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Research Article

Polypharmacy and inappropriate medication use in terminal cancer patients: A retrospective study from a community hospital in Thailand

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ABSTRACT

Polypharmacy and the use of potentially inappropriate medications (PIMs) are common among terminal cancer patients with multiple comorbidities. These are associated with increased treatment burden, diminished quality of life, and adverse clinical outcomes. This study investigates the prevalence, patterns, and associated risk factors of polypharmacy and PIMs use among hospice patients at a community hospital in Thailand. A descriptive, retrospective cross-sectional study was conducted among cancer patients aged ≥20 years who attended palliative care clinics at a community hospital between January 2018 and December 2023. Patients receiving active anticancer treatment were excluded. Polypharmacy was defined as the concurrent use of five or more medications. PIMs were identified using the STOPP-Frail, and the OncPal criteria. Logistic regression analysis was performed to identify factors associated with polypharmacy and PIMs use. A total of 65 patients were included (61.5% male; mean age 70.4 years). Polypharmacy was observed in around 40.0% during the last 6 months of life. PIMs use was found in 64.6%- 72.3% in the same periods. Antihypertensives, lipid-lowering agents, and vitamins/minerals were the most prescribed drugs. During the final six months, patients with more than two comorbidities had an increased risk of receiving PIMs when on polypharmacy. Polypharmacy was significantly associated with PIMs use in the final three and one months of life, with multivariate analysis confirming the association during the last three months. Polypharmacy and PIMs use are increasingly prevalent among terminal cancer patients receiving hospice care in Thailand. In the future, implementing systematic deprescribing strategies may help ensure appropriate medication use and improve the quality of end-of-life care.

Keywords:
Polypharmacy; Inappropriate medication use; Hospice care; Palliative; Community hospital

1. INTRODUCTION

Cancer remained a leading cause of morbidity and mortality, with an increasing number of patients presenting with advanced-stage disease.[1] Patients with progressive malignancies often experience severe physical and psychological distress, especially in the terminal phase. Consequently, hospice care becomes an essential part of comprehensive cancer management by addressing symptom burden and enhancing quality of life.[2] However, medication management during end-of-life care presents significant challenges, including the complexity of polypharmacy and the risk of potentially inappropriate medications (PIMs) use, particularly among patients with coexisting chronic conditions.[3]

Polypharmacy, commonly defined as the concurrent use of five or more medications, has become an emerging public health concern due to its association with adverse clinical outcomes, increased healthcare expenditures, and risk of medication-related complications.[4] In Thailand, the prevalence of polypharmacy among older adults ranges from 29% to 75%,[5] and it is mainly in patients

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with terminal cancer.[4, 5] Previous studies have reported that 96% of these patients receive more than five medications daily during their final week of life, with 61% continuing until death.[3, 4] Although polypharmacy may be necessary to manage advanced clinical conditions, it is related to increased symptom burden, reduced quality of life, and a more likely of adverse drug reactions.[4, 6]

PIMs are a critical issue in palliative oncology, as they contribute to increased medication burden in patients with terminal cancer without offering significant clinical benefit.[7, 8] The previous study indicated that over 60% of patients receiving more than five medications, with nearly half prescribed at least one PIMs, as identified by the Screening Tool for Older Persons' Prescriptions in Frail Adults with Limited Life Expectancy (STOPP-Frail) and the Oncological Palliative Care Deprescribing Guidelines (OncPal).[7] Frequently identified PIMs include statins, proton pump inhibitors, and antidiabetic agents often provide limited therapeutic utility in end-of-life care.[7, 8] The use of PIMs has been associated with polypharmacy, advanced age, and comorbid conditions.[7-9]

Deprescribing PIMs is a key component of palliative care for vulnerable patients with limited life expectancy. The STOPP-Frail and OncPal guidelines are widely used to guide this process. STOPP-Frail is designed for patients with severe physical or cognitive impairment or poor one-year survival and prioritizing symptom control over disease prevention, while OncPal applies to patients with cancer receiving palliative care with an estimated life expectancy of less than six months. Studies by McNeill et al[10]. and Kim et al[7]. showed that both tools can be effectively adapted for real-world practice.

Although the prevalences of polypharmacy and PIMs have been reported, evidence in Thailand remain limited, particularly within hospice care. To our knowledge, few studies have systematically examined medication use patterns in terminal cancer patients receiving palliative care.[6-9] This study aims to investigate the prevalence and patterns of polypharmacy and PIMs use and to identify the associated risk factors in a hospice care setting in Thailand.

2. METHOD

2.1. Study design and participants

This descriptive, retrospective cross-sectional study included patients with cancer aged 20 years or older who visited palliative care clinic for end-of-life care between January 2018 and December 2023 at Sanpatong Hospital, a community hospital in northern Thailand. Patients undergoing active treatment, including chemotherapy, targeted therapy, or immunotherapy, were excluded. Ethical approval for the study was obtained from the hospital's Human Research Ethics Committee (research ID: SPT REC 010/2567) and adhering to the Declaration of Helsinki. The requirement for informed consent was waived due to the retrospective nature of the study.

2.2. Data collection and outcome

Data were collected from electronic medical records (EMR), including age, sex, comorbidities, type of cancer and extension of disease, Eastern Cooperative Oncology Group (ECOG) score, Palliative Performance Scale (PPS), and prescription medications during the final 6 months of life.

The primary outcomes were to evaluate the patterns of polypharmacy and PIMs, with a focus on patients' prescribing medications for enhancing quality of life during end-of-life care. Polypharmacy is defined as the concurrent use of five or more medications. The pattern of PIMs was assessed using the modified PIMs criteria developed by author consensus (Supplementary Table S1), which are derived from STOPP-Frail and the OncPal.[11-13] PIMs were identified in all patients, regardless of the number of medications, in both polypharmacy and non-polypharmacy groups. Secondary outcomes were identifying the risk associated with polypharmacy and PIMs use at 6, 3, and 1 months before death.

2.3. Statistical analyses

Patients' demographics were reported using descriptive statistics. The patterns of polypharmacy and PIMs, presenting results as frequencies (percentages) for categorical data and means (standard deviations: SD) or medians (interquartile ranges: IQR) for continuous data, as appropriate. The monthly percentage of patients with PIMs was calculated as the number of patients with at least one PIMs divided by the total number of patients in the study during that month, expressed as a percentage. Logistic regression was used to examine associations between patient characteristics and polypharmacy or PIMs use. The potential risk factors included age, gender, number of metastatic, PPS, CCI, and comorbidities. Variables with P-value <0.2 in univariate analysis were included in multivariate analysis. A two-sided P-value <0.05 was considered statistically significant. Statistical analyses were performed using STATA version 14.0.

3. RESULT

3.1. Participants Characteristics

A total of 65 patients met the inclusion criteria. Of those, 61.5% were male, with a mean (SD) age of 70.4 years (12.5). The most common cancer types were

hepatobiliary (24.6%), colorectal (20.0%), and lung (16.9%). Metastasis was found in 78.5% of patients.

Most of the patients had at least one comorbidity, 35.4% had one to two comorbidities. The median PPS (IQR) were 70(10), and 31.8% of patients had an ECOG 2 to 4. Patient characteristics are summarized in Table 1.

3.2. The patterns of polypharmacy and PIMs

Polypharmacy was observed in 40.0%, 44.0%, and 44.6% of patient with terminal cancer during the last 6, 3, and 1 months of life, respectively. The overall median number of medications (IQR) that patients received was 6(5), with the medians of 3(7), 4(6), and 3(4) during the last 6, 3, and 1 months of life, respectively. During the last 6 months of life, the most frequently prescribed medications were antihypertensive agents (73.1%), lipid-lowering drugs (69.2%), and vitamin/mineral supplements (52.9%). In the final 3 months, the most common medications were antihypertensives (51.7%), followed by vitamins/minerals (44.8%), lipid-lowering drugs (44.8%), and gastrointestinal agents (44.8%). In the final month, the prescribing patterns remained consistent, with antihypertensives (52%), vitamins/minerals (44%), and lipid-lowering agents (36%) being most commonly used (Table 2).

Table 1. Baseline characteristics at the last 6 months of life

	Total (N=65)	Non-polypharmacy (N=39)	Polypharmacy (N= 26)
Age (mean±SD)	70.4±12.5	69.2±12.6	72.0±12.3
Male, n (%)	40 (61.5)	24 (61.5)	16 (61.5)
Type of cancer, n (%)			
Hepatobiliary	16 (24.6)	8 (20.5)	8 (30.8)
Colorectal	13 (20.0)	6 (15.4)	7 (26.9)
Lung	11 (16.9)	7 (18.0)	4 (15.4)
Genitourinary*	7 (10.8)	5 (12.8)	2 (7.7)
Breast	5 (7.7)	2 (5.1)	3 (11.5)
Head and neck	4 (6.2)	4 (10.3)	0 (0.0)
Esophageal	3 (4.6)	1 (2.6)	2 (7.7)
Hematologic malignancy**	3 (4.6)	3 (7.7)	0 (0.0)
Thyroid	3 (4.6)	3 (7.7)	0 (0.0)
Extension of disease, n (%)			
Metastatic	51 (78.5)	29 (74.4)	22 (84.6)
Locally advanced	14 (21.5)	10 (25.6)	4 (15.4)
Comorbidities, n (%)			
1-2	23 (35.4)	17 (43.6)	6 (23.1)
3-4	17 (26.1)	10 (25.6)	7 (26.9)
≥5	12 (18.5)	0 (0.0)	12 (46.2)
None	13 (20.0)	12 (30.8)	1 (3.8)
Most common comorbidities, n (%)			
Hypertension	29 (44.6)	11 (28.2)	18 (69.2)
Dyslipidemia	27 (41.5)	11 (28.2)	16 (61.5)
Chronic Kidney Disease	23 (35.4)	9 (23.1)	14 (53.9)
Diabetes mellitus	15 (23.1)	3 (7.7)	12 (46.2)
CAD/stroke	14 (21.5)	6 (15.4)	8 (30.8)
CCI, n (%)			
≤11	34 (53.1)	25 (65.8)	9 (34.6)
>11	30 (46.9)	13 (34.2)	17 (65.4)
PPS N=61, n (%)			
Median (IQR)	70 (10)	70 (15)	70 (20)
<70	46 (75.4)	30 (83.3)	16 (64.0)
≥70	15 (24.6)	6 (16.7)	9 (36.0)
ECOG N=63, n(%)			
0-1	43 (68.2)	23 (62.2)	20 (76.9)
2-4	20 (31.8)	14 (37.8)	6 (23.1)

* bladder cancer: 2 cases, prostate cancer 2 cases, penis cancer 1 case, and kidney cancer 1 case
** acute myeloid leukemia 2 cases and lymphoma 1 case
CCI: Charlson Comorbidity Index, ECOG: Eastern Cooperative Oncology Group, IQR: interquartile ranges, PPS: Palliative Performance Scale, SD: standard deviation.

Table 2 The pattern of polypharmacy and potentially inappropriate medication (PIMs) at the last 6 months, 3 months, and the last month of life regarding to drug class

	6 months			3 months			1 month		
Drug class	**PIMs, n(%) (N=43)**	**Polypharmacy, n(%) (N=26)**	**Non-polypharmacy, n(%) (N=39)**	**PIMs, n(%) (N=47)**	**Polypharmacy, n(%) (N=29)**	**Non-polypharmacy, n(%) (N=36)**	**PIMs, n(%) (N=42)**	**Polypharmacy, n(%) (N=25)**	**Non-polypharmacy, n(%) (N=40)**
Antihypertensive drugs	24 (55.8)	19 (73.1)	5 (12.8)	17 (36.2)	15 (51.7)	2 (5.6)	16 (38.1)	13 (52.0)	3 (7.5)
Lipid-lowering drug	21 (48.8)	18 (69.2)	3 (7.7)	15 (31.9)	13 (44.8)	2 (5.6)	11 (26.2)	9 (36.0)	2 (5.0)
Vitamin and mineral	19 (44.2)	14 (53.9)	5 (12.8)	21 (44.7)	13 (44.8)	8 (22.2)	20 (47.6)	11 (44.0)	9 (22.5)
Gastric drugs	13 (30.2)	11 (42.3)	2 (5.1)	17 (36.2)	13 (44.8)	4 (11.1)	7 (16.7)	6 (24.0)	1 (2.5)
Antiplatelet drugs	9 (20.9)	9 (34.6)	0 (0.0)	3 (6.4)	2 (6.9)	1 (2.8)	4 (9.5)	4 (16.0)	0 (0.0)
Herb use	9 (20.9)	5 (19.2)	4 (10.3)	12 (25.5)	9 (31.0)	3 (8.3)	18 (42.9)	9 (36.0)	9 (22.5)
Alpha-1 blockers	7 (16.3)	6 (23.1)	1 (2.6)	4 (8.5)	4 (13.8)	0 (0.0)	3 (7.1)	3 (12.0)	0 (0.0)
Antidiabetic drugs	7 (16.3)	7 (26.9)	0 (0.0)	5 (10.6)	5 (17.2)	0 (0.0)	4 (9.5)	4 (16.0)	0 (0.0)
Neuroleptic antipsychotics	4 (9.3)	3 (11.5)	1 (2.6)	4 (8.5)	3 (10.3)	1 (2.8)	2 (4.8)	2 (8.0)	0 (0.0)
Calcium supplement	3 (7.0)	2 (7.7)	1 (2.6)	2 (4.3)	1 (3.5)	1 (2.8)	1 (2.4)	0 (0.0)	1 (2.5)
Theophylline	2 (4.7)	1 (3.9)	1 (2.6)	2 (4.3)	1 (3.5)	1 (2.8)	2 (4.8)	1 (1.0)	1 (2.5)
Antianginal drugs	1 (2.3)	1 (3.9)	0 (0.0)	1 (2.1)	1 (3.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Steroids	1 (2.3)	1 (3.9)	0 (0.0)	2 (4.3)	1 (3.5)	1 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)
Other	3 (7.0)	2 (7.7)	1 (2.6)	1 (2.1)	1 (3.5)	0 (0.0)	2 (4.8)	1 (4.0)	1 (2.5)

Regarding pain management, 69.2% (45 of 65 patients) of patients received opioids. During the last 6, 3, and 1 months of life, opioids were administered to 23.1% (15 patients), 38.5% (25 patients), and 69.2% (45 patients), respectively. Among patients receiving opioids, polypharmacy was observed in 60.0% (9 of 15 patients) during the last 6 months, 64.0% (16 of 25 patients) during the last 3 months, and 53.3% (24 of 45 patients) during the last month of life.

The prevalence of PIMs use was 66.2%, 72.3%, and 64.6% during the final 6, 3, and 1 months of life, respectively. In the last 6 months, the most commonly prescribed PIMs were antihypertensives (55.8%), lipid-lowering drugs (48.8%), and vitamins/minerals (44.2%). In the final 3 and 1 months, vitamins and minerals were the most frequently identified PIMs (44.7% and 47.6%, respectively). Details of PIMs are provided in Table 2.

3.3. Factor associated polypharmacy and PIMs

Univariate analysis indicated that a CCI <11 (OR: 3.63, 95% CI: 1.27-10.38, *p*-value= 0.016) and comorbidities >2 (OR: 7.87, 95% CI: 2.55-24.27, *p*-value <0.001) were significantly associated with polypharmacy during the last 6 months of life. The association between >2 comorbidities and polypharmacy remained significant during the last 3 months (OR: 3.72, 95% CI: 1.32-10.44, p=0.013) and final month of life (OR: 3.69, 95% CI: 1.29-10.56, p=0.015). Multivariate analysis confirmed that comorbidities >2 remained significantly associated with polypharmacy in the last 6 months of life (adjusted OR: 4.60, 95% CI: 1.22-17.27, *p*-value= 0.024). (Table 3)

Among patients with PIMs receiving polypharmacy in the final 6 months of life, >2 comorbidities demonstrated significant association with PIMs occurrence in both univariate (OR: 12.08, 95% CI: 2.49-58.55, p=0.002) and multivariate analyses (adjusted OR: 14.84, 95% CI: 2.41-91.38, p=0.004). In the final 3 months and last month of life, polypharmacy was significantly associated with PIMs (OR 25.05, 95% CI:3.07-204.43, *p*-value=0.003; OR 29.30, 95% CI:3.61-238.38, *p*-value =0.002, respectively). Multivariate analysis was significant for polypharmacy at the last 3 months of life (adjusted OR: 23.28, 95% CI 2.78-194.93, *p*-value=0.004). (Table 4)

4. DISCUSSION

This study highlights the significant challenges associated with medication use in patients with advanced cancer at the end of life, particularly the high prevalence of polypharmacy and PIMs. These findings demonstrate the critical need for regular and systematic medication reviews to optimize pharmacotherapy, minimize the use of potentially harmful or clinically unnecessary medications, and improve the overall quality of end-of-life care in this population.

4.1. Polypharmacy

In this study, polypharmacy was prevalent in 40.0%, 44.0%, and 44.6% of terminal cancer patients during the last 6, 3, and 1 months of life, respectively. A significant association with having more than two comorbidities was identified only during the last 6 months, but not in the last 3 or 1 month. These results indicate that comorbidities may have a stronger influence on medication use during the earlier part of the terminal phase, whereas other factors are likely to affect prescribing practices closer to the end of life. Opioid use increased during the terminal phase of life, with many patients concurrently receiving polypharmacy, reflecting the complexity of pharmacological management in palliative care. These findings are consistent with previous studies reporting a substantial medication burden among patients with advanced cancer, particularly those experiencing pain.[14] Although our study showed a relatively high prevalence of polypharmacy (around 40-45% across the last 6, 3, and 1 months of life), the observed rate was still lower than those reported in earlier studies, which documented polypharmacy rates exceeding 60–90% and average medication use ranging from five to nine drugs during the end of life.[15, 16] These discrepancies may reflect differences in healthcare settings, patient populations, prescribing behaviours, and medication availability. Moreover, the lack of data on OTC medications in this study may have contributed to an underestimation of the true prevalence of polypharmacy. Notably, the relatively lower prevalence observed in our community hospital setting may indicate earlier deprescribing efforts or more conservative prescribing practices aligned with hospice and palliative care goals.

4.2. Potentially Inappropriate Medications

The use of PIMs was common among patients in the final months of life, with prevalence rates of 66.2%, 72.3%, and 64.6% during the last 6, 3, and 1 months, respectively. These findings are consistent with a previous study reporting PIMs rates of 73.1% using STOPP criteria and 81.8% using OncPal among hospitalized older cancer patients.[17, 18] In contrast, a recent study of home-based hospice patients using the STOPP-Frail tool reported a lower prevalence of 40.2%[19], suggesting that differences in assessment criteria and clinical settings may influence the detection of PIMs. The prevalence of PIMs in this study, assessed using the STOPP-Frail and OncPal criteria, was presented in Supplementary Table S2 and Table S3

Table 3 Factor associated polypharmacy at the last 6 months, 3 months, and the last month of life

Variables	6 months						3 months						1 month					
	Univariable analysis			Multivariable analysis			Univariable analysis			Multivariable analysis			Univariable analysis			Multivariable analysis		
	OR	95% CI	*p*-value	Adjusted OR	95% CI	*p*-value	OR	95% CI	*p*-value	Adjusted OR	95% CI	*p*-value	OR	95% CI	*p*-value	Adjusted OR	95% CI	*p*-value
Male	1	0.36-2.77	1.000				0.43	0.46-3.41	0.664				1.46	0.52-4.06	0.469			
Age >70	1	0.37-2.71	1.000				1.50	0.56-4.02	0.420				1.47	0.54-4.00	0.456			
No of metastatic ≥2	0.72	0.16-3.17	0.661				0.99	0.24-4.09	0.991				0.77	0.17-3.42	0.734			
PPS*	0.36	0.11-1.18	0.091	0.40	0.10-1.55	0.184	0.73	0.26-2.07	0.551				0.71	0.26-1.95	0.503			
CCI <11	3.63	1.27-10.38	0.016	1.72	0.45-6.52	0.425	2.40	0.87-6.57	0.089	1.37	0.41-4.53	0.606	2.4	0.86-6.71	0.095	1.37	0.41-4.64	0.075
Comorbidities >2	7.87	2.55-24.27	<0.001	4.60	1.22-17.27	0.024	3.72	1.32-10.44	0.013	3.04	0.92-10.05	0.069	3.69	1.29-10.56	0.015	3.02	0.89-10.22	0.075

* PPS group was classified regarding to median: < 70 VS ≥ 70 (reference) at the last 6 months of life; < 60 VS ≥ 60 (reference) at the last 3 months of life; < 50 VS ≥ 50 (reference) at the last month of life
CCI: Charlson Comorbidity Index, 95% CI: 95% confidence interval, ECOG: Eastern Cooperative Oncology Group, OR: odds ratio, PPS: Palliative Performance Scale

Table 4 Factor associated the use of potentially inappropriate medication (PIMs) at the last 6 months, 3 months, and the last month of life

Variables	6 months						3 months						1 month					
	Univariable analysis			Multivariable analysis			Univariable analysis			Multivariable analysis			Univariable analysis			Multivariable analysis		
	OR	95% CI	*p*-value	Adjusted OR	95% CI	*p*-value	OR	95% CI	*p*-value	Adjusted OR	95% CI	*p*-value	OR	95% CI	*p*-value	Adjusted OR	95% CI	*p*-value
Polypharmacy	N/A	N/A	N/A	N/A	N/A	N/A	25.05	3.07-204.43	0.003	23.28	2.78-194.93	0.004	29.30	3.61-238.38	0.002	N/A	N/A	N/A
Age >70	2.36	0.77-7.30	0.135	1.88	0.49-7.15	0.355	1.51	0.50-4.56	0.468				1.56	0.55-4.37	0.402	N/A	N/A	N/A
No of metastatic ≥2	0.80	0.18-3.59	0.771				1.40	0.26-7.47	0.694				2.10	0.40-11.07	0.382	N/A	N/A	N/A
PPS*	1.03	0.28-3.86	0.965				0.49	0.16-1.54	0.223				0.72	0.25-2.04	0.535	N/A	N/A	N/A
CCI <11	2.18	0.70-6.81	0.179	0.51	0.11-2.42	0.397	2.18	0.70-6.81	0.179	1.27	0.28-5.70	0.758	1.44	0.51-4.10	0.490	N/A	N/A	N/A
Comorbidities >2	12.08	2.49-58.55	0.002	14.84	2.41-91.38	0.004	2.71	0.83-8.82	0.097	1.40	0.29-6.67	0.673	1.41	0.50-3.97	0.511	N/A	N/A	N/A

* PPS group was classified regarding to median: < 70 VS ≥ 70 (reference) at the last 6 months of life; < 60 VS ≥ 60 (reference) at the last 3 months of life; < 50 VS ≥ 50 (reference) at the last month of life
CCI: Charlson Comorbidity Index, 95% CI: 95% confidence interval, ECOG: Eastern Cooperative Oncology Group, N/A: not applicable, OR: odds ratio, PPS: Palliative Performance Scale

Patients with advanced cancer in hospice care are typically prescribed 5 to 15 medications, often including treatment for chronic conditions that are unlikely to improve quality of life.[15] Statins and antihypertensives are commonly considered for deprescribing in palliative oncology settings.[16, 20, 21] Similarly, our study identified antihypertensives, lipid-lowering agents, and vitamin/mineral supplements as the most common PIMs, with vitamin/mineral use persisting into the final month of life. This finding may reflect routine prescribing patterns or efforts to maintain nutritional support in line with general clinical guidelines, rather than individualized end-of-life care planning. However, such practices may not align with palliative goals, which prioritize symptom control and quality of life over long-term disease prevention. These findings highlight the importance of conducting a thorough medication review to ensure that pharmacological interventions are tailored to the patient's goals, prognosis, and comfort during the terminal phase of life, including the discontinuation of medications with minimal benefit such as antihypertensives and antilipidemics. Patients with more than two comorbidities were significantly more likely to receive PIMs when exposed to polypharmacy, which itself was an independent predictor of PIMs use, especially in the last three months of life, consistent with previous study that was conducted on advance cancer patients.

4.3. Implications for clinical practice

The findings from this study highlight the importance of regular medication reviews for patients with advanced cancer, especially those with multiple comorbidities and polypharmacy, as they are at greater risk of receiving PIMs. Healthcare team should closely monitor patients with these risk factors and consider early deprescribing interventions to reduce unnecessary medication burden. In practice, this may include reassessing the ongoing need for preventive medications (e.g., statins, antihypertensives, or vitamin/mineral supplements) and prioritizing treatments that improve symptom control and quality of life. The integration of tools such as STOPP-Frail and OncPal into routine medication review can provide structured guidance to support individualized care planning.

4.4. Strengths and limitation

This study has several strengths. It provides real-world data on polypharmacy and PIMs used in terminal cancer patients receiving hospice care within a community hospital, that is rarely reported in previous study. Additionally, the longitudinal assessment of medication uses at three distinct time points 6, 3, and 1 months before death provide prescribing patterns and highlights dynamic changes in medication burden at the end of life.

Nevertheless, several limitations should be considered. First, the use of EMRs as the primary source of prescription data may have resulted in an underestimation actual medication use, particularly for OTC medications that were not consistently documented. Second, comorbidity data were retrieved only from a community hospital, which may have incomplete medical profiles if comorbidities were managed at other healthcare setting. Third, the retrospective single-center design in a community hospital and limited to hospice cancer patients with a small sample size, may reduce the generalizability of the findings. Future study should adopt a more comprehensive approach, that addresses both polypharmacy and PIMs used in end-of-life care. Larger sample size, or prospective designs are warranted to validate these findings, optimize medication management strategies, and explore variations in deprescribing practices based on medication type, admission source, and patient prognosis.

5. CONCLUSION

This study provides real-world evidence of the high prevalence of polypharmacy and PIMs use among terminal cancer patients receiving hospice care in a community hospital setting. Polypharmacy was significantly associated with a higher comorbidity burden and independently predicted PIMs use, particularly during the final three months of life. These findings emphasize the importance of routine, medication reviews and the implementation of deprescribing strategies to optimize pharmacotherapy in end-of-life care.

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Author contributions

Conceptualization, J.Y, T.P, P.R, P.F, and P.S.; method, J.Y, T.P, P.R, P.F, and P.S.; formal analysis, J.Y, and T.P; data curation, J.Y, T.P, P.R, P.F, and P.S.; writing—original draft preparation, J.Y, and T.P; writing - review and editing, J.Y, and T.P.; All authors have read and agreed to the published version of the manuscript.

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Conflicts of interest

The authors declare they have no conflict of interest.

Ethics approval

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Research Ethics Committee at Sanpatong hospital Human Research Ethics Committee (research ID: SPT REC 010/2567)

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