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Original Article

Effects of ERAS combined with holistic nursing in elderly patients with ovarian cancer

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Abstract: Objective: To observe the effect of enhanced recovery after surgery (ERAS) combined with holistic nursing on the nursing quality of elderly patients with ovarian cancer. Methods: A total of 94 elderly patients with ovarian cancer who were admitted to our hospital were randomly divided into two groups, with 47 cases in each group. The control group was given routine nursing, while the intervention group was given holistic nursing with ERAS (mainly including health education, rational fasting, early postoperative activities and other methods). The recovery of gastrointestinal function (first exhaust, defecation, time of getting out of bed and motilin level (MTL) before and after intervention), psychological state (SAS, SDS score), pain degree (VAS score), complications, nursing quality score, hospitalization time and nursing satisfaction were compared between the two groups. Results: After intervention, the MTL level of the two groups decreased, but the MTL level of the intervention group was higher than that of the control group ($P<0.05$). The first time of exhausting, defecating and getting out of bed in the intervention group was earlier than that of the control group, and the hospitalization time was shorter than that of the control group ($P<0.05$). After intervention, SAS and SDS scores of both groups decreased, and those of the intervention group was lower than those of the control group ($P<0.05$). At 6 h and 12 h after operation, VAS scores in the intervention group were lower than those in the control group ($P<0.05$). There was no significant difference in the incidence of complications between the intervention group and the control group ($P>0.05$). The scores of nursing quality and nursing satisfaction in the intervention group were higher than those in the control group ($P<0.05$). Conclusion: ERAS combined with holistic nursing intervention in elderly patients with ovarian cancer after operation can effectively promote the recovery of gastrointestinal function, relieve bad mood, relieve pain, improve nursing quality and encourage patients to recognize nursing service.

Keywords: Ovarian cancer, enhanced recovery after surgery, holistic nursing, mental state, gastrointestinal function, complications, degree of pain

Introduction

As the ovary is located in the pelvic cavity, it is small and hidden, and there is no typical symptom in the early stage of ovarian cancer, so it is often in the middle and late stages when it is diagnosed. This makes cancer treatment more difficult and as such ovarian cancer easily becomes the leading cause of mortality rates in females, and the recurrence rate after treatment is as high as 70% [1, 2]. At present, the main clinical treatment is surgery combined with chemotherapy and radiotherapy, and the effect is ideal. However, chemotherapy and radiotherapy have many side effects [3, 4]. As a result, there are many problems in patients' self-care and mental stress adjustment during perioperative period, which cause patients to be to become anxious and depressed, especially for some patients with large emotional fluctuations. These may produce strong stress reactions, thus affecting a smooth operation and reducing the prognosis [5].

Conventional nursing pays more attention to the progress of patients' illness, which is not widely involved in psychological and social dimensions and lacks overall nursing effects.

Table 1. Comparison of general data between the two groups ($\bar{x} \pm sd$)

Index	Control group (n=47)	Intervention group (n=47)	t/χ^2	P
Age (year)	69.8±6.1	70.7±8.7	0.501	0.618
Course of disease (month)	12.84±1.06	13.07±1.33	0.927	0.356
KPS score	74.34±9.22	75.68±8.78	0.722	0.472
FIGO stage (I stage/II stage)	29/18	32/15	0.420	0.517
Pathological differentiation (medium-poor differentiation/high differentiation)	34/13	36/11	0.224	0.636
Operation time (min)	219.35±51.24	217.27±52.68	0.194	0.847
Intraoperative blood loss (mL)	284.22±62.14	286.37±59.74	0.171	0.865
Tumor diameter (cm)	6.37±1.28	6.48±1.16	0.437	0.664
Number of lymph nodes (n)	21.42±2.36	21.57±2.48	0.300	0.765

Holistic nursing is patient-centered, and all-round nursing is carried out to promote the recovery of patients [6]. Enhanced recovery after surgery (ERAS) originated from European and American countries and was proposed by Danish surgeon Kehlet. In recent years, this model has made great progress in minimally invasive surgery, anesthesia and nursing technology. It has been recognized in vastly in the field of surgery [7]. ERAS optimizes the routine perioperative nursing measures based on evidence-based medicine, so as to accelerate the recovery of gastrointestinal function, reduce the incidence of complications and shorten the hospital stay [8]. At present, there are many clinical reports about holistic nursing and about ERAS in patients with ovarian cancer during perioperative period, but few reports about their combination. In view of this, in order to further enhance the surgical nursing quality of elderly patients with ovarian cancer and improve their prognosis, this study applied ERAS combined with holistic nursing to analyze its influence on the surgical nursing quality of elderly patients with ovarian cancer.

Materials and methods

General data

Altogether 94 elderly patients with ovarian cancer who were treated in West China Second University Hospital, Sichuan University/West China School of Nursing from December 2019 to July 2020 were randomly divided into two groups, with 47 cases in each group. There was no obvious difference in the general data between the two groups (P>0.05) and the results are comparable (**Table 1**). This research has been approved by the Medical Ethics Committee of West China Second University Hospital, Sichuan University/West China School of Nursing.

Inclusion and exclusion criteria

Inclusion criteria: The diagnosis was in line with the guidelines for diagnosis and treatment of ovarian malignant tumors (fourth edition) [9]; patients were diagnosed by operation and pathology; all patients were treated by laparoscopic surgery; routine blood levels, renal function, electrocardiogram and other indicators met the surgical standards; patients or their families have signed the informed consent; the estimated life span was more than 3 months; patients had surgical indications.

Exclusion criteria: Patients complicated with multiple tumors, abnormal immune systems, abnormal coagulation function, or mental cognitive abnormality; there were multiple metastases in the lesion; patients with contraindications to operation; patients with stage IV cancer.

Methods

Control group: The control group was given routine nursing. The nursing staff gave health education when the patients were admitted to hospital; informed the patients of their disease progress and the necessity of surgical treatment; informed them of precautions during the operation and treatment to make the patients actively cooperate with the treatment; explained the risk factors of ovarian cancer to the patients; taught patients to correctly prevent complications, keep an optimistic attitude towards treatment and be aware of psychologi-

cal factors, the main factors to promote the prognosis of the disease; instructed patients to fast 12 hours before operation and prohibit drinking water 4 hours before operation; and disinfected with disinfectant at normal temperature without adjusting the temperature and humidity of the operating room and without using the thermostatic blanket. After the operation, food and water were forbidden, and then liquid food was given after intestinal exhaust; a postoperative analgesia pump was given to relieve pain; 3-4 days after the operation, patients could get out of bed. In general, 24 hours after operation, the urinary catheter was removed according to the doctor's advice. Supervision and inspection were actively performed.

Intervention group

The intervention group had implementation of holistic nursing under ERAS [10]. (1) Health education was carried out one day before the operation, so that the patients could learn about the treatment plan during hospitalization, understand the problems they need to face, and have psychological adaptability in advance. The nursing content and function of ERAS were introduced, the patient's physiological and psychological bearing capacity were observed in conversation to appease patients in real time, encourage patients to look at the disease optimistically, overcome the disease as soon as possible, build up the confidence of successful treatment, draw closer the relationship with patients, and gain the trust and cooperation of patients. The environment of the operating room was introduced to patients, and the advanced medical equipment of the hospital and the superb operation skills of the surgeons were informed to patients, so the patients can reduce any strangeness they feel about the environment. (2) Patients were given 500 mL of 10% glucose solution orally before 8:00 p.m. on the first day before operation, and 250 mL of 10% glucose solution orally before 6:00 a.m. on the day of operation. They were in a fasted state for 6 hours before operation and were forbidden from water 3 hours before the operation. (3) The temperature of the operating room was adjusted to 22°C-25°C and the humidity to 50%-60% 30 min before operation. A 38°C thermostat blanket was laid on the operating bed, and an adjustable temperature insulation blanket was placed on the external position of the operation. The disinfectant was heated to 40°C to disinfect the skin, and the washing fluid was placed in the incubator in advance and heated to 37°C. (4) A little water was allowed after 2 hours after operation, and the liquid food and removing of catheter were allowed after 6 hours. Antibiotics were stopped after 24 hours. The heart rate, blood pressure and other vital signs were closely observed. Whether there were adverse reactions, such as nausea and vomiting, was observed. The amount of rehydration was controlled at 2000 mL, and surgical incision nursing was performed to prevent infection. After waking up after anesthesia for 6 hours, the patient was assisted to turn left and right and move the limbs passively and actively. One day after operation, the patient was assisted to get out of bed for simple activities, such as standing and moving slowly. After operation, the patient could walk in the ward or corridor accompanied by nursing staff or family members. (5) The patient's condition after operation was closely observed. The degree of pain was evaluated to notify the attending physician in time. Physical methods, such as hot compress and massage for relieving pain, were given according to the specific situation of patients. In addition, patients could be diverted from thinking about their pain by talking with nursing staff, listening to music and watching TV.

Outcome measures

Main outcome measures: (1) Recovery of gastrointestinal function: the time of first exhaust, defecation and getting out of bed after operation was recorded; at the same time, 4 mL of fasting venous blood was collected before and after intervention (48 h after operation), centrifuged to take serum, and gc-2010 radioimmunoassay provided by Zhongke Zhongjia Scientific Instrument Co., Ltd., Anhui, China was applied to detect motilin (MTL) by radioimmunoassay, and the kit was provided by Wuhan Easy Diagnosis Biomedicine Co., Ltd., China.

(2) Nursing quality: When the patient was discharged from hospital, the nursing quality of nursing staff was evaluated according to the assessment standard of our hospital, including disinfection and isolation, environmental man-

Table 2. Recovery of gastrointestinal function and hospitalization time ($\bar{x}$ ± sd)

Groups	First exhaust time (h)	Defecation time (h)	Get out of bed time (h)	hospitalization time (d)
Control group (n=47)	22.65±2.21	25.63±2.41	56.68±6.24	13.21±2.11
Intervention group (n=47)	17.56±1.60	20.84±2.17	45.21±5.54	8.64±1.68
t	12.790	10.126	9.424	11.616
P	<0.001	<0.001	<0.001	<0.001

agement, nursing safety, and nursing staff training. The score range was 0-100 points, with 90 points and above being excellent, 80-89 being good, 60-79 being poor, and 60 or below being extremely poor.

Secondary outcome measures: (1) Psychological state before and after intervention (before discharge): The patients were assessed by self-rating anxiety scale (SAS) and self-rating depression scale (SDS), with SAS score below 50 being anxiety, SDS score below 50 being no depression. A high score indicates a high degree of anxiety and depression [11].

(2) Pain degree at 6 hours and 12 hours after operation: visual analogue scale (VAS) was applied, with 0 score as no pain; 1-3 points as mild pain, daily life and work were slightly affected, patients could tolerate the pain, and sleep was basically unaffected; 4-6 points as severe pain, part of daily life and work were affected, and sleep was affected; 7-10 points as unbearable, and daily life and work were seriously affected, patients had trouble sleeping [12].

(3) Complications: the occurrence of postoperative complications was recorded, such as intestinal obstruction, severe pain in the lower abdomen, deep vein thrombosis, and infection.

(4) Nursing satisfaction: When the patient was discharged from hospital, a questionnaire made by our hospital was used, including nursing attitude, nursing skills, communication skills and health education. The questionnaire had five degrees: very satisfied, satisfied, fair, dissatisfied and very dissatisfied. The total score was 100 points, 90 points and above being very satisfied, 80-89 points being satisfied, 70-79 points being fair, 60-69 points being dissatisfied, and below 60 points being very dissatisfied. Satisfaction = (very satisfied + satisfied)/n * 100%.

(5) Hospital stay was recorded.

Statistical method

SPSS 22.0 was used, and the measurement data were represented by mean ± standard deviation ($\bar{x}$ ± sd). The comparison between groups and intra-group comparison before and after treatment were performed by independent sample t and paired sample t, respectively. The counting data were expressed by percentage, the χ^2 test was used, and the rank sum test was used for grade data. P<0.05 was statistically significant.

Results

General data

There was no significant difference in general data such as age, course of disease, anemia, KPS score and FIGO stage between the two groups (P>0.05). It could be seen that the two groups were comparable. See **Table 1**.

Recovery of gastrointestinal function and hospitalization time

The first time of exhaust, defecating and getting out of bed in intervention group were earlier than that in control group, and the hospitalization time was shorter than that in control group (P<0.001). Before intervention, there was no significant difference in MTL levels between the two groups (P>0.05). After intervention, MTL levels in both groups decreased, but MTL levels in intervention group were higher than those in control group (P<0.05). Therefore, ERAS combined with holistic nursing can effectively promote the recovery of gastrointestinal function and shorten the hospitalization time of elderly patients with ovarian cancer. See **Tables 2**, **3**; **Figures 1** and **2**.

Table 3. Comparison of MTL levels between the two groups ($\bar{x}$ ± sd, ng/L)

Groups	Before intervention	After intervention	t	P
Control group (n=47)	235.34±37.62	178.74±32.42	7.813	<0.001
Intervention group (n=47)	234.46±37.39	215.03±45.91	2.250	0.027
t	0.114	4.427		
P	0.909	<0.001		

Note: MTL: motilin.

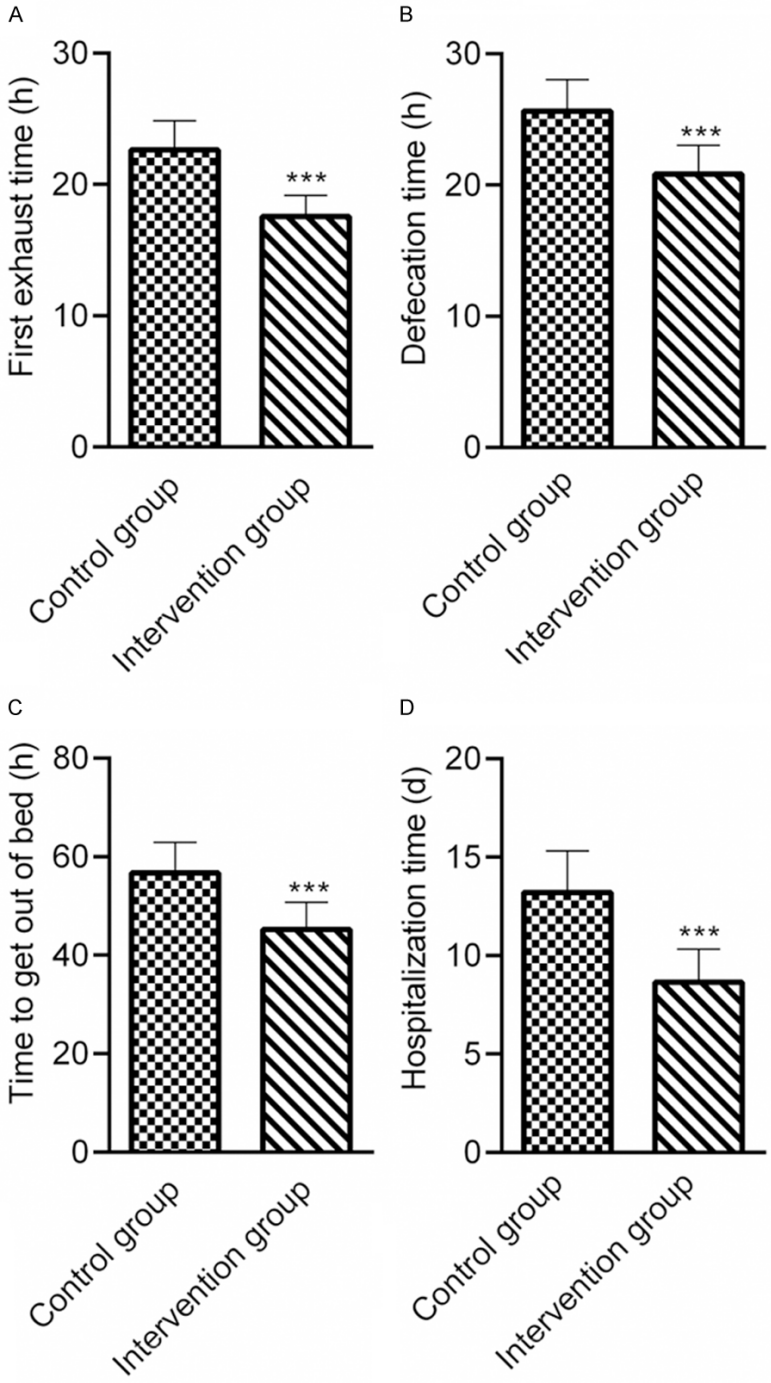

Figure 1. Recovery of gastrointestinal function and hospitalization time. A. The time of first exhaust; B. The time of defecation; C. The time of getting out of bed; D. The time of hospitalization. Compared with control group, ***P<0.001.

Mental state

Before intervention, there was no significant difference in SAS and SDS scores between the two groups (P>0.05). After intervention, SAS and SDS scores of the two groups decreased, and those of the intervention group were lower than those of the control group (P< 0.001). It could be seen that ERAS combined with holistic nursing can significantly improve the psychological state of elderly patients with ovarian cancer. See **Table 4** and **Figure 3**.

VAS score

Six hours and 12 hours after operation, VAS scores of intervention group were lower than those of control group (P<0.05). ERAS combined with holistic nursing could significantly relieve the pain of elderly patients with ovarian cancer. See **Table 5**.

Complications

The incidence of complications in the intervention group was slightly lower than that in the control group, but the difference was not statistically significant (P>0.05). It could be seen that ERAS combined with holistic nursing had little effect on the incidence of complications in elderly patients with ovarian cancer. See **Table 6**.

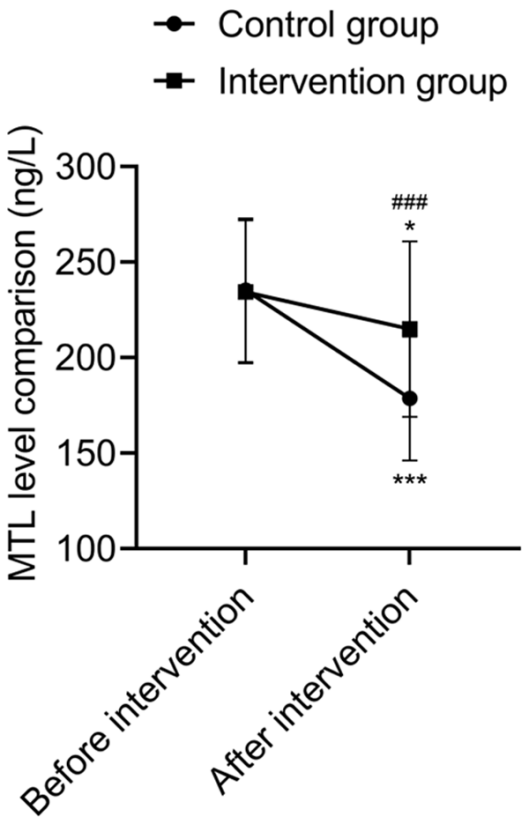

Figure 2. Comparison of MTL levels between the two groups. Compared with before intervention, *P<0.05, ***P<0.001; compared with control group, ###P<0.001. MTL: motilin.

Nursing quality

The scores of nursing quality in the nursing quality intervention group were higher than those in control group (P<0.001), indicating that ERAS combined with holistic nursing could significantly improve the nursing quality of nursing staff. See **Table 7** and **Figure 4**.

Nursing satisfaction

The nursing satisfaction of the intervention group was higher than that of the control group (P<0.05). It revealed that ERAS combined with holistic nursing could significantly improve nursing satisfaction of elderly patients with ovarian cancer. See **Table 8**.

Discussion

The cure rate of ovarian cancer is very low, especially for patients in advanced stages. It can only be temporarily relieved by surgery combined with radiotherapy and chemotherapy. Patients will suffer great pain in the course of treatment, so they are not only suffering from diseases, but also suffering from psychological distress [13]. This makes patients reject surgery subjectively and produces various stress sources [14]. Conventional nursing work pays insufficient attention to this aspect and lacks integrity [15]. In this study, scientific education and humanistic care were combined, and ERAS mode was adopted to optimize operating room allocation resources and integrate intervention measures during the perioperative period, so as to reduce the surgical stress response and accelerate postoperative rehabilitation [16]. A series of procedures such as preoperative visits, nutritional support, intraoperative heat preservation, scientific analgesia, and early activities were performed to improve nursing details and optimize and integrate routine nursing, so as to improve nursing quality and prognosis.

The results showed that after the intervention, the psychological state of the intervention group was better, the postoperative pain was lighter, the incidence of complications was lower, and the hospitalization time was shorter, indicating that ERAS combined with holistic nursing was more conducive to enhancing the psychological resistance of patients, relieving the pain of surgery, and reducing the incidence of complications and hospital stay. Lindemann et al. pointed out that ERAS intervention can effectively reduce the overreaction of ovarian cancer patients to surgical pressure, improve the nutritional status of the body and promote the recovery of gastrointestinal function [17]. Fan et al. pointed out that ERAS can accelerate the postoperative recovery, reduce the incidence of complications and shorten the hospital stay, which is consistent with the results of this study [18].

ERAS combined with holistic nursing has the following advantages: (1) Patients were visited before surgery to inform them of the treatment plan during hospitalization, so that they can have a concrete understanding of perioperative work and have sufficient psychological preparation, which helps the patient feel comfortable, and help patients have psychological adaptation to special and complex environments in advance. Conventional health educa-

Table 4. Comparison of the mental state of the two groups ($\bar{x}$ ± sd, score)

Groups	SAS		SDS	
	Before intervention	After intervention	Before intervention	After intervention
Control group (n=47)	51.24±3.59	46.45±3.61***	52.71±3.36	46.41±2.73***
Intervention group (n=47)	51.69±3.86	41.61±4.05***	52.93±3.42	42.08±2.63***
t	0.585	4.424	0.315	7.831
P	0.560	<0.001	0.754	<0.001

Note: Compared with before intervention, ***P<0.001. SAS: self-rating anxiety scale; SDS: self-rating depression scale.

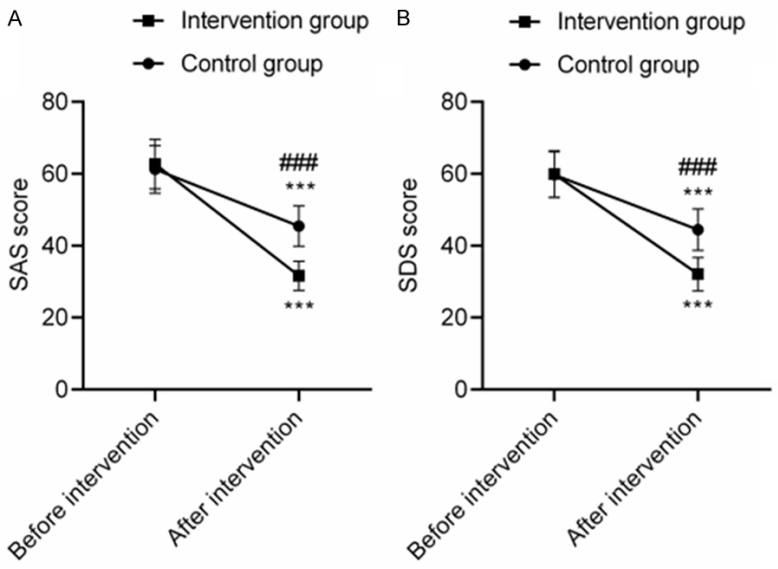

Figure 3. Comparison of the mental state of the two groups. A: SAS score comparison; B: SDS score comparison. Compared with before intervention, ***P<0.001; compared with control group, ###P<0.001. SAS: self-rating anxiety scale; SDS: self-rating depression scale.

Table 5. Comparison of VAS scores between the two groups ($\bar{x}$ ± sd, score)

Groups	6 h after operation	12 h after operation	t	P
Control group (n=47)	4.62±1.48	3.15±0.85	5.925	<0.001
Intervention group (n=47)	3.82±1.59	2.01±0.42	7.545	<0.001
t	2.525	8.243		
P	0.013	<0.001		

Note: VAS: visual analogue scale.

tion pays little attention to psychological intervention of patients, and focuses on matters needing attention in disease biological factors. ERAS encourages patients and introduces hospital medical background to patients, which can enhance their confidence in treatment. (2) Reasonable fasting and prohibition of drinking before operation were performed to prevent aspiration, but the routine fasting time is 12 hours before operation, which has exceeded the physiological diet time of human body. If patients are not given nutrition for a long time, it will lead to the decline of various functions of the body. Therefore, oral glucose support by ERAS at 1 day before operation and 6 o'clock in the morning on the day of operation can ensure patients receive surgery with the best physique, which is also necessary for smooth operation and promoting patients' rehabilitation. In addition, oral glucose at these time points is stable and will not increase regurgitation aspiration. (3) Normal body temperature plays an important role in the functional operation and normal metabolism of the human system. When the patient suffers from hypothermia during operation, the immune function of the body will be weakened, which will inhibit collagen fiber synthesis and protein consumption, and make the tissue lack oxygen supply, thus increasing the risk of surgical infection [19-21]. In addition, the body surface temperature is mainly maintained by the heat supply brought by blood circulation. Intraoperative low temperature will also affect the decrease of platelet count in patients, activate fibrinolytic systems, reduce the activity of coagulation substances, and

Table 6. Comparison of complications between the two groups n (%)

Groups	Intestinal obstruction	Abdominal pain	Infection	Deep vein thrombosis	Total incidence
Control group (n=47)	1 (2.13)	2 (4.26)	1 (2.13)	1 (2.13)	5 (10.64)
Intervention group (n=47)	1 (2.13)	1 (2.13)	0 (0.00)	0 (0.00)	2 (4.26)
χ^2	0.000	0.344	2.043	2.043	1.389
P	1.000	0.557	0.153	0.153	0.239

Table 7. Comparison of nursing quality between two groups of nursing staff ($\bar{x} \pm$ sd, score)

Groups	Disinfection and isolation	Environmental management	Nursing safety	Nursing staff training
Control group (n=47)	86.68±4.78	83.42±4.12	88.84±4.93	74.76±4.03
Intervention group (n=47)	92.34±5.02	90.45±4.88	94.53±5.41	92.47±5.09
t	5.598	7.546	5.330	18.701
P	<0.001	<0.001	<0.001	<0.001

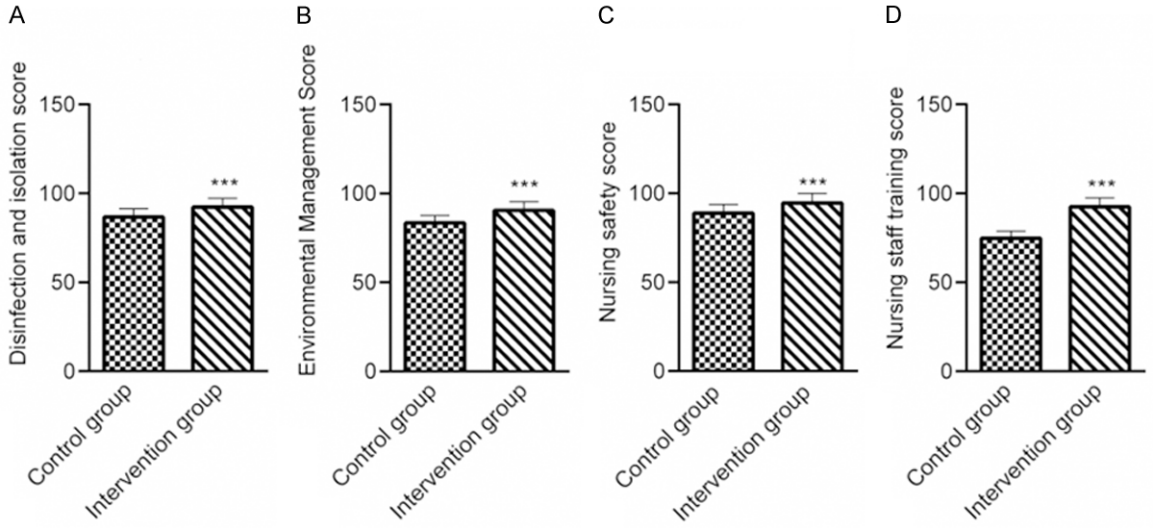

Figure 4. Comparison of nursing quality between two groups of nursing staff. A. Disinfection and isolation; B. Environmental management; C. Nursing safety; D. Nursing staff training. Compared with control group, ***P<0.001.

Table 8. Comparison of nursing satisfaction between the two groups n (%)

Groups	Very satisfied	satisfaction	general	Not satisfied	Very dissatisfied	Total satisfaction
Control group (n=47)	20 (42.55)	17 (36.17)	7 (14.89)	2 (4.26)	1 (2.13)	37 (78.72)
Intervention group (n=47)	32(68.09)	12 (25.53)	2 (4.26)	1 (2.13)	0 (0.00)	44 (93.62)
Z/χ^2			Z=7.742			χ^2=4.374
P			0.101			0.037

increase blood viscosity and slow bleeding, resulting in deep vein thrombosis [22]. By adjusting the operating room temperature, providing a constant temperature blanket, and preheating the washing fluid, the adverse conditions caused by low temperature can be effectively avoided. (4) Long-term stay in bed without muscle exercise after operation will reduce immunity and slow down blood circulation, leading to abnormal blood coagulation in

blood vessels and deep vein thrombosis [23]. Appropriate early activities can effectively enhance the body's immunity, promote blood circulation, prevent thrombosis and bedsore, and contribute to early recovery after surgery. However, postoperative analgesics, physical analgesia and distraction can effectively relieve pain and provide favorable conditions for patients' early activities.

Clinically, the recovery of gastrointestinal function is beneficial to the postoperative recovery of patients with ovarian cancer [24]. As a common digestive tract hormone, MTL can stimulate pepsin secretion, stimulate physiological myoelectric activity and mechanical movement of upper digestive tract, increase gastric mucosal blood flow, accelerate gastrointestinal peristalsis and promote gastrointestinal function recovery. The results of this study showed that after intervention, the MTL level of the two groups decreased, but the MTL level of the intervention group was higher than that of the control group. The first time of exhaust, defecating and getting out of bed in the intervention group was earlier than that in the control group, and the hospitalization time was shorter than that in the control group. In the research of Li , ERAS in the perioperative nursing of laparoscopic ovarian tumor resection can obviously shorten the time of getting out of bed, the time of anal exhaust and the time of first defecation, which is basically consistent with the results of this study [25]. This shows that ERAS combined with holistic nursing intervention in elderly patients with ovarian cancer surgery can effectively promote the recovery of gastrointestinal function after surgery, and the reason may be that proper early exercise can promote the effect of physical friction between the intestines and stomach. In addition, turning left and right can promote gastrointestinal peristalsis, and accelerate exhaust and defecation. In addition, we investigated the nursing quality of nursing staff and patients' nursing satisfaction, and found that the nursing quality of the intervention group was significantly higher than that of the control group, and the patients' satisfaction with nursing was also higher. It revealed that ERAS combined with holistic nursing not only helps patients improve their prognosis, but also has good benefits in improving the service quality of nursing staff and establishing a good doctor-patient relationship, which also provides a scientific basis for the long-term management mechanism of the hospital.

However, it is worth noting that this study is limited to a small sample size, so the research results cannot fully explain the definition and effectiveness of this nursing model. In addition, this study did not follow up the elderly patients with ovarian cancer surgery, and did not evaluate the effect of ERAS combined with holistic nursing intervention in elderly patients with ovarian cancer surgery. Therefore, in the future, the scale of clinical research will be expanded and the observation time will be extended, and the effect of ERAS combined with holistic nursing intervention on elderly patients with ovarian cancer undergoing surgery will be discussed more in depth.

To sum up, ERAS combined with holistic nursing intervention on elderly patients with ovarian cancer after operation can effectively promote the recovery of gastrointestinal function, relieve bad mood, relieve pain, reduce the incidence of complications, improve the quality of nursing, and encourage patients to recognize nursing services.

Disclosure of conflict of interest

None.

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