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Original Article

Personalized nursing improves the quality of life and treatment compliance during chemotherapy for patients with gastrointestinal cancer

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Abstract: Objective: To explore the effect of personalized nursing intervention on the compliance of patients with gastrointestinal cancer chemotherapy. Methods: A total of 188 patients with tumor and chemotherapy who were treated in our gastroenterology department were enrolled in this study. The patients were divided into the control group (CG) and the observation group (OG) according to a random number table method. The Activity of Daily Living (ADL) score, Self-Rating Anxiety Scale (SAS) and self-report of depression changes in the Self-Rating Depression Scale (SDS) were observed before the nursing (T0), 2 weeks after nursing (T1) and 1 month after treatment (T2). The treatment compliance scale was used to evaluate both groups. A satisfaction rating scale designed by our hospital was used to compare the level of patient satisfaction. A 3-year prognostic follow-up was performed in both groups. Results: The ADL score of the OG was different from that of CG before treatment, and was higher than that of CG at T1 and T2 ($P<0.05$). The SAS and SDS scores of each group at T1 and T2 were different from those at T0 ($P<0.05$). The OG showed significantly better compliance and higher level of satisfaction than those of the CG ($P<0.05$). No statistical difference in the 3-year survival rate was observed between the two groups ($P=0.853$). Conclusion: Personalized nursing can effectively improve the quality of life and treatment compliance during chemotherapy for patients with gastrointestinal tumors.

Keywords: Effect, personalized nursing intervention, compliance, gastrointestinal cancer chemotherapy, depression and anxiety

Introduction

In recent years, with the continuous improvement of people's living standards, people's dietary habits their lives have undergone great changes [1]. In the latest global oncology epidemiological statistics [2], new gastrointestinal cancers (DTTs) accounted for 22.2% of all cancers, and the mortality accounted for 35.2% of all tumor related deaths. How to treat the high morbidity and mortality of this cancer disease is particularly important. At present, the most effective treatment plan in clinical practice is to remove the lesioned tissue of the patient by surgery [3]. However, the patients who can undergo surgery only account for a small portion of all tumor patients. Most of the patients are in an advanced stage of the disease, are unable to undergo surgical resection, and we can only prolong the life of patients through radiotherapy and chemotherapy [4]. However, during the course of radiotherapy and chemotherapy, patients are prone to adverse reactions [5]. This easily causes patients to question the therapeutic effect, resulting in negative emotions, reducing the quality of life of patients and treatment compliance [6]. This will have an impact on the clinical treatment efficacy of patients [7]. Therefore, clinical treatment can help improve the patient's bad mood and improve the patient's treatment compliance and quality of life [8, 9].

Nursing is an indispensable part of clinical treatment [10]. Because nursing programs that lack diversity are most commonly adopted, patients' individual needs are not met which may cause doctor-patient disputes [11]. Therefore, we hope to improve this status by finding a solution to the current situation [12]. Patient-centered nursing includes minimizing adverse reactions in patients' treatment, and improving patients' awareness of disease treatment, thereby improving patients' quality of life

and treatment compliance [13, 14]. Moreover, previous studies have shown that patients' nursing satisfaction, quality of life and negative emotions were improved after personalized nursing [6]. However, there is no literature on the clinical effects of personalized nursing on patients with gastrointestinal tumors after digestive tract chemotherapy.

Therefore, this study conducted personalized nursing for patients with gastrointestinal tumors after chemotherapy, in order to find a more effective nursing program to improve patients' mood, quality of life, and provide reference for clinical nursing.

Materials and methods

From January1st 2013 to January 1st 2015, 188 patients with gastric cancer, esophageal cancer, colorectal cancer treated with chemotherapy in the Department of Gastroenterology in our hospital were enrolled as the study subjects; including 89 cases of gastric cancer, 76 cases of esophageal cancer, and 23 cases of intestinal cancer. The patients were divided into CG and OG according to a random number table method. In the CG, there were 50 males and 44 females, with an average age of 62.7±9.2 years. There were 54 males and 40 females in the OG, with an average age of 63.1±10.5 years. This study was approved by the Medical Ethics Committee of the Affiliated Hospital of Chengdu Traditional Chinese Medicine University.

Inclusion criteria: patients who met the corresponding tumor criteria by pathological diagnosis; patients with gastric cancer, esophageal cancer, colorectal cancer; patients with Clinical Staging III, IV; patients with life expectancy of more than 3 months patients whose disease diagnosis and treatment were performed in our hospital; and patients who met the 7th edition of the TNM staging issued by the 2009 AJCC (American Joint Committee on Cancer) [15].

Exclusion criteria: patients with a predicted survival of less than 3 months, patients with tumors other than those mentioned in the inclusion criteria; patients with clinical data completion; patients who were unwilling to cooperate with the family; patients with immune system diseases.

Nursing plan

In the study, the CG was given routine care. The program was as follows: Medical staff guide the patients through hospitalization, remind them of precautions before chemotherapy, guidance on regular diet and medication. Instructions in treatment and care process were communicated with family members. The medical staff observe whether the patient's basic vital signs are stable, guide patients to eat food high in protein, and inform patients with a history of smoking to ban smoking.

On the basis of the CG, the OG had a personalized nursing program as follows: 1) Responsible nurses communicate with patients at least 20 minutes a day to comprehensively understand the patient's physical, psychological, family, social, and living habits, as well as personality characteristics and other aspects. While providing professional nursing, nurses meet the individual needs of patients, maximize the expectations of patients towards their services, and fulfill their need for self-esteem [16]. 2) Personalized duty nursing [6]: The patient was given personalized nursing according to the characteristics of the condition. The patient was given a detailed and targeted care plan, which was adjusted according to patient' overall condition. The patients' bad eating habits were corrected and a plan of eating less in more frequent meals was made. The patient's diet was balanced. Patients get appropriate outdoor exercise, which can be assisted at the initial stages, then assistance is gradually reduced, and completed independently as far as possible [17]. 3) Psychological counseling: Since patients had less knowledge about the disease, the medical staff actively communicate with the patient, patiently listen to their complaints, guide them to express their feelings, and give advice and certain encouragement when appropriate. This could help patients build self-confidence against the disease [18].

Outcome measures

Main outcome measures: Changes in the ADL scores [19] were observed before treatment, 2 weeks into nursing, and 1 month after nursing. There were a total of 18 questions, with a total score of 126 points, and the lowest score was 18 points. The higher the score, the stronger the patient's ability to live independently. SAS and SDS were used to evaluate patients' anxiety and depression before nursing, 2 weeks after nursing, and 1 month after treatment. There were 20 questions, with a total score of 80; and the lowest score was 20 points. The

Table 1. Baseline data

Factor	Control Group (n=94)	Observation Group (n=94)	X^2/t value	*P* value
Gender			0.344	0.557
Male	50 (53.19)	54 (57.45)		
Female	44 (46.81)	40 (42.55)		
Age (years)	62.7±9.2	63.1±10.5	0.278	0.782
BMI (kg/m^2)	22.14±1.75	22.47±1.81	1.271	0.205
Past Medical History				
Hypertension	21 (22.34)	25 (26.60)	0.460	0.497
Hyperlipidemia	19 (20.21)	24 (25.53)	0.754	0.385
Diabetes	22 (23.40)	19 (20.21)	0.281	0.596
Tumor type			1.125	0.570
Gastric Cancer	42 (44.68)	47 (50.00)		
Esophageal Cancer	41 (43.62)	35 (37.23)		
Colorectal Cancer	11 (11.70)	12 (12.77)		
Clinical Staging			0.246	0.620
III	84 (89.36)	86 (91.49)		
IV	10 (10.64)	8 (8.51)		
Residence			0.572	0.449
City	62 (65.96)	57 (60.64)		
Rural	32 (34.04)	37 (39.36)		
Smoking History			0.200	0.655
Comorbid diseases	No	No		
Nutritional status	Yes	Yes	0.35	0.967
Alcohol, History			0.52	0.764
Gender				
Yes	55 (58.51)	58 (61.70)		
No	39 (41.49)	36 (38.30)		

higher the score, the more serious the patient's anxiety and depression.

Secondary outcome measures: [20] ADL, SAS and SDS scale was used to evaluate the treatment compliance. A satisfaction rating scale designed by our hospital was used to compare patients' satisfaction. A 3-year prognostic follow-up over the phone and Wechat was conducted in both groups, which was performed at the 1st, 3rd, 6th, 9th and 12th month after discharge.

Statistical analysis

In this study, the collected data was analyzed using SPSS 20.0 software. GraphPad Prism 7 software was used to draw related images. K-S was used to analyze the distribution of data. The rate (%) was used to represent the count data, using the chi-square test, expressed as X^2. Non-parameters are used to verify grade data, denoted by Z. Measurement data were expressed as mean ± standard deviation (mean ± SD). The data conforming to the normal distribution was analyzed by independent sampled t test. The data that did not conform to the normal distribution were analyzed by the rank sum test, denoted by Z. K-M survival curve was used to plot the 3-year survival of patients in the CG and OG. Multiple sets of different time points were compared using repeated measures analysis of variance, denoted by F. Bonferroni was used to compare the two pairs. When $P < 0.05$, there was a statistical difference.

Results

Clinical data of the patients

There were no differences in gender, age, BMI, past medical history, tumor type, clinical stage, place of residence, comorbid diseases, nutritional status, alcohol and smoking history between the two groups (P>0.05) (**Table 1**).

Table 2. Comparison of ADL scores between two groups

Group	ADL score			F	P
	Before Nursing	Nursing 2 Weeks	Nursing for 1 month		
Control Group (n=94)	45.14±5.25	58.74±7.14*	68.74±6.14*,#	278.918	<0.001
Observation Group (n=94)	46.72±6.74	68.14±6.21*	79.57±7.11*,#	590.723	<0.001
t	1.793	9.631	11.177		
P	0.075	<0.001	<0.001		

Note: *indicates that there is a difference compared with that before nursing (P<0.05), and #means that there is a difference compared with 2 weeks of nursing (P<0.05).

Table 3. Comparison of SAS scores between two groups

Group	SAS score			F	P
	Before Nursing	Nursing 2 Weeks	Nursing for 1 Month		
Control Group (n=94)	59.41±4.84	51.24±4.89	41.35±3.94	435.541	<0.001
Observation Group (n=94)	58.88±4.77	43.18±4.32	32.74±3.59	980.155	<0.001
t	0.756	11.976	15.661		
P	0.450	<0.001	<0.001		

Table 4. Comparison of SDS scores between two groups

Group	SDS score			F	P
	Before Nursing	Nursing 2 Weeks	Nursing for 1 Month		
Control Group (n=94)	60.88±5.75	51.74±4.77	44.84±4.12	242.770	<0.001
Observation Group (n=94)	59.74±5.48	43.77±4.98	33.25±4.39	574.832	<0.001
t	1.392	11.206	18.664		
P	0.166	<0.001	<0.001		

Comparison of ADL scores of two groups at different time points during nursing

As time increased, the ADL scores of the two groups of patients gradually increased. Comparison between both groups showed that there was a statistical difference in ADL scores at four weeks and 1 month time point (P<0.05). The comparison between groups showed that there was a difference in ADL score between the OG and CG before nursing, and there was a difference between both groups at other time points as well (P<0.05) (**Table 2**).

Comparison of SAS and SDS scores at different time points during nursing

As time increased, the SAS and SDS scores of both groups gradually decreased. The comparison between both groups showed that there was a statistical difference between the SAS and SDS scores (P<0.05). The comparison between groups showed that there was a difference in SAS and SDS scores between the OG and CG before nursing. At the other time points, the scores of the OG were lower than those of CG (P<0.05) (**Tables 3**, **4**).

Comparison of patients' compliance and satisfaction

The compliance of the two groups was compared. It was found that 50 patients in the OG complied completely, 39 patients partially complied, and 5 patients did not comply. In the CG, 30 patients complied completely, 43 patients partially complied, and 21 patients did not comply. The OG showed significantly better compliance than the CG (P<0.05). Comparing the satisfaction of the two groups, 44 patients were very satisfied, 43 were satisfied, and 7 were unsatisfied in the OG. Otherwise, 28 patients were very satisfied, 50 were satisfied, and 16 were unsatisfied in the CG. The comparison showed that the satisfaction of the OG was significantly better than that of the CG (P<0.05) (**Tables 5**, **6**).

Table 5. Comparison of compliance between two groups

Group	Complete Compliance	Partial Compliance	Non-compliAnce	Z	P
Control Group (n=94)	50 (53.19)	39 (41.49)	5 (5.32)	-3.638	<0.001
Observation Group (n=94)	30 (31.91)	43 (45.74)	21 (22.34)		

Table 6. Comparison of patient satisfaction between the two groups

Group	Very Satisfied	Satisfied	Discontent	X^2	P
Control Group (n=94)	44 (46.81)	43 (45.74)	7 (7.45)	-2.725	0.006
Observation Group (n=94)	28 (29.79)	50 (53.19)	16 (17.02)		

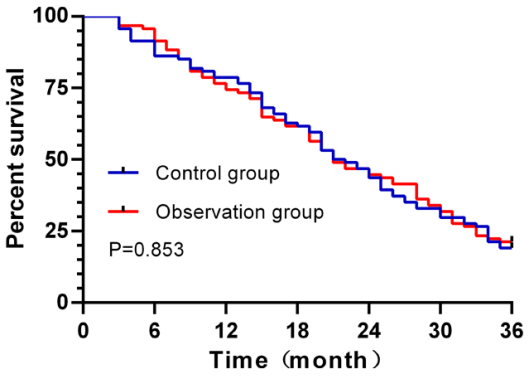

Figure 1. There was no significant difference in 3-year survival between the two groups (P<0.853).

Three-year survival of the two groups of patients

The 3-year survival rates of the two groups were compared. There was no statistically significant difference in the 3-year survival rate between patients in the CG and those in the SG (P=0.853), (**Figure 1**).

Discussion

Gastrointestinal tumors are a class of malignant tumors with high global morbidity and mortality [21]. The most effective and prognostic method for treating tumors today is surgical resection. However, not all patients can be treated with surgery to improve the condition, most of the early tumor lesions do not have clear clinical symptoms, due to lack of early screening markers [22, 23]. Therefore, after the patient is admitted to the hospital, they are basically in middle-advanced stages, and can only be treated by chemoradiotherapy, palliative treatment, to prolong the life of the patient [24, 25]. Chemotherapy is one of the main means of clinical treatment in the middle and late stages. Studies have shown that [26] the survival time of most tumor patients after chemotherapy has been significantly improved. Moreover, the patient does not understand the adverse reactions that occur during the treatment of the disease, which brings panic. This may cause patients to question the treatment effect, and thus become unwilling to cooperate with treatment and this reduces the efficacy, which can be due to lack of clinical communication [27]. Previous studies have shown that care can improve patient compliance and reduce patient's negative emotions. However, due to the continuous improvement of quality of life and living standards, basic routine care can no longer meet the clinical needs of patients, so a new type of care plan is sought to improve this problem. In recent years, a variety of nursing models have been validated in clinical studies, such as evidence-based nursing [28], comprehensive nursing [29], personalized nursing [14] and so on. Personalized nursing is based on the patient's condition and has been designed as a corresponding nursing program, which meets the individual needs of patients and emphasizes people-oriented care [30]. Related literature has shown that [31] personalized nursing has achieved good results in chronic obstructive pulmonary disease, chronic hepatitis B, and orthopedic surgery. However, it is unclear whether it is possible to have excellent performance in DTT. In this study, 188 patients with gastrointestinal cancer chemotherapy were randomized to observe the effect of personalized nursing on patients. The patient's quality of life was first assessed using the ADL score, which was used as a clinically useful quality of life score. It is mainly based on the patient's daily life, and the score can directly reflect patients' life quality [32]. It was found that the ADL scores of patients in the two

groups increased gradually over time, which was different from that before nursing. Moreover, ADL scores of the OG at each time point were higher than those of the CG. This suggested that personalized nursing can effectively improve the patients' life quality. This is mainly because personalized nursing is tailored to the patient's condition, and proper outdoor exercise is one of the reasons for improving patients' life quality [33]. The patient's SAS and SDS scores were then compared. The SAS and SDS scores were edited by Professor Zhuang of the Chinese American Duke University in 1971 and 1966, and are currently widely used in clinical practice [34]. The changes of SAS and SDS scores before and after treatment were compared between the two groups. It was found that the scores of the two groups of patients gradually decreased with time, and the scores of the patients in the OG at different time points were lower than those of the CG. In the study of Zhang et al. [35], it was found that the SAS and SDS scores of patients with gastrointestinal tumors were effectively improved by comprehensive nursing. Although our study differed from its care model, the patient's anxiety and depression were also improved by personalized nursing, which better illustrated the improvement of anxiety and depression in patients through personalized nursing. However, the clinical compliance of patients is closely related to the therapeutic effect of patients. Studies have shown that patients with low compliance rates can directly affect the clinical efficacy of patient's treatment. Therefore, the clinical efficacy of patients care was also compared. It was shown that the compliance of the CG was significantly lower than that of the OG. Not only that, but the patient's care satisfaction was compared. The nursing satisfaction of the OG was found to be significantly higher than that of the CG. This suggested that personalized nursing effectively improved patient compliance and satisfaction, which was conducive to improving the relationship between doctors and patients.

At the end of the study, the 3-year survival of the two groups of patients was compared. In a study by Boele et al. [36], home-nursing effectively improved patient survival. The 3-year survival rate of the two groups was not significantly different. Although our study did not affect the patient's survival, we effectively improved the patient's quality of life and negative emotions, as well as improving patients' compliance and satisfaction. Our research had certain limitations. First of all, this study did not improve patient's survival. Second, it was not analyzed whether the clinical efficacy of the patient was improved after nursing. Therefore, it is expected that, a nursing program to improve the patient's survival can be found in the future, and the impact on the clinical efficacy of the patient after the nursing can be analyzed to supplement the study.

In summary, personalized nursing can effectively improve the quality of life and nursing compliance during chemotherapy for patients with gastrointestinal tumors, which is worthy of being promoted in clinical practice.

Disclosure of conflict of interest

None.

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