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ORIGINAL RESEARCH

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Effect of multiple disciplinary team led by pain specialist nurses on postoperative analgesia in patients undergoing mastectomy

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Abstract

This study aims to analyze the effect of multiple disciplinary team (MDT) led by pain specialist nurses on postoperative analgesia in patients undergoing mastectomy. 140 patients with breast cancer admitted to our hospital were treated with mastectomy and randomly divided into the control group and the intervention group. Routine pain care was applied in the control group, while pain care of MDT led by pain specialist nurses was applied in the intervention group based on the control group. The degree of pain, total postoperative analgesic dose, the first ambulation time, the time for recovery of surgical wound and hospital stay were compared between both groups. The psychological status, stress response-related indicators before and after intervention were compared between both groups, and the incidence of postoperative complications and analgesic satisfaction were counted. In contrast to the control group, the numerical rating scale (NRS) score of the intervention group was lower ($p < 0.05$); total postoperative analgesic dose, the first off-bed activity time, the time for surgical wound recovery, the drainage tube placement time and the hospital stay of the intervention group were reduced ($p < 0.05$); after intervention, self-rating anxiety scale (SAS) and self-rating depression scale (SDS) scores of the intervention group were diminished ($p < 0.05$); after intervention, decreased noradrenaline (NE), adrenocorticotropic hormone (ACTH) and Cor indexes were presented in the intervention group ($p < 0.05$); the incidence of postoperative complications of the intervention group was 7.14%, lower than 18.57% of the control group ($p < 0.05$); the analgesic satisfaction of the intervention group was 95.71%, higher than 84.29% of the control group ($p < 0.05$). Therefore, we conclude that MDT led by pain specialist nurses is worthy of clinical application.

Keywords

Mastectomy; Pain specialist nurse; Multidisciplinary team; Postoperative analgesia

1. Introduction

Breast cancer emerges as a common gynecological malignant tumor in clinical practice, with an incidence of about 8% of malignant tumors. Mastectomy is an operation to remove the breast tissue and related lymph node tissue invaded by cancer cells [1]. Foreign studies have shown that [2] the incidence of postoperative pain syndrome in breast cancer is as high as 52.9%. The incidence of postoperative pain syndrome in China is around 21.15%. Affected fossa remains as the most common site of pain [3]. Postoperative pain after breast cancer surgery is usually described as burning sensation or tenderness. As the prevalence of breast cancer has been rising year by year, there are more and more patients with postoperative pain, which seriously affects the psychological status and quality of life of patients and is an urgent clinical problem [4]. At present, pain management is performed clinically in line with routine nursing measures and pain scores, but the results are unsatisfactory [5]. With the attention drawn to pain management by clinical medical staff, Japan took the lead in carrying out the training of pain specialist nurses for cancer, and then the United States and others countries gradually implemented and achieved good results in clinical practice by performing pain specialist nurse-led nursing intervention, but pain specialist nurses have not been popularized in China [6]. To reduce the pain of patients undergoing breast cancer surgery, improve the surgical effect, and realize a pain management program suitable for clinical practice in China [7], this study combined pain specialist nurse training with multidisciplinary team intervention to implement pain specialist nurse-led multidisciplinary care to analyze its application effect in patients undergoing breast cancer surgery, which is reported as follows.

2. Materials and methods

2.1 General data

Patients with breast cancer admitted to our hospital from July 2021 to January 2023 were selected as the study subjects by convenience sampling. Sample size was calculated according to the formula in the 4th edition of Medical Statistics: $n = \sigma^2 (e^2/z^2 + \sigma^2/N)$. Considering 20% loss to follow-up rate and combining with the actual situation of our hospital, 140 patients were finally included. All patients were subjected to mastectomy and were divided into the control group and the intervention group. Inclusion criteria contained the following ones: It was diagnosed as primary breast cancer at clinical stage 0~III according to the imaging and pathological results; newly diagnosed patients aged 18~75 years old; Patients underwent (unilateral) radical mastectomy; patients voluntarily participated in this study and gave informed consent to the content of this study. Exclusion criteria include the following ones: Combined with malignant tumors of other systems; combined with other pain diseases; integrated with severe heart, lung, liver, kidney and other important organ dysfunction, as well as unstable condition; combined with mental diseases or unconsciousness, or lack of communication ability. The subjects were numbered according to the order of convenience sampling. The person who did not participate in the late intervention generated random numbers using SPSS (SPSS19.0, IBM, Armonk, NY, USA) and performed the randomization. The randomization information was placed in a sealed light envelope. After the patients who met the inclusion and exclusion criteria agreed to participate in the study, the envelope was distributed. The investigator determined the patient group and divided them into the control group and the intervention group, with 70 cases in each group. The patient study flow is shown in Fig. 1.

2.2 Methods

The patients in both groups underwent standard radical mastectomy on the affected side by the same group of physicians. The patients were treated with ultrasound-guided serratus anterior muscle block assisted general anesthesia and given conventional perioperative nursing program, including health education, psychological care, life guidance and prevention of complications.

2.2.1 Control group

Routine pain care was adopted in the control group. Patients were educated by the nursing staff before surgery to help the patients relax their emotions. Tell them the causes, duration, evaluation methods of pain and methods related to pain transference. Postoperative analgesia pump (oxycodone hydrochloride injection + flurbiprofen axetil lipid injection) was routinely used for analgesia. Numerical rating scale (NRS) [8] was used for pain assessment. When the score was $\geq$7 points (severe pain), pain assessment was performed every 4 hours and recorded; when the patient's pain was 4~6 points (moderate pain), pain assessment was performed every 8 hours and recorded; when the patient's pain score was $\leq$3 points (mild pain), assessment was carried out every 12 hours. Analgesic drugs were given according to the doctor's advice, the patients were instructed to master the use of analgesic drugs, and vital signs were routinely monitored. To ensure fairness, informed consent was obtained from patients and the same postoperative non-pharmacological intervention was performed for the control group after the end of the study. Besides, small video for education was sent.

2.2.2 Intervention group

Based on the control group, the intervention group applied pain specialist nurse-led multidisciplinary care, the specific content was as below.

2.2.2.1

Established multidisciplinary team led by pain specialist nurse: Team members: pain specialist nurses served as the core and multidisciplinary members were included. Team members consisted of 1 co-chief nurse and 4 nurses of pain specialist, breast specialist, anesthesiologist, rehabilitation physician, psychologist and nursing postgraduate 1 person each. A total of 10 members formed a multidisciplinary team, and co-chief nurse served as the group leader. All members have bachelor degree or above, except nursing graduate students. Other members have more than 5 years of clinical work experience with rich clinical work and scientific research experience. Responsibilities of team members: the group leader was in charge of the training and assessment, development and supervision of nursing program of team members; the pain specialist nurses were responsible for pain assessment, implementation of pain management program, health education, psychological intervention, pain treatment and adverse reaction monitoring, *etc.*; the breast specialist took responsibility for the development of treatment program, medication therapy, pain management development, cooperation and supervision of trial effect on pain management program; the anesthesiologist undertook the development of pain treatment guidelines and intervention program, analysis on the causes of pain and intervention improvement measures, consideration of the impact of analgesic program on the prognosis of patients, *etc.*; the rehabilitation physician developed rehabilitation program based on the patient's postoperative conditions; the psychologist performed psychological assessment of patients and guided the breast specialist nurse to perform psychological intervention; the nursing graduate student is responsible for collecting patient data, questionnaires and recording the patient's conditions, *etc*. Team training and assessment: Each team member needs to learn the theoretical knowledge in 20 lessons, including the basic concept of pain, routine assessment and intervention of pain, analgesic drugs, non-drug analgesia, adverse drug reactions and treatment measures, psychological problems and prognosis of patients. The training was taken *via* lectures, online learning, case analysis, micro-courses, *etc*. Each member should carry on online assessment, and those who fail need to relearn until qualified. Pain related intervention training can be combined with standardized patient, situational simulation and other clinical drills.

2.2.2.2

Pain intervention was taken by pain specialist nurse-led MDT: Preoperative evaluation and education: team members develop videos that is easy to be understood by patients, and the videos

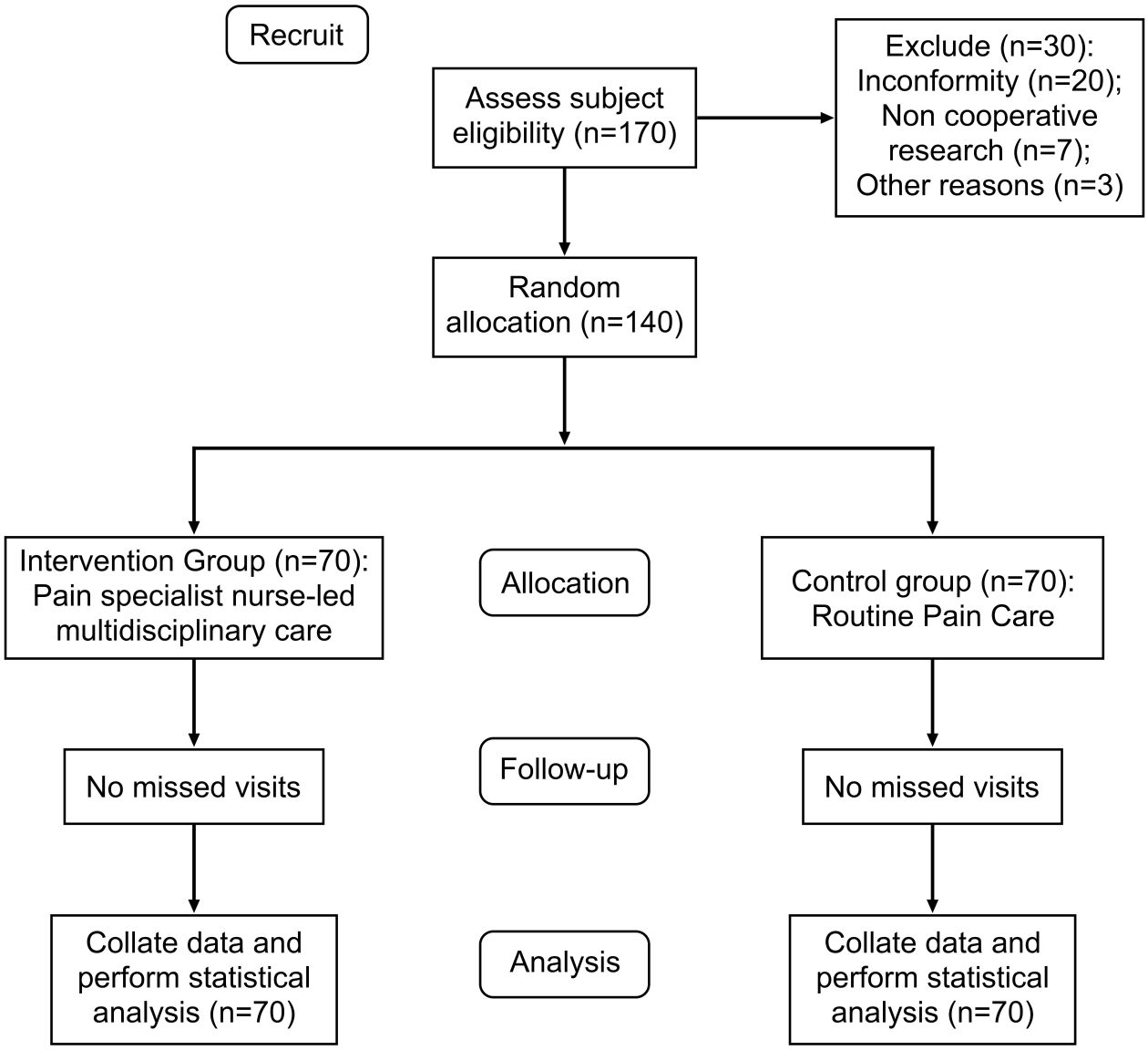

FIGURE 1. Flowchart.

include breast cancer surgery-related knowledge, postoperative pain that may occur after surgery and postoperative pain assessment and relief methods, *etc*. Each small video of education is appropriate for 5 to 10 minutes. Pain specialist nurses applied education video to help patients improve their disease awareness on the basis of distributing education brochures and one-on-one health education for patients after admission. Upon the end of the education, the patients were told to repeat the education content in simple language according to the manual and video to ensure that they fully understood the education content. The education lasted 20~30 minutes. Pain specialist nurses sort out the cognitive problems of adverse diseases of patients and answer them one by one to relieve the excessive worry and fear of patients about surgery and pain. To pacify the patient's mood, nurses can guide patients to use respiratory relaxation method to relieve mood, respiratory relaxation method: nurses helped patients take a sitting or supine position, guided patients to perform deep and slow breathing, keep the frequency at 10~15 beats/min. Patients slowly clenched their fists with both hands during inspiration, slowly exhale and relax their hands for 2~3 s after maximum inspiration. Patients gradually relaxed the whole body during inspiratory training, and the training was performed 1~2 times a day and 10~15 min each time. Specialists and anesthesiologists should inform patients of specific anesthesia methods and surgical methods before surgery to reduce patients' strangeness to surgery and anesthesia and improve their understanding of disease-related knowledge. Meanwhile, the rehabilitation physician should explain the postoperative rehabilitation program to the patient and discuss the requirements for pain-related issues with the physician during the course. Postoperative intervention: pain intervention was implemented by pain specialist nurses according to NRS scoring method. Mild pain: patients were instructed to use non-drug therapy to assist analgesia, such as music intervention (light and soothing music, *etc.*, volume should not be too large, mainly comfortable for patients),

transference of attention (in chatting with patients in the same ward or family members, patients were guided to tell about previous experiences and hobbies and encouraged to read), mindfulness breathing training (nurses guided patients to close their eyes and relax accompanied by family members, feel physical changes during breathing), non-drug therapy was self-selected in accord with patients' preferences. The time was about 20 min/time, which could be prolonged or shortened spontaneously based on patients' pain relief. Moderate pain: Non-drug therapy intervention was used first. If the pain was not relieved 10 minutes after non-drug intervention, the patient-controlled analgesic pump was pressed once. If the pain was not alleviated 15 minutes later, drug intervention (drug class and dose were the same as the control group) was given according to the doctor's advice. Drug intervention was followed by a re-evaluation. Until the pain became mild, non-drug intervention was taken. Severe pain: Analgesic drugs and analgesic pump intervention were taken according to the doctor's advice. The use method of analgesic pump was the same as that of the control group. After the pain became moderate, non-drug intervention was integrated. If the pain cannot be relieved after routine treatment and intervention, the nurse should immediately notify the anesthesiologist and attending physician to adjust the medication regimen for the treatment. The psychotherapist guided the pain specialist nurse to perform the postoperative psychological assessment of the patients, and when the patients developed anxiety, depression and fear due to pain, the specialist nurse and the psychological counselor jointly implemented the patient's psychological intervention. During postoperative rehabilitation training, the pain status should be re-evaluated, and analgesic methods were developed in the light of the postoperative rehabilitation needs, such as oral analgesic drugs. The anesthesiologist visited the patient at least once a day to know the patient's analgesia.

2.3 Outcome measures

The investigators shall uniformly train the data collectors who were responsible for data collection and evaluation. The training content mainly include the purpose of filling in the questionnaire, the specific content of the questionnaire, the evaluation method of subjective and objective indicators and precautions. On-site distribution and recycling questionnaire were used for data collection to uniformly guide patients or data collection personnel to fill in the questionnaire. The questionnaire was immediately checked after completion, and misfiled or missed items were timely supplemented and corrected. NRS score was utilized to compare the degree of pain on the day of surgery and on the 1st, 3rd and 7th day after surgery between both groups. Total postoperative analgesic dose, the time for first ambulation, recovery of surgical wound and hospital stay were compared between both groups. Self-rating anxiety scale and self-rating depression scale (SAS, SDS) [9] were used to compare the psychological status of the two groups before intervention (at enrollment) and after intervention (7 days after surgery). There were 20 items in SAS and SDS, respectively. Likert 4-level scoring method was applied. 1, 2, 3 and 4 points indicated no or little time, a small part of time, a considerable part of time and most of the time, respectively. The scores of the 20 items were added up as raw score, and the integer part was taken as standard score after raw score $\times$ 1.25. According to the Chinese norm results, scores $<$50 points were classified as no anxiety/depression, 50–59 points as mild anxiety/depression, 60–69 points as moderate anxiety/depression, and $\geq$70 points as severe anxiety/depression. The related indexes of stress response, including norepinephrine (NE), adrenocorticotropic hormone (ACTH) and cortisol (Cor), were compared between both groups before intervention (before anesthesia) and after intervention (7 days after operation). Fasting venous blood was collected and measured by high-performance liquid chromatography-electrochemical method and chemiluminescence. The incidence of postoperative complications was counted, including upper limb lymphedema, flap necrosis, subcutaneous effusion, gastrointestinal reactions and cancer fatigue. Houston Pain Outcome Instrument (HPOI) was utilized to compare the satisfaction rate of analgesia between both groups [10]. The end of Houston scale set the item of "overall satisfaction". The scale scores from 0 to 10 points. The score $\geq$9 points was satisfaction, 6~8 points was basic satisfaction and $<$6 points was dissatisfaction. The satisfaction rate of analgesia = satisfactory rate + basic satisfaction rate.

2.4 Statistical methods

SPSS 19.0 medical software was adopted for statistical analysis. Qualitative data in both groups were statistically described by frequency and percentage with χ^2 test and Fisher's exact test; general data of patients and quantitative data of each outcome indicator before and after intervention were statistically described by mean $\pm$ standard deviation ($\bar{x} \pm s$) in accordance with normal distribution using two independent samples t-test. Paired t-test was adopted for comparison within groups with α = 0.05 as the test level. $p < 0.05$ showed that the differences were statistically significant.

3. Results

3.1 Comparison of general data between both groups

There was no marked difference in general data between both groups ($p > 0.05$), as displayed in Table 1.

3.2 Comparison of pain severity between both groups

On the day of operation, there was no evident difference in NRS score between both groups ($p > 0.05$); on the 1st, 3rd and 7th day after surgery, the NRS score of the intervention group was reduced in contrast to the control group ($p < 0.05$), as implied in Table 2.

3.3 Comparison of postoperative recovery time between both groups

In comparison with the control group, total postoperative analgesic dose, the first off-bed activity time, surgical wound recovery time and hospital stay in the intervention group were diminished ($p < 0.05$), as demonstrated in Table 3.

TABLE 1. Comparison of general data between both groups ($\bar{x} \pm s$).

Item	Control group (n = 70)	Intervention group (n = 70)	χ^2/t value	p value
Gender (n)				
Male	6	7	0.085	0.771
Female	64	63		
Mean age (yr)	46.04 ± 12.26	46.07 ± 12.19	0.015	0.988
BMI (kg/m^2)	23.16 ± 1.12	23.11 ± 1.63	0.212	0.833
Affected Side				
Left	36	38	0.115	0.735
Right	34	32		
Pathological diagnosis (n)				
Special-type Invasive carcinoma	4	6		
Non-special type invasive carcinoma	60	57	0.554	0.758
Noninvasive carcinoma	6	7		
Tumor stage (n)				
Stage I	6	8		
Stage II	29	26	0.463	0.793
Stage III	35	36		

BMI: body mass index.

TABLE 2. Comparison of pain severity between both groups (Point, $\bar{x} \pm s$).

Group	Case	Day of surgery	1 d after surgery	3 d after surgery	7 d after surgery
Control group	70	7.69 ± 1.33	7.01 ± 1.19	6.24 ± 1.06	5.51 ± 0.92
Intervention group	70	7.71 ± 1.28	6.24 ± 1.05	5.30 ± 0.98	4.47 ± 0.86
t value		0.091	4.059	5.448	6.909
p value		0.928	<0.001	<0.001	<0.001

TABLE 3. Comparison of postoperative recovery time between both groups ($\bar{x} \pm s$).

Group	Case	Total postoperative analgesic dose (mL)	Time to first ambulation (h)	Time for surgical wound recovery (d)	Drain placement time (h)	Hospital stay (d)
Control group	70	77.83 ± 8.20	10.04 ± 1.25	10.54 ± 1.20	10.51 ± 1.22	11.04 ± 1.49
Intervention group	70	72.65 ± 6.13	8.79 ± 1.38	8.13 ± 1.29	9.13 ± 1.18	10.16 ± 1.15
t value		4.233	5.617	11.445	6.803	3.912
p value		<0.001	<0.001	<0.001	<0.001	<0.001

3.4 SAS and SDS scores of patients in both groups before and after intervention

Before intervention, there was no statistical significance in SAS and SDS scores between both groups ($p > 0.05$); after intervention, decreased SAS and SDS scores were presented in the intervention group compared with the control group ($p < 0.05$), as disclosed in Table 4.

3.5 Comparison of changes in stress response indicators between both groups before and after intervention

Before intervention, no significant difference was exhibited in stress response indicators between both groups ($p < 0.05$); after intervention, NE, ACTH and COR indicators in the intervention group were lower than the control group ($p < 0.05$), as unveiled in Table 5.

3.6 Comparison of the incidence rate of postoperative complications between both groups

The incidence of postoperative complications in the intervention group was 7.14%, lower than 18.57% in the control group ($p < 0.05$), as elucidated in Table 6.

3.7 Comparison of analgesic satisfaction between both groups

The analgesic satisfaction in the intervention group was 95.71%, higher than 84.29% in the control group ($p < 0.05$), as revealed in Table 7.

TABLE 4. SAS and SDS scores of patients in both groups before and after intervention (point, $\bar{x} \pm s$).

Group	Case	SAS score		SDS score	
		Before intervention	After intervention	Before intervention	After intervention
Control group	70	63.71 ± 5.75	54.90 ± 5.71	57.06 ± 6.69	51.16 ± 5.74
Intervention group	70	63.40 ± 5.86	48.46 ± 4.37	56.60 ± 5.05	46.83 ± 3.11
t value		0.316	7.494	0.459	5.549
p value		0.753	<0.001	0.647	<0.001

SAS: Self-rating anxiety scale; SDS: self-rating depression scale.

TABLE 5. Comparison of changes in stress response indicators between both groups before and after intervention ($\bar{x} \pm s$).

Group	Case	NE (pg/mL)		ACTH (pg/mL)		Cor (pg/mL)	
		Before intervention	After intervention	Before intervention	After intervention	Before intervention	After intervention
Control group	60	358.06 ± 39.74	401.04 ± 33.15	35.47 ± 4.40	45.36 ± 5.44	196.19 ± 27.59	236.79 ± 31.24
Intervention group	60	363.10 ± 37.32	378.90 ± 36.33	35.60 ± 4.46	41.94 ± 5.05	196.34 ± 22.01	211.51 ± 23.70
t value		0.773	3.766	0.174	3.855	0.036	5.394
p value		0.441	<0.001	0.862	<0.001	0.972	<0.001

NE: norepinephrine; Cor: cortisol; ACTH: adrenocorticotropic hormone.

TABLE 6. Comparison of the incidence rate of postoperative complications between both groups (n (%)).

Group	Case	Upper limb lymphedema	Skin flap necrosis	Subcutaneous effusion	Gastrointestinal reactions	Cancerous fatigue	Overall incidence
Control group	70	4 (5.71)	2 (2.86)	2 (2.86)	4 (5.71)	1 (1.43)	13 (18.57)
Intervention group	70	2 (2.86)	1 (1.43)	0	1 (1.43)	1 (1.43)	5 (7.14)
χ^2 value							4.080
p value							0.043

TABLE 7. Comparison of analgesic satisfaction between both groups (n (%)).

Group	Case	Satisfaction	Basic satisfaction	Dissatisfaction	Satisfaction rate of analgesia
Control group	70	42 (60.00)	17 (24.29)	11 (15.71)	59 (84.29)
Intervention group	70	53 (75.71)	14 (20.00)	3 (4.29)	67 (95.71)
χ^2 value					5.079
p value					0.024

4. Discussion

At present, surgery is the optimal treatment for breast cancer, which is not easy to relapse and has a high cure rate *via* eliminating the lesion from the breast [11, 12]. However, unbearable pain is prone to occur after radical mastectomy, and the nature of pain generally belongs to chronic neuralgia, which seriously affects the quality of life and prognosis of patients [13]. Pain, as a sign of complex physical and psychological reactions required for human tissue damage, can protect the human body from in-depth injury, but if the pain is not effectively controlled, it will trigger central nervous system lesions and affect the outcome of patients [14, 15]. In addition to conventional drug analgesia, the NRS scoring system is currently used in clinical practice for pain management as a more effective intervention based on traditional care. However, the NRS score still has some limitations and cannot allow patients to receive better pain intervention [16].

The findings of this study shown that the NRS scores of patients in the intervention group were decreased in contrast to the control group on 1 d, 3 d and 7 d after surgery ($p < 0.05$), which was in line with the research by Geng YY *et al.* [17] MDT guided by pain specialist nurses was illustrated to reduce the degree of postoperative pain in mastectomy patients. The reason for this analysis is as below: The MDT nursing intervention led by pain specialist nurses is patient-centered and relies on multidisciplinary expert groups to provide patients with a more rational analgesic regimen [18]. The MDT

management organized in this study is a professional team composed of surgeons, anesthesiologists, rehabilitation physicians and psychological counselors. During pain management, medical staff performed their respective duties and cooperate together to form a "closed-loop management". Prior studies have suggested [19] that the construction of a multidisciplinary team with specialist nurses at the dominant place can diminish the degree of moderate as well as severe postoperative pain. In addition, it will effectively improve the mental health of patients and accelerate disease recovery. The results of this study are the same as the preceding researches. Jiang Y *et al.* [20] showed that the attention of cancer nurses to pain exerts a great effect on pain management. If the pain in cancer patients is not well treated, weak awareness of nurses in actively dealing with pain remains as the prominent reason. Therefore, it is particularly necessary to implement the pain management model guided by specialist nurses in China. The results of this study revealed that total postoperative analgesic dose, the first ambulation time, the time required for surgical wound recovery and hospital stay in the intervention group were reduced compared with the control group ($p < 0.05$), indicating that the MDT dominated by the pain specialist nurse could effectively abate the postoperative pain of the patients. Preceding studies have shown [21] that after the improvement of postoperative pain, the degree of cooperation in medical operation and nursing satisfaction of patients have been promoted, and the compliance in early ambulation of patients has been raised, which is conducive to helping patients to recover their postoperative wounds and reducing the hospital stay. The results of this study are the same as the prior studies. The multidisciplinary team led by the pain specialist nurse reduced the dose of analgesic drugs through non-drug therapy on the basis of routine treatment and nursing in this study, which reduced the degree of postoperative pain of patients, helped them to get out of bed as early as possible. It was conducive to promoting the postoperative recovery of patients undergoing mastectomy and improving the prognosis of patients.

In this study, after the intervention, lower SAS and SDS scores of patients were presented in the intervention group in comparison with the control group ($p < 0.05$), dissecting that MDT led by pain specialist nurses can relieve postoperative adverse emotions in mastectomy patients. The International Society for the Study of Pain defines pain as "an unpleasant sensory and emotional experience caused by actual or potential tissue damage", which illustrates that pain is psychosensory and entails psychological and emotional processes [22]. In the past, in the postoperative pain management of breast cancer patients, most of the patients were passive, and the patients' complaints were difficult to be understood and solved. The multidisciplinary team guided by the pain specialist nurse applied in this study strengthened the preoperative evaluation and education of the patients through videos and manuals. Besides, targeted psychological intervention was performed on the patients under the guidance of psychological counselors to relieve the patients' excessive worries, fears and anxiety about the operation and pain *via* distinct methods such as shifting attention and respiratory relaxation, which effectively pacified the patients' emotions. As displayed in previous studies [23, 24], nursing intervention through MDT can effectively alleviate the adverse emotions of surgical patients, and the outcomes of this study are in consistent with previous findings. Moreover, preceding literature demonstrated [25] that breast cancer patients are prone to psychological stress response after surgery, which aggravates pain. Targeted psychological intervention and health education can reduce their muscle tension, stabilize brain structure and function, and maintain a good mentality of patients. In the present study, NE, ACTH and Cor indicators in the intervention group were lower than the control group ($p < 0.05$), revealing that MDT led by pain specialist nurses can reduce the postoperative stress response in patients undergoing mastectomy. Stress response is a common complication of surgery and anesthesia, which is a non-specific response triggered by stressors in the body and is a normal physiological feature. However, strong stress response stimulates the hypothalamic-pituitary-adrenocortical (HPA) system, and the increase of NE, ACTH and Cor [26]. The MDT intervention led by pain specialist nurses enables patients to receive physical and psychological treatment through boosting the professional ability of pain specialist nurses, multidisciplinary discussion of analgesic regimens, enhancing patients' psychological intervention and health education, which favors postoperative recovery of patients.

In this study, the incidence of postoperative complications in the intervention group was 7.14%, which was lower than 18.57% in the control group, and the satisfaction rate of analgesia in the intervention group was 95.71%, which was superior to 84.29% in the control group ($p < 0.05$), signifying that the MDT led by pain specialist nurses can reduce the occurrence of postoperative complications in patients undergoing mastectomy and help to improve the satisfaction rate of analgesia in patients. Prior studies have unveiled [27, 28] that specialist nurse-led multidisciplinary pain intervention can shorten the duration of hospital stay and lessen postoperative complications. Finding in this study was the same as it. The current study reinforced the preoperative psychological intervention to diminish the preoperative anxiety of patients. Meanwhile, phased pain intervention based on NRS score is conducive to early ambulation, alleviate pain and promote gastrointestinal peristalsis, which lowers the incidence of complications. Pain control satisfaction serves as one of the key indicators to evaluate the quality management of medical care. Improving pain control satisfaction is also the ultimate goal of pain specialist nurse management [29]. The MDT guided by pain specialist nurses applied in this study fully integrated the resources of pain specialist nurses, surgeons, anesthesiologists, rehabilitation physicians, and psychological counselors, maximally improved the correctness of multidisciplinary management programs for patients, reduced the drawbacks of "nurse-led" pain management, which is single. Furthermore, it combined with humanistic care concepts, paid more attention to patient experience and feelings, increased patient comfort to a certain extent, and improved pain control satisfaction in patient [30].

5. Conclusions

In summary, pain specialist nurses-led MDT can improve the postoperative analgesic effect of mastectomy patients, speed up postoperative recovery and relieve adverse emotions of

patients. Besides, it can also reduce the incidence of stress reactions and postoperative complications, which is beneficial to improve analgesic satisfaction and is worthy of clinical adoption. However, this study was limited by small sample size and no long-term follow-up survey of patients.

AVAILABILITY OF DATA AND MATERIALS

The authors declare that all data supporting the findings of this study are available within the paper and any raw data can be obtained from the corresponding author upon request.

AUTHOR CONTRIBUTIONS

CLJ—designed the study and carried them out; CLJ, XJH, MJL, XLL and JW—supervised the data collection, analyzed the data, interpreted the data; CLJ and YKZ—prepare the manuscript for publication and reviewed the draft of the manuscript. All authors have read and approved the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical approval was obtained from the Ethics Committee of People's hospital of Deyang City (Approval no. 2022-04-004-K01). Written informed consent was obtained from a legally authorized representative(s) for anonymized patient information to be published in this article.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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