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Knowledge, attitudes, and practices regarding whole-course management among patients with gastrointestinal cancers: a cross-sectional study

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Abstract

Background This study aimed to investigate the knowledge, attitudes, and practices (KAP) regarding whole-course management among patients with gastrointestinal (GI) cancers.

Methods This cross-sectional study enrolled patients with GI cancers at the Inner Mongolia Hospital of Peking University Cancer Hospital between November 2023 and April 2024. Data were collected through a self-administered questionnaire, which captured demographic information and scores on KAP.

Results A total of 408 participants were included in this study. The mean KAP scores were 10.62 ± 3.14 (out of a maximum of 15), 39.11 ± 4.94 (out of a maximum of 50), and 31.35 ± 5.60 (out of a maximum of 40), respectively. Knowledge was positively correlated with attitudes (r=0.307, P<0.001) and practices (r=0.417, P<0.001), while attitudes were positively correlated with practices (r=0.383, P<0.001). The structural equation model indicated that knowledge influenced attitudes ($\beta=0.573$, P<0.001) and practices ($\beta=0.466$, P<0.001), while attitudes influenced practices ($\beta=0.525$, P<0.001).

Conclusions Patients with GI cancers demonstrated insufficient knowledge, moderate attitudes, and suboptimal practices regarding whole-course management. Improvements in practice could be achieved by enhancing knowledge and attitudes through specialized health education.

Keywords Gastrointestinal neoplasms, Colorectal neoplasms, Knowledge, attitudes, practices, Cross-sectional study, Personalized treatment

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Background

Gastrointestinal (GI) cancers are highly lethal malignancies, with gastric cancer remaining the fifth most common malignancy and the fourth leading cause of cancer-related mortality, while colorectal cancer ranks as the third most common cancer and the second leading cause of cancer-related deaths globally [1, 2]. With approximately 4.8 million new cases and 3.4 million related deaths annually, GI cancers account for 26% of global cancer incidence and 35% of all cancer-related deaths, ranking highest among all cancer types [3]. Despite advancements in medical technology that have improved early diagnosis and treatment outcomes [4], many patients are diagnosed at advanced stages, resulting in poor prognoses [3, 5]. Moreover, GI cancer treatments are associated with various complications, including peripheral neuropathy [6], impaired hematopoiesis [7, 8], and hearing loss [9]. Consequently, enhancing survival rates and quality of life for patients with GI cancers through personalized multidisciplinary management has become a key focus in contemporary medical research.

Whole-course management, also known as a multidisciplinary or holistic approach to cancer care, involves close collaboration among interlinked disciplines within a multidisciplinary team throughout the disease course to provide accurate diagnostic methods, precise treatment, and meticulous identification of important prognostic factors for follow-up [10, 11]. This approach encompasses not only traditional management options such as surgery, chemotherapy, and radiotherapy but also nutritional support, psychological counseling, pain management, and rehabilitation training [12, 13]. A wholecourse management model has been shown to improve patient outcomes, and multidisciplinary teams implementing this model are becoming standard practice in the treatment of GI cancers in Europe and, more recently, in the United States and China [10, 14]. However, the successful implementation of this model heavily relies on interactions among team members, patients, and their families, which are largely influenced by patients' awareness and acceptance.

The Knowledge, Attitudes, and Practices (KAP) methodology is an essential tool for evaluating health-related behaviors and intervention outcomes, based on the premise that knowledge forms the foundation of attitudes, which, in turn, directly influence practices [15]. KAP instruments have been applied in various contexts, including assessing public attitudes toward vaccinations, understanding behaviors during the COVID-19 pandemic, and evaluating knowledge and practices in managing chronic diseases, thereby providing critical insights to guide public health interventions and policy development [16, 17]. These tools have also been widely used in GI cancer research to plan educational interventions in esophageal/gastric cancer [18] and to improve colorectal cancer screening rates [19, 20]. Understanding the levels of knowledge, attitudes, and practices among patients with GI cancers is of great significance for optimizing clinical intervention strategies and improving patient compliance by enhancing their understanding of and satisfaction with treatment [21]. However, to the best of our knowledge, no previous studies have assessed KAP regarding whole-course management in China, highlighting the urgent need for further exploration. Therefore, this study aims to evaluate KAP regarding whole-course management among Chinese patients with GI cancers.

Methods

Study design and participants

This cross-sectional study enrolled patients with GI cancers at the Inner Mongolia Hospital of Peking University Cancer Hospital between November 2023 and April 2024. The study was approved by the Ethics Review Committee of the Inner Mongolia Hospital of Peking University Cancer Hospital (Approval number: WZ202404), and informed consent was obtained from all participants.

Inclusion Criteria: (1) Adult patients diagnosed with GI cancers through pathological or cytological examinations [3]; (2) Patients who provided informed consent, indicating their understanding and agreement to participate in the study; (3) Patients with sufficient cognitive ability to complete the questionnaire independently or with assistance from family members or medical staff.

Exclusion Criteria: (1) Incomplete data; (2) Inconsistent or illogical responses, indicating unreliable answers.

Questionnaire introduction and distribution

The questionnaire design was based on a prior KAP study on GI cancers conducted among Chinese participants [22] and previously published literature on the contents and efficacy of whole-course cancer management [10, 13]. A preliminary survey was conducted among 27 participants to test the reliability of the questionnaire, yielding a Cronbach's α coefficient of 0.885.

The final questionnaire was in Chinese and comprised four sections: demographic data (age, gender, residence, education, monthly income, dietary status, tumor location, current pain level, analgesic medication, and follow-up interval in the past year), knowledge dimension, attitude dimension, and practice dimension. The knowledge dimension included 15 items, with 1 point awarded for correct answers and 0 points for incorrect or unclear answers, resulting in a score range of 0–15. The attitude dimension consisted of 10 questions scored on a five-point Likert scale. For positively worded questions (questions 1, 3, 4, 6, 7, 9, and 10), responses ranged from strongly agree to strongly disagree, scored 5 - 1. For negatively worded questions (questions 2, 5, and 8), responses ranged from strongly agree to strongly disagree, scored 1–5, resulting in a score range of 10–50. The practice dimension included 8 questions, with responses ranging from never to always, scored 1–5, resulting in a score range of 8–40. Scores exceeding 80% of the maximum in each dimension were considered indicative of sufficient knowledge, positive attitudes, and proactive practices [23]. In the formal study, the subscales demonstrated good internal consistency, with a Cronbach's α coefficient of 0.858 and a KMO value of 0.880 for the total scale.

Questionnaires were distributed offline to study participants. The department responsible for gastrointestinal tumor patients was selected as the target for the survey. The number of questionnaires allocated to each department was proportional to the number of gastrointestinal tumor patients treated there. Before distribution, responsible nurses in each department received training on how to assist with completing the questionnaires. Each ward received one questionnaire at a time, with responsible nurses guiding patients or their family members during completion. Completed questionnaires were collected by the responsible nurses, who also checked them for quality and completeness.

Sample size calculation

The sample size was calculated using the single population proportion formula, $n=[(Z_{\alpha/2})^2P(1-P)]/d^2$. As no prior KAP studies on whole-course management among Chinese GI cancer patients existed, the sample size was calculated based on an expected awareness proportion of 50%. With a confidence level of 95% and a margin of error of 5%, the required sample size was 384 participants.

Statistical methods

Statistical analyses were performed using Stata 18.0 (StataCorp LLC, College Station, TX, USA) and R 4.3.2 (R Foundation for Statistical Computing, Vienna, Austria). Continuous data were expressed as means and standard deviations (SD). Normally distributed continuous data were analyzed using the t-test and ANOVA, while skewed continuous data were analyzed using the Wilcoxon Mann-Whitney test and Kruskal-Wallis test. Categorical data were presented as n (%). Spearman analyses were conducted to examine the relationships between KAP scores. Univariate and multivariate regression analyses were performed with KAP scores as the dependent variables to analyze associations between demographic variables and scores for each dimension. Variables with P < 0.10 in univariate analysis were included in the multivariate regression. The cutoff for sufficient knowledge, positive attitudes, and proactive practices was set at 80% of the total score. A structural equation model (SEM) was constructed to test whether attitudes mediated the relationship between knowledge and practice behaviors.

Indirect effects were calculated and compared with direct effects. Goodness-of-fit indicators for the SEM model were evaluated using the following thresholds: root mean square error of approximation (RMSEA) < 0.08, standardized root mean squared residual (SRMR) < 0.08, Tucker-Lewis index (TLI) > 0.8, and comparative fit index (CFI) > 0.8. A two-sided P-value of less than 0.05 was considered statistically significant.

Results

Basic characteristics of respondents

A total of 545 questionnaires were collected. Of these, 13 questionnaires with missing answers, 4 with errors, and 120 with logical inconsistencies were excluded, leaving valid data from 408 cases for analysis.

The age distribution of respondents was as follows: 19.6% were younger than 55 years, 34.6% were aged 55–64 years, 35.3% were aged 65–74 years, and 10.5% were older than 75 years. Among all participants, 25.2% had gastric cancer, 54.7% had colorectal cancer, and 20.1% had other GI cancers. The majority of respondents reported being mostly pain-free (40.9%) or experiencing mild pain (39.7%), with 71.1% not prescribed regular analgesic medication. Regular follow-ups were reported once a month (25.5%) or every three months (36.3%). Among all participants, 51.0% reported no difficulties eating, 71.3% did not receive oral nutritional supplementation, and 8.3% required parenteral nutrition (Table 1).

Most participants obtained knowledge about their condition's management through social media (55.9%) and hospital lectures (46.8%) (Supplementary Figure S1). Follow-up knowledge was primarily received from doctors (69.6%) or nurses (27.2%) (Supplementary Figure S2).

Distribution of KAP scores

The mean KAP scores in this study were 10.62 ± 3.14 (70.8% of the maximum), 39.11 ± 4.94 (78.2% of the maximum), and 31.35 ± 5.60 (78.4% of the maximum), respectively (Table 1).

Among the participants, 80.9% were familiar with the concept of whole-course management for GI cancer; however, 87.5% believed that psychological state adjustment could only be achieved through medication, while only 15.7% were aware that moderate exercise could facilitate recovery (Supplementary Table 1).

Most attitude-related questions received positive responses; however, 34.3% of participants agreed, and 19.4% strongly agreed, that frequent hospital visits for follow-up appointments consumed considerable time and energy. Approximately one-third of participants expressed disregard for dietary management, with 14.7% agreeing and 14.2% strongly agreeing that they ate without regard to recommendations. Similarly, nearly onethird believed that exercising was not suitable for their

Table 1 Baseline characteristics of study participants and distribution of KAP scores

	N (%)	Knowledge	Р	Attitude	Р	Practice	Р
		mean±SD		mean ± SD		mean ± SD	
Total Score	408(100.0)	10.62 ± 3.14		39.11 ± 4.94		31.35 ± 5.60	
Age			0.001		0.023		< 0.001
<55 years old	80(19.6)	11.69 ± 2.49		40.27 ± 4.67		33.64 ± 5.56	
55–64 years old	141(34.6)	10.60 ± 3.10		39.56 ± 4.97		31.83 ± 5.27	
65–74 years old	144(35.3)	10.30 ± 3.23		38.22 ± 4.98		30.15 ± 5.16	
≥75 years old	43(10.5)	9.74 ± 3.57		38.40 ± 4.67		29.51 ± 6.57	
Gender			0.915		0.416		0.745
Male	282(69.1)	10.60 ± 3.21		39.22 ± 5.07		31.36 ± 5.61	
Female	126(30.9)	10.65 ± 2.97		38.84 ± 4.62		31.32 ± 5.59	
Residence			0.007		< 0.001		0.001
Urban	239(58.6)	10.89 ± 3.16		39.89 ± 4.80		32.10 ± 5.57	
Other	169(41.4)	10.23 ± 3.08		37.99 ± 4.92		30.29 ± 5.47	
Education			< 0.001		0.008		< 0.001
Primary school and below	120(29.4)	9.72 ± 3.22		38.07 ± 4.66		29.78 ± 5.58	
Junior high school	146(35.8)	10.66 ± 3.26		38.99 ± 4.84		31.27 ± 5.27	
Senior high school/technical school	86(21.1)	10.87 ± 3.02		40.09 ± 5.34		31.67 ± 5.27	
Junior college	34(8.3)	11.97 ± 2.55		39.21 ± 4.46		33.71 ± 5.74	
Bachelor's degree and above	22(5.4)	12.14±1.21		41.50 ± 4.95		35.50 ± 5.75	
Monthly income, RMB			0.007		0.079		0.009
<2000	128(31.4)	9.88 ± 3.52		38.49 ± 5.02		30.25 ± 5.88	
2000–5000	204(50.0)	10.86 ± 3.05		39.09 ± 4.99		31.51 ± 5.33	
>5000	76(18.6)	11.21 ± 2.38		40.18 ± 4.50		32.75 ± 5.51	
Normal eating			0.001		0.054		0.033
Yes	208(51.0)	10.99 ± 3.18		38.68 ± 4.64		31.99 ± 5.62	
No	200(49.0)	10.23 ± 3.05		39.55 ± 5.20		30.68 ± 5.51	
Oral nutritional supplements			< 0.001		0.343		0.004
Yes	11/(28./)	9./6±3.23		38./1±5.16		30.03 ± 5.48	
No	291(71.3)	10.96±3.03		39.26 ± 4.84		31.88 ± 5.56	
Enteral nutrition			0.416		0.002		0.596
Yes	/3(1/.9)	10.93 ± 2.78		40.6/±5.13		30.9/±5.31	
No	335(82.1)	10.55 ± 3.21		38./6±4.83		31.43 ± 5.66	
Parenteral nutrition	24(2.2)	10 50 + 2 5 4	0.291	44.20 + 4.47	0.004	22.76 . 5.40	0.117
Yes	34(8.3)	10.59 ± 2.54		41.29 ± 4.47		32.76±5.40	
	374(91.7)	10.62 ± 3.19	0.600	38.91±4.93	0.470	31.22 ± 5.60	0.001
Location of tumor	102/25 2)	10 (7) 2 00	0.603	20.50 + 4.04	0.478	22.20 + 5.64	0.001
Stomacn	103(25.2)	10.67 ± 3.00		39.50 ± 4.94		32.38±5.64	
Colorectal	223(54.7)	10.52 ± 3.18		38.83 ± 4.89		30.48±5.30	
Other	82(20.1)	10.83±3.20	0.210	39.38±5.05	0.001	32.41±5.84	0.275
	167(40.0)	1064 1 2 20	0.519	20.04 + 4.60	0.001	21.02 + E.E.G	0.275
Pain-free Mild	162(20.7)	10.04 ± 3.20		30.04 ± 4.30		31.95 ± 5.50	
Moderate to sovere	70(10.4)	10.09 ± 3.20 10.42 ± 3.71		39.00 ± 3.01		30.93 ± 3.76	
Analgesic medication	79(19.4)	10.45 ± 2.71	0 808	40.10 ± 5.14	0.458	50.97 ± 5.25	0.567
Voc	110(20 0)	10 01 + 2 60	0.090	20.20 ± 5.10	0.456	21 10 + 5 12	0.507
No	200(71.1)	10.01 ± 2.00		39.30±3.12		31.10 ± 3.43	
Interval follow-ups in the past year	290(71.1)	10.54±5.51	0187	50.99±4.00	0 700	51.45 ± 5.07	0.045
1-2 weeks	52(127)	1042+378	0.107	3874+130	0.799	3302+663	0.040
1 month	104(25.5)	11 22 + 2 68		3934+497		3175+601	
3 months	148(36 3)	10 35 + 3 07		3937+573		30.61 + 4.97	
Concentration of the second se	1 10100001	10.00 ± 0.07		J J . J . L J . L J		JUID 1 - 1.27	
6 months	66(16.2)	10 25 + 3 50		38 58 + 5 06		3186+531	

condition (20.6% agreed and 18.9% strongly agreed) (Supplementary Table 2).

Among the participants, 66.9% actively sought information about whole-course management. However, 43.4% only occasionally consulted with doctors regarding their psychological state, and 31.6% rarely or never engaged in rehabilitation exercises (Supplementary Table 3).

Correlation analysis and multivariate regression analysis associated with KAP scores

Knowledge was positively correlated with attitudes (r = 0.307, P < 0.001) and practices (r = 0.417, P < 0.001), while attitudes were positively correlated with practices (r = 0.383, P < 0.001).

Univariate and multivariate logistic regression analyses revealed that higher education levels (senior high school/ technical school, OR = 2.239, 95% CI: 1.072-4.676, *P* = 0.032; junior college, OR = 2.869, 95% CI: 1.048–7.853, P = 0.040; bachelor's degree and above, OR = 10.222, 95% CI: 2.305-45.337, P=0.002), not receiving oral nutritional supplements (OR=2.846, 95% CI: 1.377-5.881, P = 0.005), and not receiving parenteral nutrition (OR = 4.174, 95% CI: 1.591–10.956, P = 0.004) were associated with higher knowledge scores (Table 2 and Supplementary Table 3). Higher knowledge scores (OR = 1.213, 95% CI: 1.116–1.318, P<0.001) and pain level (mild, OR = 1.676, 95% CI: 1.007–2.790, *P* = 0.047; moderate to severe, OR = 2.657, 95% CI: 1.275–5.538, P = 0.009) were associated with higher attitude scores (Table 2). Higher knowledge scores (OR=1.232, 95% CI: 1.116-1.360, *P*<0.001) and attitude scores (OR = 1.125, 95% CI: 1.069– 1.185, P<0.001) were associated with higher practice scores, while older age (65-74 years, OR=0.371, 95%)CI: 0.184–0.748, P = 0.006; ≥ 75 years, OR = 0.304, 95% CI: 0.117-0.789, P=0.014), tumor location (colorectal, OR = 0.490, 95% CI: 0.283–0.846, P = 0.011), and longer intervals between follow-ups (1 year, OR = 0.295, 95% CI: 0.107–0.813, P = 0.018) were associated with significantly lower practice scores (Table 2).

The SEM model was constructed with all indices indicating an acceptable model fit (Supplementary Table 5). As illustrated in Fig. 1, knowledge was found to influence attitude (β = 0.573, *P* < 0.001) and practice (β = 0.466, *P* < 0.001), while attitude influenced practice (β = 0.525, *P* < 0.001).

Discussion

Main findings of this study

Patients with GI cancers exhibited insufficient knowledge, moderate attitudes, and suboptimal practices toward whole-course management, with notable barriers identified, particularly in the implementation of dietary and rehabilitation regimens. Higher practice scores were strongly correlated with knowledge and attitude, and the results of multivariate logistic regression and SEM confirmed that improvements in practice could be achieved by enhancing knowledge and attitudes. The findings of this KAP study provide valuable insights into how healthcare providers and patients perceive multidisciplinary treatment for GI cancers. Identified gaps in knowledge and barriers to effective care should be prioritized to improve communication and collaboration among oncologists, dietitians, surgeons, and rehabilitation specialists.

Although the overall knowledge did not reach the threshold of 80% defined as sufficient, many GI cancer patients demonstrated adequate understanding of the definition and principles of whole-course management, reflecting recent advancements in treatment approaches globally and specifically in China [14]. Notably, trends have been observed wherein cancer patients in various countries express a desire to learn more about their condition and actively seek information about new treatments [21, 24]. The correctness rate for general questions suggests that participants have access to new information sources and are interested in the benefits of whole-course management. However, significant knowledge gaps were identified, accounting for the mean scores corresponding to "insufficient knowledge." Specifically, 87.5% of respondents believed medication was the sole method for addressing psychological challenges. This aligns with findings from other studies in China, highlighting a limited understanding of psychological counseling compared to other countries [25, 26]. Psychological support is a crucial component of holistic cancer treatment and should be provided by trained specialists [27], a concept not yet fully understood by Chinese GI cancer patients.

Cultural and social factors in China, such as the emphasis on family-centered decision-making and traditional beliefs about medicine and nutrition [28], may influence the KAP of GI cancer patients by shaping their perceptions, treatment adherence, and communication dynamics with healthcare providers. These factors should be considered when developing personalized treatment plans based on the whole-course management model. Healthcare professionals who have established trust with patients should introduce new team members responsible for psychological support and explain the goals of counseling. Additionally, media campaigns could be employed to reach GI cancer patients and their families [29], promoting the benefits of psychological counseling in stress relief and recovery.

A significant gap identified in this study was the insufficient knowledge regarding the role of rehabilitation exercises in promoting recovery. This gap appears to extend to attitudes, as approximately one-third of participants believed that exercise should be avoided entirely and rarely or never engaged in physical activity. These

N=408	Knowledge		Attitudes		Practices	
	OR (95%CI)	Р	OR (95%CI)	Р	OR (95%CI)	Р
Knowledge	/		1.213 (1.116,1.318)	< 0.001	1.232 (1.116,1.360)	< 0.001
Attitudes	/		/		1.125 (1.069,1.185)	< 0.001
Age						
<55 years old	Ref.		Ref.		Ref.	
55–64 years old	0.623 (0.338,1.148)	0.129	1.059 (0.576,1.950)	0.853	0.440 (0.227,0.855)	0.015
65–74 years old	0.645 (0.341,1.218)	0.176	0.855 (0.449,1.629)	0.634	0.371 (0.184,0.748)	0.006
≥75 years old	0.489 (0.204,1.170)	0.108	0.846 (0.351,2.039)	0.709	0.304 (0.117,0.789)	0.014
Residence						
Urban	Ref.		Ref.		Ref.	
Other	0.801 (0.509,1.260)	0.337	0.751 (0.474,1.189)	0.221	0.792 (0.482,1.302)	0.358
Education						
Primary school and below	Ref.		Ref.		Ref.	
Junior high school	1.571 (0.861,2.865)	0.141	1.187 (0.667,2.111)	0.561	0.889 (0.479,1.650)	0.709
Senior high school/technical school	2.239 (1.072,4.676)	0.032	1.353 (0.682,2.686)	0.387	0.813 (0.391,1.692)	0.581
Junior college	2.869 (1.048,7.853)	0.040	1.009 (0.405,2.513)	0.985	0.645 (0.241,1.727)	0.383
Bachelor's degree and above	10.222 (2.305,45.337)	0.002	1.591 (0.550,4.604)	0.392	1.158 (0.346,3.871)	0.812
Location of tumor						
Stomach					Ref.	
Colorectal					0.490 (0.283,0.846)	0.011
Other parts					0.924 (0.471,1.812)	0.818
Current pain level						
Pain-free			Ref.			
Mild			1.676 (1.007,2.790)	0.047		
Moderate to severe			2.657 (1.275,5.538)	0.009		
Interval of each follow-up in the past year						
1–2 weeks					Ref.	
1 month					0.671 (0.314,1.433)	0.303
3 months					0.620 (0.293,1.315)	0.213
6 months					1.087 (0.463,2.551)	0.848
1 year					0.295 (0.107,0.813)	0.018
Difficulties in eating						
No	Ref.		Ref.			
Yes	1.663 (0.842,3.283)	0.143	1.313 (0.765,2.252)	0.323		
Prescribed oral nutritional supplements						
Yes	Ref.				Ref.	
No	2.846 (1.377,5.881)	0.005			1.252 (0.738,2.126)	0.405
Enteral nutrition						
Yes			Ref.			
No			1.341 (0.642,2.803)	0.435		
Parenteral nutrition						
Yes	Ket.	0.67.	Ket.			
No	4.1/4 (1.591,10.956)	0.004	0.462 (0.193,1.108)	0.084		

findings align with those of a prior study conducted by Xu et al. [30] among colorectal cancer patients, which identified similar barriers to compliance. Substantial evidence indicates that rehabilitation exercises provide significant benefits in the recovery of patients with GI cancers [31], and participation in supervised exercise programs under the close observation of healthcare professionals does not increase the risk of complications [32]. Nevertheless, another study involving general practitioners in Australia revealed that even physicians, despite their positive attitudes, were reluctant to refer cancer patients to rehabilitation exercise programs [33].

This reluctance may be partially attributed to the perception that physical activities, particularly those perceived as strenuous, must also be deemed necessary by the patient, who ultimately bears responsibility for adhering to prescribed regimens and following safety guidelines. Emotional factors, rather than physical limitations,



Fig. 1 Structural equation model demonstrating effects of knowledge and attitude on practice

often play a decisive role in this context [34]. Moreover, the need for frequent hospital visits to participate in exercise programs represents a significant barrier for many patients. Enhancing patient knowledge is crucial to enabling informed decision-making regarding rehabilitation exercises. In this study, higher Practice scores were strongly associated with both Knowledge and Attitude, a finding substantiated by additional analyses. According to the theory of learned behavior [35], targeted educational interventions aimed at improving patients' understanding of the benefits of rehabilitation exercises could facilitate greater adherence to such practices among GI cancer patients.

The knowledge gaps identified in this study warrant further investigation through longitudinal studies, clinical trials, and the development of evidence-based guidelines. Collaborative efforts involving patients and healthcare providers are essential to co-developing practical dietary and rehabilitation protocols. Emerging tools such as precision nutrition and digital health technologies could be leveraged to deliver personalized care. Over the next five years, advancements in artificial intelligence, big data analytics, and personalized medicine are anticipated to enhance treatment regimens. An increased focus on patient-reported outcomes and holistic care approaches is likely to foster more effective and individualized dietary and rehabilitation strategies, ultimately improving patient quality of life and survival rates.

What is already known on this topic

One effective avenue for enhancing patient knowledge and practice is through regular follow-ups. This study found that follow-up intervals of one year or longer were associated with significantly lower Practice scores, consistent with findings from previous KAP studies [21, 36]. Lower Knowledge and less positive Attitude may contribute to less frequent follow-ups, particularly given that many participants perceived regular hospital visits as time- and energy-intensive. However, survey responses indicated that most participants obtained their knowledge from social media and hospital lectures. Given the potential for social media to disseminate unreliable or outdated information [37], and the limitations of in-person hospital lectures, infrequent follow-ups may adversely impact patient practices. Striking a balance in the frequency of follow-ups is crucial to ensuring

that patients acquire adequate knowledge while avoiding discouragement from excessive hospital visits. This is particularly important in the context of whole-course management, where patients must engage with multiple healthcare specialists. Personalized education and follow-up plans incorporating telemedicine, social media platforms, and family involvement could mitigate the burden of frequent hospital visits while promoting sustained engagement with healthcare services.

Contributions of this study and future directions

The findings of this study contribute to the development of holistic, personalized care strategies for GI cancer patients and offer valuable insights for planning and implementing future educational interventions focused on whole-course management. By addressing the knowledge gaps identified, future studies can refine dietary and rehabilitation protocols through longitudinal research, clinical trials, and the application of evidence-based guidelines. The integration of emerging technologies such as precision nutrition and digital health platforms holds promise for improving personalized care. In the coming years, advancements in artificial intelligence, big data, and personalized medicine are expected to drive more effective treatment strategies, with an emphasis on enhancing patient-reported outcomes and fostering holistic care approaches.

Limitations of this study

Several limitations should be considered when interpreting the findings of this study. First, despite efforts to include a diverse participant population and ensure statistical robustness, the study was conducted at a single center, potentially limiting the generalizability of the results to other settings or populations. Furthermore, while the sample size was sufficient for preliminary analyses, it may not capture the full variability and nuances present in larger, more diverse cohorts. Second, the cross-sectional study design precludes the establishment of causal relationships between variables. Observed associations may be influenced by temporal or contextual factors that this study design cannot adequately address.

Additionally, potential confounding variables may have affected the findings. For instance, the association between not receiving parenteral nutrition and higher Knowledge scores likely reflects confounding factors, such as advanced disease stage and older age among patients requiring parenteral nutrition, rather than a direct relationship. Another limitation arises from potential response bias, as self-reported data are inherently subject to inaccuracies. Participants may have misunderstood survey questions, provided socially desirable responses, or omitted critical information, which could impact the reliability of the results. Finally, logistical constraints precluded the inclusion of longitudinal follow-ups or the collection of additional contextual data that could have enriched the study's findings. Future research should employ multicenter designs, larger sample sizes, and longitudinal approaches to address these limitations and enhance the robustness and applicability of the results.

Conclusions

This study identified insufficient knowledge, moderate attitudes, and suboptimal practices regarding wholecourse management among patients with GI cancers. The observed strong associations among knowledge, attitudes, and practices indicate that improvements in practices may be achieved by enhancing knowledge and attitudes. This could be facilitated through specialized health education programs, which may be effectively implemented during regular follow-up visits.

Supplementary Information

The online version contains supplementary material available at https://doi.or g/10.1186/s12957-025-03668-7.

Supplementary Material 1
Supplementary Material 2
Supplementary Material 3
Supplementary Material 4

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Author contributions

Conception and design: Li Feng, Min Huang. Collection and assembly of data: Cailian Liu, Yujie Liu, Ting Su, Xiaofei Zhang, Lingling Zhang. Data analysis and interpretation: Huiling Ren, Zhina Yuan. Manuscript writing: Min Huang, Li Feng. All authors read and approved the final manuscript.

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Data availability

All data generated or analysed during this study are included in this published article.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki (2000) of the World Medical Association. Ethical approval was obtained from the Ethics Review Committee of Inner Mongolia Hospital of Peking University Cancer Hospital (Approval Number: WZ202404). Informed consent was obtained from all study participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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