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Original Article

Impact of continuity of care based on Triangle theory on nutritional status of patients after pancreatic cancer surgery: a retrospective study

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Abstract: Objective: To evaluate the impact of Triangle theory-based continuity of care on postoperative malnutrition in pancreatic cancer patients. Methods: We retrospectively analyzed the data from 184 patients with pancreatic cancer admitted to The Second People's Hospital of Lanzhou City from January 2020 to May 2023. Patients were divided into a control group receiving conventional care (n = 114) and a study group receiving Triangle theory-based care (n = 70). Postoperative nutritional status and prognosis were compared between the two groups. Nutritional indexes included serum total protein (STP), albumin (ALB), and hemoglobin (HB). Self-care ability was assessed using the Exercise of Self-care Agency (ESCA). Quality of life was measured using the Quality-of-Life Questionnaire for Pancreatic Cancer 26 (QLQ-PAN-26), and the incidence of malnutrition was evaluated using the Patient-Generated Subjective Global Assessment (PG-SGA). Multifactorial logistic regression was applied to analyze risk factors for malnutrition. Results: At ten days post-operation, the study group showed significantly better nutritional levels ($P < 0.05$). After three months, the, study group also exhibited superior self-care ability and quality of life scores (all $P < 0.001$). The incidence of malnutrition was 42.39%. Independent risk factors for malnutrition included routine care (OR = 3.459), operation time ≥ 90 min (OR = 2.277), intraoperative bleeding ≥ 200 mL (OR = 2.590), postoperative day 1 ALB < 37.5 g/L (OR = 3.975), and HB < 95.5 g/L (OR = 6.068). Conclusion: Triangle theory-based continuity of care significantly improves nutritional status and quality of life in postoperative pancreatic cancer patients, demonstrating its potential for broader clinical use.

Keywords: Pancreatic tumors, triangle theory, extended care, nutritional status, quality of life

Introduction

Pancreatic cancer, a highly malignant gastrointestinal tumor, has seen a rising incidence and mortality worldwide in recent years [1]. This trend is particularly alarming in Asia, where the number of new cases and deaths is expected to increase by more than 80% over the next 20 years [2]. Often diagnosed at an advanced stage due to the challenge of early detection, pancreatic cancer presents a grim prognosis. Even with early diagnosis and surgical intervention, the five-year survival rate remains a modest 20% [3]. The mainstay treatment for pancreatic cancer is radical pancreatic surgery, which includes pancreaticoduodenectomy and a reconstruction of the digestive tract [4]. This procedure is complex, with many postoperative complications, and may lead to abnormal GI function and malnutrition, adversely impacting prognosis.

In China, malnutrition caused by malignant tumors has an estimated incidence of about 58%. Patients with upper gastrointestinal tract tumors in particular are more prone to malnutrition, with an incidence rate significantly higher than that of other types of malignant tumors

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[5]. Pancreatic cancer typically manifests with significant wasting, fatigue, and weight loss in 80% to 90% of patients in the early stages [6]. As the disease progresses, patients may develop serious problems such as cachexia, electrolyte disturbances, and hypoproteinemia. Postoperatively, the incidence of malnutrition soars to 50%, with over 60% of patients at nutritional risk due to heightened tumor metabolism, damage to digestive organs, and bile duct obstruction [7]. This underscores the importance of nutritional screening and assessment for patient management. These preventive measures are essential for slowing the progression of malignancy. Nurses play a vital role in the nutritional management of patients with pancreatic cancer and are responsible for performing accurate nutritional assessment and providing dietary counseling and nutrition education, all of which are core components of overall nursing care [8]. As medical nutrition knowledge continues to evolve, the nutritional status of patients during hospitalization has received more attention.

Traditional models of care often fall short in improving quality of life, self-care, and nutritional function in postoperative pancreatic cancer patients [9]. This is mainly due to the interruption of care services after discharge, lack of individualized care plans, and low patient and family involvement. In contrast, the continuity of care model based on the Triangle theory significantly improves the overall recovery of postoperative patients by providing sustained nursing support, crafting individualized care plans, encouraging total patient and family involvement, and collaborating with the multidisciplinary team [10]. It ensures a seamless transition of care from the hospital to home and community settings, improving patients' quality of life, self-care ability, and nutritional status through enhanced self-management skills and optimized nutritional support. Despite these advantages, Triangle theory-based care has not been widely implemented for management of pancreatic cancer.

This study aims to address this oversight by integrating the Triangle theory's continuity of care model into postoperative pancreatic cancer care and to explore its benefits for improving patients' quality of life, enhancing self-care, or improving nutritional status.

Methods and data

Case sources

The data of pancreatic cancer patients admitted to the Second People's Hospital of Lanzhou City from January 2020 to May 2023 were retrospectively analyzed. This study was conducted with the approval of the hospital's Medical Ethics Committee.

Inclusion and exclusion criteria

Inclusion criteria: 1. Patients with CT-confirmed pancreatic cancer (n = 342). 2. Patients aged between 18-70 years old (n = 331). 3. Patients who had undergone pancreatic cancer resection surgery (n = 284). 4. Patients with complete clinical data (n = 251). 5. Patients who had received routine or Triangle theory-based continuity of care (n = 211).

Exclusion criteria: 1. Presence of intractable diarrhea, dysphagia, or other diseases affecting the patient's postoperative enteral nutrition (EN) (n = 204). 2. Presence of other serious tumors (n = 199). 3. Presence of severe cardiac and hepatic dysfunction (n = 191). 4. Long-term use of hormonal drugs or immunosuppressants (n = 189). 5. Presence of severe malnutrition prior to the operation (n = 184).

Case screening

After applying the inclusion and exclusion criteria, we identified 184 eligible cases for this study. Among them, there were 114 cases receiving routine care (control group) and 70 cases receiving the Triangle theory-based continuity of care model (study group). Patients in the control group were treated during January 2020 and January 2022, and those in the study group were treated during February 2022 and May 2023. The introduction of the Triangle theory-based care model in February 2022 aimed to better address the nursing needs and enhance the recovery of postoperative pancreatic cancer patients in our department (**Figure 1**).

Nursing program

The control group received conventional continuity nursing, which was designed to support the comprehensive postoperative rehabilitation of pancreatic cancer patients. The program

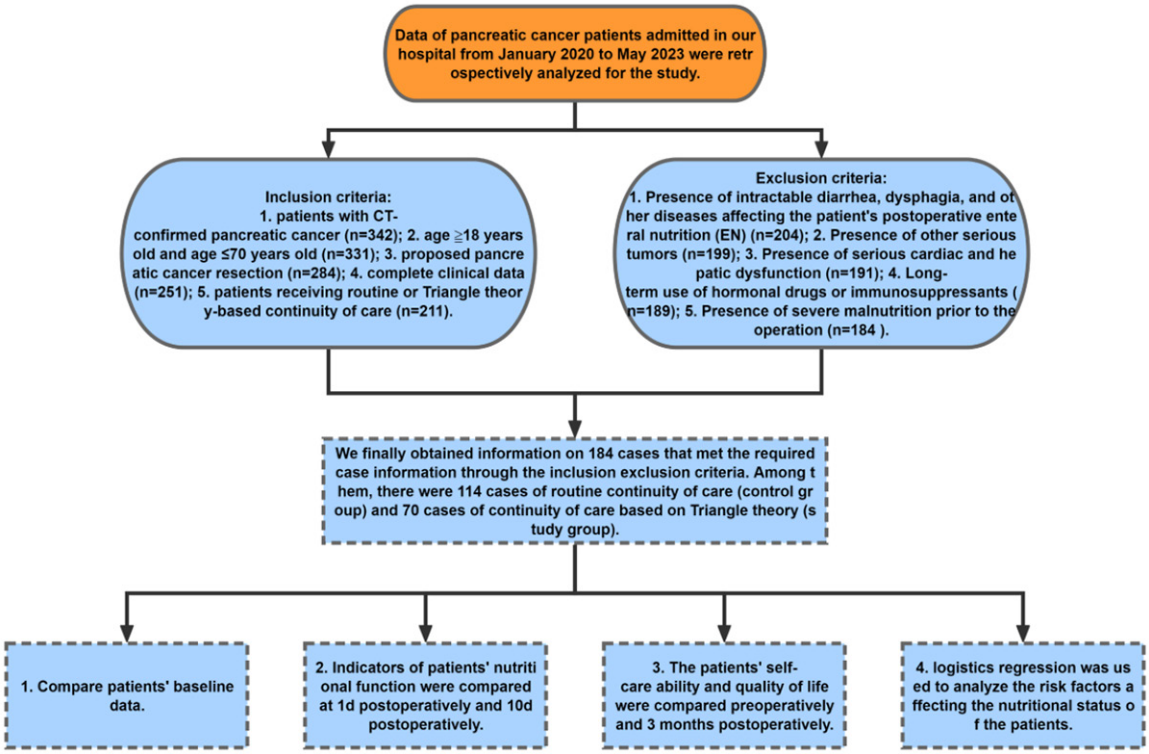

Figure 1. Study flowchart.

was divided into two phases: hospitalization and out-of-hospital follow-up. During the hospitalization phase, the basic data of the patients were first collected and organized in detail. At the same time, the education of patients and their families was strengthened through intradepartmental training activities, covering essential aspects such as possible postoperative side effects, medication instructions, dietary adjustments and rehabilitation exercises. One day before discharge, a personalized follow-up plan was developed based on a comprehensive assessment of the patient's nutritional status, psychological status, and pain control. Post-discharge, weekly telephone follow-ups and monthly home visits were conducted to continuously monitor patients' dietary habits, medication use, rehabilitation exercise progress, and overall recovery. Patients received ongoing support through a WeChat group and regular online Q&A sessions focused on postoperative care, daily dietary management, disease-related knowledge, and rehabilitation information, enhancing the continuity of care and improving postoperative quality of life.

The study group followed the Triangle theory-based continuity of care with the following protocol. Using the European Society for Parenteral Nutrition (ESPEN) Nutritional Risk Screening (NRS 2002) tool [11], patients were assessed across three dimensions: nutritional status, disease severity, and age, with risk levels rated from 0 to 7. Based on the score results, patients received tiered nutritional support tailored to their risk level ranging from basic nutrition education and dietary counseling for low-risk patients (< 3 points), to protein supplementation for intermediate-risk patients (3 points), specific enteral caloric adjustments for higher-risk patients (4 points), and continued hospitalization with specialized nutritional protocols for the highest-risk patients (≥ 5 points). This protocol aimed to optimize patients' nutritional status and support their postoperative recovery, emphasizing the importance of personalized care in enhancing overall recovery. The intervention continued for 3 months for both groups.

Clinical data collection

Patient-related data were obtained through the electronic medical record and in-hospital medical record follow-up system, including age, sex,

household registration, monthly household income, education level, tumor size, tumor location, peripancreatic infiltration, tumor, node, metastasis staging system (TNM), surgical method, surgical time, and intraoperative bleeding. Nutrition-related indices included serum total protein (STP), albumin (ALB), and hemoglobin (HB) on preoperative day 1 and postoperative day 10. Functional assessments were conducted preoperatively and 10 days postoperatively using the Exercise of Self-care Agency (ESCA) Function Score [12] and the Quality-of-Life Questionnaire for Pancreatic Cancer 26 (QLQ-PAN-26) Score [13]. Additionally, the QLQ-PAN-26 score was also collected at 3 months post-operatively, along with the Patient-Generated Subjective Global Assessment (PG-SGA) score [14]. The Nutrition Risk Screening 2002 (NRS 2002) score was assessed at hospital discharge. All nutrition-related indicators were measured using a fully automated biochemical analyzer (Hitachi 7600).

Implications of clinical indicators

1. STP, ALB, and HB: These biochemical markers assess the nutritional status of patients. STP and HB were measured in grams per liter (g/L), ALB was measured in grams per deciliter (g/dL). Higher levels indicate better nutritional status, which is crucial for recovery.

2. ESCA: This scale assesses the self-care abilities of patients, measuring aspects such as self-concept, responsibility, skills, and health knowledge. Scores are numerical, with higher scores indicating better self-care capabilities.

3. QLQ-PAN-26*:* This questionnaire measures various aspects of a patient's quality of life specific to pancreatic cancer, including pain, dietary and digestive symptoms, and satisfaction with healthcare. It uses a numerical scoring system; lower scores in pain and symptoms indicate better outcome, and higher scores in healthcare satisfaction indicate greater satisfaction with care received.

4. PG-SGA: This tool was used to evaluate and rate the nutritional status of patients, identifying those at risk of malnutrition. It uses a scoring system where higher scores indicate a greater nutritional risk or poorer nutritional status.

5. NRS 2002: This screening tool assesses the risk of malnutrition based on nutritional status, disease severity, and age, providing a numerical risk score where higher values denote greater risk.

Observations

1. Baseline data of patients were compared. 2. Nutritional function indicators on preoperative day 1 and postoperative day 10 were compared between the two groups. 3. Patients' self-care ability and quality of life were compared between the two groups before and 3 months after operation. 4. Risk factors affecting patients' nutritional status were analyzed using logistic regression.

Statistical analysis

SPSS 26.00 software was used for data analysis, and GraphPad Prism 8 software was used for graphical visualizations. Counted data were expressed as percentages (%) and compared using the chi-square test. Measured data were expressed as mean ± standard deviation, and an independent t-test was used for the comparison between the two groups, while a paired t-test was used for comparison within the group. Logistic regression was used to analyze the risk factors for malnutrition. Differences were called significant if $P < 0.05$.

Results

Comparison of baseline information

A comparison of the baseline data between the two groups revealed that there was no statistical differences between the two groups in terms of age, gender, household registration, monthly household income, education level, tumor size, tumor site, peripancreatic infiltration, TNM stage, or surgical approach (all $P > 0.05$, **Table 1**).

Comparison of nutrition-related indicators

Nutritional indices, including serum total protein (STP), albumin (ALB), and hemoglobin (HB), were evaluated between the two groups one day preoperatively and ten days postoperatively (**Figure 2**). On the preoperative day, there were no significant differences in STP, ALB, or HB levels between the groups (all $P > 0.05$).

Table 1. Baseline information

Factors	Control group (n = 114)	Study group (n = 70)	χ^2-value	*P*-value
Age				
≥ 60 years	66	39	0.084	0.772
< 60 years	48	31		
Gender				
Male	85	49	0.456	0.5
Female	29	21		
Household registration				
Municipalities	51	36	0.779	0.377
Countryside	63	34		
Monthly household income				
≥ 4000	59	30	1.375	0.241
< 4000 yuan	55	40		
Educational attainment				
≥ High School	40	29	0.744	0.388
< High School	74	41		
Tumor size				
≥ 3 cm	86	49	0.657	0.418
< 3 cm	28	21		
Tumor site				
Head of the pancreas	81	43	1.828	0.176
Pancreatic tail	33	27		
Peripancreatic infiltration				
Yes	40	19	1.257	0.262
No	74	51		
TNM staging				
I-II	75	49	0.35	0.554
III-IV	39	21		
Surgical Procedures				
Radical operation	57	42	1.745	0.187
Dividend surgery	57	28		
Surgical time				
≥ 90 min	63	40	0.062	0.803
< 90 min	51	30		
Intraoperative bleeding				
≥ 200 mL	48	29	0.008	0.928
< 200 mL	66	41		

Note: Tumor, Node, Metastasis staging system (TNM).

However, a subsequent comparison ten days postoperatively revealed significant increases in ALB and HB levels compared to preoperative levels, alongside a significant decrease in STP levels (all P < 0.05). Notably, at ten days postoperatively, the STP, ALB, and HB levels in the study group were higher than those of the control group (all P < 0.05).

Comparison of ESCA functional scores

ESCA functioning scores were compared between the two groups preoperatively and 3 months postoperatively (**Figure 3**). Initially, there were no significant difference in self-concept, responsibility, skills, or health knowledge scores between the two groups (all P > 0.05). However, at three months postoperatively, statistical improvements were noted in these categories for both groups compared to their preoperative scores (all P < 0.001). In addition, we found that the self-concept, sense of responsibility, skills, and health knowledge scores of patients in the control group were notably higher in the study group than in the control group at 3 months postoperatively (all P < 0.001).

Comparison of QLQ-PAN-26 scores

QLQ-PAN-26 scores were compared between the two groups preoperatively and 3 months postoperatively (**Figure 4**). Initially, no significant differences were observed between the two groups in terms of preoperative cancer pain, dietary and digestive symptoms, or healthcare care satisfaction scores (all P > 0.05). Subsequent assessments at three months postoperatively showed significant improvements; cancer pain and dietary symptoms decreased, whereas healthcare satisfaction scores increased significantly (all P < 0.001). Additionally, at three months postoperatively, the control group reported higher levels of cancer pain and dietary and digestive symptoms, and lower healthcare satisfaction scores compared to the study group (all P < 0.001).

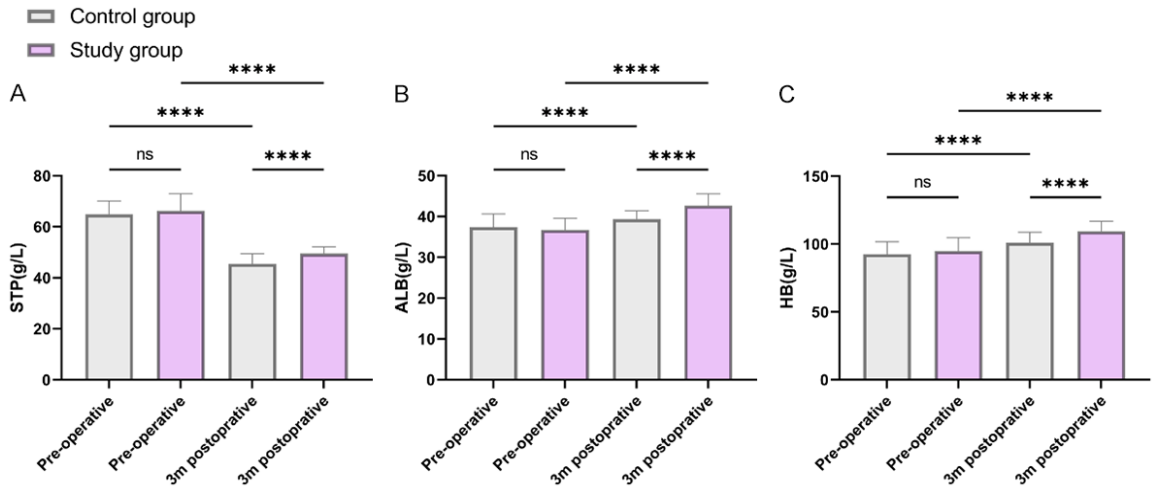

Figure 2. Changes in nutrition-related indices in patients before and after operation. A. Comparison of STP between the two groups. B. Comparison of ALB between the two groups. C. Comparison of HB between the two groups. Note: ****P < 0.0001.

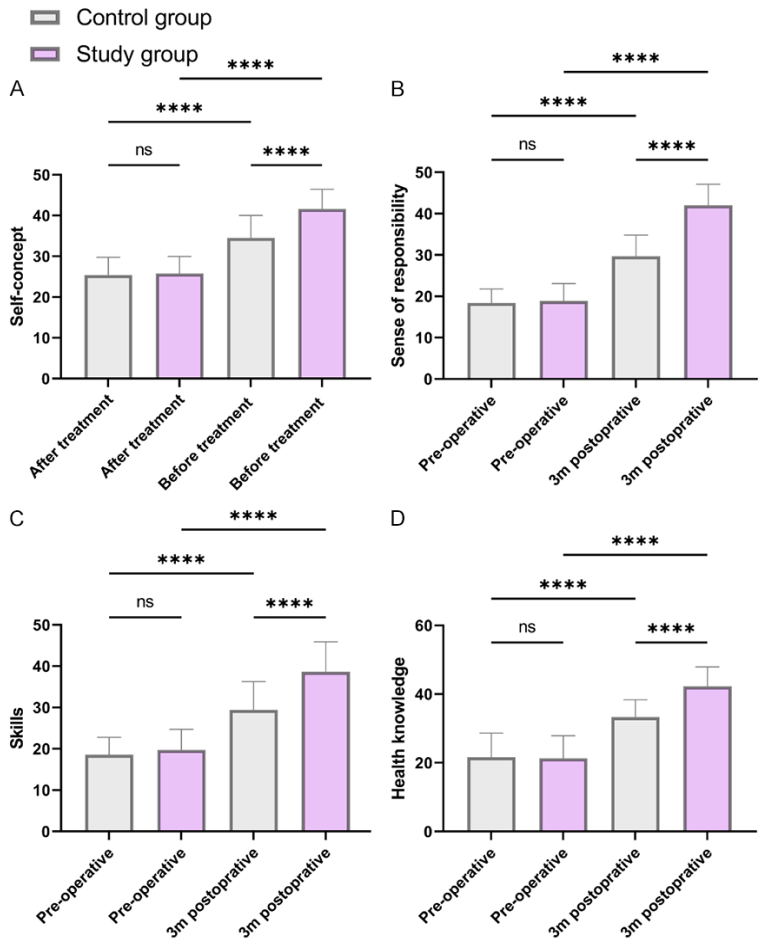

Figure 3. Changes in patients' ESCA functioning scores in patients before and after operation. A. Comparison of self-concept scores between the two groups. B. Comparison of responsibility scores between the two groups. C. Comparison of skill scores between the two groups. D. Comparison of health knowledge scores between the two groups. Note: ****P < 0.0001, Serum total protein (STP), Albumin (ALB), and Hemoglobin (HB).

Analysis of risk factors affecting malnutrition

We assessed the nutritional status of patients using the Patient-Generated Subjective Global Assessment (PG-SGA) scores three months postoperatively. Malnutrition, defined as a PG-SGA score of 2 or higher, was observed in 73 patients, resulting in an incidence rate of 42.39%. We categorized patients into two groups: those with malnutrition and those with normal nutritional status.

Factors with statistical difference in the baseline data comparison (**Table 2**), including hair malnutrition (P = 0.002), operation time ≥ 90 min (P = 0.006), intraoperative bleeding ≥ 200 mL (P = 0.001), as well as preoperative ALB (P < 0.001) and HB (P < 0.001) were entered into the multivariate analysis, with assignment shown in **Table 3**. Multivariate logistic regression analysis revealed that conventional care plan, operation time ≥ 90 min, intraoperative bleeding ≥ 90 mL, preintervention ALB < 37.5 g/L

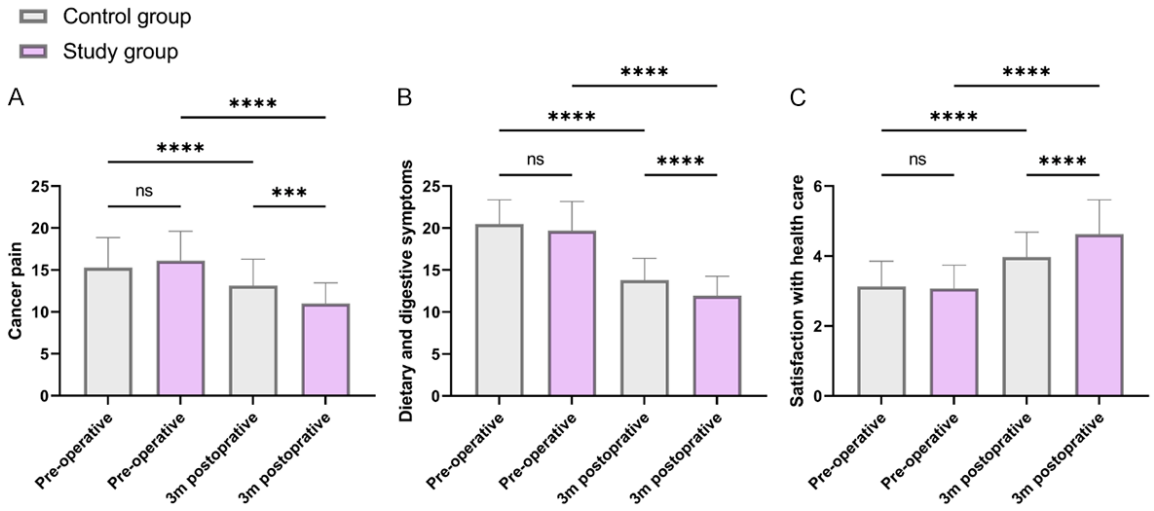

Figure 4. Changes in QLQ-PAN-26 scores in patients before and after operation. A. Comparison of pain scores between the two groups. B. Comparison of dietary and digestive symptom scores between the two groups. C. Comparison of health care satisfaction scores between the two groups. Note: ****P < 0.0001, Exercise of Self-care Agency (ESCA) Function Score, Quality of Life Questionnaire for Pancreatic Cancer 26 (QLQ-PAN-26) Score, Patient-Generated Subjective Global Assessment (PG-SGA) score, and Nutrition Risk Screening 2002 (NRS 2002).

Table 2. Comparison of baseline data of malnourished patients

Considerations	Malnutrition (n = 73)	Normal group (n = 111)	χ^2-value	*P*-value
Nursing program				
Conventional care (Control)	55	59	9.199	0.002
Continuity care (Study)	18	52		
Age				
≥ 60 years	42	63	0.011	0.917
< 60 years	31	48		
Gender				
Male	58	76	2.685	0.101
Female	15	35		
Household registration				
Municipalities	33	54	0.209	0.647
Countryside	40	57		
Monthly household income				
≥ 4000	38	51	0.658	0.417
< 4000 yuan	35	60		
Educational attainment				
≥ High School	33	36	3.066	0.080
< High School	40	75		
Tumor size				
≥ 3 cm	54	81	0.023	0.881
< 3 cm	19	30		
Tumor site				
Head of the pancreas	47	77	0.498	0.480
Pancreatic tail	26	34		
Peripancreatic infiltration				
Yes	26	33	0.701	0.403
No	47	78		

TNM staging				
I-II	52	72	0.813	0.367
III-IV	21	39		
Surgical Procedures				
Radical operation	38	61	0.149	0.699
Dividend surgery	35	50		
Surgical time				
≥ 90 min	50	53	7.691	0.006
< 90 min	23	58		
Intraoperative bleeding				
≥ 200 mL	41	36	10.192	0.001
< 200 mL	32	75		
Postoperative 1 d STP (g/L)	65.12±4.73	65.58±6.55	-0.545	0.587
Preoperative 1 d ALB (g/L)	36.00 [34.00, 38.00]	38.00 [36.00, 40.50]	-4.510	< 0.001
Postoperative 1 d HB (g/L)	89.00±6.83	96.23±9.98	-5.830	< 0.001
Preoperative self-concept	25.38±4.64	25.62±4.11	-0.356	0.722
Preoperative responsibility	18.22±3.37	18.81±3.90	-1.094	0.276
Preoperative skills	18.89±4.63	19.08±4.53	-0.275	0.783
Preoperative health information	20.78±6.90	21.98±6.78	-1.164	0.246
Preoperative Cancer Pain	16.00 [13.00, 18.00]	16.00 [13.00, 18.00]	-0.226	0.821
Preoperative Dietary Digestive Symptoms	20.22±3.14	20.17±3.14	0.102	0.919
Preoperative healthcare satisfaction	3.00 [3.00, 3.00]	3.00 [3.00, 4.00]	-0.893	0.310

Note: Serum total protein (STP), Albumin (ALB), Hemoglobin (HB), Exercise of Self-care Agency (ESCA) Function Score, Quality of Life Questionnaire for Pancreatic Cancer 26 (QLQ-PAN-26) Score, Patient-Generated Subjective Global Assessment (PG-SGA) score, and Nutrition Risk Screening 2002 (NRS 2002).

Table 3. Assignment table

Consideration	Type of the assignment
Nursing program	Control group = 1, study group = 0
Surgical time	≥ 90 min = 1, < 90 min = 0
Intraoperative bleeding	≥ 200 mL = 1, < 200 mL = 0
Postoperative 1 d ALB	≥ 37.5 g/L = 1, < 37.5 g/L = 0
1 d HB postoperatively	≥ 95.5 g/L = 1, < 95.5 g/L = 0
Dystrophy	Yes = 1, No = 0

Note: Albumin (ALB), and Hemoglobin (HB).

and pre-intervention HB 95.5 g/L were independent risk factors for malnutrition in patients with pancreatic cancer within postoperative 3 months (**Table 4**).

Discussion

Pancreatic cancer patients are prone to protein-calorie deficiency after surgery, which can compromise their immune function and adversely affect their prognosis [15]. The value of continuity of care, as a service to meet the ongoing care needs of discharged patients, has been recognized across various chronic disease frameworks [16, 17]. However, few studies have applied the Triangle theory to postoperative pancreatic cancer care.

The Triangle theory, pioneered by Kaiser Permanente in California, introduces an innovative model that categorizes patients into critical, high-risk, and stable tiers based on their condition and provides customized care according to the needs of each tier [10]. In the present study, we used this innovative model to categorize patients into critical and stable tiers and provide customized care according to their needs. We found that the continuity of care under the guidance of the Triangle theory significantly improved the nutritional status of postoperative pancreatic cancer patients and reduced the incidence of malnutrition. Compared to conventional care, it effectively improves patients' self-concept, sense of responsibility, skills and health knowledge scores, thus improving patients' quality of life. This improvement was primarily attributed to the

Table 4. Multifactor logistic regression

Consideration	β	standard error	χ^2(be) worth	*P*-value	OR value	95% CI	
						lower limit	limit
Nursing program	1.241	0.409	9.221	0.002	3.459	1.553	7.704
Surgical time	0.823	0.379	4.726	0.030	2.277	1.084	4.783
Intraoperative bleeding	0.952	0.378	6.331	0.012	2.590	1.234	5.435
Postoperative 1d ALB	1.380	0.393	12.322	< 0.001	3.975	1.839	8.589
1d HB postoperatively	1.803	0.421	18.342	< 0.001	6.068	2.659	13.847

Note: Albumin (ALB), and Hemoglobin (HB).

model's ability to accurately address individual needs through meticulous nutritional risk assessment and hierarchical nutritional support, effectively aiding postoperative recovery [18]. In addition, the model also emphasizes the importance of self-management and empowerment education, which effectively enhance patients' self-concept, sense of responsibility, skills, and health knowledge, contributing to improved quality of life and reduced incidence of malnutrition [19]. For example, Liu et al. [20] improved the quality of life and patient satisfaction in pancreatic cancer care through evidence-based practices. Similarly, Ma et al. [21] significantly improved the quality of life for postoperative pancreatic cancer patients by integrating a multidisciplinary team care model with a mind-mapping approach, effectively alleviating postoperative pain and negative emotions. These studies further support the notion that evidence-based nursing practice, multidisciplinary teamwork, and innovative teaching methods can provide personalized and holistic care addressing both the physical and psychological needs of pancreatic cancer patients, ultimately improving their quality of life [22]. The results of this study not only corroborate previous research but also highlight the benefit of the Triangle Theory-guided continuity of care for nutritional status and quality of life of postoperative pancreatic cancer patients.

Postoperative malnutrition in pancreatic cancer patients is a common phenomenon in which patients may experience loss of appetite, decreased intake, and malabsorption of nutrients due to cancer itself and the treatment on the patient's digestive and absorptive functions [23, 24]. This can lead to protein-energy malnutrition, which affects patients' postoperative recovery and quality of life. At the end of this study, we examined the risk factors for malnutrition. We found that nursing care, duration of surgery, intraoperative bleeding, preoperative 1 d ALB, and preoperative 1 d HB were independent risk factors for malnutrition. The complexity and invasiveness of surgery may elevate patients' stress response, accelerating nutrient depletion and hindering postoperative recovery. Prolonged surgery and excessive bleeding can increase the body's nutritional demands, which are unlikely to be met by a regular diet during recovery, thereby increasing the risk of malnutrition. For example, Zhang et al. [25] observed that intraoperative and postoperative bleeding worsened malnutrition among patients undergoing pancreatic cancer surgery. Hypoalbuminemia reflects insufficient protein reserves. ALB, as the major plasma protein, is essential for maintaining nutritional status and tissue repair. A low HB level suggests anemia, which impairs oxygen delivery and cellular metabolism, further exacerbating malnutrition. Collectively, these factors undermine the postoperative recovery process, possibly leading to unmet energy and nutritional requirements and increased malnutrition risk. For example, Shim et al. [26] analyzed the changes in perioperative nutritional status of 435 patients with gastrointestinal tumors and found that preoperative ALB and lymphocyte count were risk factors for postoperative malnutrition. In addition, La et al. [27] analyzed the epidemiology and prognostic implications of malnutrition in patients undergoing pancreatic surgery and indicated that preoperative malnutrition was highly prevalent and associated with an increased risk of postoperative complications.

Traditional care models often lack post-discharge continuity, failing to provide ongoing assessment and interventions tailored to individual patient needs, potentially increasing

malnutrition risk among postoperative pancreatic cancer patients. In contrast, the continuity of care model based on the Triangle theory can better meet the individual needs of patients by providing hierarchical nutritional support and detailed nutritional risk assessment [28, 29]. At the same time, this model focuses on patients' self-management and empowerment education, which enhances patients' self-concept, sense of responsibility, skills, and health knowledge, thus better facilitating patients' overall recovery and effectively reducing the risk of malnutrition.

Research limitations

Limitations in this study are as follows. First, the small sample size may impede the extrapolation and generalizability of the results. Multicenter and large sample studies are needed to further validate the results of this study. Second, the retrospective observational nature of this study introduces a potential for selection bias. Although we compared the baseline information of the two groups of patients, there may still be unmeasured confounding factors that affect the results. Future prospective randomized controlled trials are needed to provide higher quality evidence. Finally, the assessment of patients' nutritional status and quality of life was confined to a 3-month postoperative period, lacking long-term follow-up results. Future studies should extend the follow-up period to thoroughly evaluate the impact of continuity of care on patients' long-term prognosis.

Conclusion

A continuity of care model in clinical nursing practice based on the Triangle theory can effectively improve the nutritional status and quality of life of postoperative pancreatic cancer patients and reduce the risk of postoperative malnutrition.

Disclosure of conflict of interest

None.

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