



# Effect of Multidisciplinary Team Collaborative Nursing Model Combined with Mind Mapping Teaching Method on Postoperative Complications and Mental Health of Patients with Advanced Pancreatic Cancer

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## Abstract

**Background:** To analyze the effect of multidisciplinary team (MDT) collaborative nursing model combined with mind mapping teaching method on postoperative complications and mental health of patients with advanced pancreatic cancer (APC).

**Methods:** The clinical data of 100 APC patients treated in Liaoning Cancer Hospital and Institute, Shenyang, China (Dec 2018 - Dec 2020) were retrospectively analyzed. They were randomly and equally split into group J and group Q. The patients of group J were nursed with mind mapping teaching method, while those of group Q were nursed with MDT collaborative nursing model combined with mind mapping teaching method to compare the incidence of complications, quality of life (QOL) and mental health between the two groups after nursing.

**Results:** After nursing, the SAS, SDS and NRS scores decreased in both groups, with the notably lower scores in group Q compared with group J ( $P < 0.05$ ). After nursing, the QOL scores increased in both groups, with the notably higher scores in group Q compared with group J ( $P < 0.05$ ). Compared with group J, the nursing satisfaction in group Q was notably higher while the incidence of complications was notably lower ( $P < 0.05$ ).

**Conclusion:** The MDT collaborative nursing model combined with mind mapping teaching method in postoperative nursing of APC patients can improve negative emotions such as anxiety and depression, enhance the QOL, alleviate pain, reduce the incidence of postoperative complications and improve nursing satisfaction, worthy of application and promotion in clinic.

**Keywords:** Nursing model; Mind mapping teaching method; Advanced pancreatic cancer (APC); Complications; Mental health

## Introduction

Pancreatic cancer (PC) is a digestive system malignant tumor with a high incidence in clinic.

With hidden early symptoms and rapid development, this disease can easily cause adverse effects



on surrounding organs and may have distant metastasis, resulting in poor prognosis (1, 2). In the process of tumor growth, tumor lesions may not only compress the biliary tract, thereby processing jaundice, but also destroy the surrounding tissues, thus causing pain in patients especially in the advanced stage, which poses a serious threat to their life safety (3, 4). Patients with advanced pancreatic cancer (APC) will experience negative emotions such as anxiety and depression due to long-term pain after surgery, thus affecting the mental health of patients (5).

Enhancing patient nursing can reduce postoperative complications in APC patients and improve their psychological state (6, 7).

We analyzed the effect of multidisciplinary team (MDT) collaborative nursing model combined with mind mapping teaching method on postoperative complications and mental health of APC patients, reported as below.

## Materials and Methods

### General information

The clinical data of 100 APC patients treated in Liaoning Cancer Hospital and Institute, Shenyang, China (Dec 2018 - Dec 2020) were retrospectively analyzed. They were randomly and equally split into group J and group Q.

### Inclusion criteria

1) The patients were diagnosed with PC after imaging and pathological examinations; 2) the expected survival time of the patients was more than 6 months; 3) the NRS (Numerical Rating Scale) scores of the patients were more than 3 points.

The study was approved by the hospital Ethics Committee, and the patients and their families knew the purpose and process of the study, and signed the informed consent.

### Exclusion criteria

1) The patients with non-cancerous pain; 2) the patients complicated with serious heart and cerebrovascular diseases; 3) the patients complicated

with other malignant tumors; 4) the patients with cognitive dysfunction; and 5) the patients with severe liver and renal insufficiency.

### Methods

The patients of group J were nursed with mind map teaching method. First, the teaching content about nursing of postoperative complications and mental health for APC patients should be determined, with the teaching time set to 4 weeks. In the first and the second weeks, professional teachers explained the common surgery types and the key nursing points for each type in the department. The common postoperative complications and nursing measures of APC patients were explained in detail in the third and fourth weeks. Before teaching, teachers should make mind maps in advance, mainly focusing on highlighting the precautions, types of complications and psychological problems that PC patients were prone to after surgery, as well as marking specific nursing methods beside the complications and problems (8). According to the idea of the teachers, the students drew mind maps independently. For example, the teachers set up key words of mind maps, such as “nursing of postoperative complications for PC patients” and “nursing of postoperative mental health for PC patients”, and then the students expanded them respectively. The first branches of complications could include pancreatic fistula, biliary fistula, gastroplegia and bleeding, while those of the psychological problems could cover anxiety, depression and mental stress. The students made mind maps by consulting relevant materials (9). After completion of the students, the teacher should evaluate their mind maps and learning, analyze and explain the existing problems, and then carry out nursing measures according to the developed mind maps. The patients in group Q were nursed with MDT collaborative nursing model combined with mind mapping teaching method, specifically as follows: 1) The MDT collaborative groups were divided into professional group and sub-professional group, with the head nurse as the general superintendent. The professional group consisted of three specialists in the pancreatic surgery (one

director, one attending physician and one resident physician) and three supervisor nurses. The sub-professional group consisted of one nutrition specialist nurse, one psychological specialist nurse, one pain specialist nurse and one intensive care specialist nurse. The relevant members must participate in the discussion of the MDT collaborative groups, and the head nurse regularly arranged training on clinical knowledge and carried out assessment. WeChat groups were created to facilitate timely communication and exchange.

2) Assignment of responsibility. The specialists in the pancreatic surgery were mainly responsible for the selection of cases and the assessment of diseases. The supervisor nurses were in charge of sorting out and collecting the basic information of patients, including physical situation, psychological status, complications, pain degree and nutritional status. Then specialists and the nurses above discussed the nursing problems and made nursing plans together.

3) The professional group members guided the nurses in the department to perform the nursing plans. If specialist nursing problems occurred during nursing, the relevant specialist nurses in the sub-professional group should provide help and participate in nursing. The professional group supervised the nursing work, and the primary nurses regularly provided feedback about the patient situation to the group. Then the group conveyed the dynamic information of patients to all MDT collaborative groups, and timely changed the nursing plans if patients had special circumstances.

4) The professional group timely observed the patients' condition, symptoms and complications, and provided them with self-care guidance and health education. The Nutrition specialist nurse provided diet guidance for the patients, while the pain specialist nurse observed their postoperative pain, nursed them according to their condition, and carried out preemptive analgesia when the condition permitted. Since the patients were prone to anxiety and depression after surgery, the psychological nurse gave them psychological counseling, understood their psychological changes, strengthened communication with them,

carefully listened to their thoughts and provided psychological support for them, as far as possible to meet their needs. For patients with serious condition, the intensive care specialist nurse intervened to guide the nursing work.

5) When the MDT collaborative groups held seminars to evaluate the nursing situation, the members participated in the discussion, and provided scientific and reasonable suggestions as the reference for improving the nursing work.

#### **Observation indexes and evaluation criteria**

1) The *Self-Rating Anxiety Scale (SAS)* and *Self-Rating Depression Scale (SDS)* were adopted for evaluating the anxiety and depression in both groups before and after nursing. Each scale consisted of 20 items, with each item scoring 1-4 points, and the total score of 80 points. A higher score represented more anxiety that is serious or depression.

2) The *Numerical Rating Scale (NRS)* was applied for scoring the pain degree in both groups, with 0-3 points as mild pain, 4-7 points as moderate pain, and 8-10 points as severe pain.

3) The *Short Form 36 Health Survey (SF-36)* was used for evaluating the quality of life (QOL) in both groups, and a higher score suggested better QOL.

4) The complications of both groups were recorded, including pancreatic fistula, biliary fistula, bleeding and gastroplegia.

5) The self-made nursing satisfaction questionnaire was to evaluate the nursing work as fully satisfied, satisfied and dissatisfied. Nursing satisfaction=fully satisfaction rate+ satisfaction rate.

#### **Statistical methods**

The data were processed by SPSS 20.0 (IBM Corp., Armonk, NY, USA) software, and graphed by GraphPad Prism 7 (GraphPad Software, San Diego, USA). Enumeration data were expressed as [n (%)] and tested by  $\chi^2$ , while measurement data were expressed as ( $\bar{x} \pm s$ ) and tested by *t* test. When  $P < 0.05$ , the differences were considered statistically significant.

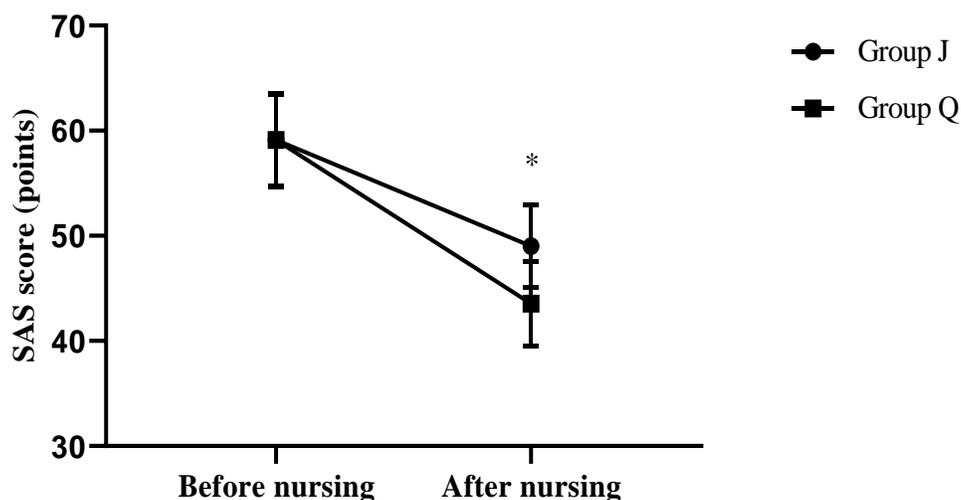
## Results

No notable differences in gender, age and differentiation degree were found between the two groups, with comparability (Table 1). Before

nursing, the SAS scores showed no notable difference between the two groups; after nursing, the scores decreased in both groups, with the obvious lower score in group Q ( $P < 0.05$ ) (Fig. 1).

**Table 1:** Comparison of clinical data

Items	Group J(n=50)	Group Q(n=50)	$\chi^2/t$	P
Gender			0.040	0.841
Male	26(52)	27(54)		
Female	24(48)	23(46)		
Average age(yr)	53.2±7.5	54.6±7.8	0.915	0.363
Differentiation degree				
High differentiation	17(34)	16(32)	0.045	0.832
Middle differentiation	18(36)	15(30)	0.407	0.523
Poor differentiation	15(30)	19(38)	0.713	0.398



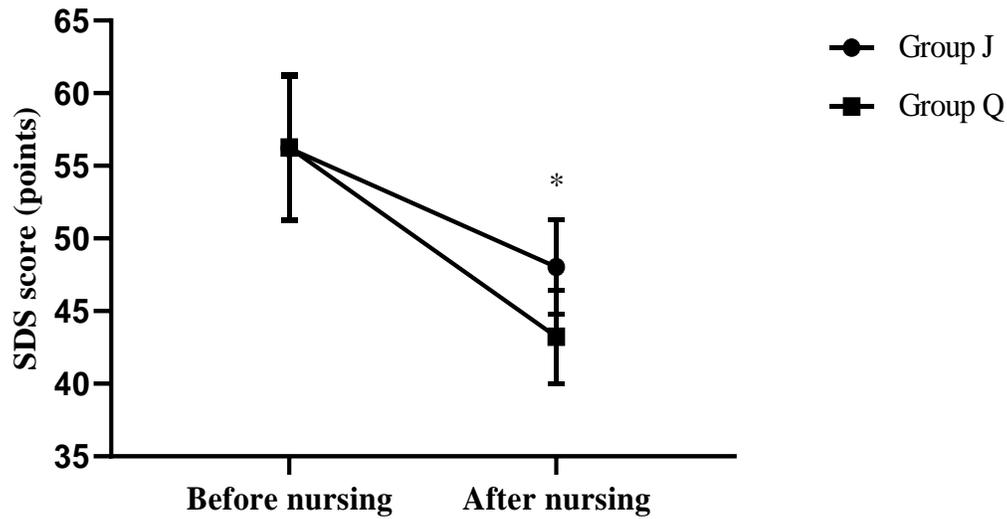
**Fig. 1:** Comparison of SAS scores before and after nursing ( $\bar{x} \pm s$ )

Note: The abscissa represented before and after nursing, and the ordinate represented the SAS score (points). The SAS scores before and after nursing in group J were (59.11±4.37) and (49.01±3.97) while those in group Q were (59.11±4.46) and (43.55±4.03).

\* indicated a notable difference in the SAS scores between group Q and group J after nursing ( $t=6.825, P < 0.05$ )

Before nursing, the SDS scores showed no notable difference between the two groups; after nursing, the scores decreased in both groups,

with the obvious lower score in group Q ( $P < 0.05$ ) (Fig. 2).



**Fig. 2:** Comparison of SDS scores before and after nursing ( $\bar{x} \pm s$ )

Note: The abscissa represented before and after nursing, and the ordinate represented the SDS score (points). The SDS scores before and after nursing in group J were (56.21±4.967) and (48.03±3.23) while those in group Q were (56.25±5.04) and (43.24±3.22).

\* indicated a notable difference in the SDS scores between group Q and group J after nursing ( $t=7.426, P<0.05$ )

Before nursing, the QOL scores showed no notable difference between the two groups; after nursing, the scores increased in both groups, with

the notably higher scores in group Q ( $P < 0.05$ ) (Table 2).

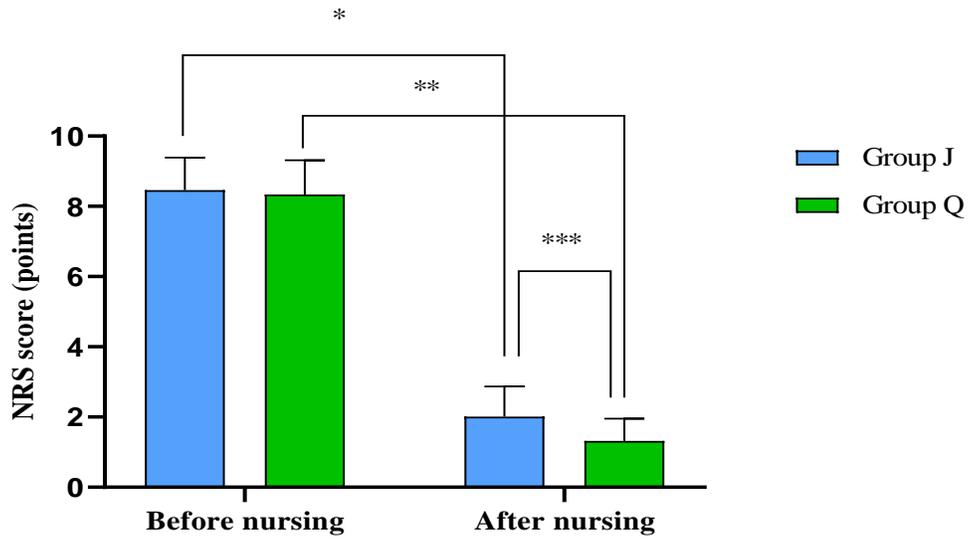
**Table 2:** Comparison of QOL scores before and after nursing ( $\bar{x} \pm s$ , points)

Dimensions	Group J(n=50)		Group Q(n=50)	
	Before nursing	After nursing	Before nursing	After nursing
Physiological function	63.32±5.45	75.54±3.81*	62.01±5.25	83.54±5.16*#
Physical pain	33.82±4.87	63.42±4.33*	36.92±7.88	69.08±6.55*#
Social function	42.62±5.72	71.22±5.96*	43.28±4.63	76.92±5.66*#
Emotional function	36.74±5.50	74.88±5.94*	35.02±6.37	84.26±5.87*#
Mental health	38.55±3.88	69.59±5.12*	36.94±5.94	77.21±5.15*#

Note: \*represented comparison with that before nursing in the same group ( $P<0.05$ ); # represented comparison between the two groups ( $P<0.05$ )

Before nursing, the NRS scores showed no notable difference between the two groups; after nursing, the scores decreased in both groups, with the notably lower score in group Q ( $P<0.05$ ) (Fig. 3). The incidence of complications in group

Q (8%) was notably lower than 24% in group J ( $P<0.05$ ) (Table 3). The nursing satisfaction in group Q (98%) was notably higher than 68% in group J ( $P<0.05$ ) (Table 4).



**Fig. 3:** Comparison of NRS scores before and after nursing ( $\bar{x} \pm s$ )

Note: The abscissa represented before and after nursing, and the ordinate represented the NRS score (points). The NRS scores before and after nursing in group J were  $(8.46 \pm 0.93)$  and  $(2.01 \pm 0.86)$ , while those in group Q were  $(8.34 \pm 0.97)$  and  $(1.32 \pm 0.63)$ .

\* indicated a notable difference in the NRS scores before and after nursing in group J ( $t=36.006, P<0.05$ );

\*\* indicated a notable difference in the NRS scores before and after nursing in group Q ( $t=42.917, P<0.05$ );

\*\*\* indicated a notable difference in the NRS scores between group Q and group J after nursing ( $t=4.577, P<0.05$ )

**Table 3:** Comparison of the incidence of complications [n(%)]

Group	N	Pancreatic fistula	Biliary fistula	Bleeding	Gastroplegia	Incidence of complications
Group J	50	5(10.00)	3(6.00)	2(4.00)	2(4.00)	12(24.00)
Group Q	50	2(4.00)	1(2.00)	1(2.00)	0(0.00)	4(8.00)
X <sup>2</sup>						4.762
P						0.029

**Table 4:** Comparison of nursing satisfaction [n(%)]

Group	N	Fully satisfied	Satisfied	Dissatisfied	Satisfaction
Group J	50	20(40.00)	14(28.00)	16(32.00)	34(68.00)
Group Q	50	26(52.00)	21(42.00)	3(6.00)	47(94.00)
X <sup>2</sup>					10.981
P					0.001

## Discussion

Pancreatic cancer (PC) is a digestive system malignant tumor, and most patients are already in advanced stage when diagnosed, and often miss

the best treatment time, resulting in a high mortality rate (10). Although surgery, radiotherapy and chemotherapy are mainly applied to treat PC patients and prolong their survival time by controlling the growth rate and diffusion range of

tumors, they also cause a high incidence of post-operative complications, leaving a serious impact on the rehabilitation and QOL of patients (11, 12). Due to long-term treatment, patients are prone to adverse emotions such as anxiety and depression, which affects their mental health. Therefore, it is very important to carry out post-operative nursing intervention for APC patients (13, 14).

The mind mapping teaching method can improve nursing quality and efficiency by clearly expressing nursing content and logic after drawing mind maps (15). It can also educate and guide nursing staff. Before carrying out nursing work, it is necessary to learn the mind mapping, conduct simulation research, evaluate the condition of patients, analyze the problems existing in mind mapping, continuously optimize and improve the mind maps, and then apply them to actual nursing work, thus improving the nursing quality (16,17). Making mind maps independently by nursing staff can enhance their awareness of nursing work, strengthen understanding, improve nursing ability, and achieve efficient and safe nursing (18,19). The MDT collaborative nursing model can integrate the nursing resources of various disciplines to complete the nursing work through the cooperation of various specialties, and provide targeted nursing for patients with postoperative complications to reduce their pain; After strengthening the communication with patients and understanding their psychological state, this model can provide psychological counseling for them to alleviate their adverse emotions; This model gives health education to patients for improving their awareness of the disease and self-care ability. It provides guidance on healthy diet for patients, corrects their unhealthy living habits, and accelerates their rehabilitation through comprehensive nursing (20-22).

In this study, after nursing, the SAS and SDS scores decreased in both groups, with the notably lower scores in group Q ( $P < 0.05$ ). The MDT collaborative nursing model combined with mind mapping teaching method can improve the adverse emotions such as anxiety and depression in APC patients, and help them actively cooperate

with the treatment and nursing work (23). After nursing, the QOL scores increased in both groups, with the notably higher QOL scores in group Q, while the NRS scores decreased in both groups, with the notably lower NRS score in group Q, consistent with the research results of Sussie Laustsen et al (24). This suggested that the MDT collaborative nursing model combined with mind mapping teaching method could reduce the postoperative pain and accelerate the rehabilitation of patients. The nursing satisfaction in group Q (98%) was notably higher than 68% in group J, while the incidence of complications in group Q (8%) was notably lower than 24% in group J. This is similar with the findings of another study (25) who pointed out that after the MDT collaborative nursing model combined with mind mapping teaching method was applied in the nursing of APC patients, the incidence of postoperative complications was 10%. So, the combination can effectively reduce the incidence of postoperative complications.

## Conclusion

The MDT collaborative nursing model combined with mind mapping teaching method in postoperative nursing of APC patients can improve negative emotions such as anxiety and depression, enhance the QOL, alleviate pain, reduce the incidence of postoperative complications and improve nursing satisfaction, worthy of application and promotion in clinic.

## Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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## Conflict of interest

The authors declare that there is no conflict of interest.

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