

## Review Article

# Effect of comprehensive nursing on VAS score and quality of life of patients undergoing elective cholecystectomy

Xinlin Li<sup>1</sup>, Jianping Sun<sup>2</sup>, Xiaoyun Liu<sup>3</sup>

<sup>1</sup>Department of Anesthesiology, The First Affiliated Hospital of Xinjiang Medical University, Urumqi 830054, China; <sup>2</sup>Binzhou Youfu Hospital, Binzhou 256600, Shandong, China; <sup>3</sup>Department of Acupuncture and Massage, Wendeng Osteopathic Hospital, Weihai 264400, Shandong, China

Received March 5, 2020; Accepted May 4, 2020; Epub June 15, 2020; Published June 30, 2020

**Abstract:** Objective: To explore the application value of comprehensive nursing intervention in patients undergoing elective cholecystectomy. Methods: A total of 135 patients undergoing elective cholecystectomy in our hospital were selected as the regular group and 150 patients with comprehensive nursing as the comprehensive group. The visual analogue scale (VAS) and quality of life of the two groups were observed. Results: There was no significant difference between the two groups in the scores of adverse negative emotions upon admission ( $P > 0.05$ ); although the negative emotions were improved after the intervention of different nursing modes, and the effect was more clear in the comprehensive group ( $P < 0.05$ ). After surgery, the VAS scores of the two groups gradually decreased with the extension of recovery time after treatment ( $P < 0.05$ ); while there was no significant difference in the VAS scores of the two groups on the 1st and 2nd day after treatment, the VAS scores of the comprehensive group were lower than those of the regular group on the 3rd and 4th day after operation ( $P < 0.05$ ). Moreover, normal activity time, exhaust time and hospitalization time of patients in the comprehensive group were lower than those in the regular group ( $P < 0.05$ ). The total incidence of postoperative complications in the comprehensive group was lower than that in the regular group ( $P < 0.05$ ). Follow-up for one month found that the quality of life score of the comprehensive group was higher than that of the regular group, and the survey found that the comprehensive group had higher satisfaction in nursing care. Conclusion: Comprehensive nursing can significantly improve the postoperative pain and quality of life of patients undergoing elective cholecystectomy.

**Keywords:** Comprehensive nursing, gallstone surgery, VAS score, quality of life

## Introduction

Gallstones are one of the most common gastrointestinal issues. In recent years the incidence rate of gallstones has been relatively high. This is mainly due to the precipitation and condensation of certain components in the bile to form gallstones in the gallbladder. Suffering from this disease will lead to long-term stimulation of the gallbladder mucosa, causing chronic inflammation, secondary infections and even gallbladder cancer [1, 2]. According to relevant statistics, the incidence of gallstones among adults in some developed countries is about 20%, and the annual growth rate is about 0.60-1.39% [3, 4]. The incidence rate of gallstones also showed an increase with age, and the incidence rate of females was higher than that of

males [5]. At present, surgical treatment is the first choice for gallstones. However, due to the patients' lack of knowledge of diseases and operations, as well as the fact that operations are stressors, and due to postoperative pain and other factors, the patients may suffer from anxiety and depression, resulting in a decrease in their quality of life [6, 7].

With the change of medical technology and the overall improvement of people's quality of life, the application of nursing mode plays an increasingly important role in clinical treatment [8]. At present, many studies have shown that nursing intervention can alleviate the negative emotions of patients and improve their quality of life [9]. However, the conventional nursing intervention method can no longer meet the

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy

growing needs of patients, so it is necessary to find a method more in line with people's ideas [10]. A comprehensive nursing intervention mode has a comprehensive form, it takes the nursing procedure as the core, and combines various nursing measures such as nursing concepts, nursing planning, nursing quality evaluation; it also has advanced concepts, and can carry out nursing intervention one on one according to the patient's specific conditions, as well as combining high-quality nursing interventions with effective treatment methods, and thus it can meet the patient's expected treatment target to the greatest extent [11, 12]. Previous studies have shown that comprehensive nursing has a better effect for patients with liver cancer and cirrhosis, which can significantly improve the quality of life of patients and reduce the incidence of postoperative complications [13]. However, few studies have been done on the application of selective gallbladder stone surgery.

This study mainly explored the application value of the nursing mode by observing the influence of comprehensive nursing on negative emotions, postoperative pain and quality of life of patients undergoing elective cholecystectomy.

### Method

#### *General data*

Gallstone patients undergoing elective surgery in our hospital were collected and different nursing intervention modes were applied during hospitalization. A total of 135 patients with conventional nursing mode were taken as the conventional group, including 59 males and 76 females, with an average age of  $(45.11 \pm 3.34)$  years and an average course of disease of  $(3.31 \pm 1.16)$  years. Another 150 patients with comprehensive nursing mode were taken as the comprehensive group, including 68 males and 82 females, with an average age of  $(45.28 \pm 3.56)$  years and an average course of disease of  $(3.27 \pm 1.03)$  years.

Inclusion criteria: All patients were diagnosed with gallstones through clinical diagnosis, and all patients met the surgical indications; patients were accompanied by family members on admission; patients could actively participate in the progress of nursing work; patients could be followed up; patients had no history of mental illness.

Exclusion criteria: patients combined with malignant tumors, immune system and other diseases; patients with severe liver and renal insufficiency; patients with incomplete clinical data; patients that have received surgical treatment.

This study was approved by the Ethics Committee of our hospital and gave a detailed description of the subjects' experimental contents. The subjects agreed and signed an informed consent form.

#### *Nursing methods*

Regular group: patients were assisted by general regular nursing (including drug taking, diet guidance, etc.), and were closely paid attention to for their changes of vital signs. Comprehensive group: 1) Pre-operation nursing: we established files to help the patients complete the corresponding routine preoperative examination, and completed the related knowledge information, so that the patients could fully understand the disease, as well as matters needing attention in the operation. Then we paid close attention to the changes of the patient's physical signs, formulated scientific and reasonable nutrition plans according to the patient's conditions and dietary habits. We encouraged the patients to eat more foods that are easy to digest, containing high quality protein, high energy and low fat foods, instructed the patients to avoid eating soy-bean milk and other foods that produce gas, and guided the patients to fast 8 hours before surgery. 2) Post-operation care: we paid attention to the patient's pain intervention after operation, and selected targeted intervention measures for the patient. For patients with mild or moderate pain, the method of diverting their attention could be selected, otherwise in more serious pain cases painkillers and other methods were used to relieve pain. After the anesthesia wore off, we guided the patient to take slow deep breaths and cough up phlegm effectively, helped the patient to turn over and nurse the wound regularly, changed dressing every day to ensure the incision is clean, urged the patient not to get out of bed prematurely to avoid intestinal adhesion, and paid close attention to the changes of the patient's consciousness and vital signs. We urged the patient to eat a small amount of liquid food within 24 hours after surgery, and then gradually change to

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy

semi-liquid food according to the specific situation of the patient, strengthen nutrition intake and avoid eating food that easily produces gas. 3) Complication nursing: combining with clinical experience, we found the complications that may occur for each patient after stone removal surgery, and then formulated reasonable and effective prevention and treatment measures on this basis. We mastered the prevention and treatment measures of complications skillfully, observed the changes of various physical signs of the patient, took emergency measures immediately in case of abnormal symptoms, and reported to doctors in real time to ensure the patient gets timely and reasonable treatment. 4) Ward environment: we helped patients to improve the hospitalization environment, strengthen the intervention of ward health conditions, kept the ward clean and tidy at all times, controlled the humidity and temperature in the ward, maintained ventilation, paid attention to the change of temperature difference between day and night, controlled ward noise as much as possible, gave importance to protecting the privacy of patients, created personal privacy space for patients in need, improved the patient's confidence in healing, actively communicated with patients, and eliminated their worries and fears. 5) Psychological intervention: we evaluated the psychological state according to the patient's personality characteristics, educational background, emotional changes and other aspects, established psychological construction. We paid close attention to the emotional changes of the patients at all times, carried out targeted psychological counseling, patiently relieved their bad emotions, and shared the good results of the surgery, so that the patients would have a positive and upward mentality to face the surgery. When necessary, psychological doctors can intervene for counseling. A good nurse-patient relationship was established, so that patients can fully trust the staff, thus promoting the improvement of patient compliance. After the operation, the family members actively guided the patients' ill emotions, to stabilize the patients' emotions and enhance their treatment confidence and rehabilitation beliefs.

### *Observation indicators*

1) Self-rating Anxiety Scale (SAS) and Self-rating Depression Scale (SDS) scores [14] were

used to evaluate the negative emotions of the two groups of patients on admission and pre-operation. 2) Visual analogue scale (VAS) [15] was used to record the pain of the two groups at each time period (on the 1st, 2nd, 3rd and 4th day after operation). 3) The patient's recovery during hospitalization (including normal activity time, postoperative exhaust time, hospitalization time) and complications were recorded. 4) Gastrointestinal Quality of Life Index (GIQLI) scale [16] was used to evaluate the patients' quality of life one month after discharge, including gastrointestinal symptoms (total score 0-76), physical condition (total score 0-28), emotional status (total score 0-20) and social function state (total score 0-20). A high score was closely related to the better quality of life. 5) The satisfaction degree of nursing work of the two groups of patients was determined by a questionnaire, which was divided into very satisfied, satisfied and dissatisfied according to the results. Nursing satisfaction % = Very satisfied % + Satisfied %.

### *Statistical methods*

SPSS 20.0 (IBM Corp, Armonk, NY, USA) was used for statistical analysis. The counting data was expressed by [n (%)], and chi-square test was used for inter-group comparison. The measurement data was expressed by mean  $\pm$  standard deviation ( $\bar{x} \pm sd$ ). The comparison between the two groups was conducted by t test. The comparison between the two groups before and after intervention was conducted by repeated measurement analysis of variance and LSD-t test was used for post-event analysis. The difference was statistically significant at  $P < 0.05$ .

## **Results**

### *Comparison of general data*

By collecting and comparing the general clinical data of the two groups, as shown in **Table 1**, we found that there was no significant difference between the comprehensive group and the regular group in gender, age, body mass index (BMI), course of disease, smoking and drinking, residence and other aspects ( $P > 0.05$ ).

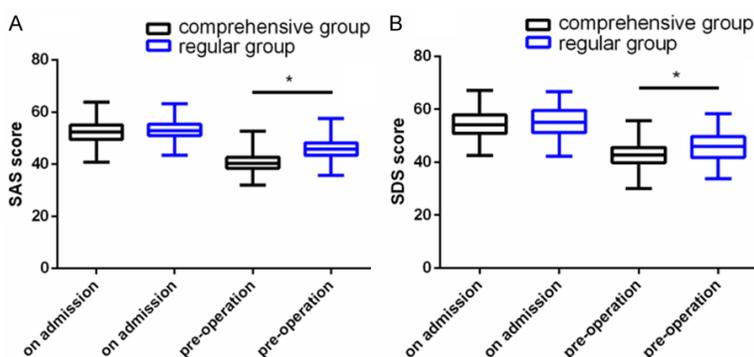
### *Comparison of SAS and SDS scores between the two groups*

After counting the adverse emotions of the two groups of patients on admission and pre-oper-

# Effect of comprehensive nursing on patients undergoing elective cholecystectomy

**Table 1.** Comparison of clinical data between the two groups (x±SD)/n [%]

	Comprehensive group (n=150)	Regular group (n=135)	X <sup>2</sup> /t	P
Gender			0.076	0.782
Female	82 (54.67)	76 (56.30)		
Male	68 (45.33)	59 (43.70)		
Average age (years)	45.28±3.56	45.11±3.34	0.414	0.679
BMI (kg/m <sup>2</sup> )	22.76±3.60	22.69±3.78	0.160	0.873
Average course of disease (years)	3.27±1.03	3.31±1.16	0.308	0.758
Smoking history			0.011	0.915
Yes	48 (32.00)	44 (32.59)		
No	102 (68.00)	91 (67.41)		
Drinking history			0.226	0.634
Yes	68 (45.33)	65 (48.15)		
No	82 (54.67)	70 (51.85)		
Residence			0.845	0.358
Urban	91 (60.67)	89 (65.93)		
Rural	59 (39.33)	46 (34.07)		

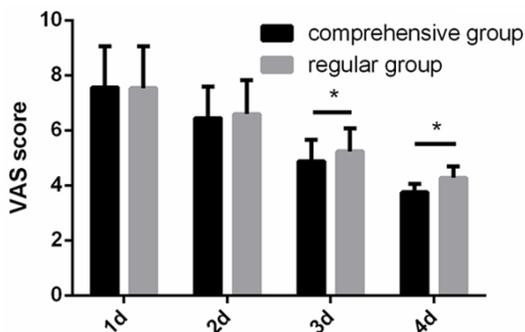


**Figure 1.** Comparison of SAS and SDS scores between the two groups. A. Comparison of SAS scores on admission and pre-operation between the two groups; B. Comparison of SDS scores on admission and pre-operation between the two groups. Note: \* indicates that there is a significant difference between the two groups, P<0.05.

the regular group (P<0.05). Note: \* indicates that there is a significant difference between the two groups, P<0.05.

ation, it was found that as shown in **Figure 1**, there was no significant difference in the scores of adverse emotions between the two groups upon admission (P>0.05). However, differences could be seen after the intervention of different nursing modes. The scores of SAS and SDS pre-operation were significantly lower than those on admission (P<0.05), while the scores

of SAS and SDS in the comprehensive group were significantly lower than those in the regular group (P<0.05).



**Figure 2.** VAS scores of the two groups at each time period after operation. Comparison of VAS scores at the first, second, third and fourth days after operation between the two groups indicated that the VAS scores of the comprehensive group at the third and fourth days after operation were lower than those of

VAS scores of each time period after operation in the two groups

By recording the VAS scores of the two groups on the 1st, 2nd, 3rd and 4th day after operation, as shown in **Figure 2**, it could be seen that the VAS scores of the two groups gradually decreased with prolonged recovery time after treatment (P<0.05). While there was no significant difference of the VAS scores between the two groups on the 1st and 2nd day after treatment, the VAS scores of the comprehensive group were lower than those of the regular

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy

**Table 2.** Comparison of rehabilitation between the two groups (x±sd)/day

	Normal activity time	Postoperative exhaust time	Hospitalization duration
Comprehensive group (n=150)	2.89±1.42	1.18±0.41	10.43±2.35
Regular group (n=135)	3.27±1.34	1.69±0.37	11.08±3.01
T	2.926	10.980	7.069
P	<0.05	<0.05	<0.05

**Table 3.** Comparison of incidence of complications between the two groups [n (%)]

	Abdominal bleeding	Postoperative infection	Gastrointestinal discomfort	Subcutaneous hematoma	Blood pressure decline	Total incidence
Comprehensive group (n=150)	1 (0.67)	5 (3.33)	5 (3.33)	2 (1.33)	3 (2.00)	10.66%
Regular group (n=135)	3 (2.22)	9 (6.67)	6 (4.44)	3 (2.22)	5 (3.70)	19.25%
X <sup>2</sup>						4.175
P						0.041

group on the 3rd and 4th day after operation (P<0.05).

### *Post-operative rehabilitation and hospitalization time of the two groups*

By comparing the rehabilitation of the two groups, it was found that, as shown in **Table 2**, after the intervention of the comprehensive nursing, the normal activity time, exhaust time and hospitalization days of the patients after operation were lower than those of the regular group (P<0.05).

### *Incidence of complications in the two groups*

The occurrence of postoperative complications was compared, see **Table 3**. The sum of the calculated percentages of each complication was taken as the total complication rate. We found that the total incidence of postoperative complications in the comprehensive group was 10.66%, while that in the regular group was 19.25%, and the incidence in the comprehensive group was lower than that in the regular group (P<0.05).

### *Quality of life score of the two groups*

After counting the scores of the two groups in the four aspects of GIQLI, as shown in **Figure 3**, it could be seen that the four aspects of the two groups' quality of life scores improved after treatment (P<0.05). The scores of the comprehensive group in physical condition, emotional status, social function and gastrointestinal symptoms after intervention were higher than those of the regular group (P<0.05).

### *Survey on nursing satisfaction of the two groups*

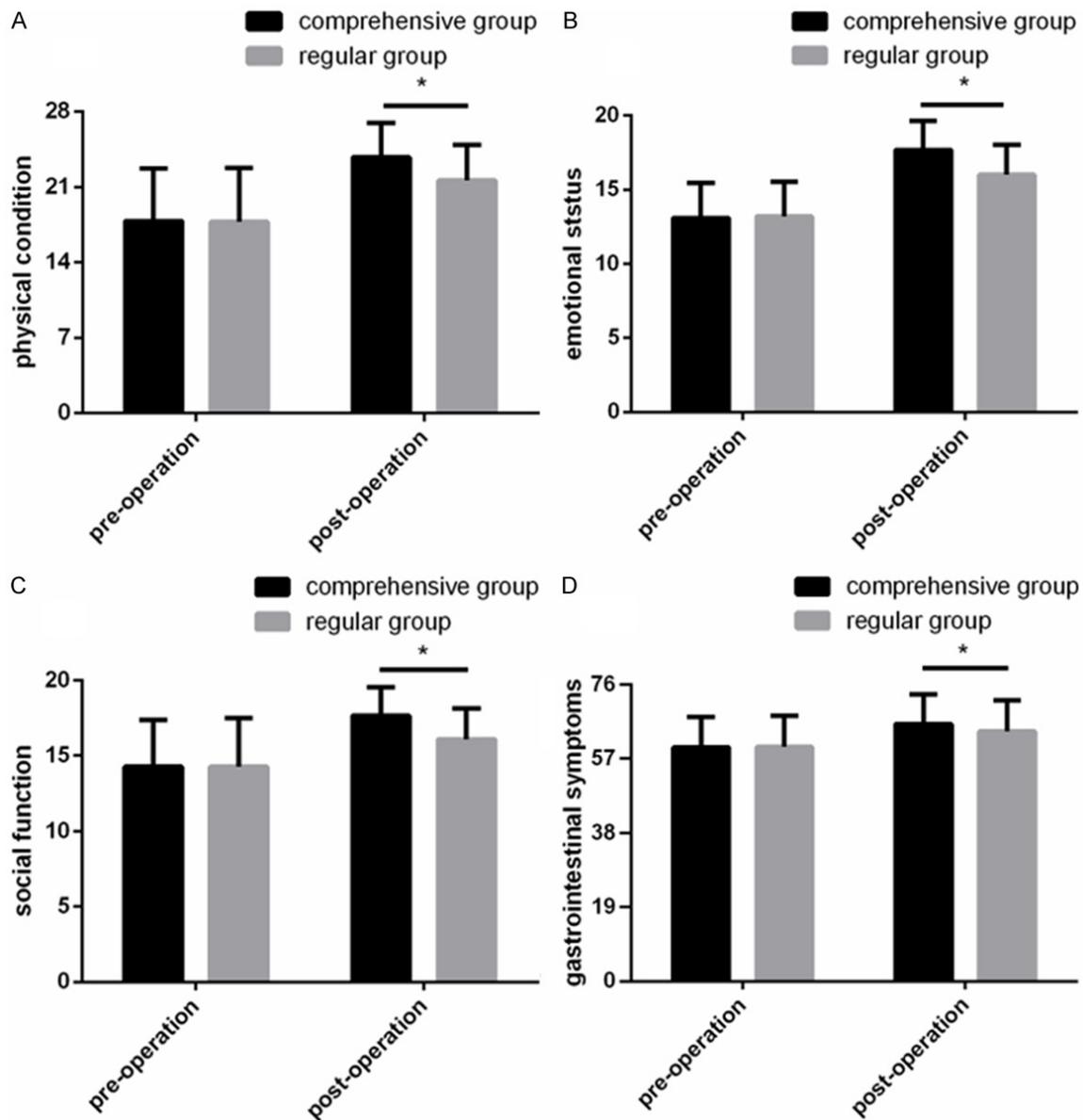
After a series of investigations, as shown in **Table 4**, we found that 78 people in the comprehensive group showed great satisfaction, 65 people showed satisfaction and 7 people showed dissatisfaction, and the satisfaction rate of nursing was 95.33%. In the regular group, 55 people showed great satisfaction, 61 people showed satisfaction and 7 people showed dissatisfaction, and the satisfaction rate of nursing was 85.93%. As could be seen from **Figure 4**, the satisfaction degree of the comprehensive group was higher than that of the regular group (P<0.05).

## **Discussion**

Gallstones are common diseases of the biliary system, most of which have no obvious symptoms, but the occurrence of the disease greatly increases with the potential risks of cholecystitis, biliary obstruction, gallbladder cancer, pancreatitis and other diseases [17]. The occurrence of gallstones is related to heredity and the environment, so the prevalence and formation of gallstones are diverse in the world [18]. The high incidence of gallstones not only increases the risk of complications, but also is responsible for using a lot of economic and social medical resources, as well as seriously affecting the quality of life of patients [19].

At present, most patients have certain feelings of fear and uneasiness before receiving surgical treatment, especially patients undergoing elective cholecystectomy. This situation is often

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy



**Figure 3.** Quality of life score of the two groups. A. Comparison of physical condition scores of the two groups one month post- operation. B. Comparison of emotional status scores between the two groups one month post- operation. C. Comparison of social function scores between the two groups one month after post- operation. D. Comparison of gastrointestinal symptoms scores between the two groups one month post- operation. Note: \* indicates that there is a significant difference between the two groups,  $P < 0.05$ .

caused by a patients' lack of understanding the disease and their lack of confidence in their own conditions, possibly refusing treatment. To a certain extent, it will increase the difficulty of treatment and increase the risk of complications. Therefore, it is very important to have good nursing intervention.

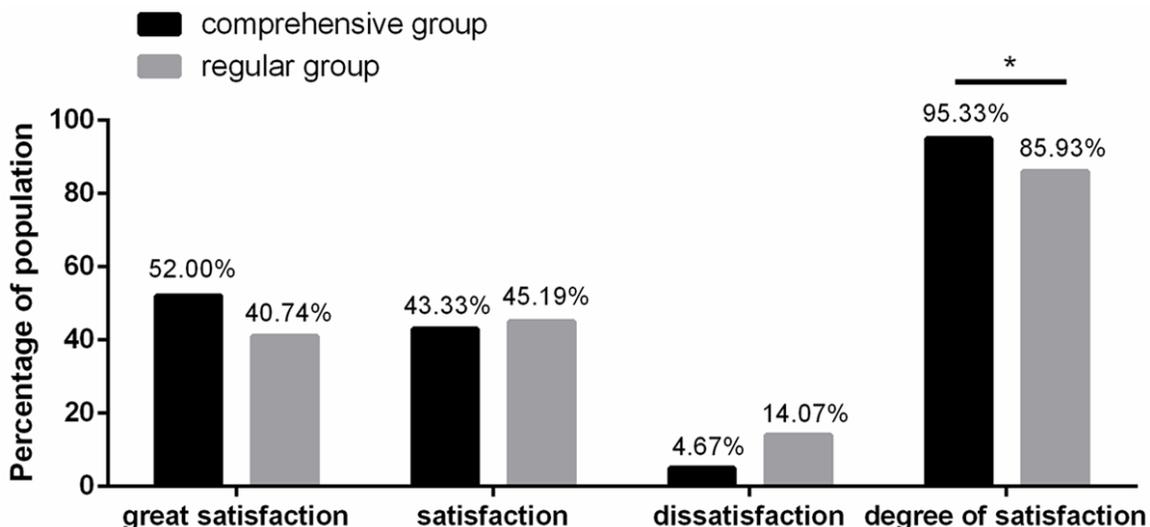
Comprehensive nursing requires nursing staff to master disease-related knowledge skillfully, and in a timely manner answer the disease-related questions raised by patients, so as to

calm them down in case of emergencies and appease patients' emotions [20]. As gallstone patients often have a certain psychological burden before surgery, and have social and economic pressures, they often have adverse emotions, which will affect the therapeutic effect [21, 22]. Therefore, we carried out relevant nursing interventions after the patients were admitted to our hospital. We found that there was no difference in the negative emotion scores pre-operation between the two groups. However, after intervention of different nursing

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy

**Table 4.** Nursing degree of satisfaction survey

	great satisfaction	satisfaction	dissatisfaction	satisfaction rate of nursing
Comprehensive group (n=150)	78 (52.00)	65 (43.33)	7 (4.67)	95.33%
Regular group (n=135)	55 (40.74)	61 (45.19)	19 (14, 67)	85.93%
X <sup>2</sup>				7.585
P				0.006



**Figure 4.** Nursing degree of satisfaction survey. The degree of satisfaction of the comprehensive group was 95.33%. The degree of satisfaction of nursing in the regular group was 85.93%, and that in the comprehensive group was higher than that in the regular group ( $P < 0.05$ ). Note: \* indicates that there is a significant difference between the two groups,  $P < 0.05$ .

modes, we could clearly see the difference. The SAS and SDS scores pre-operation were significantly lower than those upon admission, while the negative emotion improvement effect of patients after comprehensive nursing was more obvious. Previous studies have shown that comprehensive nursing has better nursing effect on patients with intertrochanteric fracture of the femur and can significantly improve anxiety and depression of patients [20]. Combined with the results of this article, it was speculated that comprehensive nursing could create a comfortable and clean environment for patients, greatly reducing the patients' fear of the hospital. In addition, comprehensive nursing could comfort the patients according to their personality, educational background and other aspects, and actively communicate with the patients in a timely manner to learn their psychological state, and help them to resolve negative emotions. Pain is a common symptom of patients after surgery, which will affect the recovery of patients, lead

to aggravation of patients' negative emotions, and prolong the recovery time of patients after surgery [23].

Studies by Xu [24] et al. showed that rapid rehabilitation nursing could effectively reduce VAS scores of colorectal cancer patients and relieve pain. It was suggested that nursing had certain effects in improving postoperative pain. Therefore, it was very important to pay attention to the postoperative pain caused by gallstones and strengthen postoperative care. In this study, the postoperative pain of the patients was recorded. It was found that the VAS scores of the two groups decreased gradually with the extension of the recovery time after treatment. There was no significant difference in the VAS scores of the two groups on the 1st and 2nd day after treatment, while the VAS scores of the comprehensive nursing were lower than those of the regular nursing on the 3rd and 4th day after operation. Compared with the rehabilitation situation, after comprehensive nursing intervention, the patient's nor-

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy

mal activity time, exhaust time and hospital stay after operation were slightly lower than those of regular nursing. As the treatment of pain involves many aspects (including disease treatment, psychological treatment, rehabilitation treatment and health care), nurses, as the front line personnel who contact patients after surgery, play an important role in reducing pain [25]. The results of this study suggested that nursing intervention reduced the pain of patients, thus promoting the recovery of disease. Comprehensive nursing is more targeted in post-operation and pain nursing. It makes multi-directional predictions of post-operation conditions and carries out special nursing for pain, which effectively relieves the mood of patients, increases their self-confidence in rehabilitation, effectively shortens the rehabilitation time and reduces the economic burden of patients to a certain extent.

Many studies have reported that gallstone removal is the main method for patients undergoing elective cholecystectomy, but improper nursing after surgery will easily lead to corresponding complications, and the postoperative infection rate is higher [26]. Previous studies have shown that comprehensive nursing intervention in otolaryngology can prevent postoperative complications [27]. The results of this study found that the incidence of complications after comprehensive nursing was 10.66% and that of regular nursing was 19.25%. The incidence of comprehensive nursing was lower than that of regular nursing, and the difference was statistically significant. This showed that comprehensive nursing has foresight, by evaluating the complications that will occur according to the patient's individual situation. It requires nursing staff to pay close attention to various examination indices and clinical signs of the patient, report to doctors immediately when abnormalities occur, and take corresponding measures in real time. Moreover, comprehensive nursing has better effect on the influence of postoperative infection, effectively reduces the occurrence of complications, and improves the prognosis of the patient through real-time information feedback and timely treatment. At present, literature has shown that home care can effectively improve the quality of life of nasopharyngeal carcinoma patients after radiotherapy and chemotherapy [28]. Moreover, comprehensive nursing intervention can effectively improve the living standard of

severely burned children, help them make better use of social support systems, and improve their satisfaction with nursing service personnel [29]. Previous studies have shown that the GIQLI table can be used to evaluate the quality of life of patients undergoing gallbladder stone surgery [30]. Therefore, we evaluated the quality of life of the two groups of patients one month after discharge from the hospital. The research results showed that the four indexes of the quality of life scores of the two groups were improved after treatment, while the scores of comprehensive nursing in the four aspects of physical condition, emotional status, social function and gastrointestinal symptoms were higher than those of regular nursing; suggesting that the application of comprehensive nursing can effectively improve the prognosis of patients. Finally, this study collected and investigated the nursing satisfaction of the two groups of patients. The results showed that the nursing satisfaction after comprehensive nursing was higher than that of regular nursing intervention, which showed that comprehensive nursing intervention overcomes the disadvantages of conventional nursing intervention and is more systematic, with better initiative, and foresight. It promotes nursing work to be more standardized, improves the nursing quality to the greatest extent, avoids mistakes in nursing work, improves the doctor-patient relationship, provides patients with a better medical experience, which provides a strong basis for its application and promotion in clinical practice in the future.

To sum up, comprehensive nursing can significantly reduce the pain after elective cholecystectomy and improve the quality of life of patients. However, since this study did not explore the long-term prognosis of patients, there are still some limitations. Moreover, there are many factors that affect the recovery of patients. In future studies, we can explore the impact of environmental care in different hospitals on the recovery of patients in order to better improve the prognosis of patients.

### Disclosure of conflict of interest

None.

**Address correspondence to:** Xiaoyun Liu, Department of Acupuncture and Massage, Wendeng Osteopathic Hospital, No. 1 Fengshan Road, Wendeng

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy

District, Weihai 264400, Shandong, China. Tel: +86-13832437645; Fax: +86-0631-8453115; E-mail: liuchunlu0225650@163.com

### References

- [1] Cha BH, Lee BS, Lee SH, Kang SJ and Park MJ. A study of alcohol consumption and obesity as main risk factor for symptomatic gallbladder stone: a case-control study. *Asian Pac J Cancer Prev* 2017; 18: 715-719.
- [2] Farthing M, Roberts SE, Samuel DG, Williams JG, Thorne K, Morrison-Rees S, John A, Akbari A and Williams JC. Survey of digestive health across Europe: final report. Part 1: the burden of gastrointestinal diseases and the organisation and delivery of gastroenterology services across Europe. *United European Gastroenterol J* 2014; 2: 539-543.
- [3] Portincasa P, Moschetta A and Palasciano G. Cholesterol gallstone disease. *Lancet* 2006; 368: 230-239.
- [4] Shabanzadeh DM. Incidence of gallstone disease and complications. *Curr Opin Gastroenterol* 2018; 34: 81-89.
- [5] Portincasa P, Molina-Molina E, Garruti G and Wang DQ. Critical care aspects of gallstone disease. *J Crit Care Med (Targu Mures)* 2019; 5: 6-18.
- [6] van Dijk AH, Wennmacker SZ, de Reuver PR, Latenstein CSS, Buyne O, Donkervoort SC, Eijsbouts QAJ, Heisterkamp J, Hof KI, Janssen J, Nieuwenhuijs VB, Schaap HM, Steenvoorde P, Stockmann HBAC, Boerma D, Westert GP, Drenth JPH, Dijkgraaf MGW, Boermeester MA and van Laarhoven CJHM. Restrictive strategy versus usual care for cholecystectomy in patients with gallstones and abdominal pain (SECURE): a multicentre, randomised, parallel-arm, non-inferiority trial. *Lancet* 2019; 393: 2322-2330.
- [7] Tsai MC, Chen CH, Lee HC, Lin HC and Lee CZ. Increased risk of depressive disorder following cholecystectomy for gallstones. *PLoS One* 2015; 10: e0129962.
- [8] Qiu LR, Zhou LJ and Wang BY. Clinical effect of nursing intervention for patients undergoing laparoscopic cholecystectomy. *J Biol Regul Homeost Agents* 2019; 33: 231-235.
- [9] Zhang LM, Li HY, Liu B, Li MY, Yao XL and Chang YH. Study on physiological and psychological comprehensive nursing of elderly tumor patients after surgery. *J Biol Regul Homeost Agents* 2018; 32: 241-249.
- [10] Krasna M, Freeman RK and Petrelli NJ. Re: tumor boards and the quality of cancer care. *J Natl Cancer Inst* 2013; 105: 1839-1840.
- [11] Fehrenbacher L, Capra AM, Quesenberry CP Jr, Fulton R, Shiraz P and Habel LA. Distant invasive breast cancer recurrence risk in human epidermal growth factor receptor 2-positive T1a and T1b node-negative localized breast cancer diagnosed from 2000 to 2006: a cohort from an integrated health care delivery system. *J Clin Oncol* 2014; 32: 2151-2158.
- [12] van Hoeve J, de Munck L, Otter R, de Vries J and Siesling S. Quality improvement by implementing an integrated oncological care pathway for breast cancer patients. *Breast* 2014; 23: 364-370.
- [13] Gou Y, Yi J, Jiang M and Cao C. Analysis on effects of comprehensive nursing care applied in interventional therapy for patients with liver cirrhosis and liver cancer. *Iran J Public Health* 2019; 48: 494-500.
- [14] Yue T, Li Q, Wang R, Liu Z, Guo M, Bai F, Zhang Z, Wang W, Cheng Y and Wang H. Comparison of hospital anxiety and depression scale (HADS) and Zung Self-Rating Anxiety/Depression Scale (SAS/SDS) in evaluating anxiety and depression in patients with psoriatic arthritis. *Dermatology* 2020; 236: 1-9.
- [15] van Brunschot S, van Grinsven J, van Santvoort HC, Bakker OJ, Besselink MG, Boermeester MA, Bollen TL, Bosscha K, Bouwense SA, Bruno MJ, Cappendijk VC, Consten EC, Dejong CH, van Eijck CH, Erkelens WG, van Goor H, van Grevenstein WMU, Haveman JW, Hofker SH, Jansen JM, Laméris JS, van Lienden KP, Meijssen MA, Mulder CJ, Nieuwenhuijs VB, Poley JW, Quispel R, de Ridder RJ, Römkens TE, Scheepers JJ, Schepers NJ, Schwartz MP, Seerden T, Spanier BWM, Straathof JWA, Strijker M, Timmer R, Venneman NG, Vleggaar FP, Voermans RP, Witteman BJ, Gooszen HG, Dijkgraaf MG and Fockens P; Dutch Pancreatitis Study Group. Predicting a 'difficult cholecystectomy' after mild gallstone pancreatitis. *HPB (Oxford)* 2019; 21: 827-833.
- [16] Yu H, Chan EE, Lingam P, Lee J, Woon WWL, Low JK and Shelat VG. Index admission laparoscopic cholecystectomy for acute cholecystitis restores gastrointestinal quality of life index (GIQLI) score. *Ann Hepatobiliary Pancreat Surg* 2018; 22: 58-65.
- [17] Zhu Q, Sun X, Ji X, Zhu L, Xu J, Wang C, Zhang C, Xue F and Liu Y. The association between gallstones and metabolic syndrome in urban Han Chinese: a longitudinal cohort study. *Sci Rep* 2016; 6: 29937.
- [18] Di Ciaula A, Wang DQ and Portincasa P. An update on the pathogenesis of cholesterol gallstone disease. *Curr Opin Gastroenterol* 2018; 34: 71-80.
- [19] Azizi F, Mirmiran P, Momenan AA, Hadaegh F, Habibi Moeini A, Hosseini F, Zahediasl S, Ghanbarian A and Hosseinpanah F; Members of

## Effect of comprehensive nursing on patients undergoing elective cholecystectomy

- Tehran Lipid and Glucose Study Group. The effect of community-based education for lifestyle intervention on the prevalence of metabolic syndrome and its components: tehran lipid and glucose study. *Int J Endocrinol Metab* 2013; 11: 145-153.
- [20] Fan D, Han L, Qu W, Tian S, Li Z, Zhang W, Xu L, Gao H and Zhang N. Comprehensive nursing based on feedforward control and postoperative FMA and SF-36 levels in femoral intertrochanteric fracture. *J Musculoskelet Neuronal Interact* 2019; 19: 516-520.
- [21] de Reuver PR, van Dijk AH, Wennmacker SZ, Lamberts MP, Boerma D, den Ouden BL, Dijkgraaf MG, Donkervoort SC, Roukema JA, Westert GP, Drenth JP, van Laarhoven CJ and Boermeester MA. A randomized controlled trial to compare a restrictive strategy to usual care for the effectiveness of cholecystectomy in patients with symptomatic gallstones (SECURE trial protocol). *BMC Surg* 2016; 16: 46.
- [22] Zeng Q, He Y, Qiang DC and Wu LX. Prevalence and epidemiological pattern of gallstones in urban residents in China. *Eur J Gastroenterol Hepatol* 2012; 24: 1459-1460.
- [23] Lamberts MP, Ozdemir C, Drenth JPH, van Laarhoven C, Westert GP and Kievit W. Cost-effectiveness of a new strategy to identify uncomplicated gallstone disease patients that will benefit from a cholecystectomy. *Surg Endosc* 2017; 31: 2534-2540.
- [24] Xu F, Yu P and Li L. Rapid rehabilitation nursing in postoperative patients with colorectal cancer and quality of life. *Oncol Lett* 2019; 18: 651-658.
- [25] Petyaeva A, Kajander M, Lawrence V, Clifton L, Thomas AJ, Ballard C, Leroi I, Briggs M, Closs J, Denning T, Nunez KM, Testad I, Romeo R, Johar I and Corbett A. Feasibility of a staff training and support programme to improve pain assessment and management in people with dementia living in care homes. *Int J Geriatr Psychiatry* 2018; 33: 221-231.
- [26] Biliaieva OO, Korzhyk NP, Myronov OM, Iemets VV, Miroshnichenko AP and Biliaiev VV. Cholelithiasis: complications and rehabilitation. *Klin Khir* 2014; 32-34.
- [27] Luan RL, Zhu MX and Sun HY. Effect of comprehensive nursing intervention in preventing postoperative pain, complications, and psychological pressure in the otolaryngology department. *Medicine (Baltimore)* 2019; 98: e15923.
- [28] Shi RC, Meng AF, Zhou WL, Yu XY, Huang XE, Ji AJ and Chen L. Effects of home nursing intervention on the quality of life of patients with nasopharyngeal carcinoma after radiotherapy and chemotherapy. *Asian Pac J Cancer Prev* 2015; 16: 7117-7121.
- [29] Luo XF, Zhang M, Zhao DJ, Lei Y, Liu J, Bai C, Zhou Q and Hu XH. Influences of comprehensive nursing intervention on the caregivers of severely burned children. *Zhonghua Shao Shang Za Zhi* 2018; 34: 648-652.
- [30] Aggarwal M, Agarwal N, Mishra TS, Sharma N and Singh S. Is laparoscopic cholecystectomy effective in relieving dyspepsia in patients of cholelithiasis? A prospective study. *Trop Gastroenterol* 2016; 37: 86-92.