

ORIGINAL RESEARCH



Palliative care in emergency departments could improve patient care and reduce medical costs

Lin-Sheng Hsu^{1,†}, Zhi-Yi Lee^{1,†}, Ming-Hao Chen¹, Sz-An Tsai¹, Chien-Hua Huang², Chiang-Ting Chien³, Ping-Hsun Yu^{3,4,*}

¹School of Medicine, Fu Jen Catholic University, 24205 New Taipei, Taiwan

²Department of Emergency Medicine, National Taiwan University Hospital, 100225 Taipei, Taiwan

³Department of Life Science, School of Life Science, College of Science, National Taiwan Normal University, 106308 Taipei, Taiwan

⁴Emergency Department, Taipei Hospital, Ministry of Health and Welfare, 242033 New Taipei, Taiwan

***Correspondence**

80943005s@ntnu.edu.tw

(Ping-Hsun Yu)

† These authors contributed equally.

Abstract

Background: Adults with chronic illnesses frequently visit emergency departments (EDs) during their final years of life. These patients often undergo numerous invasive medical procedures in EDs, such as intubation, hemodialysis, or extracorporeal membrane oxygenation. **Methods:** To assess the effectiveness of palliative care in the ED, we investigated all patients who received palliative care in the ED and were subsequently admitted to the hospital in the period January to March 2023. Patients admitted from clinics ($n = 8$), discharged in the ED ($n = 12$), and hospitalized for more than 365 days ($n = 1$) were excluded. **Results:** A total of 84 patients received palliative care in the ED, whereas 145 received it after hospital admission. No significant differences were observed between these two groups in terms of age or gender. However, the ED referral group exhibited a significantly different distribution of primary indications for palliative care compared to the admission group ($p = 0.046$). The intensive care unit (ICU) admission rate was 15.5% in the ED referral group, and 40.0% in the admission group ($p < 0.001$). The ward admission rate (75.0% vs. 75.2%, $p = 0.549$) of both groups was similar, but palliative care ward admission rate (22.6% vs. 11.7%, $p = 0.029$) of both groups was significantly different. The mean medical cost of the ED group was 3435 USD, and that of the admission group was 9957 USD ($p < 0.001$). The mortality rate was 48.8% in the ED group and 62.8% in the admission group ($p = 0.028$). The rate of ventilator use while death occurred was 17.1% in the ED group and 37.8% in the admission group ($p = 0.018$). **Conclusions:** Our study shows that early palliative referral from the ED were related to reduced ICU admission rate, less suffering for the patient, and lower medical costs.

Keywords

Emergency department; Palliative care; Hospice care; Hospice consultation; Medical cost; Quality of life; End-of-life treatment

1. Introduction

The emergency department (ED) is one of the busiest departments in the hospital, where many critical medical interventions are administered [1, 2]. Emergency physicians possess expertise in managing critically ill patients and providing life-sustaining care [3]. The use of ED continues to increase, and extensive ED utilization along with rising medication costs have significantly contributed to the escalation of medical expenses both with EDs and overall healthcare systems [4]. Optimizing healthcare resource allocation necessitates accurately distinguishing between patients with incurable conditions and those undergoing active treatment. This differentiation enables appropriate supportive care tailored to individual patient characteristics. This approach helps to minimize medical costs and avoid non-beneficial treatments [5, 6]. Among patients with serious chronic illness and identifiable trajectories of dying,

over 70% received aggressive resuscitation in the ED [7]. In addition, those who received aggressive care in the final hours of life had limited awareness of palliative care options. Among those patients, approximately 80% needed palliative care [8]. Overly aggressive end-of-life (EOL) treatment for patients may only increase healthcare costs and reduce quality of life. Therefore, palliative care in EDs can reduce suffering and improve the quality of life for those with progressive and irreversible conditions [9].

Most patients with malignancy exhibited poor Eastern Cooperative Oncology Group (ECOG) performance status scores (3 or 4) during their last month of life [10]. Palliative care emphasizes improving the quality of life of seriously ill patients and their families, as well as reducing their suffering [11]. Early effective palliative care is beneficial for both patients with and without cancer [12, 13] and can improve patients' quality of life [14–19], symptom burden [20], and

even survival [21]. However, one of the most challenging aspects of implementing palliative care is identifying suitable candidates and determining the appropriate time to intervene [22]. Screening patients for palliative care needs upon ED presentation is a viable approach. This early identification facilitates patients awareness of available palliative care resources and increase the likelihood of timely intervention [23]. Therefore, ED is a possible place to initiate or contact the palliative care department. However, only a few studies focused on the practice of palliative care within the emergency department [24]. The objective of our study was to compare patients enrolled in palliative care while in the ED with those enrolled during hospitalization. We focused on comparing baseline characteristics, intervention utilization, and clinical outcomes of those patients enrolled in palliative care. We also sought to identify potential factors or reasons contributing to the observed differences between both groups.

2. Materials and methods

2.1 Study design and participants

This single-center, retrospective observational study was conducted at Taipei Hospital of the Ministry of Health and Welfare (MOHW) in Taiwan, which included patients admitted from the ED and enrolled in palliative care from January to March 2023. The evolution of the concept and definition of palliative care over time and across different geographical regions has resulted in significant variations, making it challenging to establish a universally accepted standard [25]. In the present study, the term “palliative care” is defined as “comprehensive care provided to patients with life-threatening illnesses and their families, encompassing pain management, alleviation of other physical discomforts, and addressing psychological, social, and spiritual issues, thereby enhancing the patient’s comfort and dignity”.

Identification of patients who are eligible for palliative care was initiated by emergency or attending physicians, who subsequently referred these patients to palliative care specialists for assessment. All specialists responsible for enrolling patients into palliative care had obtained palliative care certification from the MOHW, ensuring a consistent standard in patient eligibility assessment. Following the confirmation of eligibility, patients are enrolled in the program. The palliative care team comprises physicians, specialist nurses, general nurses, chaplains, and psychologists, who collaborate to provide comprehensive care.

The services offered by the palliative care team include general physical assessments, management and care of various medical devices (*e.g.*, nasogastric tubes, urinary catheters, and tracheostomy tubes), guidance on wound care (including tertiary and quaternary wounds), specimen collection and testing, basic rehabilitation guidance, pain management, psychological and spiritual counseling, EOL preparation, and other support for patients and their families. Services are available from 8:00 AM to 12:00 PM and 1:00 PM to 5:00 PM, Monday through Friday. As this study was a chart review, the data were recorded by members of the palliative care team who had received professional training, including physicians, specialist

nurses, and general nurses. They assessed and documented the information. Data collection was conducted by case managers within the palliative care team. They organized the necessary data based on the study design and compiled it into structured tables.

Eligibility for palliative care was determined according to the guidelines of the Taiwan Anning Palliative Medicine Society. The inclusion criteria were: patients diagnosed with amyotrophic lateral sclerosis, advanced malignancy, organic psychosis, brain degeneration, heart failure, lung diseases, chronic liver disease and renal failure, and patients with frailty. These criteria were developed in alignment with international recommendations and tailored to meet the needs of terminal patients, considering Taiwan’s medical regulations and practical requirements. They represent criteria that are currently implemented in Taiwan. Patients with frailty were defined by a clinical frailty scale level of 8 (extremely severe weakness) or 9 (terminal disease), or those that met the general indicators of the first stage of Supportive and Palliative Care Indicators Tool (SPICt) and the index of the second phase of SPICt for debilitation/dementia. Patients who had been hospitalized for over one year, hospitalized from outpatient department, discharged from ED, or had died during ED were excluded. The study was approved by the MOHW Taipei Hospital Institutional Review Board (No. TH-IRB-0023-0010).

Patients who met our criteria were divided into two groups based on the location of receiving palliative care consultation and subsequent palliative care. The first group comprised patients who received palliative care in the ED, whereas the second group included patients who received palliative care after admission, regardless of whether they were located in an ordinary ward, a palliative care ward, or the intensive care unit (ICU).

2.2 Outcomes

For baseline characteristic comparisons, analyzed variables included sex, age, primary indications for palliative care, presence of Do-Not-Resuscitate (DNR) orders signed before palliative care consultation, use of inotropic agents, ventilator use prior to palliative care enrollment, marital status, and time of ED arrival. The four primary indications for palliative care (malignancy, dementia, frailty, organ failure) were primarily classified based on the primary International Classification of Diseases (ICD) codes documented in patients’ medical records. These classifications were subsequently verified by the professional palliative care physicians responsible for enrollment. It is noteworthy that in Taiwan, DNR orders are typically discussed at critical junctures (*e.g.*, when intubation or other life-sustaining treatments are considered), rather than only upon or after palliative care enrollment. Additionally, the understanding of the disease and diagnosis by patients and their families was compared between the two groups. Upon enrollment, patients were assessed for ECOG performance status, pain levels, severity of dyspnea, and severity of delirium. The distribution of these scores between the two groups was analyzed.

We carefully compared the disposition of patients after palliative care consultation by evaluating several key metrics

including, the admission rate and stay duration in the ordinary ward, ICU, and palliative care ward before the end of our data collection. Additionally, mortality and medical costs were compared.

Medical costs were defined as the total expenses incurred throughout a patient's entire hospitalization—from the emergency department visit through discharge, regardless of whether palliative care ward services were utilized. This total encompasses both payments covered by Taiwan's National Health Insurance (NHI) and any out-of-pocket payments. The cost data were obtained from our hospital's administrative department, which uses ICD-10 codes for billing under the NHI system.

To evaluate EOL comfort among deceased patients, we analyzed various parameters of patients who died in both groups. These parameters include: time from consultation to death, highest respiratory rate within 3 days before death, intravenous (IV) fluid administration, nasogastric (NG) tube use, and ventilator use while death occurred.

2.3 Statistical analysis

The data analysis was performed by the authors using SPSS 23.0 (IBM SPSS, Armonk, NY, USA). Descriptive statistics, including the means and standard errors for continuous variables such as age and days of hospitalization, were obtained. The percentages and frequencies of the categorical variables were tabulated. To analyze the palliative care patients' baseline characteristics between the ED and admission groups, the *t*-test was used for continuous variables. Pearson's chi-square test was used to analyze categorical variables. The hazard ratios and 95% confidence intervals were estimated with this model. All statistical tests were two-sided and $p < 0.05$ indicated statistical significance.

3. Results

3.1 Characteristics of patients who received palliative care enrollment in the ED or after admission

Fig. 1 shows the flowchart of patients' selections. To compare the enrollment in the ED or after admission, we selected patients admitted to the hospital through the ED. Therefore, the patients managed in either ED or ward/ICU only were excluded. A total of 84 patients were enrolled in palliative care in the ED, and 145 were enrolled after admission.

Table 1 shows the baseline characteristics before enrollment. The difference between the age and gender of both groups was insignificant. The DNR order for both was approximately 90% complete with no significant difference. The ECOG performance status (4, totally bedridden) was more than 94% in each group. For the primary indication for palliative care, the distribution of primary indication was significantly different between the ED and the admission groups. Also, the probability of ventilator use (8.3% vs. 35.2%) and inotropic agent use (7.1% vs. 37.9%) was significantly lower in the ED group compared to the admission group.

3.2 Medical resources use, total medical cost, and outcomes of patients who received palliative care enrollment in the ED or after admission

Table 2 shows the care settings of the patients, including the ward, ICU, and palliative care ward. The patients in the palliative care ward were cared for by the palliative care specialists. During hospitalization, the patient could stay in the ward, ICU, palliative care ward, or all of these settings at different stages of treatment courses. In both groups, a similar percentage of patients was cared for in the wards (75.0% vs. 75.2%, $p = 0.549$). However, the ED group had significantly fewer days of ward stay (9.43 vs. 13.51, $p = 0.023$) and higher rate of palliative care ward admission (22.6% vs. 11.7%, $p = 0.029$). More importantly, the ED group had much lower rate of ICU admission (15.5% vs. 40.0%, $p < 0.001$), ICU length of stay (0.86 vs. 6.94, $p < 0.001$), and total medical cost (103,054.6 NTD vs. 298,706.0 NTD, $p < 0.001$). The mortality rate in the ED group was lower (48.8% vs. 62.8%, $p = 0.028$).

Table 3 shows the clinical outcomes of the patients who died during hospitalization. To reduce the confounding factors of difference in baseline characteristics, we performed a subgroup analysis on the deceased patients, and it revealed the most critical patients. The ED group had a significantly lower rate of ICU admission (26.8% vs. 51.1%, $p = 0.009$) and shorter ICU length of stay (1.32 vs. 8.51, $p < 0.001$). The ED group had a significantly higher rate of palliative care ward admission (29.3% vs. 10.0%, $p = 0.005$) and length of palliative care ward stay (2.12 vs. 0.49, $p < 0.001$). The medical cost was much lower in the ED group (105,431.2 vs. 312,190.3, $p < 0.001$). The ED group had a much lower rate of invasive interventions on the day of death, including IV fluids (75.6% vs. 93.3%, $p = 0.004$), NG tube (53.7% vs. 75.6%, $p = 0.012$), and ventilator usage (17.1% vs. 37.8%, $p = 0.018$).

4. Discussion

Several factors contributed to the observed differences between palliative care consultation in the ED and after admission. First, palliative care itself requires thorough communication, psychological preparation, and spiritual support. This multifaceted approach encompasses the medical team's communication skills, administrative practices, the patient's and family's understanding of the illness, their emotional responses, expectations from the medical team, and family dynamics. Finally, the progression of the patient's condition can also influence the timing of palliative care intervention.

4.1 Primary indications for palliative care

Our findings indicate significant differences in the primary indications for palliative care between the groups receiving palliative care consultation in the ED and after admission ($p = 0.046$). Regarding frailty, patients in the ED are often characterized by a low baseline level of function and a protracted course of decline over the years [7], making it more apparent to both the medical team and family members that these patients may benefit more from comfort-focused care

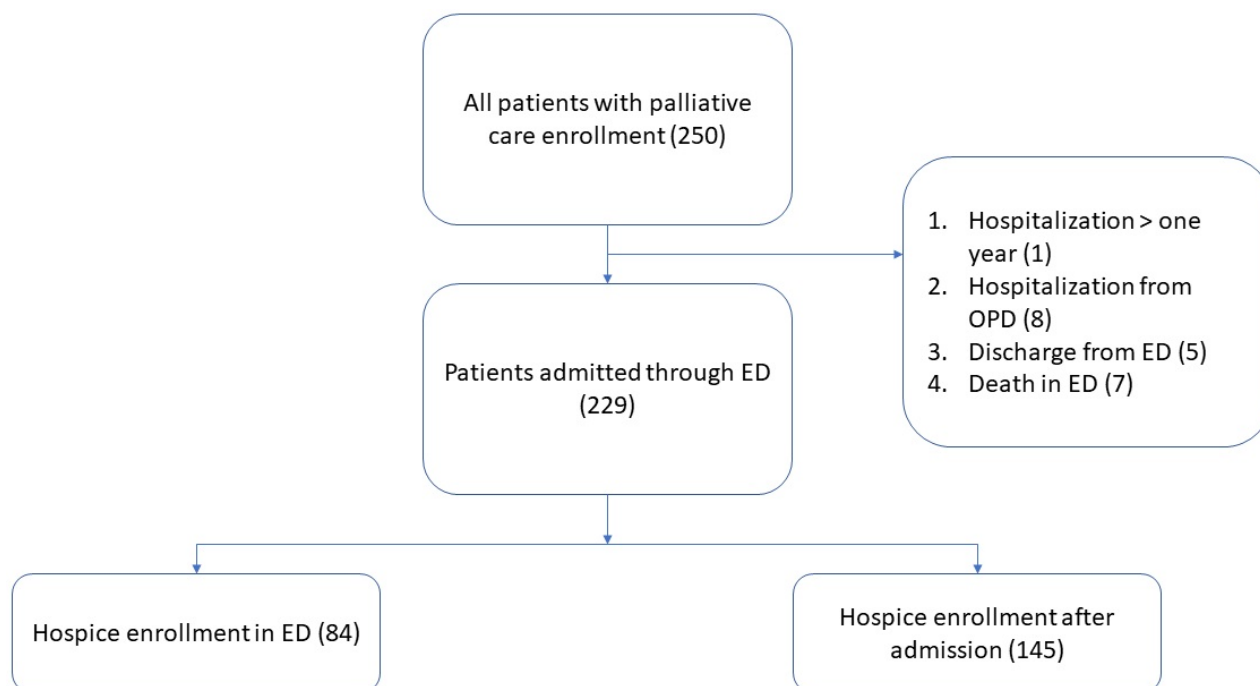


FIGURE 1. Flowchart of the patient selection. A total of 250 patients were enrolled in palliative care. After exclusion, 84 patients were in the ED group, and 145 patients were in the admission group. ED: emergency department; OPD: outpatient department.

TABLE 1. Baseline characteristics of ED and admission groups.

	Palliative care consultation in the ED (N = 84)	Palliative care consultation after admission (N = 145)	<i>p</i> value
Male, N (%)	46 (54.8%)	83 (57.2%)	0.410
Age, yr (SD)	76.62 (14.00)	76.01 (13.51)	0.760
Primary indication for palliative care			
Malignancy, N (%)	18 (21.4%)	24 (16.6%)	0.046*
Dementia, N (%)	7 (8.3%)	10 (6.9%)	
Frailty, N (%)	15 (17.9%)	4 (2.8%)	
Organ failure, N (%)	44 (52.4%)	107 (73.8%)	
DNR before palliative care enrollment, N (%)	79 (94.0%)	129 (89.0%)	0.147
Inotropic agents before palliative care enrollment, N (%)	6 (7.1%)	55 (37.9%)	<0.001*
Ventilator use before palliative care enrollment, N (%)	7 (8.3%)	51 (35.2%)	<0.001*
Arriving the ED at office time, N (%)	51 (60.7%)	64 (44.1%)	0.011*
ECOG score while enrollment			
0 (Fully active; no performance restrictions), N (%)	1 (1.2%)	0	0.408
1 (Strenuous physical activity restricted), N (%)	0	0	
2 (Capable of all self-care but unable to carry out any work activities. Up and about >50% of waking hours), N (%)	0	0	
3 (Capable of only limited self-care; confined to bed or chair >50% of waking hours), N (%)	4 (4.8%)	6 (4.1%)	
4 (Completely disabled), N (%)	79 (94.0%)	139 (95.9%)	

**p* value < 0.05; SD: standard deviation; ED: emergency department; DNR: do-not-resuscitate; ECOG: Eastern Cooperative Oncology Group; N: number of patients.

TABLE 2. Medical resource use and mortality rate in the ED and admission groups.

	Palliative care consultation in the ED	Palliative care consultation after admission	<i>p</i> value
N	84	145	
Ward admission, N (%)	63 (75.0%)	109 (75.2%)	0.549
Ward stay, d, N (SD)	9.43 (14.60)	13.51 (15.84)	0.023*
ICU admission, N (%)	13 (15.5%)	58 (40.0%)	<0.001*
ICU stay, d, N (SD)	0.86 (2.35)	6.94 (12.18)	<0.001*
Palliative care ward admission, N (%)	19 (22.6%)	17 (11.7%)	0.029*
Palliative care ward stay, d, N (SD)	1.52 (4.20)	0.77 (3.33)	0.018*
Death, N (%)	41 (48.8%)	91 (62.8%)	0.028*
Medical cost, NTD, N (SD)	103,054.6 (117,569.2)	298,706.0 (339,890.6)	<0.001*

**p* value < 0.05; SD: standard deviation; ED: emergency department; NTD: New Taiwan Dollar; ICU: intensive care unit; N: number of patients.

TABLE 3. Subgroup analysis for mortality patients in the ED and admission groups.

	Palliative care consultation in ED	Palliative care consultation after admission	<i>p</i> value
Item, N	41	90	
Time from consultation to death, d, N (SD)	11.00 (19.54)	8.74 (12.48)	0.635
Respiratory rate (highest score within 3 days before death)/min (SD)	26.46 (7.51)	30.12 (9.84)	0.192
IV fluid administration while death occurred, N (%)	31 (75.6%)	85 (93.4%)	0.004*
NG use while death occurred, N (%)	22 (53.7%)	68 (75.6%)	0.012*
Ventilator use while death occurred, N (%)	7 (17.1%)	34 (37.8%)	0.018*
Ward admission, N (%)	27 (65.9%)	58 (64.4%)	0.875
Ward stay, d, N (SD)	6.63 (16.70)	10.84 (14.86)	0.125
ICU admission, N (%)	11 (26.8%)	46 (51.1%)	0.009*
ICU stay, d, N (SD)	1.32 (2.53)	8.51 (13.13)	<0.001*
Palliative care ward admission, N (%)	12 (29.3%)	9 (10.0%)	0.005*
Palliative care ward stay, N (SD)	2.12 (5.01)	0.49 (2.27)	<0.001*
Medical cost, NTD, N (SD)	105,431.2 (126,354.3)	312,190.3 (320,329.9)	<0.001*

**p* value < 0.05; SD: standard deviation; ED: emergency department; IV: intravenous; ICU: intensive care unit; N: number of patients; NTD: New Taiwan Dollar; NG: Nasogastric.

rather than aggressive treatment. This recognition can lead to earlier identification and consultation for palliative care in the ED. In contrast, patients with organ failure are often marked by acute exacerbations of illness requiring intensive treatment, with an overall progressive decline in function [1]. The decision to change or transition these patients to palliative care typically occurs after aggressive treatments have been attempted and proven ineffective, necessitating a period of observation and treatment in the hospital before palliative care is deemed appropriate. Thus, these patients are more likely to be identified for palliative care consultation after admission. However, additional well-designed studies are needed to elucidate the factors contributing to the observed differences in the distribution of primary indications for palliative care between

the two groups.

4.2 Interventions and quality of life

We assessed patients' current condition during palliative care enrollment by analyzing ECOG score, pain score, severity of dyspnea, and delirium. These factors were related to the interventions they received and their quality of life. Among the factors, only pain score recording was significantly different (**Supplementary material**, *p* < 0.001). In the emergency department, pain score assessment was not routinely performed as part of the standard patient management process. In addition, the presence of other patients with more critical conditions often requires the immediate attention of healthcare

providers. Consequently, when a palliative care consultation has already been initiated or if a patient is preparing to be enrolled in palliative care, the medical staff may prioritize their time and resources on assessing and treating newly arrived patients or those with more urgent conditions, rather than performing a pain score assessment for each patient. This may be one of the reasons for the higher proportion of “not recorded” data for palliative care consultation in the ED. For other assessments, the patients with ECOG 4 were more than 94% in both groups, which implied poor functional status and overall survival [26, 27]. In these patients, palliative care consultation in the ED could effectively reduce invasive procedures and medical costs.

The use of inotropic agents and ventilators before palliative care enrollment differed significantly between the two groups, with higher percentages in the post-admission consultation group (7.1% vs. 37.9% for inotropic agents use and 8.3% vs. 35.2% for ventilator use, both $p < 0.001$). One possible explanation for these observations is that palliative care consultation in the ED might prompt earlier discussions about the goals of care and the appropriateness of aggressive treatments, leading to decisions to forgo inotropic agents or ventilator use in favor of comfort-focused care when the prognosis is poor. On the contrary, in the post-admission consultation group, more extensive discussions with the healthcare team about the benefits and drawbacks of continuing aggressive treatments before palliative care consultation and enrollment may have occurred. This can result in a period where attempts are made to stabilize and treat the patient more aggressively before transitioning to palliative care; hence, the higher use of inotropic agents and ventilators before consultation and enrollment.

Higher rates of aggressive interventions, such as IV fluid administration (93.3% vs. 75.6%, $p = 0.004$), NG tube use (75.6% vs. 53.7%, $p = 0.012$), and ventilator use (37.8% vs. 17.1%, $p = 0.018$), during the terminal phase, were observed in the post-admission consultation group. This may be due to the length of the transition period from aggressive interventions to palliative care. In the group with palliative care consultation after admission, there is usually a period of aggressive treatments to stabilize the patient before a decision is made to transition to palliative care. Although these patients were eventually enrolled in palliative care, the initial period of aggressive treatment increases the overall use of these interventions. In addition, the transition from the initial aggressive interventions to palliative care, enabling complete withdrawal of these interventions, was time-consuming, resulting in higher rates of aggressive interventions used while death occurred in the post-admission consultation group. Conversely, early palliative care consultations in the ED might have facilitated rapid transitions to palliative care; thus, minimizing the use of invasive interventions and lowering the rate of aggressive interventions used during the terminal phase.

These findings highlight the intensive nature of the care required for patients who are referred to palliative care units at the later stage of their illness. de Oliveira R *et al.* [8] implied that nearly 80% of adults who died at the ED required palliative care at the time of their admission. By early introduction of palliative care consultation at EDs, we can enhance the

quality of care for patients with palliative care needs at the ED via emphasizing patient well-being and minimizing patients' suffering from aggressive EOL treatment.

4.3 Resource utilization and costs

The study revealed that post-admission palliative care consultations were linked to higher rates of ICU admissions (40.0% vs. 15.5%, $p < 0.001$) and longer ICU stays (6.94 days vs. 0.86 days, $p < 0.001$), emphasizing the advanced disease progression in patients receiving later palliative care consultations. This increased utilization of intensive care resources was also associated with overall longer ward stays (13.51 days vs. 9.43 days, $p = 0.023$), indicating a more severe clinical trajectory and increased medical burden. Furthermore, the significant difference in medical costs and higher cost of post-admission consultations (average of 103,054.60 NTD vs. 29,870.60 NTD, $p < 0.001$) further emphasized the financial implications of early palliative care timing. The higher costs may reflect the extensive initial interventions required to stabilize patients before and after transitioning to palliative care.

4.4 Arriving ED at office time

The percentage of patients arriving at the ED during office hours is significantly higher in the ED consultation group (60.7% vs. 44.1%, $p = 0.011$). The palliative care or palliative care consultation team is more readily available to respond quickly to consultation requests during office hours, resulting in fewer delays. Moreover, administrative and support staff are more likely to be present, enabling smoother coordination between ED staff, palliative care teams, and other specialists. In contrast, limited availability of staff after office hours can lead to longer waiting times for consultations, decision-making, and paperwork, resulting in the initiation of palliative care after admission only when the full team is available.

4.5 Mortality

Our study corroborates previous findings [28, 29] demonstrating that earlier palliative care consultations are associated with improved survival. Specifically, patients who received earlier palliative care consultations in the ED exhibited significantly lower mortality rates than those who did not (48.8% vs. 62.8%, $p = 0.028$). This suggests that earlier access to palliative care, even in the emergency setting, may confer survival benefits. One reason for this could be that patients in palliative care typically experience better mood and quality of life [7, 30], which aligns with the significantly better pain scores observed in our study for patients in the ED palliative care group. Studies have shown that the absence of these factors is associated with increased mortality, particularly in patients with lung cancer [31, 32]. Moreover, early palliative care may be linked to decreased use of aggressive EOL interventions, which could cause more harm [10, 26, 27]. These findings align with our observation that the post-admission palliative care group exhibited higher rates of invasive interventions during the terminal phase, including IV fluid administration (93.3% vs. 75.6%, $p = 0.004$), NG tube use (75.6% vs. 53.7%, $p = 0.012$), and ventilator use (37.8% vs. 17.1%, $p = 0.018$) compared

to the group receiving palliative care consultation in the ED. Additionally, longer ICU or hospital stays are also associated with decreased survival [1, 33], which correlates with our observation that post-admission consultations were associated with longer ward stays (13.51 days vs. 9.43 days, $p = 0.023$) and longer ICU stays (6.94 days vs. 0.86 days, $p < 0.001$), potentially due to higher infection rates. The aforementioned factors emphasize the importance of early palliative care consultation and reduced mortality.

4.6 Limitations

This study has several limitations that may impact the interpretation and broader applicability of its findings. As a single-center, retrospective observational study at Taipei Hospital of the MOHW, it is subject to selection bias, reflecting the specific patient population and care practices of this hospital, which may differ, in terms of resources, expertise, and EOL care protocols, from other institutions, both within Taiwan and internationally. Moreover, since this was a retrospective cohort study, the baseline conditions of the two groups in our study were not randomized, which could impact our observations. Furthermore, in Table 1, patient classification was based on their main indication for palliative care (e.g., malignancy, dementia, frailty, organ failure), rather than an exhaustive list of comorbidities. Although this approach provides valuable insights into the primary reason for palliative care referral, it may not have encompassed all contributing factors or adequately reflected the full complexity of each patient's medical condition. Additionally, our inclusion criteria were based on the Taiwanese national palliative care recommendations and guidelines. Different countries may have varied indications for palliative care based on local guidelines and cultural views on EOL care. Some may include patients with less severe conditions or those that are at earlier stages, potentially leading to different outcomes. Although the study offers valuable insights into palliative care at this hospital, caution is needed when applying its findings to other healthcare settings or populations with differing medical, cultural, or resource conditions. Finally, as this study is observational, we cannot conclude from its findings that patients enrolled in palliative care in the ED experience better quality of life, improved clinical outcomes, or reduced healthcare resource utilization and expenditures compared to those enrolled during hospitalization. Further well-designed randomized controlled trials are needed to confirm the benefits of earlier palliative care intervention for patients.

5. Conclusions

Our observational study shows that early palliative care in the ED may be associated with several favorable outcomes. Our findings demonstrated that patients who received palliative care before hospital admission experienced shorter lengths of stay in both the ward and the ICU. Additionally, they exhibited reduced rates of ventilator use, nasogastric tube use, and intravenous fluid administration. We hypothesize that if we initiate a palliative care consultation for patients in the ED, we might avoid invasive intervention treatments, reduce their

suffering, and lower overall healthcare costs. This benefits both the patient and the healthcare system. Future randomized trials should focus on evaluating the impact of initiating palliative care consultations in the ED on patient outcomes, EOL care quality, and resource utilization.

ABBREVIATIONS

DNR, Do-Not-Resuscitate; ECOG, Eastern Cooperative Oncology Group; ED, emergency department; EOL, end-of-life; ICU, intensive care unit; IV, intravenous; MOHW, Ministry of Health and Welfare; NG, Nasogastric; NTD, New Taiwan Dollar; SPICT, Supportive and Palliative Care Indicators Tool; ICD, International Classification of Diseases; NHI, National Health Insurance; SD, standard deviation; USD, United States dollar; OPD, outpatient department.

AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analyzed during this study are available from the corresponding author upon reasonable request.

AUTHOR CONTRIBUTIONS

CHH, CTC and PHY—designed the research study. PHY—performed the research; analyzed the data. PHY, LSH and ZYL—provided help and advice on methodology. LSH, ZYL, MHC and SAT—wrote the manuscript. CHH and CTC—supervised the study. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was conducted in accordance with ethical guidelines and was approved by the MOHW Taipei Hospital Institutional Review Board (No. TH-IRB-0023-0010) on 15 December 2023. Given the retrospective nature of the study and the use of de-identified data, the research posed minimal impact on participant management and carried minimal risk to patient privacy, including the protection of sensitive information. Therefore, the MOHW Taipei Hospital Institutional Review Board waived the informed consent requirement.

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CONFLICT OF INTEREST

The authors declare no conflict of interest. Chien-Hua Huang is serving as one of the Editorial Board members of this journal. We declare that Chien-Hua Huang had no involvement in the peer review of this article and has no access to information regarding its peer review. Full responsibility for the editorial process for this article was delegated to YWZ.

SUPPLEMENTARY MATERIAL

Supplementary material associated with this article can be found, in the online version, at <https://oss.signavitaet.com/mre-signavitaet/article/1986672014889238528/attachment/Supplementary%20material.docx>.

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