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Original Article

Effect of comprehensive nursing intervention on perioperative anxiety and sleep quality in elderly patients with digestive tract malignancies

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Abstract: Objective: To analyze the effect of comprehensive nursing intervention on perioperative anxiety and sleep quality in elderly patients with digestive tract malignancies. Methods: In this retrospective study, a total of 96 elderly patients with digestive tract malignancies treated in The First People's Hospital of Wenling from January 2020 to July 2021 were included into a comprehensive group (n=49, comprehensive nursing) and a conventional group (n=47, conventional nursing) according to different intervention methods. Anxiety was assessed using Self-rating Anxiety Scale (SAS) and Hamilton Anxiety Scale (HAMA), and sleep quality was assessed using Pittsburgh Sleep Quality Index (PSQI). Results: The scores of SAS and HAMA of the comprehensive group on day 1 before surgery and day 7 after surgery were lower than those of the conventional group (P<0.05). After intervention, PSQI score of the comprehensive group was lower than that of the conventional group (P<0.05). The comprehensive group had a higher percentage of rapid eye movement sleep, sleep efficiency, and subjective sleep quality scores, and had lower arousal index on the 1st night after surgery than the conventional group (P<0.05). The comprehensive group had a lower incidence of complications and mortality than the conventional group (P<0.05). Univariate analysis showed that the mortality of elderly patients with digestive tract malignancies was significantly higher in patients with age over 70 years old, negative emotions, low degree of tumor differentiation, tumor stage III-IV, history of surgery, no preoperative chemoradiotherapy and conventional nursing. Poorly differentiated tumor, stage III-IV, history of surgery, and conventional nursing were independent risk factors (P<0.05). Conclusion: Comprehensive nursing intervention could effectively improve the perioperative anxiety and sleep quality as well as reduce the incidence of complications in elderly patients with digestive tract malignancies. Attention should be paid to the degree of tumor differentiation, tumor stage, and surgical history in the perioperative period.

Keywords: Digestive tract malignancies, perioperative, anxiety, sleep, comprehensive nursing interventions

Introduction

Digestive tract malignancies have a high mortality in China, and account for about 60%-70% of all malignant tumors [1]. Patients with early digestive tract malignancies present with abdominal pain, diarrhea, nausea and vomiting, and loss of appetite, which are easily misdiagnosed as improper diet, resulting in a delay in treatment. Digestive tract malignancies are highly prevalent in the elderly. Most patients are at an intermediate to advanced stage at the time of diagnosis, resulting in elevated surgical risks and complications as well as reduced chemoradiotherapy tolerance, thus hindering subsequent rehabilitation. Studies have pointed out that patients with advanced digestive tract malignancies present with sleep disorders, lassitude, loss of appetite, pain and memory loss, which negatively affect the quality of life of patients, possibly cause stress ulcer and mental disorders, and are not conducive to the prognosis and recovery of patients [2, 3].

Laparoscopic minimally invasive surgery is currently the preferred option for the treatment of

digestive tract malignancies. However, this procedure requires long anesthesia and surgical duration as well as delicate surgical operations. Therefore, effective nursing measures should be taken to promote a smooth operation and ensure the curative effect and safety. Studies have revealed that colorectal cancer, gastric cancer, and esophageal cancer are all psychosomatic diseases, and the etiology and prognosis are related to mental and psychological factors [4, 5]. Digestive tract malignancies are induced by chronic inflammation and ulcers mainly caused by mental and psychological factors, which increase the incidence of mental and psychological symptoms (e.g., anxiety) and hinder the rehabilitation of the patients. A study indicates that most patients with digestive tract malignancies have significant anxiety disorders and poor adherence to routine treatment [6].

Conventional nursing pays less attention to the psychological state of patients, and patients are more likely to be resistant to the treatment due to adverse emotions, which reduces the effectiveness of treatment and is detrimental to recovery. Psychological intervention is the most effective solution for adverse psychological emotions, and a good psychological state is more conducive to high-quality sleep and recovery. Therefore, it is necessary to give proper psychological nursing intervention during treatment. For comprehensive nursing interventions, a comprehensive intervention group and good doctor-patient and nurse-patient relationships should be established, and patients are instructed to conduct relaxation exercises to relax themselves and alleviate anxiety and nervousness. Cognitive behavioral therapy (CBT) is to enhance patients' confidence in treatment. The family members of patients are asked to maintain a positive attitude and care for the patients, so as to enhance their sense of security, enable the patients to think positively about their diseases, and improve the therapeutic effects and sleep disorders of patients [7]. A study showed that comprehensive nursing intervention could effectively improve the perioperative anxiety and sleep quality of patients with liver cancer, as well as the doctor-patient relationship [8]. However, there is no report on the effect of comprehensive nursing intervention on other digestive tract malignancies. On this basis, this study analyzed the effect of comprehensive nursing intervention on perioperative anxiety and sleep quality in elderly patients with digestive tract malignancies.

Materials and methods

General data

In this retrospective study, a total of 96 elderly patients with digestive tract malignancies treated in The First People's Hospital of Wenling from January 2020 to July 2021 were selected as study subjects. Inclusion criteria: patients with digestive tract malignancies diagnosed by pathological examination, laboratory examination and endoscopy; those aged over 60 years. Exclusion criteria: patients with infectious diseases or immune-mediated diseases; those with hematologic diseases or organic diseases; those who were unable to cooperate with the scale evaluation due to consciousness disorders or psychiatric disorders. The patients were divided into a comprehensive group (n=49) and a conventional group (n=47) according to the different intervention methods. This study was approved by the Ethics Committee of The First People's Hospital of Wenling (No. NCT02356812). The research subjects and their families were informed and signed an informed consent form.

Methods

The conventional group received conventional nursing intervention during the perioperative period, including conventional treatment and nursing, multiple examinations on admission, surgery-related preventive measures, targeted psychological nursing care and health education.

The comprehensive group was given comprehensive nursing intervention during the perioperative period. First, a comprehensive intervention group composed of full-time nurses and physicians was established. Upon admission, good doctor-patient and nurse-patient relationships were established, and the members in the comprehensive intervention group were trained regarding sequential psychological interventions to ensure the consistency of operation process and mode. Second, patients were instructed to conduct relaxation exercises. Postoperative strenuous exercise is not recom-

mended for patients with digestive tract tumors, and relaxation exercises are not only beneficial to the physical recovery of patients, but also have a positive effect on their psychology. The key of relaxation exercises lies in "relaxation" and "quietness". "Relaxation" indicates that patients can relax muscles and emotions, while "quietness" means that patients are in a quiet environment and a calm state of mind. Patients were instructed to master the imaginative relaxation techniques and deep breathing to stabilize their emotions and enhance their self-confidence in the treatment. On the basis of progressive relaxation exercises, patients were instructed to conduct the figurative imagination, and were guided to imagine the immune cells that were destroying cancer cells and previous pleasant events, thus stabilizing their emotions to enhance the therapeutic effects. Patients were placed in the supine position, with eyes closed and hands on the chest or abdomen. Then, they were instructed to breathe at rest, keep the chests still as far as possible when inhaling, try their best to straighten their abdomens, exhale and inhale slowly, contract the abdomen, keep the minimum range of motion of the chests, and try to extend the breathing time. The complete absence of breathlessness was the criterion. The respiratory rate was 6 times/min, and the duration of each inhalation and exhalation was about 10 s, 3-5 s of deep inhalation was, 1 s of holding breath, 3-5 s of slow exhalation and another second of holding breath. Patients with tension could take 2-3 breaths to relax. Third, patients were given CBT. From the day of admission to the day of discharge, the members in the comprehensive intervention group provided CBT to the patients and actively communicated with them. In addition to conventional contents such as the knowledge of digestive tract tumor and surgical precautions, targeted nursing was given to patients with prominent issues to help them view their diseases positively, enhance confidence in treatment, and promote their cooperation with physicians and nurses. CBT was implemented once in the morning and once in the evening in the first 4 weeks, and once a day from the 5th week, for 40-50 min/time. Fourth, family support for patients was strengthened. Nurses also needed to actively communicate with the families of patients to make them understand and support the patient so that they could provide adequate family support for the patient. Attention was devoted to the emotional changes of the families, and active assistance was provided to improve the emotions of the families, so as to avoid the impact of adverse emotions of the families on patients. In addition, the support of the families could enhance the sense of security of patients and improve their compliance with treatment.

If the patient developed complications such as infection or phlebitis, they should be given promptly antibiotic treatment or timely replacement of the indwelling needle.

Observational indices

Anxiety: Anxiety was assessed by Self-rating Anxiety Scale (SAS) [9] and Hamilton Anxiety Scale (HAMA) [10] on the day of admission, 1 day before surgery and 7 days after surgery. SAS comprises 20 items with a 1-4-point scale, and HAMA consists of 14 items with a 0-4-point scale. A higher score indicates a more severe anxiety disorder.

Quality of sleep: Pittsburgh Sleep Quality Index (PSQI) was used to evaluate the quality of sleep on the day of admission (before intervention) and 7 days after surgery (after intervention) [11]. PSQI consists of 7 dimensions, including sleep latency, subjective sleep quality, sleep duration, habitual sleep efficiency, sleep disturbances, daytime dysfunction and use of sleep medications, with 0-3-point scale. A higher score indicates worse sleep quality. The duration of rapid eye movement (REM) sleep was monitored using Compumedics Somté PSG Polysomnograph (Xi'an Xinkang Mingcheng Electronic Technology Co., Ltd.) on the night before surgery and the 1st night after surgery from 21:00 p.m. to 6:00 p.m. The percentage of REM sleep, arousal index and sleep efficiency (sleep time/total recording time) were calculated. Subjective sleep quality was assessed by the patients themselves after awakening in the morning of the next day (with 0 point representing very poor, and 10 points representing excellent).

Incidence of perioperative complications: The incidence of perioperative complications (e.g., infection and phlebitis) was recorded.

Prognosis and survival: The patients were followed up for 1 year, and the prognosis and survival of the patients were recorded.

Table 1. Comparison of baseline data between the two groups ($\bar{x}\pm s$; n, %)

Group	Number of cases	Sex		Age (years)	Course of disease (years)	Disease type			
		Male	Female			Gastric cancer	Colon cancer	Rectal cancer	Esophageal cancer
Comprehensive group	49	26 (53.06)	23 (46.94)	70.92±5.44	2.93±0.86	32 (65.31)	6 (12.24)	6 (12.24)	5 (10.2)
Conventional group	47	26 (55.32)	21 (44.68)	69.56±5.23	3.18±0.96	29 (61.7)	7 (14.89)	7 (14.89)	4 (8.51)
t/χ^2	-	0.049		1.248	1.345	0.024			
P	-	0.824		0.215	0.182	0.877			

Table 2. Comparison of SAS scores between the two groups at different time points (n, %)

Group	Number of cases	Upon admission	1 day before surgery	7 days after surgery	$F_{time\ points}$	$F_{between\ groups}$	$F_{interaction}$
Comprehensive group	49	53.35±5.26	44.86±4.75[a]	32.80±6.03[a,b]	708.045	24.267	25.556
Conventional group	47	54.00±5.46	51.09±4.36[a]	39.57±5.52[a,b]			
t	-	0.597	6.682	5.740	-	-	-
P	-	0.552	<0.001	<0.001	<0.001	<0.001	<0.001

Note: SAS: Self-rating Anxiety Scale; comparison with upon admission, [a]*P*<0.05; comparison with 1 day before surgery, [b]*P*<0.05.

Statistical methods

All data were processed with SPSS 22.0. The counted data were described as (n, %), and χ^2 test was adopted for the comparison. The measured data were described as ($\bar{x}\pm s$). Independent sample t-test was used for the comparison between groups, while the paired t-test was used for the comparison within groups. Repeated measures analysis of variance (ANOVA) was used for the comparisons at different time points, so as to analyze the differences between groups and among different time points. Subsequently, the least significant difference (LSD) t-test was performed. *P*<0.05 indicated a significant difference.

Results

Baseline data

There was no marked difference in the baseline data (sex, age, course of disease and disease type) between the two groups (*P*>0.05) (**Table 1**).

Anxiety

Repeated measurements showed that the scores of SAS and HAMA were noticeably different between the two groups at different time points, and the interactions of time points and between groups were significantly different (*P*<0.05). The LSD-t test suggested that the scores of SAS and HAMA in both groups were the lowest on day 7 after surgery, followed by on day 1 before surgery, and the highest on the day on admission (*P*<0.05), and the scores of SAS and HAMA in the comprehensive group were noticeably lower than those in the conventional group on day 1 before surgery and day 7 after surgery (*P*<0.05) (**Tables 2** and **3**, **Figures 1** and **2**).

Sleep quality

There was no significant difference in the scores of PSQI between the two groups before intervention (*P*>0.05). After intervention, the scores of PSQI in both groups were lower than those before intervention (*P*<0.05), and the score was markedly lower in the comprehensive group than that in the conventional group (*P*<0.05) (**Table 4**). There was no significant difference in the percentage of REM sleep, arousal index, sleep efficiency and subjective sleep quality scores between the two groups on the night before surgery (*P*>0.05). The percentage of REM sleep, sleep efficiency and subjective sleep quality scores on the 1st night after surgery were lower than those on the night before surgery in both groups (*P*<0.05), and were significantly higher in the comprehensive group than those in the conventional group (*P*<0.05). The arousal index on the 1st night after surgery was higher than that on the night before

Table 3. Comparison of HAMA scores between the two groups at different time points ($\bar{x}\pm s$)

Group	Number of cases	Upon admission	1 day before surgery	7 days after surgery	$F_{time\ points}$	$F_{between\ groups}$	$F_{interaction}$
Comprehensive group	49	35.59±8.75	25.18±7.89[a]	17.27±5.46[a,b]	110.751	15.569	7.773
Conventional group	47	35.89±8.62	30.38±8.04[a]	25.17±7.81[a,b]			
t	-	0.170	3.197	5.770	-	-	-
P	-	0.865	0.002	<0.001	<0.001	<0.001	0.001

Note: HAMA: Hamilton Anxiety Scale; comparison with upon admission, [a]*P*<0.05; comparison with 1 day before surgery, [b]*P*<0.05.

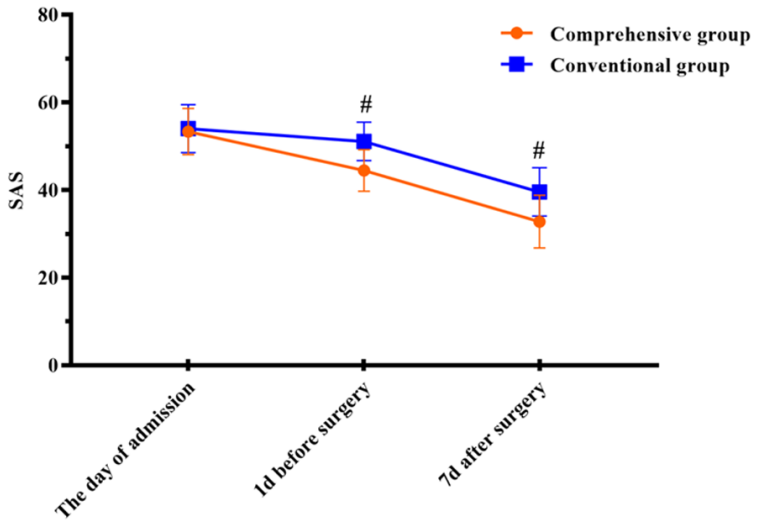

Figure 1. Comparison of SAS scores between the two groups at different time points. SAS: Self-rating Anxiety Scale. # indicates a comparison between the two groups at the same time points, *P*<0.05.

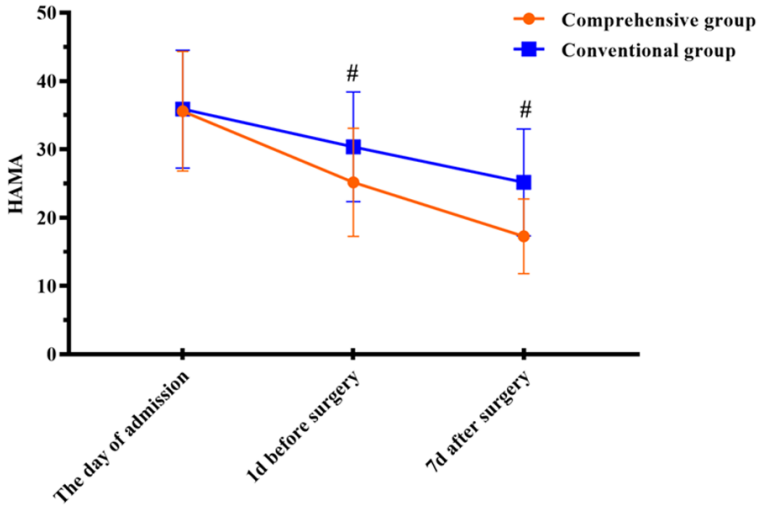

Figure 2. Comparison of HAMA scores between the two groups at different time points. HAMA: Hamilton Anxiety Scale. # indicates the comparison between the two groups at the same time points, *P*<0.05.

surgery in both groups (*P*< 0.05), and was significantly lower in the comprehensive group than that in the conventional group (*P*<0.05) (**Table 5**).

Incidence of complications

The incidence of complications in the comprehensive group was markedly lower than that in the conventional group (2.04% vs. 12.77%, *P*<0.05) (**Table 6**).

Vital status

In the comprehensive group, there were 14 deaths (28.57%) within 1 year, which was significantly lower than 24 deaths in the conventional group (51.06%) (*P*<0.05).

Factors influencing prognosis and survival

Univariate analysis showed that the mortality of elderly patients with digestive tract malignancies was significantly higher in patients with age over 70 years old, negative emotions, low degree of tumor differentiation, tumor stage III-IV, history of surgery, no preoperative chemoradiotherapy and conventional nursing (*P*< 0.05) (**Table 7**). The survival of elderly patients with digestive tract malignancies was taken

Table 4. Comparison of PSQI scores between the two groups before and after intervention ($\bar{x}\pm s$)

Group	Time points	Subjective sleep quality	Sleep latency	Sleep duration	Habitual sleep efficiency	Sleep disturbances	Use of sleep medications	Daytime dysfunction
Comprehensive group (n=49)	Before intervention	1.41±0.31	1.28±0.36	1.09±0.28	1.38±0.32	1.49±0.44	1.04±0.27	0.92±0.25
	After intervention	0.64±0.16	0.85±0.22	0.56±0.14	0.72±0.18	0.67±0.16	0.39±0.13	0.43±0.14
t_a		15.451	7.134	11.851	12.583	12.260	15.184	11.971
P_a		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Conventional group (n=47)	Before intervention	1.47±0.35	1.38±0.38	1.08±0.35	1.28±0.27	1.51±0.44	0.99±0.27	0.95±0.32
	After intervention	1.09±0.29	1.05±0.26	0.88±0.19	1.01±0.22	1.15±0.29	0.76±0.19	0.68±0.18
t_a		5.731	4.914	3.443	5.315	4.683	4.776	5.042
P_a		<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
t_b		0.890	1.324	0.155	1.651	0.223	0.907	0.513
P_b		0.376	0.189	0.877	0.102	0.824	0.367	0.609
t_c		9.465	4.075	9.422	7.082	10.096	11.176	7.614
P_c		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Note: PSQI: Pittsburgh Sleep Quality Index; t_a and P_a indicate the comparison within groups, t_b and P_b indicate the comparison before treatment, and t_c and P_c indicate the comparison after treatment.

Table 5. Comparison of sleep monitoring results between the two groups ($\bar{x}\pm s$)

Group	Time points	Percentage of REM sleep (%)	Arousal index	Sleep efficiency (%)	Subjective sleep quality scores
Comprehensive group (n=49)	The night before surgery	21.73±3.78	4.15±1.13	80.81±9.44	7.58±0.52
	First night after surgery	10.83±1.82	7.23±1.84	67.43±5.19	5.62±0.85
t_a		18.187	9.985	8.694	18.187
P_a		<0.001	<0.001	<0.001	<0.001
Conventional group (n=47)	The night before surgery	22.82±3.72	4.45±1.05	81.42±8.54	7.51±0.58
	First night after surgery	9.27±1.78	11.81±2.14	43.33±5.86	2.72±0.84
t_a		22.526	21.168	25.213	32.17
P_a		<0.001	<0.001	<0.001	<0.001
t_b		1.423	1.346	0.332	0.623
P_b		0.158	0.182	0.741	0.535
t_c		4.244	11.259	21.353	16.807
P_c		<0.001	<0.001	<0.001	<0.001

Note: REM: rapid eye movement; t_a and P_a indicate the comparison within groups, t_b and P_b indicate the comparison before treatment, and t_c and P_c indicate the comparison after treatment.

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

Group	Number of cases	Infection	Phlebitis	All complications
Comprehensive group	49	1 (2.04)	0 (0.00)	1 (2.04)
Conventional group	47	4 (8.51)	2 (4.26)	6 (12.77)
χ^2	-	2.034	2.129	4.082
P	-	0.154	0.144	0.043

as the dependent variable (death assigned to 1, survival assigned to 2), and the above factors with statistical difference were taken as independent variables (age over 70 years old, negative emotions, low degree of tumor differentiation, tumor stage III-IV, history of surgery, no preoperative chemoradiotherapy and conventional nursing were assigned to 1, and other variables were assigned to 2). A binary Logistic regression model was established, and the results showed that low degree of tumor differentiation, tumor stage III-IV, history of surgery and conventional nursing were independent risk factors for poor prognosis and death in elderly patients with digestive tract malignancies (P<0.05) (**Table 8**).

Discussion

Nursing interventions enable patients and their families to have some understanding of the dis-

Table 7. Univariate analysis of prognosis and survival in patients with digestive tract malignancies

Factor	Classification	Death (n=38)	Survival (n=58)	χ^2 value	*P* value
Sex	Male	22 (42.31)	30 (57.69)	0.352	0.553
	Female	16 (36.36)	28 (63.64)		
Age (years old)	≤70	21 (61.76)	13 (38.24)	10.831	0.001
	>70	17 (27.42)	45 (72.58)		
Disease type	Gastric cancer	24 (63.16)	37 (63.79)	0.058	0.809
	Colon cancer	5 (13.16)	8 (13.79)		
	Rectal cancer	5 (13.16)	8 (13.79)		
	Esophageal cancer	4 (10.53)	5 (8.62)		
Psychological states	Negative emotions	21 (53.85)	18 (46.15)	5.587	0.018
	Health emotions	17 (29.82)	40 (70.18)		
Degree of tumor differentiation	Well and moderately differentiated	23 (65.71)	12 (34.29)	15.727	<0.001
	Poorly differentiated and undifferentiated	15 (24.59)	46 (75.41)		
Tumor stage	I-II	20 (66.67)	10 (33.33)	13.384	<0.001
	III-IV	18 (27.27)	48 (72.73)		
History of surgery	No	24 (57.14)	18 (42.86)	9.627	0.002
	Yes	14 (25.93)	40 (74.07)		
Preoperative chemoradiotherapy	Yes	18 (54.55)	15 (45.45)	4.707	0.03
	No	20 (31.75)	43 (68.25)		
Nursing measures	Comprehensive nursing	14 (28.57)	35 (71.43)	5.075	0.024
	Conventional nursing	24 (51.06)	23 (48.94)		

Table 8. Logistic analysis of prognostic and survival factors in patients with digestive tract malignancies

Variable	B	S.E.	Wald	*P* value	Exp (B)	95% CI	
						Lower limit	Upper limit
Age	1.015	0.617	2.706	0.1	2.761	0.823	9.257
Psychological states	0.952	0.607	2.463	0.117	2.591	0.789	8.504
Degree of tumor differentiation	1.81	0.61	8.814	0.003	6.11	1.85	20.184
Tumor stage	1.739	0.627	7.699	0.006	5.69	1.666	19.431
History of surgery	1.63	0.599	7.408	0.006	5.102	1.578	16.498
Preoperative chemoradiotherapy	0.664	0.604	1.211	0.271	1.943	0.595	6.34
Nursing measures	1.194	0.595	4.022	0.045	3.299	1.028	10.59

ease and treatment through planned, organized and scheduled health education activities, so that patients no longer have fear and anxiety due to the lack of understanding of the disease, and patients and their families can keep their mind at ease. As a result, the adaptability and immunity of patients can be improved, thereby effectively enhancing the curative effect [12, 13]. This study presented with targeted countermeasures to patients' concerns and prominent issues through the establishment of comprehensive nursing intervention group and good doctor-patient and nurse-patient relationships. Comprehensive nursing interventions are helpful for patients to positively view their disease and establish protective psychological defenses against the disease. The targeted guidance and systematic education enable patients to have a comprehensive understanding of their disease. The members in the comprehensive intervention group learned effective nursing methods through training, so as to help patients adjust their body and mind, correct adverse habits, relieve negative emotions (e.g., anxiety and nervousness), improve self-care abilities and enhance confidence in treatment [14, 15].

Most patients who recognize that they have intermediate or advanced digestive tract malig-

nancies consider themselves a burden to their families. Comprehensive nursing intervention increases family support, pays attention to the emotions of patients' families, enables the families to maintain a good psychological state. Frequent communication with patients guides their families to participate in nursing interventions for patients, provides patients with the effective support from families, and enhances their sense of security [16, 17]. In addition, patients who recognize that they have digestive tract malignancies are often under pressure, and intend to "escape" or "fight". They present with muscular tension, increased heart rate, and shallow breathing, resulting in the collapse of defensive system and a high incidence of diseases. Comprehensive nursing intervention enables patients to conduct relaxation exercises, and relieves their stress, promotes the balance and coordination of body, mind, and spirit, and independently controls the involuntary reactions (e.g., heartbeat, respiration) [18, 19]. In this study, the scores of SAS and HAMA in both groups were the lowest on day 7 after surgery, followed by the score on the day before surgery, and were the highest on the day of admission. The scores of SAS and HAMA in the comprehensive group were noticeably lower than those in the conventional group on the day before surgery and day 7 after surgery. Similar to the findings of the study by Xu et al. [20], for cancer patients suffered from psychological stress and developed psychological distress, depression and anxiety, nurses could help alleviate these symptoms by identifying stressors and by referring patients to specialists for psychological support. The findings exhibited that after comprehensive nursing intervention, the anxiety disorders were alleviated in elderly patients with digestive tract malignancies. Relaxation exercises are a simple and effective way for adjuvant treatment of anxiety disorders. Therefore, elderly patients with digestive tract malignancies should be encouraged to actively engage in long-term relaxation exercises.

The sleep quality of patients with digestive tract malignancies is related to anxiety disorders, and most patients with digestive tract malignancies get fatigue, lassitude and insomnia [21, 22]. Studies have shown that patients with poor sleep quality generally have aneuria, irritability, anxiety and nervousness, which easily aggravate the physical and mental symptoms of patients, leading to the worse sleep quality, thus forming a vicious circle [23, 24]. Cancer patients can exhibit symptoms of sleep deprivation after surgery, i.e., significant reduction or even loss of REM sleep, decrease of subjective sleep quality and increase of arousal index, and sleep deprivation is related to postoperative pain. In this study, the scores of PSQI in both groups after intervention were lower than before intervention, and were sigificantly lower in the comprehensive group than in the conventional group. The percentage of REM sleep, sleep efficiency, and subjective sleep quality scores on the 1st night after surgery were lower than those on the night before surgery in both groups, and they were significantly higher in the comprehensive group than in the conventional group. The arousal index on the 1st night after surgery was higher than that on the night before surgery in both groups, and was significantly lower in the comprehensive group than in the conventional group. This exhibited that comprehensive nursing intervention can improve the sleep quality of patients. James et al. [25] reported that sleep quality is closely related to in patients' pain, stress reaction and negative psychological state, which shows that comprehensive nursing intervention can improve the sleep quality of patients through relieving patient pain, reducing stress response and improving negative psychological state. The results in this study showed that the incidence of complications (2.04% vs. 12.77%) and 1-year prognostic mortality (28.57% vs. 51.06%) in the comprehensive group were markedly lower than those in the conventional group. This suggests that comprehensive nursing intervention could effectively reduce the incidence of complications in elderly patients with digestive tract malignancies. The prognosis of patients with digestive tract malignancies is one of the clinical focuses, especially in the elderly patients with worse physical condition and worse tolerance than young and middle-aged patients. It is not only related to the survival of patients but also closely related to the quality of clinical nursing. Univariate analysis in this study showed that the mortality of elderly patients with digestive tract malignancies was significantly higher in patients with age over 70 years old, negative emotions, low degree of tumor differentiation, tumor stage III-IV, history of surgery, no preoperative chemoradiotherapy and con-

ventional nursing, with low degree of tumor differentiation, tumor stage III-IV, history of surgery, conventional nursing as independent risk factors. Elderly patients usually have poorer physical function and lower immunity, so they may experience greater trauma after surgery and higher possibility of tumor recurrence. Patients with low tumor differentiation and higher tumor stage have higher risk of tumor cell spread and recurrence, resulting in poor prognosis. Appropriate adjuvant chemoradiotherapy in combination with surgical treatment for patients with digestive tract malignancies is beneficial to prognosis [26, 27]. Therefore, a more effective therapeutic regimen (adjuvant chemoradiotherapy) and nursing regimen (comprehensive nursing) should be adopted for elderly patients with digestive tract malignancies at high risk, so as to maintain a positive and healthy attitude and improve the prognosis and survival of patients.

In summary, we performed comprehensive nursing intervention in the perioperative period for elderly patients with digestive tract malignancies by constructing a comprehensive intervention group consisting of full-time nurses and physicians, as well as good doctor-patient and nurse-patient relationships. The members in the comprehensive intervention group were trained to improve their nursing skills, and the patients were instructed to perform breathing exercises to relieve stress and relax themselves. In addition, targeted explanations were provided regarding prominent concerns of patients to alleviate their fear and anxiety due to lack of understanding of the disease, and attention was devoted to the psychological state of patients' families to obtain their support, thus effectively improving the anxiety of patients, improving sleep quality, and reducing the incidence of complications. However, this study was analyzed retrospectively, which may have biased the results. The limited lengths of hospital stay led to a short duration of interventions, so we failed to investigate the long-term prognosis in depth. In addition, the sample size was relatively small. Therefore, future studies with larger sample sizes and longer durations of interventions should be performed to explore and validate the long-term prognosis.

Disclosure of conflict of interest

None.

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References

[1] Teich N, Selig L, Liese S, Schiefke F, Hemprich A, Mössner J and Schiefke I. Usage characteristics and adverse event rates of the direct puncture and pull techniques for percutaneous endoscopic gastrostomy in patients with malignant tumors of the upper aerodigestive tract. Endosc Int Open 2018; 6: E29-E35.

[2] Qin XG, Zeng JH, Lin P, Mo WJ, Li Q, Feng ZB, Luo DZ, Yang H, Chen G and Zeng JJ. Prognostic value of small nuclear RNAs (snRNAs) for digestive tract pan-adenocarcinomas identified by RNA sequencing data. Pathol Res Pract 2019; 215: 414-426.

[3] Zhang J and Dong W. Lentiviral-mediated beclin-1 overexpression inhibits cell proliferation and induces autophagy of human esophageal carcinoma Eca109 cell xenograft in nude mice. Recent Pat Anticancer Drug Discov 2020; 15: 70-77.

[4] Baudry AS, Anota A, Mariette C, Bonnetain F, Renaud F, Piessen G and Christophe V. The role of trait emotional intelligence in quality of life, anxiety and depression symptoms after surgery for esophageal or gastric cancer: a French national database FREGAT. Psychooncology 2019; 28: 799-806.

[5] Mols F, Schoormans D, de Hingh I, Oerlemans S and Husson O. Symptoms of anxiety and depression among colorectal cancer survivors from the population-based, longitudinal PROFILES registry: prevalence, predictors, and impact on quality of life. Cancer 2018; 124: 2621-2628.

[6] Peng YN, Huang ML and Kao CH. Prevalence of depression and anxiety in colorectal cancer patients: a literature review. Int J Environ Res Public Health 2019; 16: 411.

[7] 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.

[8] Zhang X, Wang Q, Zhang X, Wu X, Wang Q and Hong J. A cognitive-behavioral intervention for the symptom clusters of chinese patients with gastrointestinal tract cancer undergoing chemotherapy: a pilot study. Cancer Nurs 2019; 42: E24-E31.

[9] Yang G, Su S, Jie H, Baad-Hansen L, Wang K, Yan S, Liu H, Xie QF and Svensson P. Somato-

sensory profiling of patients with burning mouth syndrome and correlations with psychologic factors. J Oral Facial Pain Headache 2019; 33: 278-286.
[10] Gale C, Glue P, Guaiana G, Coverdale J, McMurdo M and Wilkinson S. Influence of covariates on heterogeneity in Hamilton anxiety scale ratings in placebo-controlled trials of benzodiazepines in generalized anxiety disorder: systematic review and meta-analysis. J Psychopharmacol 2019; 33: 543-547.
[11] Dunleavy G, Bajpai R, Tonon AC, Chua AP, Cheung KL, Soh CK, Christopoulos G, Vries H and Car J. Examining the factor structure of the Pittsburgh sleep quality index in a multi-ethnic working population in Singapore. Int J Environ Res Public Health 2019; 16: 4590.
[12] Luan L and Wang L. Observation of nursing effect for patients with primary liver cancer before and after transcatheter arterial embolization. Pak J Pharm Sci 2019; 32: 2455-2458.
[13] Coolbrandt A, Wildiers H, Aertgeerts B, Dierckx de Casterlé B, van Achterberg T and Milisen K. Systematic development of CHEMO-SUPPORT, a nursing intervention to support adult patients with cancer in dealing with chemotherapy-related symptoms at home. BMC Nurs 2018; 17: 28.
[14] Lim SH, Chan SWC, Lai JH and He HG. A qualitative evaluation of the STOMA psychosocial intervention programme for colorectal cancer patients with stoma. J Adv Nurs 2019; 75: 108-118.
[15] McCaughan E, Curran C, Northouse L and Parahoo K. Evaluating a psychosocial intervention for men with prostate cancer and their partners: outcomes and lessons learned from a randomized controlled trial. Appl Nurs Res 2018; 40: 143-151.
[16] Zhou K, Wang W, An J, Li M, Li J and Li X. Effects of progressive upper limb exercises and muscle relaxation training on upper limb function and health-related quality of life following surgery in women with breast cancer: a clinical randomized controlled trial. Ann Surg Oncol 2019; 26: 2156-2165.
[17] Sridhar S, Suprabha BS, Shenoy R, Shwetha KT and Rao A. Effect of a relaxation training exercise on behaviour, anxiety, and pain during buccal infiltration anaesthesia in children: randomized clinical trial. Int J Paediatr Dent 2019; 29: 596-602.
[18] Liu XY, Zhao X, Gan CB, Shao LL and Wang X. Effect of psychological nursing based on relaxation training for the psychological state in patients with impacted third molar removal surgery. Zhonghua Kou Qiang Yi Xue Za Zhi 2018; 53: 324-327.
[19] Szulczewski MT. Training of paced breathing at 0.1 Hz improves CO_2 homeostasis and relaxation during a paced breathing task. PLoS One 2019; 14: e0218550.
[20] Xu B, Ng MSN and So WKW. A review of the prevalence, associated factors and interventions of psychological symptoms among cancer patients in the Chinese Mainland during the COVID-19 pandemic. Ecancermedicalscience 2021; 15: 1332.
[21] McCall M. Yoga intervention may improve health-related quality of life (HRQL), fatigue, depression, anxiety and sleep in patients with breast cancer. Evid Based Nurs 2018; 21: 9.
[22] Yıldırım E and Demir E. The relationship of hyperemesis gravidarum with sleep disorders, anxiety and depression. J Obstet Gynaecol 2019; 39: 793-798.
[23] Wallen GR, Park J, Krumlauf M and Brooks AT. Identification of distinct latent classes related to sleep, PTSD, depression, and anxiety in individuals diagnosed with severe alcohol use disorder. Behav Sleep Med 2019; 17: 514-523.
[24] Effendy E, Prasanty N and Utami N. The effects of brain gym on quality of sleep, anxiety in elderly at nursing home care case Medan. Open Access Maced J Med Sci 2019; 7: 2595-2598.
[25] James LE, Gottschlich MM, Nelson JK, Cone LC and McCall JE. Pediatric perioperative measures of sleep, pain, anxiety and anesthesia emergence: a healing touch proof of concept randomized clinical trial. Complement Ther Med 2019; 42: 264-269.
[26] Shang W, Yuan W, Liu R, Yan C, Fu M, Yang H and Chen J. Factors contributing to the mortality of elderly patients with colorectal cancer within a year after surgery. J Cancer Res Ther 2022; 18: 503-508.
[27] Lee KE and Lim KH. Differences in factors affecting the quality of life over time after the gastrectomy in patients with stage I gastric cancer. Gastroenterol Nurs 2020; 43: 241-248.