [57].

Future research should include longitudinal validation with larger sample sizes. Further, the development and validation of new practical and effective scales would advance the field.

Limitations of the study

This study has some limitations. First, the sample size was relatively small, requiring caution when generalizing the results. Future studies should target larger and more diverse populations. Additionally, this study was conducted in a single-home hospice facility, limiting its applicability to other settings and populations.

Moreover, this study exclusively examines cancer patients, which may affect the generalizability of the findings. Typically, the progression and needs of cancer patients differ from those of residents with other conditions, such as neurological diseases. Therefore, analyses tailored to the specific characteristics of different diseases may be necessary.

Additionally, the study environment may have influenced the results owing to decisions and actions of

on-site staff. For example, the study design did not specify which scale (EQ-5D-5L or IPOS) should be administered first. This flexibility might have affected the order and process of responses, potentially introducing factors such as fatigue or reduced concentration during the assessments. This flexibility might have affected the order and process of responses, potentially introducing factors such as fatigue or reduced concentration during the assessments. These effects could be particularly relevant to the completion rates and accuracy of responses for the IPOS, which includes a more significant number of items. Future studies should consider implementing standardized measurement procedures and controlled environments to mitigate these potential biases.

Additionally, the measurement intervals for the scales in this study were set at one week and at times of clinical change, based on the IPOS manual and previous literature regarding recommended measurement frequency. Consequently, the EQ-5D-5L was also administered according to this schedule. This may have influenced the evaluation of the EQ-5D-5L's responsiveness, as it primarily captures functional aspects of health status. These findings suggest that future studies should consider setting measurement intervals that align with the characteristics of each scale to assess responsiveness more accurately. However, considering the need for cooperation from the facilities, time, and psychological considerations regarding the residents involved, this study is considered a relatively substantial investigation in hospice research.

Conclusion

The EQ-5D-5L may be slightly more suitable for primary screening needs in community home hospices owing to its higher feasibility. In contrast, the IPOS is an excellent tool when it is important to comprehensively and deeply capture the needs of individuals over time. This study suggests that it is necessary to consider the specific characteristics of each measure when selecting or using different measures.

Abbreviations

EQ-5D-5L	EuroQol 5-Dimension 5-level
HRQoL	Health-related QoL
IPOS	Integrated Palliative care Outcome Scale
QoL	Quality of life

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Authors' contributions

TM, MK, KK, and YK contributed to the study's concept, design, and data collection. TM, MK, and MK handled data analysis, interpretation, and manuscript drafting. All authors approved the final version and accept public responsibility for their contributions.

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Data availability

The dataset utilized and analyzed during the current study is available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

The study protocol was reviewed and approved by the"Ethics Committee for Life Science and Medical Research Involving Human Subjects"at Yokohama City University (YCU). This study was conducted in accordance with relevant guidelines and regulations, such as the Declaration of Helsinki. Informed consent was obtained from all participants prior to their inclusion in the study. Yokohama City University (YCU) has established the"Ethics Committee for Life Science and Medical Research Involving Human Subjects"to oversee and ensure that all research involving human participants or human tissue samples complies with relevant ethical guidelines and regulations. This committee reviews research protocols to confirm adherence to national and international standards, including the Declaration of Helsinki and Japan's Ethical Guidelines for Medical and Biological Research Involving Human Subjects.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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