INCIDENCE TRENDS, SURVIVAL OUTCOMES, AND PREDICTIVE FACTORS FOR ONE-YEAR SURVIVAL IN ADVANCED PANCREATIC DUCTAL ADENOCARCINOMA: A TEN-YEAR SINGLE-CENTER RETROSPECTIVE STUDY

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Abstract

Background: Pancreatic cancer remains one of the most lethal malignancies worldwide, with a five-year survival rate of less than 10%. Over the past decade, small improvements in survival have resulted from better surgical techniques, new therapies, and advances in systemic treatments. However, the overall prognosis remains poor, as most cases are diagnosed at advanced stages, at which survival rates decline sharply.

Methods: A retrospective review was conducted at the Surin Hospital Cancer Center from January 2015 to January 2025. While overall hospital case trends were evaluated for patients across all stages, the primary survival analysis focused specifically on patients with locally advanced/unresectable and metastatic disease. For this advanced cohort, clinical characteristics and overall survival were evaluated, and independent predictors of one-year survival were identified using multivariable logistic regression.

Results: A total of 212 patients with confirmed pancreatic cancer were included. The cohort was 55.2% male, and 59.9% were over 65 years old. Hospital case volume increased over the ten-year study period. The majority of patients (70.3%) presented with metastatic disease. First-line palliative chemotherapy was administered to 23.4% of patients, while 76.6% received best supportive care (BSC) alone. The overall one-year survival rate was 11.2%. Patients receiving palliative chemotherapy had significantly longer median overall survival (OS) than those receiving BSC alone (7.6 vs. 1.9 months, $p < 0.001$). Among chemotherapy regimens, FOLFIRINOX yielded a median OS of 17.7 months (95% CI: 10.5–35.8, $p = 0.0008$) compared to 6.0 months for single-agent gemcitabine. Multivariate logistic regression identified four independent predictors of one-year survival: ECOG performance status 0-1 (aOR = 6.82; 95% CI: 1.32–35.27, $p = 0.022$), receipt of first-line chemotherapy (aOR = 8.92; 95% CI: 2.78–28.64, $p < 0.001$), use of FOLFIRINOX (aOR = 12.9; 95% CI: 1.2–137.9, $p = 0.034$), and serum albumin ≥ 3.5 g/dL (aOR = 3.15; 95% CI: 1.45–6.85, $p = 0.004$).

Conclusion: The prognosis for locally advanced/unresectable and metastatic pancreatic cancer in this regional cohort remains poor, driven by late-stage diagnoses and a low utilization rate of palliative chemotherapy. However, achieving one-year survival is significantly predicted by favorable baseline health (ECOG performance status 0-1 and serum albumin ≥ 3.5 g/dL) and the receipt of first-line chemotherapy, particularly the FOLFIRINOX regimen. These quantitative findings underscore the critical need to overcome clinical and systemic barriers to administering combination chemotherapy to eligible patients to extend survival.

Keyword: pancreatic cancer, pancreatic ductal carcinoma, survival predictor, overall survival, FOLFORINOX

J Southeast Asian Med Res 2026: 10: e0284
https://doi.org/10.55374/jseamed.v10.284

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Received: 23 February 2026
Revised: 17 March 2026
Accepted: 20 March 2026

Introduction

Pancreatic cancer, or pancreatic ductal adenocarcinoma (PDAC), is among the most aggressive and deadly malignancies worldwide, with survival rates remaining dismally low, despite significant advances in diagnosis and treatment. It is now the third-leading cause of cancer-related deaths in the United States and ranks eighth among cancer-related deaths in the Asian population. In the U.S., pancreatic cancer is projected to become the second-leading cause of cancer-related deaths by 2030, driven by rising incidence rates and persistent challenges in treatment efficacy. In Asia, the burden of pancreatic cancer is also increasing, with both incidence and mortality rates climbing steadily, particularly among older adults.[1] Over the past three decades, the five-year relative survival rate for pancreatic cancer has stagnated below 10%,[2] highlighting its dire prognosis. Key factors contributing to this poor outlook include late-stage diagnosis, resistance to conventional therapies, and the anatomical proximity of tumors to critical structures like the biliary tract and small intestine, which complicates surgical and therapeutic interventions.[3]

Recent research has identified several predictive factors for pancreatic cancer recurrence and progression, including lymph node metastasis, elevated serum CA 19-9 levels, and tumor size, which are crucial for tailoring follow-up strategies to improve patient outcomes.[4] Advances in systemic therapies, including FOLFIRINOX and gemcitabine combined with albumin-bound paclitaxel regimens, have shown promise in improving survival in advanced cases, particularly in high-income Asia-Pacific countries.[5] Moreover, emerging targeted treatments, such as pan-RAS inhibitors and innovative drug-delivery methods, offer new avenues to improve survival rates and quality of life.[6] However, significant disparities in survival rates persist among different populations; for example, Black patients and certain Asian groups experience lower survival rates compared to other racial groups. These disparities highlight the urgent need to ensure equitable access to healthcare, enhance early detection strategies, and implement culturally tailored interventions to address these gaps effectively.

This study evaluated institutional case volume trends over the past decade and identified key prognostic factors associated with 1-year survival among Thai patients with locally advanced/unresectable and metastatic pancreatic cancer. Rather than broadly representing the entire Asian continent, this regional cohort provides critical insights into the real-world clinical realities, treatment disparities, and resource constraints commonly encountered in a developing Southeast Asian healthcare setting. By focusing on the specific challenges in this region, the study aims to highlight actionable avenues to optimize systemic therapy delivery and strengthen multidisciplinary collaboration to improve patient outcomes.

Methods

Study design and patients

This study is a retrospective cohort analysis conducted at the Surin Hospital Cancer Center. Ethical approval for this study was obtained from the Research Ethics Committee of Surin Hospital (certificateno.7/2568).Informedconsentwaswaived due to the retrospective nature of the study.

It included patients aged 18 years or older with histologically confirmed pancreatic ductal adenocarcinoma diagnosed between January 2015 and January 2025. In cases where histopathological diagnosis was not possible—typically due to the patient's poor performance status, severe comorbidities, rapid clinical decline, or patient refusal precluding an invasive biopsy—the date of cross-sectional imaging (CT or MRI) providing a definitive clinical diagnosis of pancreatic cancer was used. Notably, histopathological confirmation was routinely required for all patients before initiating palliative chemotherapy. Patients were excluded if more than 50% of their medical records were incomplete, if they had other primary malignancies, or if they received treatment outside Surin Hospital. To ensure methodological clarity, the included patients were divided into two distinct cohorts: the overall cohort (N = 212, encompassing all disease stages) used to evaluate institutional case volume trends and baseline characteristics, and the analytical cohort (N = 197, restricted to locally advanced/unresectable and metastatic disease) used exclusively for evaluating survival outcomes and prognostic factors.

Outcomes and data collection

This study aimed to investigate institutional case trends across the overall cohort and identify key prognostic factors associated with achieving one-year survival, specifically within the analytical cohort (patients with locally advanced/unresectable or metastatic pancreatic cancer). Data were retrospectively collected from the electronic medical records of patients treated at Surin Hospital Cancer Center between January 2015 and January 2025 (**Figure 1**). The dataset included comprehensive demographic information (e.g., age, sex, comorbidities), clinical characteristics (e.g., performance status, metastatic burden), laboratory results (e.g., CA19-9 levels, serum albumin), imaging findings (e.g., CT/MRI reports), and treatment details (e.g., chemotherapy regimens, cycles completed).

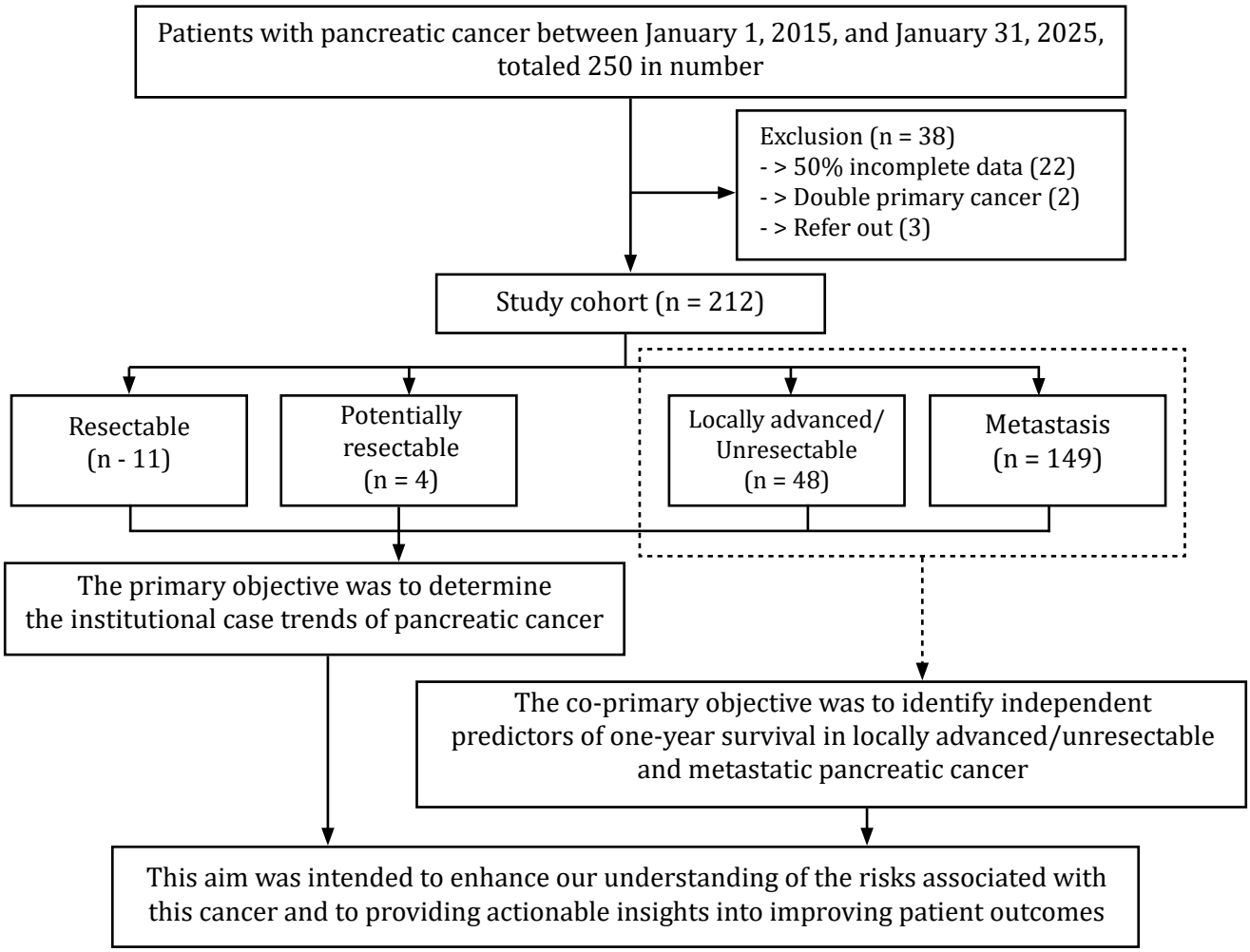

Figure 1. Flow diagram of the retrospective case-control study

Definition

Pancreatic cancer: Pancreatic ductal adenocarcinoma (PDAC), excluding other histological subtypes such as neuroendocrine tumors (PanNETs or PanNECs), intraductal papillary mucinous neoplasms (IPMNs), and others.

The date of diagnosis for pancreatic cancer

Histopathology Report Date: If a tissue diagnosis is available, the date on which the histopathology report confirms pancreatic cancer is considered the official diagnosis date.

Imaging Confirmation Date: In cases where a histopathological diagnosis is not possible, the imaging date (e.g., CT or MRI) that provides clear confirmation of pancreatic cancer is used as the diagnosis date; this is based on imaging findings that are highly suggestive or diagnostic of pancreatic cancer, regardless of tumor marker levels.

Overall survival (OS): The duration of time from the date of diagnosis of a pancreatic cancer, to the occurrence of death from any cause or the last follow-up.

Disease progression: As defined by the Response Evaluation Criteria in Solid Tumors version 1.1 (RECIST 1.1) criteria, as an increase in tumor size or the appearance of new lesions on imaging studies.

FOLFIRINOX: A chemotherapy regimen that combines folinic acid, fluorouracil, irinotecan, and oxaliplatin.

Disease staging classification

Patients were classified based on standard clinical and radiological criteria (e.g., NCCN guidelines) at the time of diagnosis:

Resectable: Tumors confined to the pancreas with no distant metastasis, no arterial tumor contact (celiac axis, superior mesenteric artery [SMA], or common hepatic artery), and no clear tumor contact with the superior mesenteric vein (SMV) or portal vein (PV) [or ≤180° contact without vein contour irregularity].

Borderline Resectable: No distant metastasis but exhibiting tumor-vascular contact that localized the tumor to the pancreas but increased the risk of a positive margin (e.g., SMV/PV involvement >180°, or reconstructable short-segment venous occlusion; SMA or celiac contact ≤180°). Locally Advanced/Unresectable: No distant metastasis but exhibiting extensive vascular involvement precluding safe margin-negative resection (e.g., >180° involvement of the SMA or celiac axis, or unreconstructable SMV/PV involvement).

Metastasis: Evidence of distant disease spread beyond the pancreas and regional lymph nodes (e.g., to the liver, peritoneum, lungs, or distant lymph nodes).

Statistical analysis

The sample size for this retrospective prognostic study was calculated as 75 participants (adjusted for a 20% dropout rate), based on a hazard ratio of 2.22 for poor performance status or hypoalbuminemia compared to better-performing patients. The calculation assumed a median survival of 12 months in the reference group, 80% power, and a one-sided significance level of $\alpha = 0.05$.[4]

Descriptive statistics (mean, median, percentages) were used to analyze numerical and categorical data on clinical characteristics, and the Pearson Chi-square test or Fisher's exact test was used for categorical variables. Because the primary prognostic aim was to evaluate factors predicting survival beyond a clinically meaningful time point, patients were stratified into two discrete cohorts (survival < 12 months vs. ≥ 12 months) based on the overall median survival. Therefore, binary logistic regression (univariable and multivariable) was utilized to identify independent prognostic factors associated with 12-month survival, reporting adjusted odds ratios (aORs) with 95% confidence intervals. A p-value of less than 0.05 was considered statistically significant. Median overall survival (mOS) was estimated using the Kaplan-Meier method, and survival curves between different patient cohorts and treatment groups were compared using the log-rank test. All data analysis was conducted using IBM SPSS Statistics version 26.

Results

A total of 212 pancreatic cancer patients were identified from medical records at Surin Hospital Cancer Center between January 1, 2015, and January 31, 2025. During this period, the hospital's pancreatic cancer case volume increased (**Figure 2**). The group had a nearly equal gender split, with 55.2% male and 44.8% female patients, indicating no significant gender difference in this population. The median age at diagnosis was 64.5 years (IQR: 56–73), and 59.9% of patients were aged 65 years or older. Epigastric pain was the most common symptom, reported by 48.8% of patients. Most tumors (55.6%) were located in the head of the pancreas. However, the majority of patients (70.3%) were diagnosed at an advanced stage with metastatic disease (**Table 1**).

Patients with locally advanced/unresectable and metastatic disease (N = 197) were stratified into two cohorts based on survival duration relative to a clinically meaningful one-year survival landmark. The long-survivor group included patients with an OS of ≥12 months (defined as the time from diagnosis to death or last follow-up), while the short-survivor group comprised those with an OS of <12 months. A detailed comparison of demographic, clinical, and treatment-related variables between these groups is presented in **Table 2**. Baseline characteristics such as pre-chemotherapy albumin level <3.5 g/dL (57.7% vs. 72.7%, $p = 0.012$) and the proportion of patients who received first-line chemotherapy (22.3% vs. 77.3%, $p < 0.001$) revealed significant imbalances, underscoring the need for multivariable adjustment in subsequent analyses (**Table 2**).

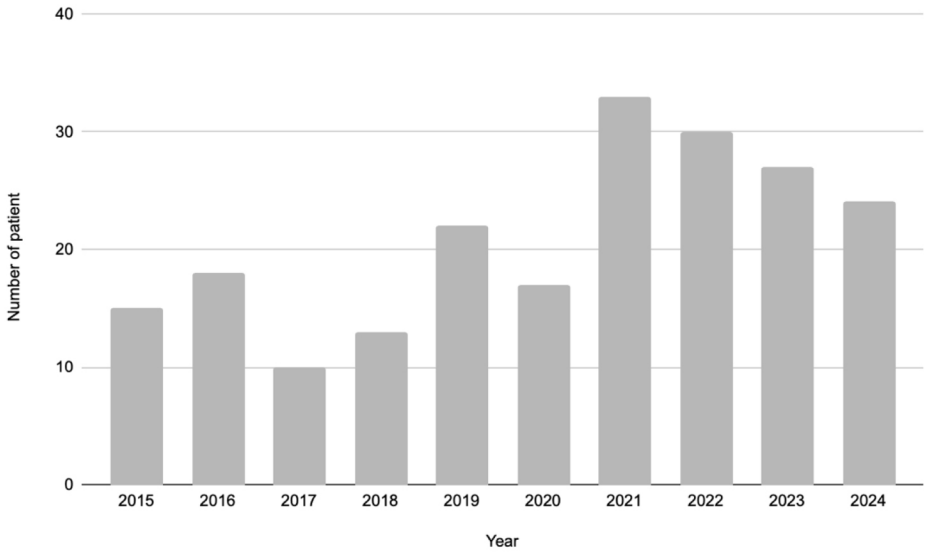

Figure 2. The incidence of pancreatic cancer over the decade

Table 1. Patient's baseline characteristics (N = 212)

Characteristics	Patient diagnosed pancreatic cancer (N = 212)	Percentage
Age (years) – median (IQR)	64.5 (56 - 73)	
- Age < 65 years	104	49.1
- Age ≥ 65 years	108	59.9
Gender		
- Female	95	44.8
- Male	117	55.2
ECOG		
- 0	37	17.4
- 1	129	60.9
- 2	43	20.3
- 3	3	1.4

Table 1. Patient's baseline characteristics (N = 212) (Cont.)

Characteristics	Patient diagnosed pancreatic cancer (N = 212)	Percentage
Bodyweight (kg) -- median (IQR)	51 (45 – 60.3)	
Body mass index		
- < 18 kg/m^2	58	23.4
- ≥ 18 kg/m^2	122	57.5
- Missing data	32	19.1
History of smoking	58	23.4
History of alcohol drinking	69	32.6
At least one comorbidity	118	55.7
- Hypertension	71	33.5
- Diabetic mellitus	61	66.5
- Dyslipidemia	26	12.3
- Chronic kidney disease (stage 3 - 5)	20	9.4
Primary presenting symptom		
- Epigastric pain	95	44.8
- Obstructive jaundice	88	41.5
- Anorexia and weight loss	15	7.1
- Chronic pancreatitis	5	2.4
- others	9	4.2
Diagnosis		
- Histopathologic diagnosis (adenocarcinoma)	89	42.0
- Clinical and imaging	123	58
Staging		
- Resectable	11	5.2
- Potentially resectable	4	1.9
- Locally advanced/unresectable	48	22.6
- Metastasis	149	70.3
Tumor location (of pancreas)		
- Head	118	55.6
- Body	51	24.1
- Tail	36	17.0
- Uncinate process	7	3.3

ECOG = Eastern Cooperative Oncology Group performance status

Table 2. The patient characteristics of those diagnosed with locally advanced/unresectable and metastatic pancreatic cancer (N = 197)

Characteristic	OS < 1 year. (N= 175), n (%)	OS ≥ 1 year. (N= 22), n (%)	*p*-value
Age (years) – median (IQR)	65 (56 - 74)	62.5 (60 – 67.5)	
Age ≥ 65 years	89 (50.9%)	9 (40.9%)	0.514
Male	97 (55.4%)	9 (40.9%)	0.208
ECOG			
- 0 - 1	132 (75.4%)	21 (95.5%)	0.064
- 2 - 4	43 (24.6%)	1 (4.5%)	
History of smoking	48 (27.4%)	2 (9.1%)	0.071
History of alcohol drinking	59 (33.7%)	3 (13.6%)	0.086
At least one comorbidity	97 (55.4%)	11 (50.0%)	0.603
- Hypertension	60 (34.3%)	7 (36.4%)	
- Diabetic mellitus	47 (26.9%)	8 (31.8%)	
- Dyslipidemia	17 (9.7%)	4 (18.2%)	
- Chronic kidney disease (stage 3 - 5)	17 (9.7%)	1 (4.6%)	
Multiple comorbidities			
- 1 – 2	79 (81.4%)	6 (54.5%)	0.093
- 3 - 5	18 (18.6%)	5 (45.5%)	

Table 2. The patient characteristics of those diagnosed with locally advanced/unresectable and metastatic pancreatic cancer (N = 197) (Cont.)

Characteristic	OS < 1 year. (N= 175), n (%)	OS ≥ 1 year. (N= 22), n (%)	*p*-value
Primary presenting symptom			
- Epigastric pain	78 (44.6%)	14 (63.6%)	0.112
- Obstructive jaundice	74 (42.3%)	3 (13.6%)	
- Anorexia and weight loss	11 (6.3%)	3 (13.6%)	
- Chronic pancreatitis	4 (2.3%)	1 (4.6%)	
- Others	8 (4.5%)	1 (4.6%)	
Tumor location			
- Head	94 (53.7%)	10 (45.5%)	0.32
- Body	42 (24.0%)	9 (40.9%)	
- Tail	32 (18.3%)	3 (13.6)	
- Uncinate process	7 (4.0%)	0 (0%)	
Staging			
- Metastasis		135 (77.1%)	14 (63.6%)
- locally advanced/unresectable		40 (22.9%)	8 (36.4%)
Number of organ systemic involvement			
- 0 - 2	141 (80.6%)	18 (81.8%)	0.260
- 3 - 5	34 (19.4%)	4 (18.2%)	
Liver metastasis	88 (50.3%)	9 (40.9%)	0.546
Lung metastasis	38 (21.7%)	5 (22.7%)	0.869
Peritoneal metastasis	36 (20.6%)	2 (9.1%)	0.637
Initial CA-199 level			
- ≥ 1000 ug/ml	74 (42.3%)	7 (31.8%)	0.307
- < 1000 ug/ml	74 (42.3%)	13 (59.1%)	
- Missing data	27 (15.4%)	2 (9.1%)	
Pre-chemotherapy albumin level < 3.5 g/dL	101 (57.7%)	16 (72.7%)	0.012
Pre-chemotherapy Hb level < 10	103 (58.9%)	17 (77.3%)	0.151
Recived 1st line chemotherapy		39 (22.3%)	17 (77.3%)
1st line chemotherapy			
- FOLFIRINOX		1 (2.6%)	3 (17.6%)
- Gemcitabine/nab-paclitaxel		0	3 (17.6%)
- Gemcitabine/capecitabine		4 (10.3%)	2 (11.8%)
- Single gemcitabine		26 (66.7%)	6 (35.4%)
- Others		8 (20.6%)	3 (17.6%)
Response of 1L treatment			
- Partial response	2 (5.1%)	7 (41.2%)	0.009
- Stable disease	9 (23.1)	4 (23.5%)	
- Progression of disease	28 (71.8%)	6 (35.%)	
Received 2nd line chemotherapy	8 (20.5%)	8 (52.9%)	0.034
2nd line regimen			
- FOLFIRINOX		-	2 (25.0%)
- Single gemcitabine		-	1 (12.5%)
- mFOLFOX6		8	4 (50.0%)
- TS-0ne		-	1 (12.5%)
Response of 2L treatment			
- Partial response		0	3 (37.5%)
- Stable disease		0	2 (25.0%)
- Progression of disease		8 (100%)	3 (37.5%)
Received 3rd line chemotherapy		0 (0.0%)	4 (50.0%)
3rd line regimen			
- TS-one		-	4 (100%)
Response of 3L treatment			
- Partial response		-	1 (25%)
- Stable disease		-	0
- Progression of disease		-	3 (75%)

OS = overall survival, ECOG = Eastern Cooperative Oncology Group performance status

Treatment patterns revealed significant disparities in care for those with locally advanced/ unresectable or metastatic disease: just 23.4% received first-line palliative chemotherapy, whereas the vast majority (76.6%) were managed with best supportive care alone. Within the supportive care cohort, the primary documented reasons for omitting systemic therapy included poor baseline performance status (ECOG 2), advanced age compounded by severe comorbidities, rapid clinical deterioration prior to oncologic evaluation, and patient or family refusal of treatment.

Staging and overall survival outcomes

Among the 212 patients comprising the overall cohort, the majority (70.3%) presented with metastatic disease, while 22.6% had locally advanced or unresectable tumors. Only 7.5% were classified as having resectable or borderline resectable disease, and of these, 81% underwent curative-intent surgery. Treatment patterns within the analytical cohort (N = 197; locally advanced/ unresectable and metastatic disease) revealed significant disparities in care: just 23.4% received first-line palliative chemotherapy, whereas the vast majority (76.6%) were managed with best supportive care (BSC) alone. Within the supportive care group, the primary documented reasons for omitting systemic therapy included poor baseline performance status (ECOG 2), advanced age compounded by severe comorbidities, rapid clinical deterioration prior to oncologic evaluation, and patient or family refusal. This treatment gap was reflected in outcomes, with an overall 1-year survival rate of only 11.2%. Patients who received chemotherapy had a median overall survival (OS) of 7.6 months—more than five times longer than those who received supportive care alone (1.9 months; log-rank $p < 0.001$) (**Figure 3**).

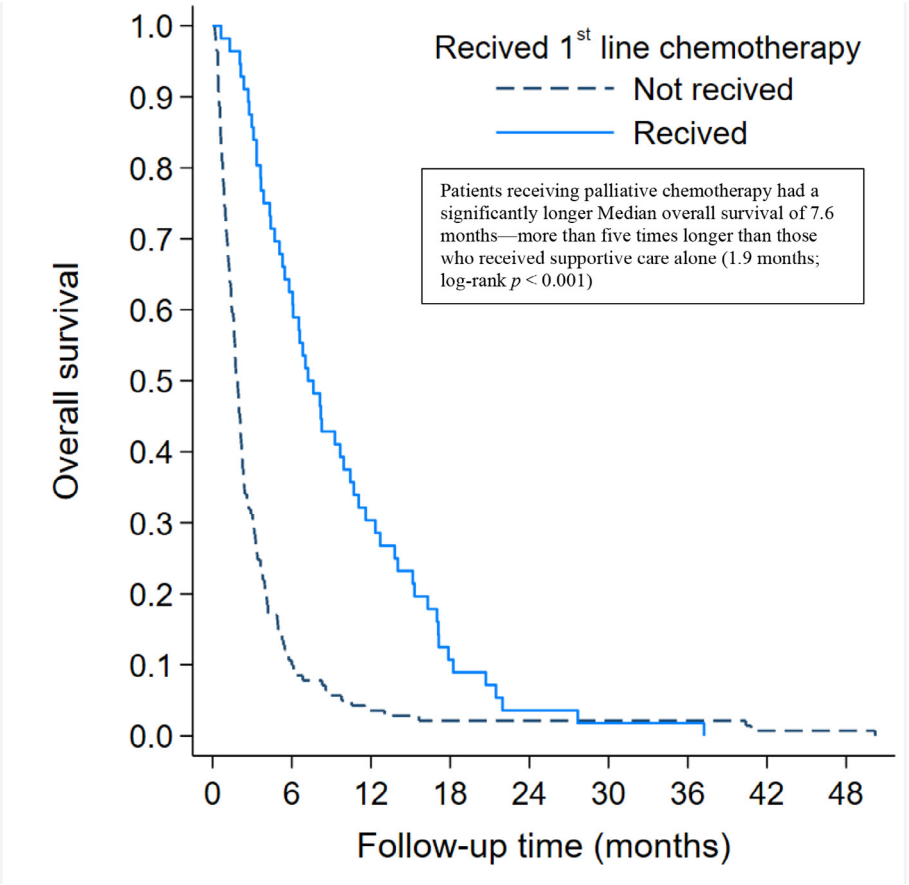

Figure 3. Kaplan-Meier Curves for treatment (compare the best supportive care (BSC) group vs. the first-line chemotherapy group.)

Table 3. Overall survival

	mOS (months)	95%CI	*p*-value
Resectable disease	7.0	(5.96 – 9.48)	0.0019
- Underwent curative surgey	11.8	(6.71 – 13.62	
locally advanced/Unresectable and metastasis disease	2.6	(1.58 - 3.62)	reference
- locally advanced/Unresectable	4.1	(1.64 - 6.56)	
- Metastasis	2.3	(1.16 - 3.37)	
Received 1st line chemotherapy	7.6	(7.76 – 11.49)	< 0.001
Best supportive care	1.9	(2.37 – 4.55)	reference
Received 1st line chemotherapy			
- Combination regimen	10.2	(7.45 – 12.92)	0.0357
FOLFORINOX	17.7	(10.47 – 35.81)	0.0008
Gem/nab-pac	17.1	(15.26 – 20.52)	0.0071
Other combination regimen	8.27	(6.63 – 8.27)	0.036
- Single gemcitabine	6.0	(1.89 – 23.25)	reference

mOS = median overall survival, 95%CI = 95% confidence interval, Gem/nab-pac = combination of gemcitabine and nab-paclitaxel

The type of chemotherapy regimen also had a notable impact on survival. Patients treated with combination therapies such as FOLFIRINOX or gemcitabine/nab-paclitaxel achieved a median OS of 17.7 months, consistent with results from clinical trials in selected populations. In contrast, those receiving single-agent chemotherapy, such as gemcitabine, had a median OS of 6.0 months, mirroring historical outcomes for monotherapy. Treatment sequencing further illustrated the challenges of disease management: only 47% of patients who progressed after first-line chemotherapy received a second-line regimen, and access to third- or fourth-line palliative chemotherapy was rare (<5%), underscoring the impact of disease progression, treatment toxicity, and limited therapeutic options (**Table 3**).

Prognostic factors for overall survival in locally advanced/unresectable and metastatic pancreatic cancer

The analysis identified ECOG performance status 0–1 as a strong independent predictor of achieving one-year survival, demonstrating 7.14-fold higher odds in the univariable analysis (95% CI: 1.45–35.1, $p = 0.016$) and an adjusted odds ratio (aOR) of 6.82 (95% CI: 1.32–35.27, $p = 0.022$). Receipt of first-line chemotherapy was associated with a profound survival benefit, with univariable odds of 11.85 (95% CI: 4.32–32.51, $p < 0.001$) and an aOR of 8.92 (95% CI: 2.78–28.64, $p < 0.001$). Furthermore, the use of the FOLFIRINOX regimen was associated with the highest likelihood of surviving beyond one year (aOR = 12.9; 95% CI: 1.2–137.9, $p = 0.034$). Additionally, a baseline serum albumin level of 3.5 g/dL was a significant independent prognostic factor for 1-year survival (aOR = 3.15; 95% CI: 1.45–6.85, $p = 0.004$).

Conversely, an extensive metastatic burden (three organs) (OR = 0.31; 95% CI: 0.12–0.82, $p = 0.018$) and the presence of obstructive jaundice (OR = 0.22; 95% CI: 0.06–0.76, $p = 0.017$) trended toward worse survival in the univariable analysis; however, both lost statistical significance after multivariable adjustment. Other non-significant factors included age, comorbidities, smoking or alcohol history, and the presence of liver metastasis (**Table 4**).

Discussion

Characteristics and incidence trends

This decade-long retrospective analysis of 212 patients with pancreatic ductal adenocarcinoma treated at Surin Hospital Cancer Center (2015–2025) provides important insights into the evolving epidemiology, treatment patterns, and survival outcomes of pancreatic cancer in a regional Thai cohort. The findings reaffirm that pancreatic cancer remains a formidable malignancy, with the majority of patients presenting at locally advanced/unresectable or metastatic stages, and overall survival outcomes continuing to lag behind other solid tumors.

Table 4. Prognostic factors for survival - univariable and multivariable analysis

Characteristic	Univariate OR (95% CI)	*p*-value	Multivariate aOR (95% CI)	*p*-value
ECOG 0-1	7.14 (1.45-35.1)	0.016*	6.82 (1.32-35.27)	0.022*
Age >65 years	1.49 (0.62-3.59)	0.514	1.22 (0.47-3.19)	0.681
Albumin ≥3.5 g/dL	2.10 (1.22-3.62)	0.008*	3.15 (1.45-6.85)	0.004*
CA19-9 >1000 μg/mL	0.62 (0.24-1.61)	0.307	0.58 (0.20-1.68)	0.316
At least one comorbidity	0.80 (0.33–1.95)	0.603	0.76 (0.29–2.01)	0.581
History of Smoking	3.78 (0.85-16.78)	0.071	2.11 (0.41-10.83)	0.367
History of Alcohol	3.24 (0.93-11.26)	0.086	1.89 (0.47-7.62)	0.372
Presented with Obstructive Jaundice	0.22 (0.06–0.76)	0.017*	0.31 (0.08–1.19)	0.087
Extensive Metastatic Burden (≥3 organs)	0.31 (0.12–0.82)	0.018*	0.38 (0.14–1.03)	0.058
Liver Metastasis	0.68 (0.28-1.65)	0.546	0.71 (0.26-1.93)	0.499
1st Line Chemo Received	11.85 (4.32-32.51)	<0.001*	8.92 (2.78-28.64)	<0.001*
FOLFIRINOX Use	27.5 (2.8–267.1)	0.004*	12.9 (1.2–137.9)	0.034*

The study observed a rising institutional case volume of pancreatic cancer over the past decade, consistent with global trends that attribute increases to aging populations, lifestyle changes, and improved diagnostic capabilities. The near-equal gender distribution and predominance of elderly patients (median age 64.5 years; 59.9% aged 65 or older) align with established demographic patterns for this disease. The cohort's predominant head-of-pancreas involvement (68%) mirrors global PDAC epidemiology.[10] Late-stage diagnosis dominated, with 70.3% metastatic and 22.6% locally advanced disease at presentation, consistent with reports from Armenia (60% stage IV)[11] and Malaysia.[12] Epigastric pain (44.8%) and obstructive jaundice were common symptoms, underscoring the need for earlier detection strategies targeting high-risk populations (e.g., genetic predisposition, chronic pancreatitis).[13]

Treatment patterns and survival outcomes

Only 6% of patients underwent curative resection, compared to 15%–20% in high-income settings.[14] Late-stage diagnosis remains a significant challenge in pancreatic cancer care. Screening programs targeting high-risk populations—such as individuals with genetic predispositions or lifestyle risk factors—could help reduce late-stage diagnoses by identifying cases earlier when curative interventions are more feasible. Tailored screening approaches using biomarkers like CA19-9 trends or imaging modalities may offer cost-effective solutions for early detection.

A critical finding is the low proportion of patients receiving first-line palliative chemotherapy (23.4%), with the majority managed with best supportive care alone; this reflects both the aggressive nature of the disease and real-world barriers to systemic therapy, such as poor performance status and comorbidities. Patients who received chemotherapy experienced a substantial survival benefit (median OS 7.6 months vs. 1.9 months with supportive care), mirroring outcomes reported in larger international cohorts and clinical trials.

Among chemotherapy regimens, FOLFIRINOX demonstrated the greatest survival advantage (median OS 17.7 months) compared with 6.0 months for single-agent gemcitabine. However, regimen selection in this real-world cohort was highly individualized. Single-agent gemcitabine was the most frequently utilized

regimen, primarily prescribed to older or frailer patients, those with marginal performance status, or those presenting with biliary obstruction. In contrast, the adoption of FOLFIRINOX was highly restricted to a small subset of highly fit, younger patients with an ECOG performance status of 0–1 and normal hepatic function. Consequently, while our multivariable analysis showed a statistically significant survival benefit for FOLFIRINOX, the extremely wide 95% confidence interval (1.2–137.9) reflects this very small subgroup size. Therefore, the exact magnitude of this survival benefit remains uncertain in our specific population, underscoring the inherent selection bias associated with administering this intensive regimen. This underutilization of multi-agent regimens reflects systemic barriers observed globally, including in Armenia (37.1% second-line access) and France (41% of untreated PDAC patients).[15] Expanding access to novel regimens, including targeted therapies, could improve outcomes. Additionally, integrating early supportive care strategies to manage disease-related symptoms and treatment toxicities may help maintain performance status, thereby enhancing patient eligibility for life-prolonging combination chemotherapy.

Prognostic factors for survival in locally advanced/unresectable and metastatic pancreatic cancer

The analysis identified an ECOG performance status of 0–1 as the strongest independent predictor of survival beyond 1 year, with 7.14-fold higher odds in the univariate analysis (p=0.016) and 6.82-fold higher adjusted odds (p = 0.022). This finding is consistent with the association observed for higher serum albumin levels (3.5 g/dL). Both factors reflect a better overall health status, which is associated with a more favorable prognosis and greater tolerance to various treatment modalities, ultimately translating into improved overall survival.

Receipt of first-line chemotherapy demonstrated the greatest survival benefit (aOR = 8.92, $p < 0.001$), while the use of the FOLFIRINOX regimen showed a pronounced survival signal (aOR = 12.9, $p = 0.034$). However, the extremely wide 95% confidence interval (1.2–137.9) reflects the very small number of patients in our cohort who were fit enough to receive this intensive multi-agent regimen; this indicates that while the benefit is statistically significant, the exact magnitude of the effect remains uncertain in this specific population. These findings are consistent with pivotal studies of FOLFIRINOX for metastatic pancreatic cancer, which have shown significant improvements in all key outcomes—including response rate, progression-free survival, and overall survival—compared with single-agent gemcitabine regimens.[16] Conversely, an extensive metastatic burden (three organs) trended toward worse outcomes (aOR = 0.38, p = 0.058), aligning with literature linking disseminated disease to a poor prognosis.

The results are broadly consistent with international data, which show modest improvements in survival for pancreatic cancer over the past decade, primarily due to advances in systemic therapy.[17] However, the overall prognosis remains poor, and the low rate of curative surgery highlights the urgent need for earlier diagnosis. The study also echoes global concerns about disparities in access to care and the underutilization of effective treatments in real-world settings, particularly in developing regional healthcare networks.

The study encountered some limitations. First, in a retrospective review, the quality of the data was inherently affected by missing or inconsistent medical records. Second, the small subgroup sizes—especially for early-stage resectable cases—limited the ability to perform detailed subgroup analyses and reduced the statistical power to detect meaningful differences within those cohorts. Furthermore, the small subgroup sizes for specific systemic treatments, particularly in the FOLFIRINOX cohort, resulted in extremely wide confidence intervals, limiting our ability to quantify their survival benefit relative to other regimens precisely. Lastly, the single-center design limits the generalizability of these findings to other regions or international populations with differing healthcare systems, patient demographics, and resource access.

Future studies should aim to address the identified limitations by prospectively improving data collection processes, increasing sample sizes, and incorporating multi-center collaborations to enhance regional representativeness and statistical reliability. Clinically, evaluating and implementing targeted screening protocols for high-risk populations could help shift the diagnostic paradigm toward earlier stages, when curative interventions are more feasible. Furthermore, expanding institutional access to multi-agent regimens, such as FOLFIRINOX, alongside integrating early and comprehensive supportive care, is critical for improving survival outcomes in patients with locally advanced/unresectable and metastatic pancreatic cancer. Ultimately, strengthening multidisciplinary tumor board collaborations will be essential to optimizing individualized treatment decisions and improving overall patient management in resource-limited settings.

Conclusion

The prognosis for patients with locally advanced/unresectable and metastatic pancreatic cancer in this regional cohort remains exceptionally poor, heavily driven by late-stage presentation and a low utilization rate of palliative chemotherapy. This study demonstrates that achieving one-year survival is significantly dependent on favorable baseline health status (ECOG performance status 0–1 and serum albumin 3.5 g/dL) and receipt of first-line systemic therapy, particularly the FOLFIRINOX regimen. Improving real-world outcomes for advanced pancreatic cancer relies directly on optimizing patient fitness to increase eligibility for these proven systemic treatments.

Acknowledgments

Our appreciation goes out to the patients whose participation formed the cornerstone of this research; their willingness to share their experiences and medical data made this study possible.

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