RESEARCH ARTICLE

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Health Outcomes and Symptom Intensity Over Time among Cancer Patients Receiving Palliative Care in Vietnam: A Prospective Cohort Study

Thuy Thi Thanh Mai[1]*, Oanh TH Trinh[1], Dung Van Do[2], Lin Cheng-Pei[3], Richard Harding[4]

Abstract

Background: In Vietnam, research on palliative care, particularly for cancer patients, remains limited. This gap reduces the practical relevance of research findings in shaping policies and strategies for palliative care tailored to Vietnam's healthcare system. This study aimed to assess health outcomes in cancer patients receiving palliative care over a one-year period using the APCA African Palliative Outcome Scale (IPOS). **Methods:** The prospective cohort study was conducted over one year, with monthly interviews using IPOS scale to measure patient health outcomes. A multilevel linear mixed model was used to analyze changes in IPOS scores over time, and a Bonferroni-adjusted pairwise comparisons test was applied to compare mean IPOS scores of patients before death. **Results:** Among the 134 patients included, mean IPOS scores along with physical, emotional, and communication symptoms decreased over time. The total IPOS score declined from 32.2 (95% CI: 30.3–34.1) to 11.4 (95% CI: 9.6–13.3) after one year, with the greatest reduction observed in physical symptoms. Patients in the 0–2 months before death group had significantly higher scores than those in the 3–5 months and 6 months before death groups. Physical symptoms, including pain, dyspnea, and weakness, worsened the most, while communication issues remained stable, peaking at 2 months and reaching their lowest point at 6 months before death. **Conclusion:** This study provides evidence of the benefits of palliative care in improving the health of cancer patients. Quality of life declines most in the final months, highlighting the need for early symptom management. This study also paves the way for further research into symptom progression before death.

Keywords: Cancer- Patient Care- Symptom Management- IPOS- POS

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Introduction

Cancer incidence is rising worldwide due to aging populations and the prolonged survival of terminal cancer patients, made possible by effective treatments [1]. In developing countries, approximately 70% of cancer patients are diagnosed at an advanced stage when curative treatment is no longer effective, leaving palliative care particularly pain management as the only available option [2]. Palliative care is a specialized medical approach for individuals with serious illnesses, especially terminal cancer, its focusing on improving the quality of life (QoL) and providing emotional support [3]. Patients with terminal cancer and their families face significant challenges related to life-threatening illness, including physical and psychological symptoms that obviously impact the QoL [4]. Therefore, palliative care is essential in helping patients and their families recognize and manage disease symptoms early. It also provides counseling and support to address the psychological and emotional issues of the illness [3].

Recent studies have shown that comprehensive palliative care and rehabilitation programs increase physical, emotional, and social functioning while reducing symptoms such as fatigue and pain in patients with terminal cancer [5]. Furthermore, a retrospective cohort study reported that palliative care programs reduce the need for emergency care, are tailored to needs, and may alleviate the discomfort of cancer patients [6]. Additionally, previous research has shown that the QoL

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[1]*Lecturer, Department of Epidemiology, Faculty of Public Health, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam.* [2]*Lecturer of Biostatistics Department, Faculty of Public Health, University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam.* [3]*WHO Global Palliative Care Evaluation Research Associate (Cicely Saunders Institute of Palliative Care, Policy and Rehabilitation Florence Nightingale Faculty of Nursing, Midwifery & Palliative Care, King's College London - Bessemer Road, London, SE5 9PJ, UK.* [4]*Director of Global Programmes and Partnershipsicely (Cicely Saunders Institute of Palliative Care, Policy and Rehabilitation Florence Nightingale Faculty of Nursing, Midwifery & Palliative Care, King's College London - Bessemer Road, London, SE5 9PJ, UK. *For Correspondence: maithanhthuy@ump.edu.vn*

of cancer patients declines significantly in the six months before death, with this deterioration intensifying in the final two months of life, and the collection of data on the QoL of cancer patients in the context of palliative care is necessary to contribute to symptom management and improve patient-physician communication [7, 8]. However, the assessment of changes in physical and psychological symptoms during palliative care for cancer patients remains underexplored. Most studies on QoL in cancer patients are cross-sectional or involve short-term follow-up [9-12]. Given the importance of assessing these changes, especially in terminally ill patients, long-term follow-up until death is necessary to more comprehensively understand the impact of treatment and palliative care [13].

In Vietnam, research on palliative care remains limited, particularly for cancer patients. Most studies focus on assessing symptoms, QoL, and care needs of patients at a single point in time, with few long-term cohort studies monitoring symptom progression over time [9-14]. This limitation reduces the practical applicability of research findings in developing policies and strategies for palliative care that are tailored to Vietnam's healthcare context.

This study was conducted at one of the largest cancer hospitals in Vietnam, which treat cancer patients from across the country. The hospital's Palliative Care Department (PCD), established in 2011, admits patients with advanced cancer who are no longer eligible for specific treatments. In this study, changes in QoL and symptoms of terminal cancer patients receiving palliative care were tracked over a one-year period. Additionally, the study examined the differences in palliative care-related symptoms and concerns among patients with varying survival durations. The findings not only enhance understanding of symptom progression but also contribute to the development of clinical guidelines and health policies aimed at optimizing the QoL for cancer patients in Vietnam.

Materials and Methods

Study design and setting

This study was based on a prospective cohort study conducted at the PCD of Ho Chi Minh City Oncology Hospital from July 2020 to September 2021. Admissions are determined based on medical records symptom evaluations in accordance with the Guidelines for Palliative Care for Cancer and AIDS Patients published by the Vietnamese Ministry of Health [15].

Participants

The study included all newly referred cancer patients with varying diagnoses and stages who were admitted to palliative care within three days of referral. Eligible participants were cancer patients aged 18 and older who received palliative care services within this timeframe. Written informed consent was obtained from all patients and their caregivers before participation. Only patients with at least one follow-up evaluation after enrollment were included in the study. Patients were excluded if they lacked a caregiver, had cognitive impairment, suffered from unstable health conditions, or were severely debilitated, preventing their participation.

Measurements

This study collected information through a patient and caregiver self-report of symptoms and health problems, and a health care provider (HCP) questionnaire on patient clinical information. Both questionnaires were completed at baseline and monthly until death or study withdrawal.

The patient and caregivers self-report consisted of demographic characteristics, e.g. age, gender, survival time, financial status, health status, social activity, time caring for patient, and The APCA (African Palliative Care Association) African Palliative Outcome Scale (IPOS). This is a validated tool designed to assess the health outcomes of patients with advanced disease and improve outcome measurement in palliative care. It demonstrates moderate internal consistency (Cronbach's Alpha = 0.6) and high test-retest reliability (ICC 0.78–0.89). The scale consisted 10 items covering physical symptoms, emotional symptoms and communication issues. Patient questions 1–7 addressed physical symptoms, feeling worried, sharing feelings, feeling at peace, feeling that life was worthwhile, and receiving support from family. Caregiver questions 8–10 addressed feeling worried, self-confidence, and access to information. Questions 4–9 were reverse-coded so that higher scores indicate more severe symptoms [16, 17].

The HCP questionnaire consisted patients clinical information, e.g. diagnosis, phase of illness, performance status. The Australia-modified Karnofsky Performance Scale (AKPS) Questionnaire was used to evaluate activity, work capability, and self-care across 11 levels, with higher percentages indicating better functional ability [18]. In this study, scores were categorized as ≤60% (requiring some assistance) or >60% (independent but unable to work). Moreover, HCP used "The Phase of illness" scale to categorize patient's stages in palliative care consisting of five distinct (stable, unstable, deteriorating, dying, and deceased). This scale was commonly used for communicating clinical status, care planning, quality improvement, and funding [19].

Both patients and caregivers completed both questionnaires at baseline and then monthly throughout the study. All data were self-reported unless the patient was unable to respond, in which case the caregiver answered on their behalf. Proxy reporting was documented in the questionnaire.

Study sample size

Sample size calculation will be performed based on the main outcome, the IPOS score, to detect changes across individual assessments [20]. Using parameters that include the baseline assessment score and six subsequent monthly follow-up assessments, with a weak-to-moderate correlation between the baseline and follow-up scores, a total of 134 patients is required to detect a small effect size of 0.25 in IPOS score changes [21]. This calculation was based on a statistical power of 80% and a two-sided significance level of 0.05, accounting for an anticipated 30% loss to follow-up over the study period.

Statistical method

Data were processed using EpiData and Stata 17. Descriptive statistics were used to summarize patient and caregiver characteristics, patient's performance status, and illness phase.

A multilevel linear mixed model was employed to analyze the change in IPOS scores over time at two levels: within patients (repeated observations over time) and between patients. The model incorporated both fixed effects (to assess the overall association between time and IPOS score) and random effects (to account for individual variations in score trajectories). This approach allowed for patient-specific trajectories of IPOS score changes while estimating the overall trend across all patients.

Assessment time points were determined based on the last interview before death or study withdrawal. Due to a decreasing number of survivors, data from month eight onward were pooled. Bonferroni-adjusted pairwise comparisons were conducted to compare mean IPOS scores across three periods before death (0–2 months, 3–5 months, and ≥6 months). All analyses were performed using two-tailed tests, with statistical significance set at $p < 0.05$.

Results

A total of 11 patients (7.5%) were excluded from the analysis due to death or discharge before their interview, leaving 134 patients for the final analysis. By the end of the study, 13 patients (9.7%) were still being followed at eleventh month, 102 patients (76.1%) had died, and 19 patients (14.2%) were unreachable (Figure 1).

Descriptive data

Among 134 patients, 44% were female, with a mean age of 58.1 ± 14.1 years. Most (56.7%) required assistance to complete the questionnaire, and 61.9% faced financial difficulties. Gastrointestinal cancers were most common (21.6%), followed by head-face-neck (17.2%), respiratory (16.4%), and breast cancers (13.4%). Regarding illness phase, 43.3% of patients were classified as stable, 29.8% as unstable, 25.4% as deteriorating, and 1.5% as in the dying phase. The median survival duration after receiving palliative care was 3.6 months. Caregivers were predominantly women (70.9%) with a mean age of 47.2 ± 13.5 years, most of whom were spouses, children, or siblings of the patients. Only 11.2% rated their own health as very good, while 5.2% reported poor health. Caregivers spent an average of 19.9 ± 6.9 hours per day providing care (Table 1).

Changes in patients' IPOS scores over time

This study found that cancer patients experienced significant physical, emotional, and psychosocial problems prior to receiving palliative care, including pain, weakness, poor mobility, anxiety, and depression (Figure 2). Over one year, these symptoms showed significant improvement, with a significant reduction in IPOS scores. The total IPOS score decreased from 32.2 (95% CI: 30.3–34.1) at baseline to 11.42 (95% CI: 9.6–13.3). The physical symptom score decreased from 15.1 to 2.9, indicating a reduction in pain and discomfort ($p < 0.001$). Emotional symptoms score also decreased from 9.7 to 5. Social and communication scores decreased from 7.4 at admission to 3.4 at one year as well (Table 2).

Table 1. Baseline Characteristics of Cancer Patients Receiving Pallative Care and Caregivers (n=134)

Characteristics of patients		n (%)
Female		59 (44.0)
Age, mean (SD)		58.1 ± 14.1
Respondents	Patients	58 (43.3)
	Family/friend	76 (56.7)
Place of care	Inpatients	70 (52.2)
	Outpatients	60 (44.8)
	Home-care	4 (3)
Have financial hardship	Yes	83 (61.9)
Primary cancer diagnosis	Digestive organs	29 (21.6)
	Head-Face-Neck	23 (17.2)
	Respiratory and intrathoracic organs	22 (16.4)
	Breast	18 (13.4)
	Genital organs	18 (13.4)
	Other	12 (9)
	Liver	8 (6)
	Pancreatic	4 (3)
Phase of illness	Stable	58 (43.3)
	Unstable	40 (29.8)
	Deteriorating	34 (25.4)
	Dying	2 (1.5)
Performance status (AKPS)	≤ 60%	26 (19.4)
	Above 60%	108 (80.6)
Survival	Still alive at the end of the study	13 (9.7)
	Lost follow-up	19 (14.2)
	Death	102 (76.2)
Survival in months from admission	≤ 2 months	77 (57.5)
	3-5 months	38 (28.3)
	≥ 6 months	19 (14.2)
Characteristics of cargivers		n (%)
Female		95 (70.9)
Age, mean(SD)		47.2 ± 13.5
The relationship with patients	Spouse/partner	57 (42.6)
	Son/daughter	48 (35.8)
	Friend/Parent/Cousin	18 (13.4)
	Sibling	11(8.2)
Health status	Very good	15 (11.2)
	Good	62 (46.3)
	Fair - Poor	57 (42.5)
Social activity	Much less than most	28 (20.9)
	Less than most	68 (50.7)
	About the same/ More than most	38 (28.4)
Time for patient care, mean (SD)		19.9 (6.9)

AKPS, Australia-Modified Karnofsky Performance Scale; SD, standard deviation

Table 2. Mean of IPOS Score Over Time of Cancer Patients

IPOS score	Time*								
	Baseline (Ref.) (n=134)	Month 1 (n=134)	Month 2 (n=57)	Month 3 (n=32)	Month 4 (n=25)	Month 5 (n=19)	Month 6 (n=17)	Month 7 (n=16)	Month ≥8 (n=14)
	Estimated mean (95%CI)"								
IPOS total score†	32.2 (30.4-34.1)	23.5 (22.1-25.04)	19.2 (16.9-21.4)	17.1 (13.9-20.3)	13.8 (11.4-16.2)	11.9 (9.3-14.4)	12.5 (8.9-16)	11.4 (7.8-15.1)	11.42 (9.6-13.3)
Physical symptoms†	15.1 (13.8-16.4)	9.4 (8.3-10.5)	6.4 (5.1-7.8)	6.03 (3.9-8.2)	3.9 (2.5-5.4)	2.9 (2.1-3.8)	2.9 (1.9-3.9)	3 (1.7-4.3)	2.9 (2.3-3.5)
Symptoms†									
Pain	2.7 (2.5-2.9)	1.8 (1.6-2.01)	1.3 (1-1.5)	1.1 (0.7-1.5)	1 (0.6-1.4)	0.8 (0.4-1.1)	0.9 (0.5-1.4)	0.5 (0.2-0.8)	0.9 (0.7-1.2)
Shortness of breath	1.4 (1.1-1.7)	1.1 (0.8-1.3)	0.7 (0.4-1)	0.6 (0.3-1)	0.2 (-0.04 – 0.5)	0.2 (-0.07 – 0.4)	0.1 (-0.04 – 0.3)	0.2 (-0.07 – 0.5)	0.2 (0.02-0.4)
Fatigue	2.04 (1.8-2.3)	1.7 (1.5-1.9)	1.2 (0.9-1.5)	1.3 (0.9-1.7)	0.5 (0.2-0.9)	0.6 (0.2-0.9)	0.3 (0.1-0.5)	0.6 (0.3-0.9)	0.6 (0.4-0.9)
Nausea	0.8 (0.6-1.02)	0.4 (0.2-0.5)	0.2 (-0.01 – 0.4)	0.2 (-0.5 – 0.5)	0	0.05 (-0.05-0.2)	0	0.2 (-0.08 – 0.5)	0.04 (-0.02 – 0.09)
Vomiting	0.7 (0.5-0.9)	0.4 (0.3-0.6)	0.4 (0.1-0.6)	0.2 (-0.1 – 0.5)	0	0	0	0	0
Poor appetite	1.6 (1.3-1.8)	0.8 (0.6-1)	0.5 (0.3-0.8)	0.5 (0.1-0.9)	0.5 (0.1-0.9)	0.3 (-0.1 – 0.6)	0.2 (-0.01 – 0.4)	0.3 (-0.1 – 0.7)	0.3 (0.1-0.4)
Constipation	1.4 (1.1-1.6)	0.6 (0.4-0.8)	0.4 (0.2-0.6)	0.5 (0.2-0.9)	0.1 (-0.1 – 0.3)	0.1 (-0.1 – 0.3)	0.1 (-0.06 – 0.2)	0	0
Dry mouth	1.4 (1.2-1.7)	0.6 (0.4-0.8)	0.2 (0.02-0.4)	0.1 (-0.04 – 0.2)	0.08 (-0.07 – 0.2)	0	0.1 (-0.1 – 0.4)	0.06 (-0.06 – 0.2)	0.1 (-0.003 – 0.2)
Drowsiness	1 (0.8-1.2)	0.4 (0.3-0.6)	0.1 (-0.003 – 0.3)	0.3 (0.01-0.6)	0.08 (-0.08 – 0.2)	0.1 (-0.1 – 0.3)	0.1 (-0.1 – 0.3)	0.2 (-0.1 – 0.5)	0
Poor mobility	2.1 (1.8-2.4)	1.6 (1.4-1.8)	1.5 (1.1-1.8)	1.3 (0.9-1.7)	1.4 (0.9-2)	0.9 (0.3-1.5)	1.1 (0.6-1.7)	0.9 (0.4-1.4)	0.7 (0.4-1)
Emotional symptoms†	9.7 (9.9-10.3)	8.7 (8.2-9.3)	8 (7.7-8.9)	6.8 (5.5-8.1)	6.2 (5.1-7.3)	5.3 (3.9-6.7)	5.4 (3.5-7.2)	5.1 (3.4-6.9)	5 (4.1-5.9)
Communication issues†	7.4 (6.7-8.02)	5.4 (5-5.9)	4.8 (4.2-5.4)	4.4 (3.8-4.9)	3.7 (2.8-4.5)	3.6 (2.4-4.8)	4.2 (2.7-5.7)	3.3 (2.1-4.5)	3.4 (2.7-4.1)

IPOS score, The APCA African POS score; CI, confidence interval; †Score were converted with higher mean scores indicated higher average symptom severity; *, Multilevel Linear mixed model analysis; All p-value <0.001

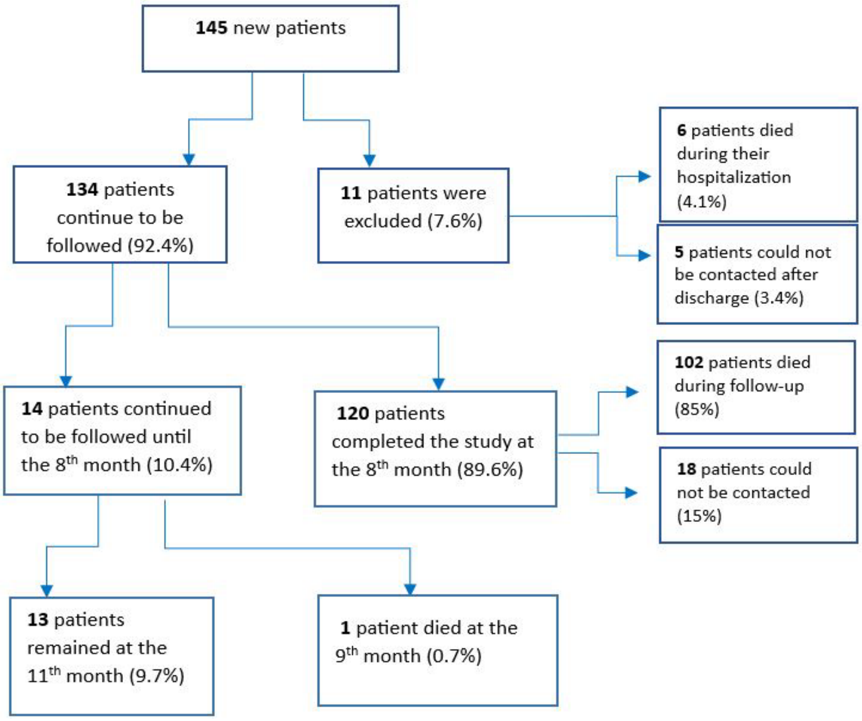

Figure 1. Patients Flow Diagram

Change in patients' IPOS score over time before death

Table 3 presents the analysis results of mean IPOS scores of patients based on the time period before death, categorized into three groups: 0–2 months before death (n=60), 3–5 months before death (n=38), and ≥6 months before death (n=18).

The mean of IPOS total score increased from 15 in the "≥6 months before death" group to 29.4 in the "0-2 months before death" group, indicating a decline in patient health including physical and emotional problems as the death approaches. In physical symptoms, which increased from 4.1 points in the "≥6 months before death" group to 13.8 points in the "0-2 months before death" group, with pain, shortness of breath, and fatigue being the most prominent (Table 3).

In emotional problems, the mean IPOS score rose from 6.1 points in the "≥6 months before death" group to 8.6 points in the "3-5 months before death" group and 9.6 points in the "0-2 months before death" group. However, the increasing was smaller than physical symptoms. Communication issues remained relatively stable, with the mean IPOS score fluctuating from 4.7 in the "≥6 months before death" group to 5.6 in the "3-5 months before death" group and 5.9 in the "0-2 months before death" group.

Overall, the mean IPOS score of cancer patients receiving palliative care significantly increased as death approaches. Most score differences were statistically significant, with p-value < 0.001 for most symptoms. However, some symptoms, such as drowsiness (p=0.269) and communication problems (p=0.283) , showed no significant changes (Figure 2).

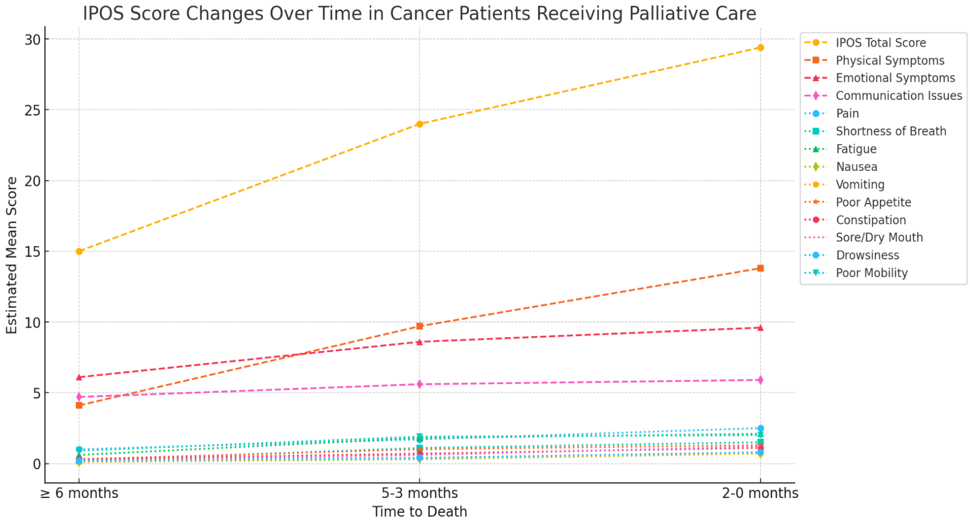

Figure 2. IPOS Mean Scores of Cancer Patients Over Time towards Death

Table 3. Changes in IPOS Scores in Cancer Patients at Different Time Intervals before Death

IPOS score	Time to death*					
	Period 1 (n=60)	Period 2 (n=38)	Period 3 (n=18)	Δ period 1 and 2	Δ period 1 and 3	Δ period 2 and 3
	Estimated mean (SD)			Mean difference (p-value)		
IPOS total score†	29.4 (10.9)	24 (10.7)	15 (8.3)	5.2(0.004)	14.5(<0.001)	9.3 (<0.001)
Physical symptoms†	13.8 (7.8)	9.9 (7)	4.1 (3.8)	3.8(0.001)	9.8(<0.001)	5.8 (<0.001)
Symptoms†						
Pain	2.5 (1.4)	1.7 (1.4)	1 (1.1)	0.8 (<0.001)	1.4 (<0.001)	0.7 (0.005)
Shortness of breath	1.5(1.5)	1.1 (1.5)	0.2 (0.6)	0.4 (<0.001)	1.3 (<0.001)	0.9 (<0.001)
Fatigue	2.1 (1.3)	1.8 (1.3)	0.6 (0.9)	0.2 (0.773)	1.5 (<0.001)	1.2 (<0.001)
Nausea	0.7 (1.3)	0.3 (0.9)	0.1 (0.5)	0.4 (0.063)	0.6 (<0.001)	0.2 (0.109)
Vomiting	0.7 (1.2)	0.4 (1)	0.1 (0.5)	0.3 (0.441)	0.6 (<0.001)	0.3 (0.013)
Poor appetite	1.3 (1.4)	1 (1.3)	0.3 (0.8)	0.3 (0.366)	1 (<0.001)	0.7 (<0.001)
Constipation	1.1 (1.4)	0.7 (1.2)	0.3 (0.7)	0.4 (0.108)	0.8(<0.001)	0.4 (0.007)
Dry mouth	1.2 (1.4)	0.6 (1.1)	0.2 (0.7)	0.6 (0.008)	1 (<0.001)	0.4 (0.007)
Drowsiness	0.8 (1.3)	0.4 (0.9)	0.2 (0.7)	0.4(0.018)	0.6 (<0.001)	0.2 (0.269)
Poor mobility	2 (1.5)	1.9 (1.5)	0.9 (1.2)	0.2 (1.000)	1.1 (<0.001)	0.8 (0.003)
Emotional symptoms†	9.6 (3.5)	8.6 (3.4)	6.1 (3.5)	1 (0.226)	3.5 (<0.001)	2.6 (<0.001)
Communication issues†	5.9 (3.3)	5.6 (3)	4.7 (3.1)	0.3 (1.000)	1.2 (0.074)	0.9 (0.283)

IPOS score, The APCA African POS score; SD, standard deviation; Period 1, 0-2 months before death; Period 2, 3-5 months before death; Period 3, ≥ 6 months before death; †Scores were converted with higher mean scores indicated higher average symptom severity; *Multilevel Linear mixed model analysis

Discussion

This study demonstrated a significant increase in IPOS scores for cancer patients receiving palliative care. The significant decrease in the total IPOS score after one year indicated an improvement in the severity of physical, emotional, and social symptoms. This finding is consistent with recent studies showing that palliative care reduces symptoms such as pain and fatigue, thereby improving physical and emotional well-being[5, 6]. Similar studies have also reported that cancer patients receiving palliative care experience improvements QoL, overall functioning, and symptom management over time. However, as death approaches, some symptoms may become more severe or harder to manage [8, 22, 23]. During the early part of the last year of life, patients experienced a slight increase in physical problems, along with symptoms of depression and anxiety. These symptoms then stabilized for approximately four to six months before worsening again in the final three to four months [24].

Notably, the results of this study, like many others, highlight a sharp decline in the physical and psychological well-being of terminally ill cancer patients in the last months of life, a phenomenon known as "terminal decline" [7]. This decline may serve as an sign that death is approaching [22].

Regarding physical symptoms, the study found a significant reduction in problems such as pain, fatigue, and poor mobility over a one-year period. These findings are consistent with previous studies by Higginson et al. and Zimmermann et al., which reported significant reductions in pain and fatigue in cancer patients receiving palliative care. In addition, the results support the view that early palliative care interventions lead to significant improvements in the control of physical symptoms, especially pain and fatigue [9, 12, 25].

Emotional symptoms were also significantly improved; specifically, patients felt more at peace, felt that life was worth living, and shared their feelings and received more support from their families. These results are consistent with the findings of Temel et al. and Truong et al., who observed that palliative care significantly reduced distress in cancer patients [26, 27]. The reduction in emotional symptoms in this study may have been due to the comprehensive support provided by the palliative care team, including psychological counseling and spiritual care. Furthermore, our findings showed obviously improvements in communication and social issues over time, suggesting that ongoing palliative interventions enhance patient-provider interactions, as previously described by Zimmermann et al. [12].

This study also compared the IPOS score between three cross-sectional subsamples of deceased patients, based on time to death (0-2, 3-5, and ≥ 6 months). The retrospective analysis revealed a different perspective, revealing that IPOS scores increased as patients neared death, particularly in the final two months. This trending is consistent such as the findings of Seow et al. and Hui et al., which reported increased symptom burden as patients approached death [28, 29]. This may be related to the increased stressors patients face as death approaches, including uncertainty, loss, life adjustment, and grief before death [24].

The increasing trend in total IPOS scores was primarily driven by a rise in physical symptoms such as pain, shortness of breath, and fatigue, in the final two months of life. The concurrent increase in emotional issues during this period further underscores the need for comprehensive palliative care that addresses both the physical and psychological well-being of patients. In contrast, social and communication problems remained relatively stable. This stability likely reflects the ongoing palliative care efforts of palliative care to maintain connection and provide support between patients, families, and healthcare staff.

These findings align with previous studies, such as the one by Hui et al., which reported a trend of increasing symptom intensity as patients approach death, highlighting the need for palliative interventions focused on managing physical symptoms [28]. Research by Yi-Shiun Tsai et al. [6] indicates that the primary reason for hospitalization of terminal cancer patients before death is uncontrollable symptoms. Studies assessing the QoL of cancer patients during their final year have found that all aspects of QoL are significantly impaired in the last months of life [22]. Additionally, increased anxiety, depression, and physical symptom burden in the final months before death are key predictors that significantly impact a patient's QoL. Recognizing these signs allows medical staff to help patients experience their final days with the highest possible level of comfort and care [30].

This is the first study in Vietnam to use a prospective cohort study to monitor and evaluate changes in the QoL of cancer patients receiving palliative care over the course of a year. Additionally, a multilevel linear mixed model was employed to analyze both fixed and random effects, allowing for the assessment of health outcome differences based on patient characteristics and hierarchical data structures. However, this study has some limitations. First, the participant recruitment process may have excluded patients in very poor health, potentially leading to an underestimation of the condition of those most in need of palliative care. Second, the sample size decreased over time due to patient death or loss of contact, which may have artificially increased the IPOS score, potentially skewing some of the study results and making them less reliable. Third, over half of the participants required caregiver assistance to complete the questionnaires, potentially affecting the accuracy of quality-of-life assessments.

In conclusion, this study demonstrates the significant benefits of palliative care in improving the physical, emotional, and social well-being of cancer patients in the Vietnamese context. Additionally, patients' QoL and physical symptom intensity changed at varying rates over time, with a more pronounced decline in QoL occurring during the final months of life, which is a sign of the approaching death. These findings highlight the importance of early detection and intervention for symptom control in patients with advanced cancer, especially physical symptoms such as pain, fatigue, and dyspnea. Furthermore, this study opens up avenues for further research that examines the characteristics of patients at different stages before death and focuses on those experiencing severe levels of physical symptoms at the time of admission.

Author Contribution Statement

Conceptualization: Richard Harding, Cheng-Pei Lin, Dung Van Do; Methodology: Thuy Thi Thanh Mai, Dung Van Do ,Oanh TH Trinh, Cheng-Pei Lin; Formal analysis: Thuy Thi Thanh Mai; Investigation: Thuy Thi Thanh Mai, Oanh TH Trinh; Supervision: Richard Harding, Oanh TH Trinh; Writing-original draft: Thuy Thi Thanh Mai, Oanh TH Trinh, Dung Van Do; Writing - review & editing: All Authors;

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Ethical Declaration

The study received medical ethics approval from the Ethical Council in Biomedical Research of the Oncology Hospital, Ho Chi Minh City (Reference Number: 427/BVUB-HDD) and King's College London Research Ethics Committee (Reference Number: HR-18/19-10835).

Conflict of Interest

The authors declare no conflicts of interest related to this study

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