

A Retrospective Study Examined the Impact of the IKAP Nursing Model on the Self-Efficacy and Quality of Life of Colorectal Cancer Patients with Permanent Stomas

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Abstract

Introduction: Permanent ostomy surgery has been shown to improve patient survival rates; however, it also results in changes to body image, bowel habits, and lifestyle. These changes can significantly affect both the physical and mental well-being of patients, ultimately impacting their overall quality of life (QOL).

Objective: This study examines the effectiveness of the Information-Knowledge-Attitude-Practice (IKAP) nursing model in patients with permanent stomas, with a particular focus on its impact on self-efficacy and QOL. The goal is to enhance the self-care abilities of patients and their families, thereby promoting a swift return to normal social activities.

Methods: A retrospective study design was used to select patients who underwent permanent ostomies in the Department of General Surgery at the hospital, between January 2015 and December 2022. Both the IKAP group (IKAP nursing model) and the control group included 94 patients. IKAP group included: (1) establishing an intervention group; (2) developing a public relations strategy and a tailored education program; (3) applying health education; and (4) implementing behavioral intervention. The two groups with various nursing modalities were assessed using the Basic Demographic Data Questionnaire, the Self-Efficacy Scale for Stoma Patients, the Quality-of-Life Scale for Stoma Patients, and data on stoma complications. SPSS software (version 20.0) was used for general description and single-factor analysis of data for comparison between groups.

Results: Three months postoperatively, the IKAP group performed better than the control group in terms of self-efficacy (92.09 ± 10.12 vs 66.17 ± 12.83 , $t=8.219$, $P=0.000$). There was significant difference in the ostomy complication rate between the two groups (6 [6.38%] vs 17 [18.09%], $\chi^2=3.946$, $P=0.041$). In terms of QOL, the IKAP group scored better in the functional dimension and symptom dimension.

Conclusion: The IKAP model can effectively improve self-efficacy and QOL, reduce complications, and enhance participation in social activities and family life for patients with permanent enterostomy.

Keywords

IKAP model, colorectal cancer, permanent stoma, quality of life

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Introduction

With over 1.8 million cases and 840,000 deaths worldwide each year, colorectal cancer ranks second in mortality rates worldwide and third in incidence among all cancers (Sung et al., 2021). The incidence of colorectal cancer is significantly correlated with age, with the majority of cases occurring in individuals aged 50 years and older (Kahi et al., 2008; Siegel et al., 2023). Empirical studies indicate that Western dietary patterns, characterized by a high consumption of red and processed meats, refined grains, and a reduced intake of vegetables, are

associated with an increased risk of colorectal cancer (Rufei et al., 2025). Conversely, an increased consumption of fruits, vegetables, and whole grains, along with a reduced intake of

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red and processed meats, in conjunction with adherence to a Mediterranean dietary pattern, has been shown to significantly lower the risk of cancer (La Vecchia, 2009; Miller et al., 2010). Excess body weight, resulting from a sedentary lifestyle and inadequate physical activity, is independently associated with an increased risk of developing colorectal cancer (Sung et al., 2021). An enterostomy is an artificial opening formed in the abdominal wall, and to preserve bowel function, a portion of the intestinal tube is taken out of the opening and flipped to the abdominal wall (Finan & Haboubi, 2012). In China, there are around 1 million people with permanent enterostomies, and every year, another 100,000 people are added (Zheng & Wang, 2021). Although enterostomy increases survival, patients' physical health and quality of life (QOL) are significantly negatively impacted by changes in their body image, bowel habits, and lifestyle (Yan et al., 2022). Santos et al. discovered that patients with permanent ostomies also feared unstable intestinal activity, intestinal mucosa exposure, fecal leakage, and uncontrolled self-odor, in addition to their dread of cancer (Santos et al., 2016). In addition, complications such as stoma infections, bleeding, and stenosis occurred in 70% of patients as a result of subpar treatment (Aoki & Ishiguro, 2014). The resilience and self-care abilities of individuals with permanent ostomies significantly impact their perceptions of both the disease and the ostomy itself, as well as their adaptability and overall QOL (Frigiola et al., 2014). Contemporary research primarily focuses on observational studies that examine the prevalence and variations of specific phenomena related to permanent stomas (Acevedo-Ibarra et al., 2021). There is a notable scarcity of interventional studies, and those that do exist are often limited in scope, lacking alignment between interventions and the diverse care needs at different stages. Furthermore, there is minimal involvement of family members in these studies (Shengmei et al., 2024; Xian et al., 2021). The objective of this research is to develop tailored guidance strategies based on the IKAP theory to increase family engagement, optimize postoperative care for individuals with permanent stomas, and enhance patients' self-care abilities.

Review of Literature

The term "self-efficacy" was first coined by American psychologist Bandura in 1977. It refers to the idea that when people feel confident in their abilities, they can undertake specified behaviors on their own and achieve the intended results. Papadopoulou et al. indicated the relationship among self-efficacy, anxiety, and QOL and highlighted that it was significantly associated with decreased anxiety and the importance of patient-perceived self-efficacy (Papadopoulou et al., 2017). Therefore, it can improve self-efficacy and promote patients to actively participate in stoma care, improving their QOL.

Based on KAP theory and the illnesses of the patients, the Information-Knowledge-Belief-Behavior (IKAP) model is a

tailored approach to disease management developed by Chinese investigators (Weiyu et al., 2015). The framework is centered on the patient, emphasizing the significance of individual factors, including physiological, psychological, and social adaptations, in the development of tailored, professional, and compassionate health management strategies. This approach actively encourages patients to participate in managing their own health conditions, thereby enhancing their understanding of the illness, reinforcing their health beliefs, and promoting the adoption of healthy behaviors (Yongxiu et al., 2023). The authors implemented the IKAP model in a cohort of patients diagnosed with gynecological tumors requiring chemotherapy. The findings indicated that participants in the IKAP group demonstrated significantly greater adherence to treatment protocols compared to the control group, along with a notable reduction in levels of anxiety and depression. Chen Hua et al. (Hua et al., 2022) developed a fluid management strategy based on the IKAP theory to address the critical period for patients with heart failure. The findings revealed a significant improvement in patients' self-care skills, weight management capabilities, and the achievement of target dry body weight. Furthermore, a marked reduction was observed in B-type natriuretic peptide levels and hospital readmission rates. Wu Hui et al. (Hui et al., 2019) implemented the IKAP model in a cohort of older patients diagnosed with hypertension, aiming to enhance blood pressure management and improve the overall QOL and mental health of the patients. Liu Liandi et al. (Liandi et al., 2016) implemented the IKAP model of health education for patients with gastric cancer undergoing perioperative care, leading to improvements in the patients' emotional well-being and overall QOL. Fu Die et al. (D et al., 2018) implemented the IKAP management model in the treatment regimen for patients with diabetes, leading to improved glycemic control and an increase in health literacy within this population. Lu et al. (Yu et al., 2023) applied the IKAP theory in a cohort of patients diagnosed with chronic obstructive pulmonary disease, leading to a significant improvement in their QOL. In conclusion, the IKAP model has been extensively employed in the management of metabolic disorders, oncology, cardiovascular conditions, and chronic respiratory illnesses. This model not only aids patients in understanding their health issues but also significantly improves their self-efficacy, adherence to treatment regimens, and overall mental well-being.

The IKAP model is currently utilized predominantly for patient care, with minimal engagement from family members and limited emphasis on long-term management following discharge. This research is grounded in the IKAP theory and aims to enhance the self-efficacy and stress resilience of patients with permanent colostomies post-surgery. The study seeks to increase family involvement, secure additional external support, and improve patients' self-care capabilities and overall QOL, ultimately facilitating their reintegration into society and the restoration of their daily routines. Furthermore, we are committed to developing a personalized,

comprehensive, targeted, and structured collaborative care system that effectively integrates theoretical frameworks with practical applications for patients with permanent intestinal stomas.

Methods

Data Sources

Data pertaining to patients diagnosed with colorectal cancer who underwent permanent ostomy surgery were retrieved from the electronic medical record system of the gastrointestinal surgery department at our institution. This dataset encompasses the period from January 2015 to December 2022 and includes a total of 312 cases.

Inclusion Exclusion Criteria

Inclusion criteria were (1) histopathological diagnosis of colorectal cancer, with the tumor located within 5 cm of the anal margin, requiring permanent colostomy; (2) age between 18 and 75 years; (3) ability to perform basic self-care in daily activities without any physical disabilities; (4) life expectancy of more than one year; (5) clear consciousness and proficient reading and communication skills; (6) participation in the study must be voluntary.

Exclusion criteria were (1) patients who currently have a stoma or have previously undergone a temporary stoma procedure; (2) patients with distant metastases of the lesion or concurrent malignant tumors; (3) patients with mental illness, cognitive impairment, or severe functional disorders affecting the heart, brain, or lungs; (4) patients who are currently participating in other studies.

In accordance with the nursing model, patients were categorized into two groups: the IKAP group, which utilized the IKAP nursing model and comprised 96 cases, and the control group, which employed the traditional nursing model and included 130 cases.

Propensity Matching Score (PSM)

In order to mitigate confounding bias in retrospective studies, this investigation employed a 1:1 PSM approach. This method incorporated variables such as age, gender, body mass index (BMI), and educational attainment, with a caliper value set at 0.02. As a result, 94 patients from each cohort were successfully matched, yielding a total sample size of 188 patients (as illustrated in Figure 1). This process ensured that no statistically significant differences were observed in baseline characteristics.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Hospital.

IKAP Group

Establishing a Group for Intervention

One attending physician, six nurses—at least two of whom were capable of conducting interviews and providing psychotherapy—and a nutritionist made up the team. The majority of illness evaluation, colon cancer, and stoma explanations, as well as other medical-related difficulties, fall under the purview of gastroenterologists, who create intervention plans and make necessary revisions in accordance with the situation, with the assistance of researchers and head nurses who specialize in gastrointestinal care. Through interviews, two supervisory nurses gathered information about the patients' and their families' knowledge requirements, psychological requirements, associated complications, home care needs, and other related theoretical knowledge training. The two supervisory nurses were primarily in charge of maintaining the patient's post-operative stoma, developing the patient's capacity for self-care through the creation of a WeChat or QQ group after discharge, and educating the patient's family members about their health in order to support both family members and patients in nursing and psychological aspects. One nurse evaluated the accuracy of the entire experiment and had relevant experience in scientific research. The dietitian was in charge of helping patients and their families make dietary changes, hastening postoperative recovery, and limiting the consumption of foods with strong odors to lessen the effects of an unpleasant odor.

1) Develop Personalized Solutions: The patients and their carers completed the information needs questionnaire after the permanent enterostomy was decided, and education was given based on the priority of their needs. 2) Special lecture: A specialized lecture, conducted by a gastrointestinal surgeon, taking place biweekly and lasts approximately 1 h per session. Patients and their families were invited to attend the lecture, which was given by gastrointestinal surgeons and covered the indications, different surgical techniques, various examination tools, and precautions for permanent ostomies. It also provided an opportunity for family members and patients to ask questions in order to clarify any concerns the patients had. 3) Belief support: Nurses with suitable psychological backgrounds offer patients and their families psychological readjustment services, such as supportive psychotherapy and relaxation training. By utilizing constructive and effective methods for psychological counseling and comforting patients, they help prompt the release of negative emotions and assist patients and their families in adopting a positive and optimistic outlook toward the illness. Patient exchange events are organized and both online and offline platforms are made available to encourage patient interaction, facilitate peer support, reduce internal fear, and instill confidence in the ability to overcome the condition.

Behavioral Intervention

The objective of this intervention is to enhance patients' self-management skills, adherence to treatment protocols, and

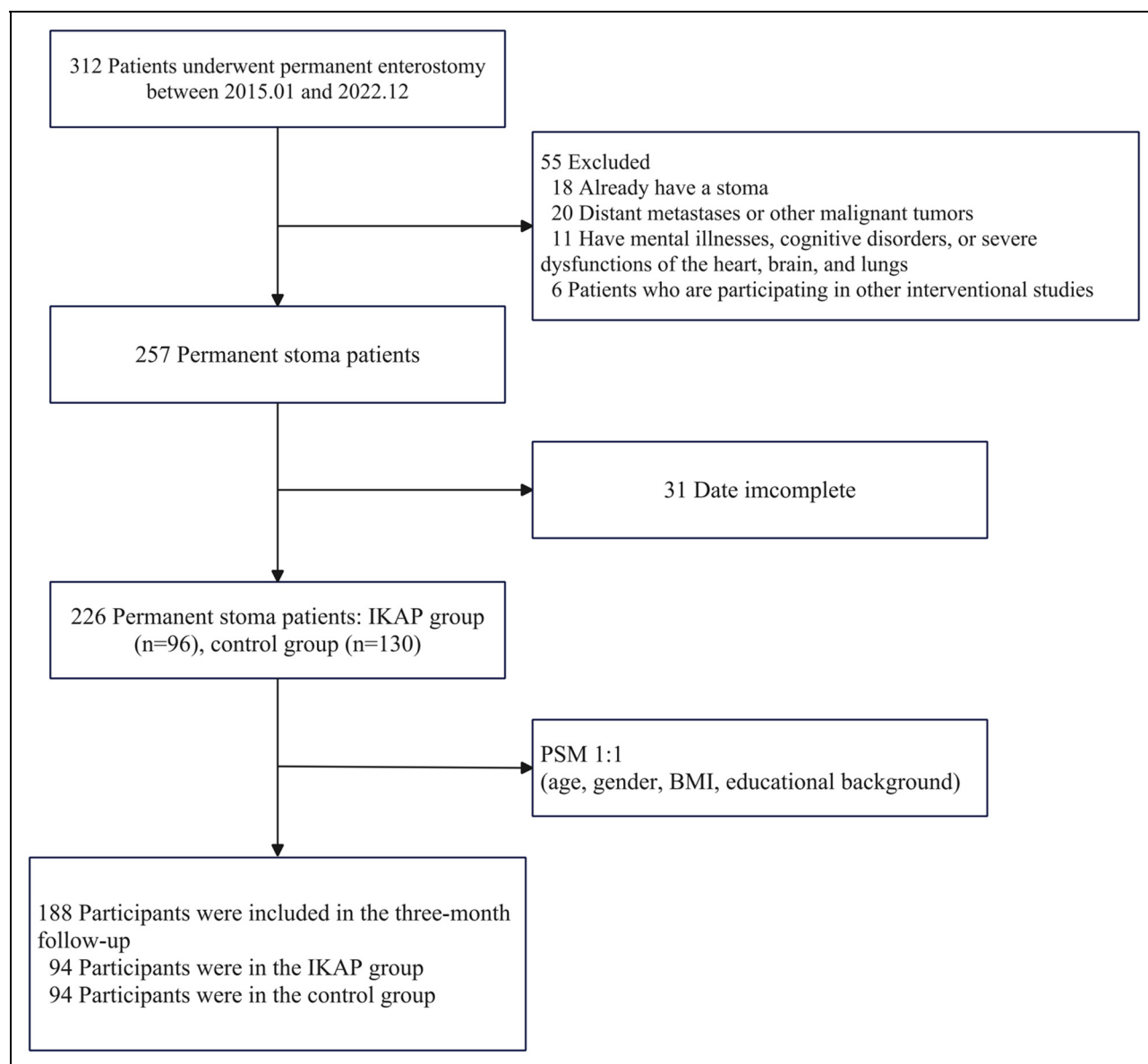


Figure 1. Flowchart.

psychological adjustment through a comprehensive and systematic approach to health education and support. This, in turn, aims to improve rehabilitation outcomes following permanent ostomy surgery.

(1) Intervention Goals

Knowledge Dissemination: Enhance patients' understanding of disease management by offering educational lectures on nutrition and guidance on functional exercise. **Skill Enhancement:** Improve the caregiving skills of patients and their families through practical training in ostomy care and daily living safety measures. **Psychological Support:** Alleviate the anxiety experienced by patients and their

families while building confidence in treatment through interactive question-and-answer sessions conducted both online and in person.

(2) Basis for Intervention Strategies

Personalization Principle: Tailor preoperative educational materials to match the educational background, cognitive abilities, and specific needs of the patient and their family, employing a tiered approach to the content. **Periodic Reinforcement:** Conduct regular postoperative training sessions to reinforce behavioral modifications and reduce the risk of knowledge retention loss. **Multi-Modal Interaction:** Combine both online (remote consultations) and offline

(in-person guidance) strategies to improve the accessibility and continuity of educational interventions.

(3) Intervention Measures

1) Facilitate lectures focused on nutrition. 2) Deliver instruction on early postoperative functional exercises. 3) Provide comprehensive support for stoma care, home care recommendations, daily living precautions, and the diagnosis and management of atypical situations. Implement preoperative education tailored to the unique needs of each patient and their family. 4) Conduct regular postoperative training sessions, organizing relevant educational activities biweekly. 5) Address patients' inquiries promptly through both online and offline channels; thereby alleviating the anxiety experienced by patients and their families. (The following specific implementation time nodes are listed in Table 1 and Table 2)

Control Group

The control group was monitored for three months following the procedure. Preoperative guidance and routine admission education were provided to patients. Upon discharge, the patients were given a health education manual by the nurses and were encouraged to review its contents regularly. 1) Regular follow-up visits were maintained after discharge. 2) A WeChat group for patients with a stoma was established. 3) Films about enterostomy care were regularly distributed.

4) Queries were answered online, and patients' conditions received prompt attention.

Survey Instrument

1) Questionnaire for general data includes age, sex, weight, BMI, tumor stage, and other fundamental information.

2) The Stoma Self-Efficacy Scale (SSES) measures the level of patient self-efficacy.

The scale contains 28 items, including two subscales for social and ostomy care self-efficacy. Participants employed self-assessment techniques to evaluate their confidence levels using a Likert scale, which assigned numerical values ranging from 1 to 5 to represent varying degrees of confidence, from low to high. The questionnaire's overall score ranged from 28 to 140 points. Three levels were assigned to the scores: 28–65 represented low-level self-efficacy, 66–102 represented medium-level self-efficacy, and 103 represented high-level self-efficacy. With a Cronbach's alpha coefficient of 0.96 and values for the two dimensions of 0.95 and 0.93, respectively, the Chinese version of this scale demonstrates excellent reliability and validity.

3) The Quality-of-Life Scale (QOL-C30) from EORTC: This scale includes five functional domains (somatic, role, cognitive, emotional, and social functioning), six symptom dimensions (dyspnea, sleep disturbance, loss of appetite, constipation, diarrhea, and perception of financial hardship), four core symptom (fatigue, pain, nausea, and vomiting), and one overall QOL dimension. The QOL-C30

Table 1. IKAP Nursing Model Implementation from Admission to Discharge for Patients in the Experimental Group.

Procedure	Time	Ways	Intervening measure
I (information)	After admission, the surgical strategy (permanent ostomy) is chosen within 1–2 days.	Face-to-face interactions with patients and their families were done through questionnaires, qualitative interviews, and medical records.	Patients' data questionnaires and self-care ability evaluation forms were gathered, and patients and their families were questioned about their needs for learning about ostomies.
K (knowledge)	The surgical approach was chosen during admission and continued until discharge.	Conduct educational in-person sessions with patients and their families and create training materials for ostomy-related training aids.	Individualized education programs based on patient and family questionnaires and knowledge of surgery, ostomy, and cancer
A (attitude)	The surgical approach was chosen during admission and continued until discharge.	Patients and their families are obliged to participate in nurse-patient communication meetings, and patients with successful ostomy management can be invited to share their experiences.	Analyze the variables that affect self-efficacy to improve the attitudes and convictions that support healthy actions.
P (practice)	Before discharge	Face to face with patients and their families	Release the "Rose Home" wechat group and QQ group, invite people to join, set up a mailbox to make it easier to share discharge education materials, create a good interaction and supervision mechanism, encourage patients' independent initiative, and provide specific nutritional guidance.

Table 2. Implementation Schedule for the IKAP Nursing Mode in the First one to Three Months Following Patient Discharge in the Trial Group.

Procedure	Time	Ways	Intervening measure
I (information)	Discharge within a week; Discharge within a month; Discharge within three months	Evaluate the stoma's upkeep self-efficacy, symptom group, and overall quality of life	Analyze the patients' post-discharge health promotion lifestyle, as well as their physical and mental health, and make a note of it.
K (knowledge)	After discharge, every two weeks until three months after surgery	Personalized instruction based on the data gathered	Create online and offline communication meetings with an emphasis on home care, ostomy management, identifying and resolving problems, and postoperative nutritional guidance. Additionally, invite family members to actively participate in the development of psychological issues in order to offer support.
A (attitude)	After discharge, every two weeks until three months after surgery	Enhance patient communication and self-efficacy	Hold both online and in-person ostomy experience sharing gatherings, include patients' families as well, and improve family participation to enhance patient psychological support. To encourage communication and help you go back to your regular social life as soon as possible, better ostomy administrators will share their experience with you.
P (practice)	1–2 months following discharge	Reevaluation and self-actualization	Scales measuring self-efficacy and quality of life were distributed as the variations between the two groups were examined. Create a plan for healthy behavior and long-term objectives.

employs a scoring system ranging from 0 to 4 and converts raw scores to a 0 to 100 scale using linear transformation. A higher functional category score indicates better function; and a higher total health score reflects better patient QOL (0.80 to 0.85 internal consistency) (Zhao & Kanda, 2000).

Data Collection

It is essential to provide training for the two nurses responsible for administering the questionnaires, ensuring they are equipped with standardized instructions. The preoperative needs questionnaire will be collected offline and returned on-site. In contrast, the post-discharge questionnaire and the three-month postoperative questionnaire will be gathered using a hybrid approach, incorporating both online and offline methods. Patients will complete the self-efficacy scale at the time of discharge, while the QOL scale will be administered 3 months after surgery.

Statistical Analysis

The data were entered into EpiData 3.0 and analyzed using SPSS 20.0. Frequency, percentage, mean, and standard deviation were used to describe the data in general. A normality test was performed on the self-efficacy scale and the QOL scale. The χ^2 test and t-test were used to compare the two groups' self-efficacy, QOL, and complications. All tests were two-sided, and $P < 0.05$ was considered statistically

significant. The caliper value was fixed at 0.02, and the two patient groups were matched 1:1 using PSM. The literature review revealed that the selected single-factor analyses varied in terms of contributing factors such as age, gender, BMI, educational background, surgical recovery, and patients' self-efficacy.

Results

A 1:1 PSM was used to filter a control group of 94 cases.

Baseline Data Comparison Between the Two Groups

After matching, no statistically significant difference was observed between the IKAP and control groups in baseline characteristics. ($P > 0.05$) (Table 3).

Comparison of Self-Efficacy Between the Two Groups 3 Months Postoperatively and at Discharge

Between the two groups, significant differences were observed in self-efficacy from discharge to 3 months after surgery, and the IKAP group showed a better trend ($P < 0.05$). No differences were observed between the two groups at the time of discharge. However, the self-efficacy levels of

Table 3. Baseline Data Comparison Between the Two Groups.

Variables	IKAP group	Control group	t/χ^2	P
Gender (n%)				
Male	54 (57.4)	57 (60.6)	0.905	0.342
Female	40 (42.6)	37 (39.4)		
Age (year, $\bar{x} \pm s$)	61.13 $\pm$ 13.45	60.63 $\pm$ 11.595	0.174	0.863
Height (cm)	163.97 $\pm$ 8.48	166.95 $\pm$ 7.49	-1.606	0.112
Weight (kg)	61.37 $\pm$ 10.59	64.64 $\pm$ 12.23	-1.249	0.216
BMI (kg/m²)	22.84 $\pm$ 2.79	23.00 $\pm$ 3.50	-0.223	0.825
NRS2002	2.49 $\pm$ 0.80	2.24 $\pm$ 1.04	1.127	0.264
Education (%)			0.017	0.898
Junior high school and below	24 (25.53)	29 (30.85)		
High school and above	70 (74.47)	65 (69.15)		
The separation between the anal margin and the lower edge of the rectal tumor (cm)	3.82 $\pm$ 4.13	4.22 $\pm$ 2.61	-0.459	0.648
Liver metastasis (n,%)			0.181	0.671
Yes	8 (8.5)	5 (5.3)		
No	86 (91.5)	89 (94.7)		
Neoadjuvant treatment			0.652	0.164
Yes	66 (70.2)	71 (75.5)		
No	28 (29.8)	23 (24.5)		
TNM stage			3.310	0.652
0	7 (7.4)	8 (8.5)		
I	8 (8.5)	7 (7.4)		
II	32 (34.0)	30 (31.9)		
III	33 (35.1)	34 (36.2)		
IV	14 (15.0)	15 (16.0)		

the IKAP and control groups were statistically different 3 months after surgery ($P < 0.05$) (Table 4).

QOL Comparison Between the Two Groups

Three months after surgery, the IKAP group was statistically different from the control group in both the functional dimension and the symptom dimension ($P < 0.05$) (Table 5).

Incidence of Complications Compared Between the Two Groups'

As shown in Table 6, a significant difference was observed between the two groups regarding the incidence of complication ($P = 0.041$). The IKAP group had 6 cases of complications (6.38%), and the control group had 17 cases of complications (18.09%).

Table 4. Comparison of Self-Efficacy Between the Two Groups Three Months After Surgery at Discharge.

Group	Discharge	Three months after surgery	t	P
IKAP group	81.03 $\pm$ 11.65	92.09 $\pm$ 10.12	5.466	0.007
Control group	82.09 $\pm$ 10.78	66.17 $\pm$ 12.83	23.437	<0.001
t	0.656	8.219	-	-
P	0.573	0.000	-	-

Discussion

In this study, the IKAP model is utilized as a theoretical framework to investigate self-efficacy, QOL, and stoma-related complications across various stages of the disease. The study proposes enhancing familial involvement, providing enhanced support and companionship to patients, and aiding them in developing greater confidence to manage life with a permanent stoma. In this research study, personalized educational sessions were provided to patients before their stoma surgery to address their concerns and uncertainties related to the procedure. Patients were encouraged to participate in sessions where they could exchange and gain insights from the positive experiences of fellow individuals who had previously undergone stoma surgery.

The involvement and backing of family members concurrently play a pivotal role. Through the collaborative efforts of family members and healthcare providers in providing diagnosis, treatment, and support, individuals can gradually develop self-assurance and transition their emphasis from physical dependence to mental resilience. Following the discharge of the patients from the hospital, the assessment of self-efficacy showed no significant differences between the two groups. Following discharge, specialist nurses should establish WeChat and QQ groups for stoma patients to offer comprehensive training through online and offline channels. These groups will also implement supervision mechanisms to guarantee the effectiveness of the training.

In addition to undergoing training in stoma care, physicians who are also nutritionists provide dietary

Table 5. Comparison of Quality of Life in Two Groups.

	Discharge			Three months after surgery		
	IKAP group	Control group	P	IKAP group	Control group	P
Functional dimension						
Physical functioning	59.42±9.43	58.71±9.32	0.266	86.47±9.03	62.53±6.11	<0.001
Role functioning	43.96±7.23	43.68±6.54	0.676	70.25±10.66	42.98±6.45	<0.001
Emotional functioning	63.81±6.56	62.27±7.89	0.335	86.32±9.81	64.32±9.23	<0.001
Cognitive functioning	67.86±8.53	65.42±7.99	0.065	91.66±6.98	72.43±10.29	<0.001
Social functioning	49.89±6.68	49.16±6.57	0.683	69.16±9.67	52.17±8.53	<0.001
Symptom dimension						
Fatigue	46.71±6.15	47.06±5.12	0.398	34.22±6.23	51.26±6.55	<0.001
Nausea and vomiting	81.74±9.01	80.20±8.34	0.365	47.23±6.54	55.77±5.51	<0.001
Pain	67.43±9.16	68.85±7.24	0.315	20.63±5.71	28.64±6.21	<0.001
Dyspnea	84.43±10.18	83.67±9.36	0.606	37.26±7.95	47.52±8.26	<0.001
Insomnia	70.45±9.38	69.11±9.03	0.254	40.65±6.98	51.24±6.65	<0.001
Appetite loss	78.51±9.25	76.87±8.51	0.187	37.54±6.94	54.93±7.59	<0.001
Constipation	74.06±5.88	74.15±6.20	0.495	42.19±6.25	64.62±8.49	<0.001
Diarrhea	72.54±6.91	73.82±7.41	0.286	36.12±8.92	61.92±10.25	<0.001
Financial difficulties	48.67±5.12	49.21±5.04	0.309	25.46±6.13	54.33±8.32	<0.001

Table 6. Comparison of the Two Groups' Ostomy Complications.

Group	Case	Stoma around dermatitis	Orifice prolapse	Stoma stenosis	Total number of cases
IKAP group	94	3 (3.19%)	3 (3.19%)	0	6 (6.38%)
Control group	94	7 (7.45%)	5 (5.32%)	5 (5.32%)	17 (18.09%)
χ^2	-	-	-	-	3.946
P	-	-	-	-	0.041

recommendations to address concerns such as stoma odor. Regular meetings are arranged for patients with stomas to exchange their experiences. This practice not only offers essential insights into nursing care but also fosters a sense of belonging to the group and supports their reintegration into a regular social routine. Encouraging family members to participate in the training sessions can enhance their comprehension of the difficulties individuals with ostomies encounter. This will empower healthcare professionals to provide more efficient assistance to patients concerning their daily routines and emotional well-being. The study revealed a significant increase in self-efficacy levels among the IKAP group three months after the surgery compared to discharge levels. Additionally, the self-confidence levels in the IKAP group were found to be higher than those in the control group. Conversely, the levels of self-confidence in the control group exhibited a notable decrease three months post-surgery, a statistically significant alteration. The IKAP model has been shown to improve the self-efficacy of individuals diagnosed with chronic stomatitis. Moreover, studies indicate that patients who do not undergo any form of intervention may encounter a decrease in self-assurance within three months following a surgical procedure. Wu Shuang and Li Ying (Wu, 2018; Ying, 2020), Chinese researchers, effectively implemented this model in a study involving patients

diagnosed with hypertension and stroke, leading to a notable enhancement in self-efficacy (Zhang et al., 2023; Zhang et al., 2021). The results of the study regarding the QOL suggest that no significant difference was observed between the two groups at the time of discharge after the surgical procedure. Three months post-surgery, the IKAP group demonstrated enhanced performance in functionality and symptom management compared to the control group. In terms of functional aspects, a higher score indicates an improved QOL. Following a 3-month postoperative period, the control group showed a decrease in role function scores, suggesting difficulty in accepting and adapting to their status as enterostomy patients. However, there was a slight improvement in scores pertaining to physical, emotional, cognitive, and social functions. The symptom dimension pertains to the severity of associated symptom problems, where higher scores indicate more significant issues. Within the control group, an increase in fatigue and financial difficulties was noted 3 months after surgery, which could possibly be linked to insufficient stoma care practices. Following discharge, the responsibility for stoma maintenance primarily rests with the patient and their family members. Hence, it is essential to obtain a thorough understanding of stoma care. Insufficient care not only increases the probability of complications related to stomas but also exacerbates the financial burden on patients.

Nichols' study (Nichols, 2015) demonstrated that individuals with a stoma experience limitations in various aspects of their physical abilities while engaging in daily activities, leading to a decrease in their overall QOL. This trend is consistent with the observations made in the control group of the study. Chinese researchers Weng Weihua and Zheng Haiying effectively applied the IKAP nursing model to improve the QOL of post-surgery patients with gastric cancer to a similar degree (Weng et al., 2017; Zheng, 2017). A research study conducted on individuals with permanent stomas in Hong Kong, China, revealed a positive correlation between high levels of self-efficacy and improved QOL among this patient group (Wu et al., 2007). Patients with stomas often experience a profound sense of shame, leading them to choose self-isolation to conceal their condition from others. This withdrawal from social interactions, limited engagement in group activities, and inadequate access to stoma self-care information collectively diminish their overall QOL. Consequently, enhancing self-efficacy levels through the implementation of the IKAP model emerges as a crucial strategy for improving the QOL for individuals with permanent stomas.

Throughout the monitoring period, two complications were noted in the IKAP group, while the control group experienced seven complications. The IKAP group demonstrated superior performance, resulting in statistically significant outcomes. Currently, stoma patient education predominantly focuses on the period of hospitalization, with insufficient attention given to stoma adjustment after discharge. This deficiency contributes to complications that arise from patients' improper stoma care practices. The IKAP model aims to instill self-assurance in managing stoma-related concerns autonomously, prioritize patient needs in the provision of guidance, and deliver tailored support. Employing targeted questions to assess the patient's capacity for understanding is recommended. Furthermore, the sharing of personal experiences by fellow patients during group sessions serves to further motivate individuals in their educational journey. In Xi Zhang's study, providing post-discharge stoma care guidance in the intervention group resulted in a significant decrease in stoma complications (Zhang et al., 2020). A positive correlation was observed between the duration of the intervention and the improvement of patients' self-care skills. Nevertheless, a lack of agreement regarding the optimal duration of such interventions to maximize outcomes still exists. Nonetheless, it is evident that interventions aimed at enhancing patients' early nursing skills play a crucial role in improving patient care. In this study, the experimental group, guided by the IKAP theory, showed significant improvements in self-efficacy and QOL 3 months after surgery, effectively reducing the occurrence of complications. Through regular training and guidance from professional nutritionists, the unpleasant odors caused by diet in patients were reduced. This improvement allowed them to better integrate into communal life and enhanced patient comfort.

Strengths and Limitations

This research employed a retrospective cohort design to implement effective management strategies for patients with permanent stomas, guided by the IKAP theory, over a period of 3 months. The findings indicated that the IKAP group demonstrated significant improvements in self-efficacy and QOL, along with a reduction in stoma-related complications, compared to the control group. The data used in this study were sourced from a single medical center, resulting in a limited sample size that may not adequately represent the broader population. While this paper employs the PSM method to simulate randomization, it is crucial to acknowledge that this approach can only account for known covariates, leaving residual confounding factors unaddressed. Furthermore, this investigation exclusively evaluated the short-term outcomes, 3 months after the surgical procedure, thereby limiting its ability to capture the long-term effects of the intervention strategies, including the persistent occurrence of stoma-related complications and the sustained improvement in QOL. Future prospective multi-center studies with larger sample sizes are necessary to include long-term follow-up metrics, thereby providing further validation for the efficacy of the IKAP nursing model.

Implications for Practice

This study significantly improved patients' self-efficacy and family involvement through systematic interventions, reducing the incidence of complications and readmission rates while alleviating patients' financial burdens. It provides effective support for the long-term rehabilitation of stoma patients. In clinical practice, healthcare professionals can refer to the IKAP theoretical framework proposed in this study, which addresses four aspects: Information, Knowledge, Attitude, and Practice, to develop structured health education programs and continuity of care plans. Through various approaches such as stoma clinics, regular follow-ups, family participatory care, and digital health management platforms, patients' mastery of stoma care knowledge and practical skills is strengthened, enhancing their confidence in self-management. Simultaneously, family members are encouraged to actively participate in caregiving, creating a supportive rehabilitation environment that improves patients' quality of life and reduces healthcare resource consumption. This model is applicable not only to systematic management during the perioperative period but can also be integrated into discharge planning and community extension services, providing a theoretical basis and practical guidance for multidisciplinary collaboration, ultimately achieving comprehensive physical, mental, and social health improvements for ostomy patients.

Conclusions

Three months following surgery, patients with permanent ostomies can benefit from the IKAP nursing model's ability

to promote self-efficacy and QOL while lowering ostomy-related problems. It can reduce the agony and annoyance brought on by ostomies, reinstate normal interpersonal communication, and successfully encourage patients to rejoin society as soon as feasible. In order to further support the efficacy of the IKAP nursing style, prospective large-scale research can be conducted in the future. This study retrospectively collected the data of the control group with a limited sample size.

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Ethics Approval and Consent to Participate

The Ethics Committee of Tangdu Hospital in accordance with the Declaration of Helsinki (TDLL-202311-01).

Consent for Publication

All authors have read and approved the final manuscript and consent to its publication.

Author Contribution Statement

Wang Nan: conceptualization, writing - original draft;
Wang Weihua: project administration, supervision;
Jin Yongni and Gao Yan: investigation, data curation;
Han Zhuo: software, visualization;
Nan Jing: methodology, writing-review & editing, funding acquisition.

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Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Availability of Data and Materials

The data used to support the findings of this study are available from the corresponding author upon request.

Study Approval Number

This study was approved by the Ethics Committee of Tangdu Hospital (TDLL-202311-01).

Use of AI Software

No AI or AI-assisted tools were used in the preparation of this manuscript.

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