Int J Clin Exp Med 2020;13(11):8391-8400
www.ijcem.com /ISSN:1940-5901/IJCEM0118773

Original Article

Effect of high-quality nursing on postoperative recovery, adverse reactions and degree of pain of patients undergoing abdominal surgery under general anesthesia

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Received July 23, 2020; Accepted August 30, 2020; Epub November 15, 2020; Published November 30, 2020

Abstract: Objective: To investigate the impact of high-quality nursing on postoperative recovery, adverse reactions and pain degree of patients undergoing abdominal surgery during the recovery period of general anesthesia. Methods: In total, 137 patients undergoing abdominal surgery under general anesthesia in our hospital from June 2018 to October 2019 were selected and divided into two groups according to different nursing methods, with 67 cases in the control group (CG) and 70 cases in the research group (RG). The CG had routine nursing, and the RG had high-quality nursing. After nursing, the emergence of agitation and postoperative adverse reactions in the recovery period of general anesthesia were observed. The changes in heart rate and blood pressure before and after nursing were observed. General self-efficacy scale (GSES) was applied for self-efficacy evaluation of the two groups before and after nursing. Visual analogue scale (VAS) was applied for degree of postoperative pain assessment after nursing. Self-rating anxiety scale (SAS) and self-rating depression scale (SDS) were utilized for evaluation of anxiety and depression of patients in the two groups before and after nursing. SF-36 quality of life scale was utilized to assess the quality of life of the two groups after nursing. Self-made nursing satisfaction questionnaire was utilized for nursing satisfaction evaluation of the two groups. Results: After nursing, the RG had significantly better blood pressure and heart rate, significantly lower scores of agitation, significantly higher GSES scores, significantly lower VAS scores at t2 and t3, significantly lower SAS score and SDS score, significantly lower total adverse reaction rate, significantly higher SF-36 score and nursing satisfaction when compared with the CG. Conclusion: High-quality nursing for patients undergoing abdominal surgery under general anesthesia can promote postoperative recovery, reduce adverse reactions and postoperative pain, and improve the quality of life.

Keywords: High-quality nursing, abdominal surgery, postoperative recovery, recovery period of general anesthesia, adverse reactions, pain degree

Introduction

As medical technology develops, the number of patients undergoing surgical treatment is increasing [1, 2]. Although surgery can fundamentally treat patients, the anesthetic drugs used during surgery remain in the body for a time, and they have different side effects on patients' bodies, such as drowsiness, cognitive dysfunction, confusion and so on [3, 4]. Studies have shown that patients awaking from anesthesia suffer from agitation, accelerated heart rate, and pain at the surgical incision; which not only cause pain physcally and psychology, but also affect the clinical prognosis of the patients [5, 6]. Therefore, it is particularly important to implement necessary nursing for patients undergoing surgery.

People's demand for medical care is increasing with the development of society, and the routine nursing model can no longer meet the needs and expectations of patients for nursing quality [7, 8]. Routine basic nursing will not only increase the risk of patients' dependence on nursing, but also reduce the curative effect [9].

High-quality nursing is a patient-centered, improved nursing, which fully implements a nursing responsibility system to provide patients with high-quality, satisfactory, efficient, guaranteed and low-consumption medical services [10]. It will also improve the conditions of nursing specialty, meet the basic living needs of patients, ensure the safety of patients, and help balance the psychology of patients, so as to improve the nursing service level as a whole [11]. Studies have shown [12, 13] that when nursing is given to patients undergoing abdominal surgery, music can be used to calm patients' blood pressure, heart rate and respiratory rate, thus reducing patients' fear of surgical treatment and enabling them to actively cooperate with treatment. Besides, nursing for patients undergoing colorectal cancer surgery can improve psychological anxiety and depression, reduce the incidence of adverse reactions and reduce the wound infection rate [14].

In this study, a high-quality nursing mode was implemented for patients undergoing abdominal surgery, and the influence of this nursing mode on postoperative recovery, adverse reactions and pain degree in patients undergoing abdominal surgery during the recovery period of general anesthesia was discussed.

Materials and methods

General data

In total, 137 patients undergoing abdominal surgery under general anesthesia in the Jiang Su Province Hospital from June 2018 to October 2019 were selected and divided into two groups according to different nursing methods; with 67 patients in the control group (CG) and 70 patients in the research group (RG). The CG was given routine nursing mode, and the RG was given a high-quality nursing mode. Inclusion criteria: Both groups of patients had no contraindications to anesthesia. This study was approved by the Ethics Committee of our hospital. Before the study was carried out, both patients and their families knew about the related matters of this study and voluntarily signed informed consent forms. Both groups of patients had complete general information. All patients had stable vital signs. Patients had the ability to think independently. Patients were able to correctly understand the relevant content of the scales used in this experiment and gave their reply. Exclusion criteria: Patients had cognitive defects, mental disorders, contraindications to surgery, failure of vital organs, refusal to cooperate with medical staff, withdrawal from the experimental group, or were lost to follow up.

Nursing methods

Patients in the CG received routine nursing. The patients were interviewed before surgery, their name, age, and other general clinical data were checked in detail. Nursing staff explained to the patients in detail about the matters needing attention for surgery. If the patient had abnormal respiratory function during surgery, nursing staff cleaned up the sputum and performed oxygen inhalation as quickly as possible. After the surgery, they closely monitored the changes of the patient's clinical signs and symptoms. If there was any problem, nursing staff informed the doctor in real time for targeted treatment.

Patients in the RG received high-quality nursing: (1) Preoperative guidance: Nursing staff searched for relevant information about surgical treatment of patients' diseases before surgery, and gave health education to patients and their families, so that patients and their families could correctly understand the needs of surgery, and actively cooperate with the doctors during surgery. Nursing staff also informed patients of relevant preparations and precautions before surgery, to help them keep a good physical condition to receive anesthesia and surgical treatment. (2) Psychological guidance: Nursing staff actively communicated with the patients to understand their cognitive level and psychological state, briefly introduced the methods of surgery and anesthesia to the patients, emphatically explained the methods and necessity of various drainage tube placement, and introduced the discomfort of a drainage tube, as well as the adverse reactions and solutions after anesthesia to the patients. Appropriate guidance was given to patients with any anxiety, fear and depression to reduce their psychological stress. (3) Intraoperative nursing: After entering the operating room, nursing staff could alleviate patients' fear through talking and shaking of hands, and improve patients' confidence in facing surgery with a skillful operation. (4) Postoperative pain care: After the patients entered the recovery

room, the nursing staff played smoothing and gentle music until the patients woke up. Based on postoperative pain degree of patients, analgesic drugs were used according to the doctor's advice, and the pain degree and position of patients were evaluated every 20 minutes to avoid agitation.

Outcome measures

Heart rate and blood pressure [systolic blood pressure (SBP), and diastolic blood pressure (DBP)] before and after nursing were observed and recorded.

Agitation score: The evaluation criteria were as follows: strong agitation: patients required coercive suppression by a number of nurses (3 points); agitation: agitation behavior was improved after coercive suppression (2 points), patients had significant physical agitation, which improved with comfort (1 point); and patients who did not have any significant physical agitation were graded as 0 points.

General self-efficacy scale (GSES) was adopted [15]. There were 10 items in the scale, and each item was scored 1-4 points, with 40 points in total. A higher score indicated higher self-efficacy.

Visual analogue scale (VAS) [16] was adopted for pain degree assessment of patients in the two groups at awakening time (t1), 6 hours after awaking (T2) and 24 hours after awaking (T3). The total score was 10 points. A higher score indicated higher pain level.

Self-rating depression scale (SDS) and self-rating anxiety scale (SAS) were adopted [17]. There were 20 items in the SDS scale, and the score boundary value was 53 points, with scores ranging from 53 to 62 being mild depression, scores ranging from 62 to 72 being moderate depression, and scores above 72 being severe depression. There were 20 items in the SAS scale, and the score boundary value was 50 points, with scores ranging from 50 to 59 as mild anxiety, scores ranging from 60 to 69 as moderate anxiety, and scores above 70 as severe anxiety.

Adverse events after nursing were observed and recorded.

The quality of life scale (SF-36) [18] was used to compare the quality of life between the two groups before and after nursing. There are five items, including physical function, cognitive function, emotional function, overall function and physical role. A higher score of patients after nursing indicated a better state.

Nursing satisfaction: The patients were given a self-made Satisfaction Questionnaire from our hospital, with total scores of 100 points. A higher score indicated higher patient satisfaction with the service.

Statistical analysis

Statistical analysis was performed using SPSS 20.0 (IBM Corp., Armonk, NY, USA), and GraphPad Prism 7 was used to plot the illustrations of data. The counting data were represented by [n (%)], and chi-square test was used to compare the counting data between groups. When the theoretical frequency of chi-square test was less than 5, chi-square test with correction of continuity was applied. The measurement data were expressed as (mean ± SD), and t-test of independent samples was applied to compare the measurement data between groups, and intragroup comparison before and after the study was performed by paired t-test.

Results

General data

There was no remarkable difference in general data such as gender, average age, body mass index (BMI), educational level, dietary preference, place of residence, smoking history, exercise habits and nutritional status between the two groups ($P > 0.05$). As shown in **Table 1**.

Comparison of heart rate and blood pressure between the two groups before and after nursing

There was no remarkable difference in heart rate, SBP and DBP between the two groups before nursing ($P > 0.05$), and the improvement of heart rate, SBP and DBP in the RG after nursing was notably better than that in the CG ($P < 0.05$). As shown in **Figure 1**.

Comparison of agitation score after nursing between the two groups

There was a significant difference in agitation score between the two groups after nursing (P

Table 1. Comparison of general data of patients in the two groups [n (%)] (mean ± SD)

Group	Research group (n=70)	Control group (n=67)	t/χ^2 value	*p* value
Gender			0.172	0.678
Male	38 (54.29)	34 (50.75)		
Female	32 (45.71)	33 (49.25)		
Average	42.47±3.41	41.87±3.26	1.052	0.294
BMI (kg/m^2)	23.18±3.61	22.89±3.54	0.474	0.635
Education level			0.867	0.351
< high school	39 (55.71)	32 (47.76)		
≥ high school	31 (44.29)	35 (52.24)		
Food preference			0.385	0.534
Light	34 (48.57)	29 (43.28)		
Spicy	36 (51.43)	38 (56.72)		
Place of residence			3.178	0.074
City	48 (68.57)	36 (53.73)		
Countryside	22 (31.43)	31 (46.27)		
Smoking history			1.580	0.208
Yes	47 (67.14)	38 (56.72)		
No	23 (32.86)	29 (43.28)		
Drinking history			0.825	0.363
Yes	44 (62.86)	37 (55.22)		
No	26 (37.14)	30 (44.78)		
Exercise habits			0.223	0.636
With	31 (44.29)	27 (40.30)		
Without	39 (55.71)	40 (59.70)		
Nutritional status			0.375	0.828
Good	26 (37.14)	22 (32.84)		
Average	21 (30.00)	20 (29.85)		
Poor	23 (32.86)	25 (37.31)		

< 0.05). The total incidence of agitation in the RG was 12.86%, while that in the CG was 29.85%, which was remarkably lower in the RG than in the CG (P < 0.05). As shown in **Table 2**.

Comparison of GSES score between the two groups before and after nursing

There was no considerable difference in GSES scores between the two groups before nursing (P > 0.05). After nursing, the score was improved in both groups (P < 0.05), and the RG had notably higher scores than in the CG (P < 0.05). As shown in **Figure 2**.

VAS scores of the two groups at different time periods

The VAS scores at t2 and t3 were higher than those at t1 in both groups (P < 0.05); while the score at t3 period was remarkably lower than those at t2 (P < 0.05), and the score in the RG was considerably lower than that in the CG (P < 0.05). As shown in **Figure 3**.

Comparison of SAS and SDS scores between the two groups before and after nursing

There was no considerable difference in SAS and SDS scores between the two groups before nursing (P > 0.05). After nursing, SAS and SDS scores improved notably in both groups (P < 0.05), and the two scores of the RG were notably lower than those of the CG (P < 0.05). As shown in **Figure 4**.

Comparison of adverse reactions between the two groups after nursing

The incidence of adverse reactions between the two groups after nursing was significantly different (P < 0.05). The total incidence of adverse reactions in the RG was 8.57%, which was notably lower than that in the CG (22.39%) (P < 0.05). As shown in **Table 3**.

Comparison of SF-36 score between the two groups before and after nursing

There was no remarkable difference in cognitive function, physical function, emotional function, physical role and overall function of SF-36 scores between the two groups before nursing. After nursing, SF-36 scores of patients in the RG were notably higher than those in the CG. As shown in **Figure 5**.

Comparison of nursing satisfaction between the two groups after nursing

The nursing satisfaction of patients in the RG was 95.71%, which was notably higher than that of the CG (74.63%) (P < 0.05). As shown in **Table 4**.

Discussion

General anesthesia is generally used in abdominal surgery, but patients will suffer from

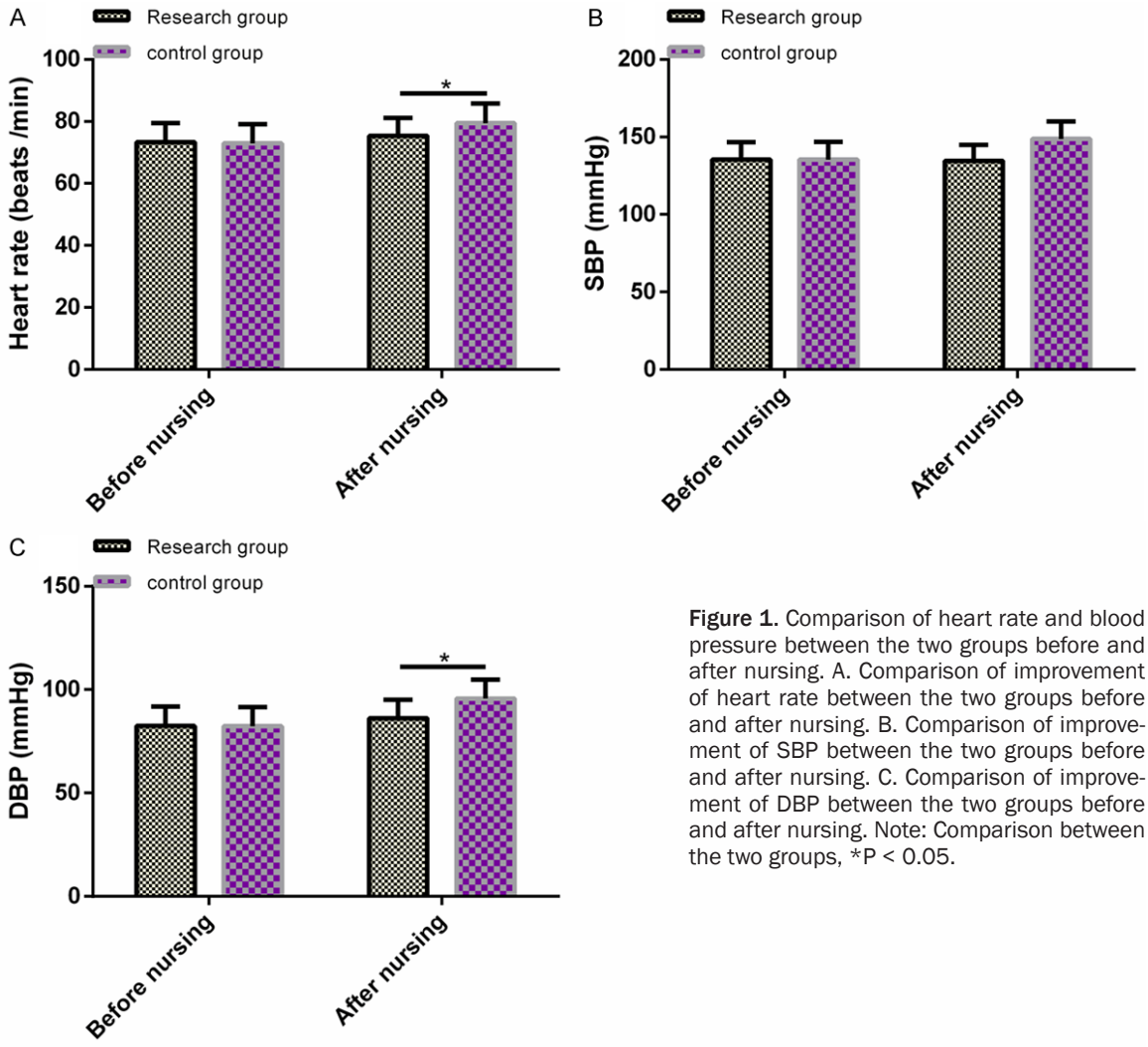

Figure 1. Comparison of heart rate and blood pressure between the two groups before and after nursing. A. Comparison of improvement of heart rate between the two groups before and after nursing. B. Comparison of improvement of SBP between the two groups before and after nursing. C. Comparison of improvement of DBP between the two groups before and after nursing. Note: Comparison between the two groups, *P < 0.05.

obvious discomfort, depression, anxiety and agitation during the recovery period from general anesthesia [19]. Studies have shown that patients with agitation during general anesthesia in the recovery period may also pull out tracheal tubes, arteriovenous puncture catheters, etc.; which cannot be treated effectively, resulting in increased blood pressure and heart rate, eventually leading to cerebrovascular accidents, myocardial ischemia, etc., and delaying the discharge time of patients [20]. Therefore, nursing of patients in the recovery period of general anesthesia is of great significance.

In this study, we applied high-quality nursing for patients undergoing abdominal surgery under general anesthesia in the recovery period, and observed the improvement of postoperative recovery, adverse reactions and postoperative pain of patients with this nursing mode, and found that the patients' conditions improved obviously after high-quality nursing. In the research of Zhang LM, et al. [21], patients undergoing tumor resection who received comprehensive physiological and psychological nursing care have improved heart rates and blood pressure and relieved postoperative pain, suggesting that nursing plays a vital role in patients' postoperative rehabilitation, which improves their health status. Here, we compared the improvement of heart rate and blood pressure between the two groups, and the comparison indicated that the improvement of heart rate, SBP and DBP in the RG was notably better than that in the CG after nursing, indicating that high-quality nursing has a certain psychological improvement for patients undergoing abdominal surgery, has helped them overcome the tension and anxiety effectively,

Table 2. Comparison of agitation score after nursing between two groups [n (%)]

Group	n	Agitation score				Total incidence
		0 point	1 point	2 points	3 points	
Research group	70	61 (87.14)	5 (7.14)	4 (5.17)	0 (0.00)	9 (12.86)
Control group	67	47 (70.15)	11 (16.42)	6 (8.96)	3 (4.48)	20 (29.85)
t	-	5.924	2.855	0.531	3.205	5.924
p	-	0.015	0.091	0.466	0.073	0.015

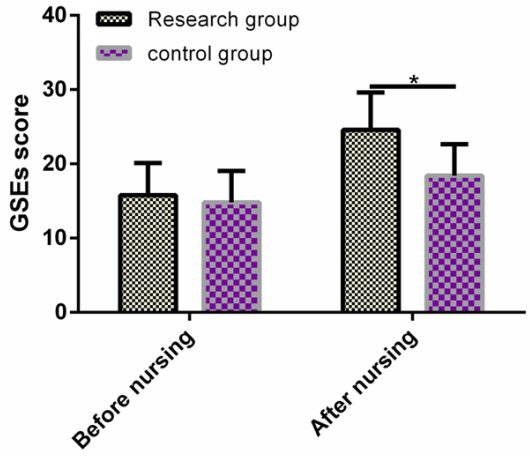

Figure 2. Comparison of GSES score between the two groups before and after nursing. Comparison of GSES score between the two groups before and after nursing. Note: Comparison between the two groups, *P < 0.05.

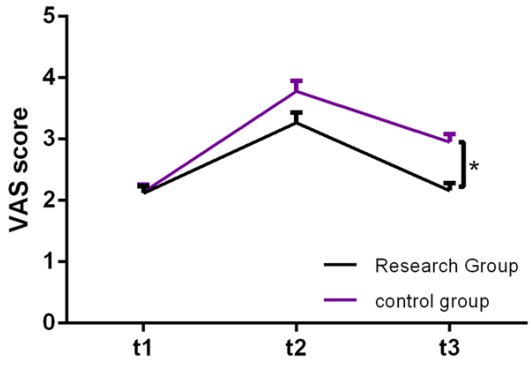

Figure 3. VAS scores of the two groups at different time periods. The VAS scores of patients at t2 and t3 in both groups were higher than those at t1 (P < 0.05), and the scores of the research group at t2 and t3 were lower than those in control group (P < 0.05). Note: Comparison between the two groups, *P < 0.05.

and stabilized their physiological and psychological conditions, thus better helping them to carry out rehabilitation treatment. Postoperative agitation is a common complication after general anesthesia. There can be unwanted postoperative behavior of patients in the recovery period of general anesthesia, resulting in accelerated heart rate and abnormal excitement [22]. According to the results of this study, the incidence of agitation after nursing in the RG was notably lower than that in the CG, suggesting that high-quality nursing can reduce the psychological burden of patients before surgery, thus reducing the incidence of agitation and enabling patients to safely pass the agitation period during recovery period of general anesthesia, which produces a marked effect on the recovery of patients. Moreover, the GSES score of patients in the RG after nursing was significantly higher than that in the CG, indicating that a high-quality nursing mode can improve patients' self-efficacy, change patients' behavior and help patients to have good behavior habits, thus ensuring good treatment effects and speeding up patients' rehabilitation.

Studies have shown that [23, 24] postoperative pain is different from inflammatory and neuropathic pain, so it is vital to understand postoperative pain. It can not only affect a patients' postoperative mood, but also affect postoperative recovery and quality of life. Nursing for perioperative patients can effectively reduce postoperative pain, improve perioperative anxiety and promote postoperative recovery [25]. Here, we included VAS scores to assess the pain level at different time periods after the nursing, and found that the scores at t2 and t3 periods after nursing in the RG were evidently lower than those in the CG, indicating that high-quality nursing gave patients good guidance before surgery, which enabled patients to have a full and comprehensive understanding of pain, learn how to relieve pain and improve their sense of treatment security. This nursing method also applied preoperative pain care to patients' clinical care, which reduced their postoperative pain and helped them recover better. SAS and SDS scores of patients in the RG after nursing were significantly lower than those in the CG, suggesting that high-quality nursing can effectively eliminate pati-

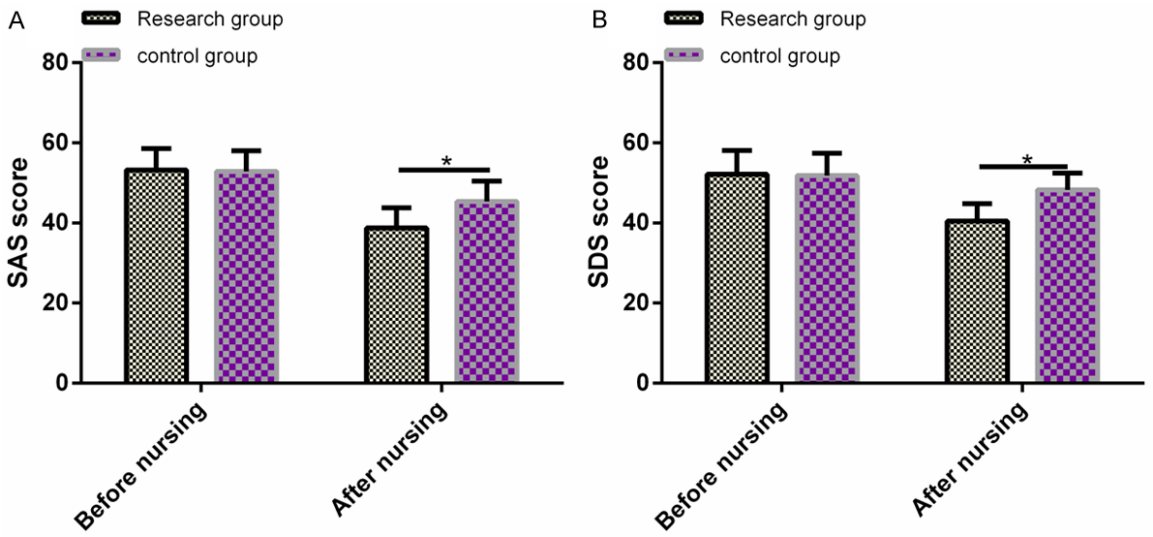

Figure 4. Comparison of SAS and SDS scores between two groups before and after nursing. A. Comparison of SAS score between two groups before and after nursing. B. Comparison of SDS score between two groups before and after nursing. Note: Comparison between the two groups, *P < 0.05.

Table 3. Comparison of adverse reactions between the two groups after nursing [n (%)]

Type	Research group (n=70)	Control group (n=67)	χ^2 value	*p* value
Abdominal distension	1 (1.43)	3 (4.48)	1.123	0.289
Nausea and vomiting	2 (2.86)	5 (7.46)	1.498	0.221
Hypotension	1 (1.43)	4 (5.97)	2.008	0.156
Respiratory inhibition	2 (2.86)	3 (4.48)	0.255	0.613
Total incidence of adverse events	6 (8.57)	15 (22.39)	5.035	0.024

ents' negative mentality while improving patients' cognition of surgery, so that patients can face the disease positively, and reduce the pain response better after surgery, thus improving patients' psychological stress response. Most patients will have adverse reactions such as incision infection and massive bleeding after surgery [26]. However, this study found that the incidence of adverse reactions after nursing in the RG was notably lower than that in the CG, showing that the high-quality nursing group had better professional ability and high nursing precision, which reduced the adverse reactions caused by improper nursing operations. Studies have shown that [27] the quality of life of patients after major abdominal surgery will be significantly reduced, and nursing for patients can effectively promote postoperative rehabilitation and improve the quality of life. The results of this study suggested that the scores of SF-36 scale in the RG after nursing were significantly higher than those in the CG, indicating that high-quality nursing can improve the quality of life of patients after discharge. Finally, we compared the satisfaction of the two groups of patients with this, which showed that the satisfaction score of patients in the RG receiving high-quality nursing was remarkably higher than that in the CG receiving routine nursing, suggesting that high-quality nursing could bring better treatment experience to patients.

Although this study confirms that high-quality nursing provides better benefits to patients undergoing abdominal surgery under general anesthesia, there is room for improvement in this study. For example, we can further analyze patient compliance in the nursing process and also risk factors that affect the poor prognosis of patients undergoing abdominal surgery, which will help the nursing staff to identify which risk factors require additional attention. Supplementary studies from the above perspectives will be conducted gradually in the future.

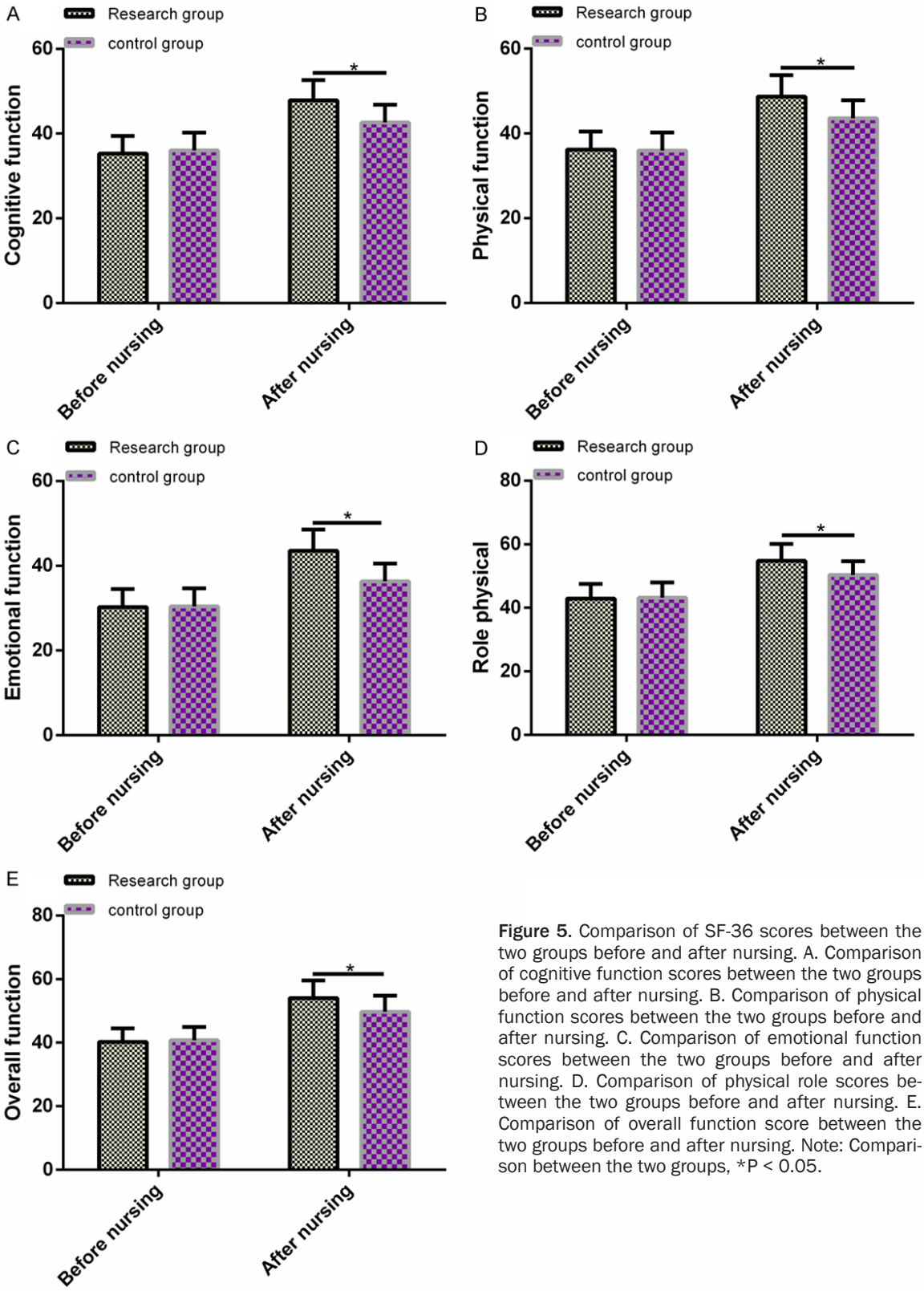

Figure 5. Comparison of SF-36 scores between the two groups before and after nursing. A. Comparison of cognitive function scores between the two groups before and after nursing. B. Comparison of physical function scores between the two groups before and after nursing. C. Comparison of emotional function scores between the two groups before and after nursing. D. Comparison of physical role scores between the two groups before and after nursing. E. Comparison of overall function score between the two groups before and after nursing. Note: Comparison between the two groups, *$P < 0.05$.

To sum up, high-quality nursing for patients undergoing abdominal surgery under general anesthesia can remarkably reduce the incidence of the emergence of agitation and post-

Table 4. Comparison of nursing satisfaction between the two groups after nursing [n (%)]

Item	Research group (n=70)	Control group (n=67)	t/χ^2 value	*p* value
Great satisfied	44 (62.86)	21 (31.34)	-	-
Satisfied	23 (32.86)	29 (43.28)	-	-
Dissatisfied	3 (4.29)	17 (25.37)	-	-
Nursing satisfaction	67 (95.71)	50 (74.63)	12.211	0.001

operative adverse reactions in the recovery period, effectively stabilize the changes of heart rate and blood pressure during the anesthesia recovery period, reduce the degree of postoperative pain, improve self-efficacy, relieve anxiety and depression, improve the quality of life and nursing satisfaction of patients, which is beneficial to postoperative recovery.

Acknowledgements

This study was financially supported by NSFC (86222111).

Disclosure of conflict of interest

None.

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