



Retrospective Study

Caregiver-involved nutritional support and mindfulness training for patients with gastrointestinal cancer: Effects on malnutrition risk and mood

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Abstract

BACKGROUND

The participation of caregivers, who play a crucial role in the recovery of patients with gastrointestinal tumors, in family nutrition support decisions can help tailor nutrition plans to meet the specific needs and lifestyle habits of the patient, thereby enhancing the effectiveness of nutritional intake.

AIM

To assess the impact of caregiver-shared decision-making in family nutritional support with mindfulness-based behavioral therapy on the risk of malnutrition and mood states in patients with gastrointestinal tumors.

METHODS

Patients with gastrointestinal tumors ($n = 118$) treated at the Jiangnan University Affiliated Hospital between December 2021 and March 2024 were assigned to the observation ($n = 59$) and control ($n = 59$) groups using the random number table method. In addition to the standard treatment and basic nursing measures implemented in the control group, the integrated approach was implemented in the observation group. The nutritional and mood state indicators, compliance, and satisfaction before and 6 months after implementing the intervention were com-

pared between the groups.

RESULTS

The body mass index, serum albumin levels, and transferrin levels, as well as the scores for all seven dimensions of the Profile of Mood States questionnaire, in the observation were higher than those in the control group after the 6-month follow-up period ($P < 0.05$). However, the Nutrition Risk Screening 2002 and Mindful Attention Awareness Scale scores were lower than those in the control group ($P < 0.05$). The compliance and satisfaction rates were 94.92% and 98.31%, respectively, which were higher than those of the control group (79.66% and 88.14%, respectively; $P < 0.05$).

CONCLUSION

The implementation of the integrated approach significantly reduced the risk of malnutrition and improved mood states in patients with gastrointestinal tumors. Moreover, the compliance and satisfaction rates were higher.

Key Words: Caregiver-shared decision-making; Family nutritional support; Mindfulness-based behavioral therapy; Gastrointestinal tumors; Risk of malnutrition; Mood state

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Core Tip: Family nutritional support integrated with mindfulness-based behavioral therapy facilitated by shared decision-making among caregivers can significantly reduce the risk of malnutrition in patients with gastrointestinal tumors. In addition, this approach can improve mood, treatment compliance, and satisfaction with care by providing home-based nutritional support and mindfulness training.

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INTRODUCTION

The prevalence of gastrointestinal tumors, which pose a significant threat to human health, has been reported to be high globally[1]. These tumors, which typically originate from the mucosal layer of the gastrointestinal tract, infiltrate and spread to deeper tissues[2,3]. No distinct symptoms may be observed during the early stages of the disease; however, symptoms such as abdominal pain, gastrointestinal bleeding, and weight loss emerge as the disease progresses[4]. Malnutrition and depression owing to prolonged torment of the disease are often observed in patients with gastrointestinal tumors, diminishing the therapeutic outcomes and quality of life[5]. Therefore, it may be beneficial to incorporate nutritional support and psychological interventions into the comprehensive treatment of gastrointestinal tumors. Mindfulness-based behavioral therapy is a psychological intervention that teaches patients to focus on the present moment and accept and observe their feelings, thoughts, and bodily sensations. This enables patients to reduce the impact of negative emotions, such as anxiety and depression, and enhance their psychological resilience[6]. Caregivers play a crucial role in the recovery of patients with gastrointestinal tumors. Shared decision-making in family nutritional support facilitates the alignment of the nutritional support plan with the actual needs and lifestyle habits of patients. Thus, the incorporation of shared decision-making in family nutritional support improves the effectiveness of nutritional intake[7]. This study aimed to explore the effects of the application of a nursing model combining caregiver-shared decision-making in family nutritional support with mindfulness-based behavioral therapy to the management of patients with gastrointestinal tumors, thereby providing a more comprehensive and effective treatment strategy.

MATERIALS AND METHODS

Study participants

Patients with gastrointestinal tumors ($n = 118$) who received treatment at the Jiangnan University Affiliated Hospital between December 2021 and March 2024 were eligible for inclusion in this study. The random number table method was used to assign the patients to the following groups at random: The observation ($n = 59$) and control ($n = 59$) groups. The inclusion criteria were as follows: (1) Patients with histopathologically-confirmed diagnosis of gastrointestinal tumors; (2) Patients aged 18-75 years with normal cognitive ability and communication skills; and (3) Voluntary participation of the patient and their families.

Table 1 Comparison of general data between the two groups n (%)

Groups	n	Sex		Age (years)	Tumor type		Lesion diameter (cm)
		Female	Male		Gastric cancer	Colorectal cancer	
Observation group	59	39 (66.10)	20 (33.90)	56.79 ± 9.34	26 (44.07)	33 (55.93)	2.87 ± 0.92
Control	59	38 (64.41)	21 (35.59)	55.35 ± 9.47	25 (42.37)	34 (57.63)	2.79 ± 0.88
χ^2/t	-	0.037		1.447	0.035		0.483
P value	-	0.847		0.151	0.853		0.630

The exclusion criteria were as follows: (1) Patients with other severe organic diseases, such as heart, liver, or kidney diseases; (2) Patients with a history of mental or psychological disorders; and (3) Patients currently receiving other forms of psychological intervention or nutritional support treatment. Table 1 presents the general characteristics of the two groups ($P > 0.05$).

Research methods

Control group: The patients assigned to the control group received the following fundamental nursing interventions in accordance with standard treatment protocol: (1) Medical observation: The patients were monitored for symptoms such as acid reflux, belching, nausea, and vomiting. The location, intensity, and duration of pain with respect to the dietary intake, as well as the changes in bowel movements, were assessed; (2) Medication observation and guidance: Personalized nursing care was provided to the patients according to the physical status and the properties of the medication, as directed by the physician. The patients were monitored for any adverse drug reactions; (3) Dietary guidance: A high-calorie, high-protein, vitamin-rich, soft, or semi-fluid diet was introduced. Small meals were provided multiple times throughout the day; irritating and gas-producing foods were avoided. Iron supplementation was commenced during chemotherapy, and the intake of food high in fat and protein was avoided; (4) Education: Nurses regularly provided information regarding gastrointestinal tumors, including the pathogenesis, treatment methods, and prognosis, to the patients and their families to enhance the self-management skills of the patient and the capacity of the caregivers to provide care; and (5) Psychological counseling: Psychological support was provided to the patients. The patients were encouraged to confront the disease positively, maintain an optimistic attitude, and increase treatment compliance.

Observation group: In addition to the aforementioned regimen, the patients assigned to the observation group received a comprehensive intervention that integrated caregiver-shared decision-making in family nutritional support with mindfulness-based behavioral therapy.

Nutritional assessment: A comprehensive evaluation of the nutritional status of the patient, including indicators such as body mass index (BMI) and the serum albumin (ALB) levels. A personalized family nutritional support plans was developed in conjunction with the dietary habits and taste preferences of the patient in accordance with these findings.

Shared decision-making for nutritional support: The caregivers were included in the shared decision-making process for the nutritional support plan through face-to-face communication and discussion. The questions posed by the caregivers were answered such that the caregivers fully comprehended the content and key implementation points of the plan and effectively executed it in daily life.

Nutritional education and skills training: The dietitian provided caregivers with the necessary nutritional knowledge. In addition, skills training, such as food pairing and cooking techniques, was provided to enhance the quality and effectiveness of family nutritional support.

Mindfulness-based behavioral therapy: Mindfulness-based behavioral therapy was provided by experienced counselors or psychotherapists through regular courses, group discussions, and individual counseling to enable patients to use mindfulness techniques to cope with the stress and challenges associated with the disease.

Training content: The patients were guided to scan their bodies starting from the toes and gradually moving upwards. They were instructed to assess the sensation of each part (tense/relaxed and painful/comfortable) and observe their breathing (focusing attention on breathing, feeling the flow of breath in the nasal cavity, the rise and fall of the chest, and the expansion and contraction of the abdomen with breathing). The patients were instructed to practice mindful walking twice a week (focusing attention on the actions of lifting, falling, and contacting the ground with the feet while walking) to help develop awareness of the present moment, reduce the interference of negative emotions, and enhance psychological resilience. Each training session lasted 60 minutes.

Caregiver involvement in mindfulness training: The caregivers were encouraged to participate in the mindfulness behavioral training process, learn and practice mindfulness techniques along with the patient, form emotional support and psychological resonance within the family, and create a warm and harmonious environment to facilitate recovery.

Data collection and intervention adjustment: Data regarding the nutritional status, psychological state, and treatment effects were collected regularly during the intervention process for assessment and feedback. The intervention plan was

Table 2 Comparison between the nutritional indices of the two groups (mean ± SD)

Groups	n	BMI (kg/m ²)		NRS2002 (score)		ALB (g/L)		TRF (g/L)	
		Before	After	Before	After	Before	After	Before	After
Observation group	59	21.35 ± 1.16	23.57 ± 1.85	4.26 ± 0.85	2.47 ± 0.64	31.08 ± 3.11	40.26 ± 3.23	1.79 ± 0.38	2.61 ± 0.52
Control	59	21.49 ± 1.28	22.35 ± 1.48	4.19 ± 0.88	3.22 ± 0.79	31.22 ± 3.05	38.28 ± 3.08	1.81 ± 0.40	2.25 ± 0.47
<i>t</i>	-	0.623	3.955	0.439	5.666	0.247	3.408	0.278	3.945
<i>P</i> value	-	0.535	< 0.001	0.661	< 0.001	0.805	0.001	0.781	< 0.001

BMI: Body mass index; NRS2002: Nutrition Risk Screening 2002; ALB: Albumin; TRF: Transferrin.

adjusted in a timely manner to ensure that the maximum intervention effects were achieved.

Communication group: A WeChat group was created to facilitate instant communication and exchange between patients, caregivers, and medical staff. This group aided in answering questions, sharing experiences, and enhancing the sense of belonging and confidence of patients and caregivers.

Follow-up observation: The patients assigned to both groups were continuously followed up and observed for 6 months after enrollment.

Evaluation indicators

The nutritional and mood state indicators, compliance, and satisfaction before and after implementing the nursing intervention were compared between the groups.

Nutritional indicators: The following parameters were assessed prior to implementing the nursing intervention and at the end of the 6-month follow-up period: BMI, Nutrition Risk Screening 2002 (NRS2002) scores, serum ALB levels, and transferrin (TRF) levels. BMI was calculated as weight divided by the square of height. The NRS2002 questionnaire was scored based on age, sex, disease severity, and nutritional status. The total NRS2002 score ranged from 0-7 points, with higher scores indicating greater nutritional risk. The ALB and TRF levels were determined as follows. Fasting venous blood samples (5 mL) were drawn from the elbow and centrifuged at 3000 rpm for 10 minutes using an LB-3000 centrifuge. The Beckman AU5800 fully automated biochemical analyzer was used to analyze the serum.

Mood state indicators: The Profile of Mood States (POMS) and Mindful Attention Awareness Scale (MAAS) were used to assess the mood of the patients prior to implementing the nursing intervention and at the end of the 6-month follow-up period. The POMS questionnaire comprises seven dimensions: Tension (24 points), anger (28 points), fatigue (20 points), depression (24 points), vigor (24 points), confusion (20 points), and total mood disturbances (20 points). Higher scores indicate more severe mood states. The MAAS questionnaire, which comprises 15 items, assesses the level of mindfulness. The total MAAS score, as measured on a 5-point scale, ranges from 15 to 75 points. Higher scores indicate a higher level of mindfulness.

Nursing satisfaction: The caregivers evaluated the compliance of the patients with medical and nursing behaviors, as well as satisfaction with the nursing work, after the 6-month follow-up period. The categories were as follows: “full compliance, partial compliance, non-compliance” and “very satisfied, satisfied, dissatisfied”.

Statistical analysis

All statistical analyses were conducted using SPSS 22.0. Count data, which were assessed using the χ^2 tests, are expressed as percentages (%). The normality of the metric data was assessed using the Shapiro-Wilk test. Metric data are expressed as mean ± SD. Statistical significance was set at $P < 0.05$.

RESULTS

Nutritional indicators

No statistically significant differences were observed between the two groups in terms of BMI, NRS2002 scores, ALB levels, or TRF levels before the intervention ($P > 0.05$). However, the BMI, ALB levels, and TRF levels in the observation group were higher than those in the control group after the 6-month follow-up period ($P < 0.05$). Notably, the NRS2002 scores in the observation group were lower than those in the control group ($P < 0.05$; Table 2).

Mood state indicators

No statistically significant differences were observed between the two groups in terms of the POMS and MAAS scores before the intervention ($P > 0.05$). However, the scores for all seven dimensions of the POMS questionnaire in the

Table 3 Comparison between the mood state indicators of the two groups (scores, mean \pm SD)

Groups	n	POMS-tension		POMS-anger		POMS-fatigue		POMS-depression		POMS-energy		POMS-panic		POMS-self-related emotions		MAAS	
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Observation group	59	19.14 \pm 2.15	13.26 \pm 3.05	22.56 \pm 2.57	18.06 \pm 2.32	16.75 \pm 1.86	13.26 \pm 1.57	17.59 \pm 2.24	14.66 \pm 1.82	18.50 \pm 2.91	15.06 \pm 2.29	16.97 \pm 1.76	12.06 \pm 2.12	15.36 \pm 1.85	12.11 \pm 1.56	43.24 \pm 5.13	58.58 \pm 6.01
Control	59	19.08 \pm 2.11	15.12 \pm 3.21	22.45 \pm 2.63	20.17 \pm 2.25	16.54 \pm 1.93	14.82 \pm 1.45	17.47 \pm 2.36	15.95 \pm 1.97	18.42 \pm 2.84	16.57 \pm 2.55	16.88 \pm 1.84	14.01 \pm 2.44	15.27 \pm 1.91	13.38 \pm 1.67	44.05 \pm 5.32	54.23 \pm 5.86
t	-	0.153	3.227	0.230	5.015	0.602	5.607	0.283	3.694	0.151	3.384	0.272	4.634	0.260	4.269	0.842	3.981
P value	-	0.879	0.002	0.819	< 0.001	0.548	< 0.001	0.777	< 0.001	0.880	0.001	0.786	< 0.001	0.795	< 0.001	0.402	< 0.001

POMS: Profile of Mood States; MAAS: Mindful Attention Awareness Scale.

observation group were lower than those in the control group after the 6-month follow-up period ($P < 0.05$). Notably, the MAAS scores in the observation group were higher than those in the control group ($P < 0.05$; Table 3).

Compliance and satisfaction

The compliance and satisfaction rates in the observation group were 94.92%, and 98.31%, respectively. In contrast, the compliance and satisfaction rates in the control group were 79.66% and 88.14%, respectively ($P < 0.05$; Table 4). Thus, the compliance and satisfaction rates were higher in the observation group.

DISCUSSION

Gastrointestinal tumors, the most prevalent type of neoplasms affecting the digestive system, are characterized by insidious onset, rapid progression, and diverse symptoms. Consequently, they have remained a long-standing focus of medical research[7]. The latest statistical data released by the World Health Organization[8] indicate a high global prevalence of gastrointestinal tumors. These tumors are associated with persistently high morbidity and mortality rates; thus, they pose a severe threat to human life and health. The gastrointestinal tract, which is in direct contact with the external environment, absorbs digested food and provides nutrition and energy to the body. Gastrointestinal tumors impair the digestive and absorptive functions of patients, leading to reduced nutritional intake[9,10]. Treatment methods such as surgical resection, chemotherapy, or radiotherapy[11,12] that target the tumor inevitably cause significant damage to digestive system function, thereby affecting the quality of life. Therefore, the present study compared the mood states and quality of life between the observation and control groups during treatment to provide a scientific basis for developing a treatment strategy that can help improve the quality of life of patients with gastrointestinal tumors.

Caregiver-shared decision-making in family nutritional support, a novel patient-centered nursing model, emphasizes the active participation of patients and their families and shared decision-making in medical decisions. This model exerts its effects through three aspects. First, it enhances the recognition of the importance of nutritional support among patients

Table 4 Comparison between the compliance and satisfaction rates of the two groups, *n* (%)

Groups	Complete compliance	Partial compliance	Noncompliance	Compliance rate	Quite satisfied	Satisfaction	Dissatisfaction	Satisfaction rate
Observation group	36 (61.02)	20 (33.90)	3 (5.08)	56 (94.92)	40 (67.80)	18 (30.51)	1 (1.69)	58 (98.31)
Control	18 (30.51)	29 (49.15)	12 (20.34)	47 (79.66)	22 (37.29)	30 (50.85)	7 (11.86)	52 (88.14)
<i>t</i>	-	-	-	6.186	-	-	-	4.827
<i>P</i> value	-	-	-	0.013	-	-	-	0.028

and families, thereby increasing the emphasis on the diet and nutritional intake of the patient[13]. Second, by jointly formulating personalized nutritional support plans, it enables patients to receive dietary guidance tailored to their condition and nutritional needs[14,15]. Third, the active involvement and companionship of caregivers increases the psychological support and emotional comfort provided to the patients, thereby alleviating the negative emotions arising from the disease and its treatment[16]. Mindfulness-based behavioral therapy, which was developed by removing the Buddhist framework and religious elements from Eastern Buddhist meditation, has been applied to fields such as medicine and psychology. It guides patients to focus on current bodily sensations, thoughts, or emotions through meditation and breathing exercises, thereby improving self-awareness and reducing the interference of negative emotions [17,18]. The present study revealed that the BMI, ALB levels, and TRF levels in the observation group were higher than those in the control group 6 months after implementing the intervention ($P < 0.05$). However, and the NRS2002 scores were lower than those in the control group ($P < 0.05$). BMI, an important indicator for assessing nutritional status, directly reflects the proportional relationship between weight and height. Thus, it can reveal potential weight-related issues[19].

ALB and TRF are essential nutrients that aid in maintaining vital functions. Notably, they also serve as important indicators that can be used to assess the nutritional status. ALB, the main protein component in plasma, reflects the synthetic function of the liver and nutritional reserve of the body. Malnutrition impairs ALB synthesis, leading to a decrease in its levels[20]. TRF is closely related to the transport and utilization of iron. Notably, the TRF levels can also reflect the nutritional status and iron metabolic state[21]. The NRS2002 scoring system, a nutritional risk assessment tool specifically designed for hospitalized patients[22], considers various factors such as age, weight changes, dietary intake, disease status, and complications. Comprehensive nursing interventions combining caregiver-shared decision-making in family nutritional support with mindfulness-based behavioral therapy can help patients and families gain a deeper understanding of the condition and nutritional plans. This will aid in improving the nutritional intake of the patient; enhancing confidence in treatment; increasing the BMI, ALB levels, and TRF levels; and reducing the risk of malnutrition.

The scores for the seven dimensions of the POMS questionnaire in the observation group were lower than those in the control group 6 months after implementing the intervention in the present study ($P < 0.05$). In contrast, the MAAS scores were higher than those in the control group ($P < 0.05$). The POMS questionnaire, which assesses the seven dimensions of tension, anger, fatigue, depression, energy, confusion, and self-related emotions, has been widely used in the field of psychology to comprehensively assess the emotional state of the patient[23]. The MAAS questionnaire assesses the level of mindfulness, that is, the degree to which individuals perceive and accept current experiences (including bodily sensations, thoughts, and emotions)[24]. The intervention model combining caregiver-shared decision-making in family nutritional support with mindfulness-based behavioral therapy ensures active involvement of the patients and their families in medical decision-making. Furthermore, it enables patients and their families to comprehensively understand the condition, actively participate in the treatment process, and understand the importance of nutritional support. This will enable patients to become more positive and optimistic, effectively improving their emotional states. Furthermore, it will reduce the impact of negative emotions such as tension, anger, fatigue, depression, and confusion, while enhancing positive feelings of energy and self-related emotions, which is crucial for recovery and improving the quality of life.

The compliance and nursing satisfaction rates in the observation group (94.92% and 98.31%, respectively) were higher than the those in the control group (79.66% and 88.14%, respectively; $P < 0.05$). Caregiver-shared decision-making in family nutritional support combined with mindfulness-based behavioral therapy also demonstrated a positive effect on enhancing the participation and sense of responsibility of patients and their families. Patients and their families can better understand the goals and expectations of treatment by jointly participating in medical decision-making and formulating personalized nutritional support plans, thereby increasing their identification with and execution of treatment plans[25], this will aid in improving patient compliance, as well as communication and trust between patients and nurses. Furthermore, this will reduce misunderstandings and conflicts, thereby improving nursing satisfaction.

The present study exhibited certain limitations in exploring the impact of family nutritional support combined with mindfulness-based behavioral therapy and shared decision-making among caregivers on the risk of malnutrition and mood states in patients with gastrointestinal tumors. First, the relatively small sample size may have limited the generalizability and external validity of the results. Second, the observation period of 6 months did not facilitate comprehensive assessment of the long-term effects of the intervention. Furthermore, loss of patients to follow-up during the study period may have affected the accuracy of the results. Future studies with a larger sample size and longer observation time must be conducted to comprehensively assess the application effects of caregiver-shared decision-making in family nutritional support during the treatment period. Furthermore, the mechanisms of action and influencing factors must be investigated to further optimize and improve this intervention model. Lastly, the study was conducted at a single institution, which may differ from the actual clinical environment. This may have potentially affected the applicability of the intervention

measures.

The significance of the present study lies in that it demonstrated the potential of caregiver-shared decision-making and mindfulness-based behavioral therapy to enhance patient outcomes in gastrointestinal tumor care. The findings of the present study indicate that this integrated approach can significantly reduce the risk of malnutrition and improve mood, compliance, and satisfaction. Future studies should refine these intervention strategies and tailor them to the diverse needs of different patient subgroups. Long-term follow-up studies must be conducted in the future to assess the sustainability of the benefits over time. These findings will provide a more nuanced understanding of the most suitable measures to support patients with gastrointestinal tumors, ultimately informing clinical practice and improving patient care.

CONCLUSION

In summary, the implementation of caregiver-shared decision-making in family nutritional support combined with mindfulness-based behavioral therapy can significantly reduce the risk of malnutrition in patients with gastrointestinal tumors and improve their mood states. Furthermore, it can increase the compliance and nursing satisfaction rates, indicating the utility of implementing this approach.

FOOTNOTES

Author contributions: Rong Y designed the study; Rong Y, Liu Y, Tang SY, Ju XJ, and Li H contributed to the analysis of the manuscript; Rong Y and Liu Y were involved in data collection and writing of this article. All authors have read and approved the final manuscript.

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