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Original Article

The effects of detailed nursing interventions on the safety and stress responses of tumor patients

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Abstract: Objective: The overall aim is to study the effect of detailed nursing interventions on the safety and stress responses of tumor patients. Methods: A total of 100 patients who underwent tumor surgery between August 2017 and August 2019 were included and randomized into an experimental group (n=50) and a control group (n=50). Both groups were administered conventional nursing, and based on that, the experimental group was treated with detailed nursing. The two groups were compared in terms of their blood pressure changes, serum norepinephrine (NE), epinephrine (E), cortisol, nursing quality, and Self-Rating Depression/Anxiety Scale (SDS/SAS) scores. The incidences of adverse reactions and the nursing satisfaction were also compared. Results: After the nursing, the experimental group had better results in their blood pressure levels, stress indexes, nutritional status, and nursing quality (P<0.05). Compared with the control group, lower SDS/SAS scores, fewer accidents, and higher nursing satisfaction were observed in the experimental group (P<0.05). The progression-free survival rates at 6 and 12 months after the operations were significantly higher in the experimental group than that in the control group (P<0.05). Conclusion: Detailed nursing interventions can substantially improve the psychological conditions of patients with tumors and diminish their adverse stress responses with a high safety profile, so it is worthy of clinical promotion and application.

Keywords: Detailed nursing, tumor patients, safety, stress response

Introduction

Statistics show that tumor-related mortality has been on the rise due to the increasing incidence of neoplastic disease in recent years, posing a grave threat to people's health and safety [1, 2]. At present, surgery and chemotherapy are the mainstays for the treatment of neoplastic disease. However, many tumor patients undergoing surgery are haunted by fear and nervousness because of their concerns about the disease conditions, which results in varying degrees of psychological stress and the physiological stress response. If left unattended, the intense stress response will drastically undermine the surgical effect and even threaten patients' lives [3, 4]. With the continuous development of the medical nursing model, positive nursing models have been developed to significantly abate the stress response of patients [5, 6]. However, patients are susceptible to adverse events during nursing due to the disease conditions and external factors, leading to sabotaged treatment effects. As the medical model continuously advances, nursing care pays more attention to improving patients' quality of life. Detailed nursing is a novel nursing model, which divides the systematic and comprehensive patient care process into several nursing links. Detailed nursing requires that the medical staff have a good sense of responsibility, with an emphasis on the psychological care of patients, such as understanding the causes of depression, through active and close communication, eliminating patients' psychological pressure, and relieving the negative emotions to the maximum extent. Detailed care also centers on an all-around and detailed nursing intervention, with the needs of patients as the primary consideration, which enjoys broad application prospects in the care of cancer patients. Rectal cancer, breast cancer, and lung cancer are the most common tumor types treated in our hospital, so the nursing effect of

detailed care in those patients is very representative. Herein, we chose 100 patients with rectal cancer, breast cancer, or lung cancer who underwent tumor surgery in our hospital from August 2017 to August 2019 to study the impact of detailed nursing on the safety and stress responses of cancer patients.

Data and methods

Participants

We conducted a prospective study of 100 patients who underwent tumor surgery between August 2017 and August 2019. The study cohort was randomized into an experimental group (n=50) and a control group (n=50). Inclusion criteria: All patients met the diagnostic standard for the relevant neoplastic disease, and were diagnosed with malignant tumors for the first time with no other anti-tumor treatments. This study was approved by the Ethics Committee of the China-Japan Union Hospital of Jilin University, (No. 2017-EC3456). All the patients and their families signed the informed consent forms after being fully informed of the purpose and process of the study.

Exclusion criteria: Patients with drug contraindications, heart failure, or severe respiratory failure were excluded, as well as those with congenital heart disease or severe liver and kidney dysfunction.

Methods

The patients in the control group underwent routine nursing intervention. Preoperative preparations were routinely carried out. Intraoperatively, the temperature and humidity in the operating room were maintained within the ideal range, and the patients' vital signs were closely monitored.

The patients in the experimental group underwent a detailed nursing intervention, based on the routine nursing intervention. After entering the operating room, the patient was comforted by the nursing staff to ensure active cooperation with the treatment. Before anesthesia, the patient was informed of the procedures and precautions of the operation [7-9]. Then the nursing staff reconfirmed the patient's surgical site, checked the surgical instruments, and performed heat preservation care for the patient after anesthesia to prevent any abnormal changes in the patient's body temperature from affecting the operation. During the operation, the nursing staff paid close attention to the patient's vital signs and promptly tackled any abnormalities [10-12]. The safety of the medical instruments was checked in accordance with the relevant regulations to ensure an uneventful surgery.

Outcome measures

The intraoperative blood pressure levels, the serum norepinephrine (NE), epinephrine (E), cortisol (COR), pre-albumin, albumin and transferrin concentration levels were recorded and compared. In addition, the nursing quality scores, the Self-Rating Depression/Anxiety Scale (SDS/SAS) scores [13], incidences of complications and accidents, and the nursing satisfaction were evaluated. The changes in blood pressure were mainly evaluated from the systolic blood pressure (SBP) and diastolic blood pressure (DBP) levels. The nursing quality was assessed from the dimensions of instrument preparation, disinfection and isolation, and instrument management. The higher the score, the better the nursing treatment. The lower the SDS and SAS scores, the lower the patients' stress responses. Complications included postoperative recovery and wound infections. Nursing satisfaction = very satisfied rate + satisfied rate. In addition, cancer pain before and 6 months after the surgery was evaluated. The Defense & Veterans Pain Rating Scale [14] was used to classify the cancer pain into the following five degrees; 0: no pain; I: intermittent pain; II: persistent pain; III: persistent severe pain; IV: Persistent severe pain that cannot be tolerated.

Statistical methods

In this study, the data analysis was carried out using SPSS 21.0 software. The measurement data were processed using t-tests and expressed as the means ± standard deviations. The count data were uniformly tested using χ^2 tests and expressed as (n, %). P values <0.05 indicate statistically significant differences.

Results

Comparison of the general data

The patients in the control group were 41-72 years old, with a mean age of (66.39±2.71) years and a male to female ratio of 23:27. The-

Table 1. Comparison of the general data

	n	Age	Gender (Male/Female)	Tumor type		
				Rectal Cancer	Breast Cancer	Lung Cancer
Experimental group	50	67.16±1.03	26/24	22	18	10
Control group	50	66.39±2.71	23/27	20	19	11
t/χ^2		1.878	0.360		0.170	
P		0.063	0.548		0.919	

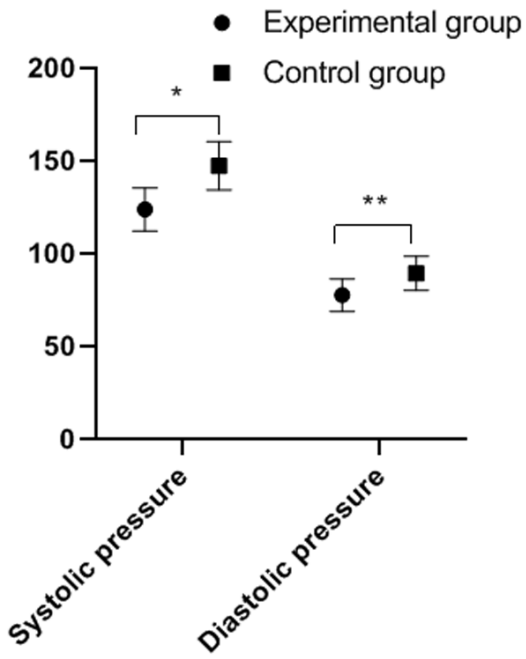

Figure 1. Comparison of the blood pressure changes between the two groups, ***P<0.001.

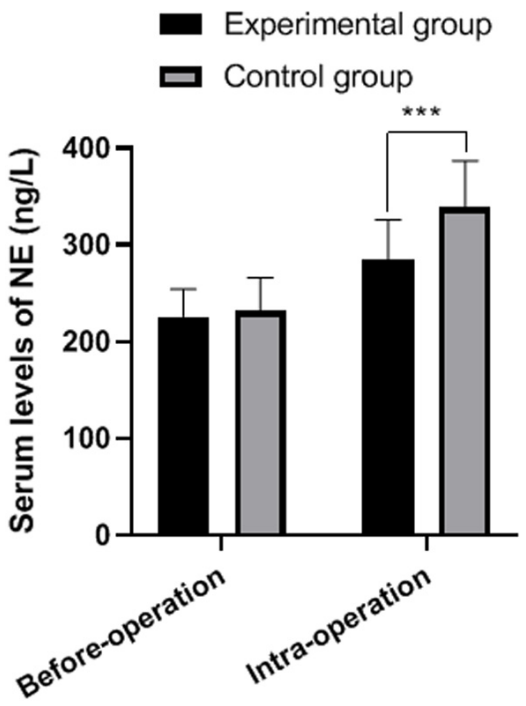

Figure 2. Comparison of the NE concentrations between the two groups before and after the nursing, ***P<0.001.

re were 20 patients with rectal cancer, 19 with breast cancer, and 11 with lung cancer. The patients in the experimental group were 43-77 years old with a mean age of 67.16±1.03 and a male to female ratio of 26:24. There were 22 patients with rectal cancer, 18 with breast cancer, and 10 with lung cancer. No statistically significant differences were observed in the general information between the two groups (all P>0.05, **Table 1**).

Comparison of the changes in the blood pressure levels and heart rates

The experimental group presented remarkably better SBP (123.67±11.51) mmHg and DBP (77.52±8.74) mmHg, as compared to the SBP (147.23±13.04) mmHg and DBP (89.23±9.23) mmHg in the control group (P<0.05; **Figure 1**).

Comparison of the changes in NE, E, and COR

Before the nursing, the concentrations of NE, E, and COR in the experimental group were (225.9±28.4) ng/L, (97.28±19.84) ng/L and (105.9±21.87) ng/L respectively, while the concentrations in the control group were (231.6±34.5) ng/L, (102.5±21.25) ng/L and (111.8±24.67) ng/L respectively. After the nursing, the concentrations of NE, E, and COR in the experimental group were (284.7±41.2) ng/L, (142.55±37.58) ng/L and (137.9±27.90) ng/L respectively, and the concentrations in the control group were (338.5±48.2) ng/L, (186.8±37.50) ng/L and (159.8±29.34) ng/L respectively. The results revealed no significant difference in terms of the NE, E, or COR concen-

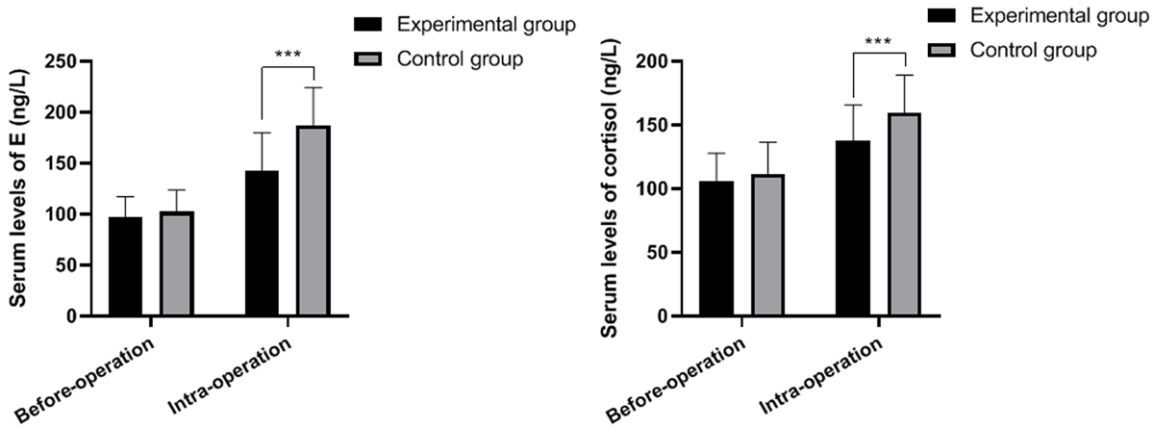

Figure 3. Comparison of the E and cortisol concentrations between the two groups before and after the nursing, ***P<0.001.

Table 2. Comparison of the serum pre-albumin levels ($\bar{x}$±s, g/L)

	n	Pre-albumin		
		Pre-operation	1 d post-operation	3 d post-operation
Experimental group	50	0.14±0.04	0.21±0.06	0.26±0.07
Control group	50	0.15±0.05	0.17±0.07	0.21±0.08
t		1.104	3.068	3.326
P		0.272	0.002	0.001

Table 3. Comparison of the serum albumin levels ($\bar{x}$±s, g/L)

	n	Serum albumin		
		Pre-operation	1 d post-operation	3 d post-operation
Experimental group	50	34.33±4.38	30.26±2.29	32.81±5.51
Control group	50	35.27±3.42	28.25±3.41	29.54±4.23
t		1.196	3.460	3.329
P		0.235	<0.001	0.001

Table 4. Comparison of the serum transferrin levels ($\bar{x}$±s, g/L)

	n	Transferrin		
		Pre-operation	1 d post-operation	3 d post-operation
Experimental group	50	1.52±0.26	1.76±0.32	2.35±0.32
Control group	50	1.55±0.29	1.62±0.21	2.11±0.29
t		0.545	2.586	3.930
P		0.587	0.011	<0.001

trations between the two groups before the nursing (P>0.05). After the nursing, the three indexes increased in both groups, but the levels in the experimental group were significantly lower than those in the control group (P<0.05; **Figures 2**, **3**).

Comparison of the nutritional statuses

The serum pre-albumin, albumin, and transferrin levels did not present any statistical differences before the nursing (P>0.05). After the nursing, the serum pre-albumin, albumin, and

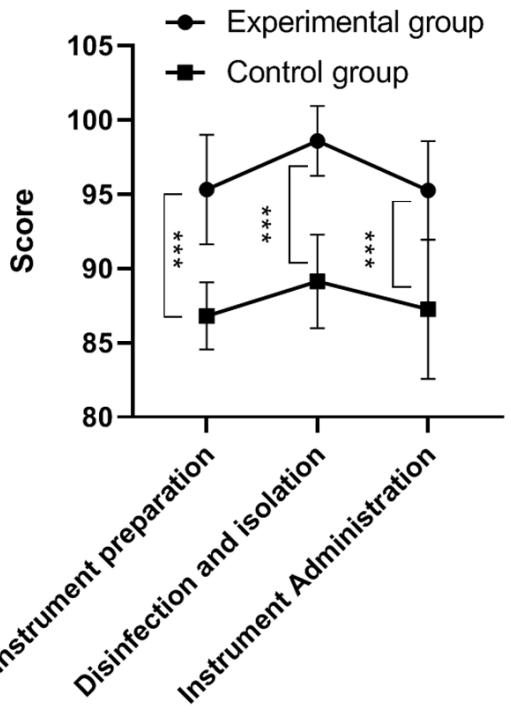

Figure 4. Comparison of the nursing quality between the two groups of patients, ***P<0.001.

transferrin levels in the experimental group were significantly higher than the corresponding levels in the control group (P<0.05; **Tables 2**-**4**).

Comparison of the nursing quality

The equipment preparation, disinfection and isolation, and equipment management scores in the experimental group were (95.32±3.68), (98.59±2.36) and (95.26±3.31), respectively, while the corresponding scores in the control group were (86.81±2.26), (89.13±3.15) and (87.25±4.68), respectively. Higher nursing quality scores were obtained in the experimental group compared to the control group (P<0.05; **Figure 4**).

Comparison of the SAS and SDS scores

The patients' SAS scores in the experimental group before and after the nursing were (53.62±9.54) and (41.29±6.76) respectively, and the scores in the control group were (54.01±9.27) and (48.22±8.29) respectively. The SDS scores of the patients in the experimental group before and after the nursing were (52.26±10.78) and (40.21±7.12) respectively, while the scores in the control group were (52.73±9.88) and (47.26±8.54) respectively. The SAS and SDS scores were not significantly different between the two groups before the nursing (P>0.05), but they were significantly lower in the experimental group compared with the control group after the nursing (P<0.05; **Figure 5**).

Comparison of adverse events and the nursing satisfaction

The results revealed that compared with the control group, the incidences of complications and adverse events in the experimental group were significantly lower (P<0.05; **Table 5**), and the nursing satisfaction was remarkably higher (P<0.05; **Table 6**).

Comparison of the cancer pain

In the experimental group, there were 10 cases of level 0, 18 cases of level I, 15 cases of level II, 5 cases of level III, and 2 cases of level IV. In the control group, there were 4 cases of level 0, 5 cases of level I, 24 cases of level II, 11 cases of level III, and 6 cases of level IV. The cancer pain was significantly different between the two groups (P<0.05; **Table 7**).

Comparison of the postoperative progression-free survival rates and the overall survival rates

As shown in **Table 8**, 6 months after the operations, the progression-free survival rate and overall survival rate of the control group were 76% and 92%, respectively, and the rates in the experimental group were 92% and 96%, respectively. 12 months after the operation, the progression-free survival rate and the overall survival rate in the control group were 62% and 78%, respectively, and the rates in the experimental group were 82% and 90%, respectively. The 6-month and 12-month progression-free survival rates in the experimental group were significantly higher than the rates in the control group (all P<0.05), but no significant differences were found in the overall survival rates between the two groups at 6 months and 12 months after the surgery (all P>0.05; **Figure 6**).

Discussion

The growth patterns and functions of the tumor cells differ from those of normal cells and tis-

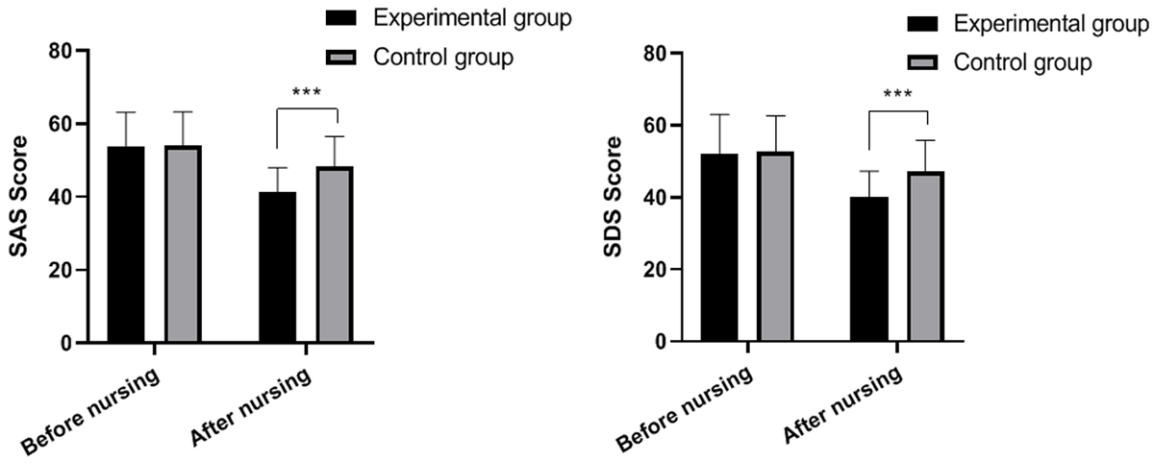

Figure 5. Comparison of the SAS and SDS scores between the two groups before and after the nursing, ***P<0.001.

Table 5. Comparison of the occurrences of accidents and complications between the two groups (n, %)

Group	n	Delayed awakening after operation	Wound infection	Accidents	Total incidence
Experimental group	50	2% (1/50)	0 (0/50)	0 (0/50)	2% (1/50)
Control group	50	6% (3/50)	4% (2/50)	4% (2/50)	14% (7/50)
X^2		1.041	2.04	2.04	4.891
P		0.307	0.153	0.153	0.027

Table 6. Comparison of the nursing satisfaction between the two groups (n, %)

Group	n	Very satisfied	Satisfied	Dissatisfied	Satisfaction rate
Experimental group	50	70% (35/50)	26% (13/50)	4% (2/50)	96% (48/50)
Control group	50	40% (20/50)	40% (20/50)	20% (10/50)	80% (40/50)
X^2		9.09	2.216	6.06	6.06
P		0.003	0.137	0.014	0.014

Table 7. Comparison of the cancer pain levels between the two groups

Group	n	0	I	II	III	IV
Experimental group	50	10	18	15	5	2
Control group	50	4	5	24	11	6
χ^2				16.25		
P				0.003		

sues [15]. The tumor cells will destroy the body's original organs and structures, with a propensity for metastasis, which can be life-threatening to patients. Currently, the treatment methods have been improved to some extent as medical research advances. The main treatment method for tumors is surgical treatment, supplemented by systemic adjuvant treatment to ameliorate patients' conditions [16]. Nowadays, tumors have gradually become chronic diseases, which increases the burden on patients, families, and society. The lack of disease awareness and the unfamiliarity with surgical treatment always result in a stress response and negative emotions in patients during surgery, which can be substantially alleviated by effective nursing interventions [17]. Detailed nursing aims to ensure more detailed and humanized nursing work, which can greatly reduce the nervousness and fear of patients during operations. Under the standardized nursing process, the responsibilities of the nursing staff are clearly defined, thereby avoiding delays in the shift exchange. Consequently, the safety of the operation from many aspects such as psychological nursing, detailed nursing, and heat preservation nursing during the operation can be ensured.

Table 8. Comparison of the 6-month and 12-month progression-free survival rates and the overall survival rate

	n	6 months after surgery		12 months after surgery	
		Progression-free survival rate	Overall survival rate	Progression-free survival rate	Overall survival rate
Experimental group	50	46	48	41	45
Control group	50	38	46	31	39
χ^2		4.762	0.709	4.960	2.679
P		0.029	0.400	0.026	0.102

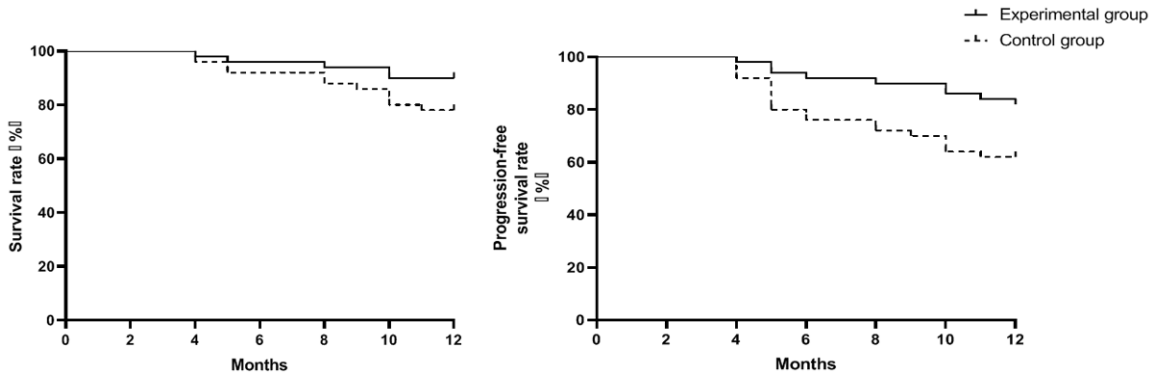

Figure 6. Comparison of the overall survival curve (left) and the progression-free survival curve (right).

In this study, the experimental group yielded better results in blood pressure, stress indexes, nutritional status, and nursing quality after the nursing, indicating that the interventions implemented in the experimental group were contributory to the patients' full preparation for the surgery. In addition, the experimental group had lower SAS and SDS scores after the nursing, indicating a milder stress response in the detailed nursing-intervention group. Previous research has pointed out the key points of detailed nursing, including the refining of the nursing service process, the implementation of single-disease health education, the formulation of standardized patient health education guidelines and hospital admission and discharge, and the teaching of communication skills to the medical staff, aiming to continuously improve the health education of the medical staff and minimize the discomfort and anxiety of patients, which is consistent with the results of this study [18]. A lower incidence of complications was observed in the experimental group, suggesting that this nursing model is safe and can effectively reduce adverse events and complications. Studies have shown that the absence of health education, the call bell response time ≤5 min, and oral care in tumor care increases the risk of adverse events. Detailed nursing attaches great importance to quality control, which can perform early detection on the missing items and carry out targeted nursing quality management to reduce the incidence of adverse events [19]. Moreover, the nursing satisfaction in the experimental group was remarkably higher than it was in the control group, indicating the patients' recognition of this nursing model. According to survey data, 40% of cancer patients need emotional and treatment support, and they expect to obtain more information about the diagnosis, the pros and cons of the treatment options, and their disease prognoses [20]. The positive response to these complex needs reveals the concept of detailed care, which, in addition to the close attention to the patient's disease condition, emphasizes the care of the patient's psychological, social, and spiritual needs to promote recovery, thus achieving promising results in various diseases.

This study adopted detailed nursing care for cancer patients and carried out a targeted analysis of the treatment effect, which provided evidence-based medicine for the deployment of clinical nursing work. However, in the

development of nursing work, the individual differences, in terms of education level, professional ability, and training times of the nurses, require further study. In addition, the condition of the patients is heterogeneous, which results in a large difference in the content of care. Moreover, the nursing procedure of detailed nursing needs to be further standardized so that the nursing model can be officially accepted and applied in actual nursing practice as soon as possible.

Conclusion

In summary, detailed nursing interventions can significantly improve the psychological statuses of tumor patients, reduce adverse stress responses and improve the safety of surgery to a certain extent, so it is worthy of clinical application and promotion.

Disclosure of conflict of interest

None.

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