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Original Article

Application effect of the principle of seamless management in nursing risk control of the department of gastrointestinal surgery

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Abstract: Objective: To determine the application effect of nursing risk control based on the principle of seamless management in the department of gastrointestinal surgery. Methods: A total of 62 patients with gastrointestinal diseases admitted to the Department of Gastrointestinal Surgery in our hospital for nursing risk management based on the principle of seamless management were enrolled into a research group, and another 58 patients admitted before the implementation of such management were enrolled into a control group. The two groups were compared in the incidence of complications, Chinese Perceived Stress Scale (CPSS) score, self-rating anxiety scale (SAS) score, nursing satisfaction, and awareness rate of health knowledge, and the nursing quality scores and medical complaints and disputes were compared before and after the implementation of nursing risk control based on the principle of seamless management by 19 nurses in the department. Results: The pulmonary infection rate, incision infection rate, incidence of gastrointestinal reaction, and incidence of anastomotic leakage in the research group were all significantly lower than those in the control group (all $P<0.05$), and CPSS and SAS scores of the research group were also both significantly lower than those of the control group (both $P<0.001$). In addition, the research group showed significantly higher nursing satisfaction and awareness rate of health knowledge than the control group (both $P<0.01$), and there were notably less medical complaints and disputes after implementation of the principle of seamless management ($P<0.01$). Moreover, after implementation of the principle, nursing staff acquired significantly higher scores of professional skills (health education, professional knowledge, and practical operation; all $P<0.001$), and also contributed to significantly higher scores of nursing work (basic nursing, disinfection and isolation, ward management, intensive care, document writing, and nursing safety; all $P<0.001$). Conclusion: Nursing risk control based on the principle of seamless management can improve the comprehensive quality of nursing staff in the department of gastrointestinal surgery and the overall quality of nursing, thus lowering the incidence of nursing risk, relieving patients' negative moods, and improving the nurse-patient relationship and satisfaction of both nurses and patients.

Keywords: Department of Gastrointestinal Surgery, principle of seamless management, risk management, nursing satisfaction, ward management

Introduction

In the Department of Gastrointestinal Surgery, there are many kinds of complex diseases, such as acute appendicitis and strangulated hernia that need an emergency operation, as well as gastrointestinal cancer that requires all-round care after operation, and other diseases requiring complicated operations with assistance of other departments [1]. In addition, patients admitted to the department of gastrointestinal surgery often suffer from severe discomfort such as vomiting and abdominal pain when their disease attacks them, which brings about emotional anxiety and poor nursing compliance, which compromises postoperative recovery, and can induce postoperative bleeding, adhesive intestinal obstruction, incision infection and other complications [2]. Moreover, the patients may have many kinds of physical and psychological emergencies, which complicates their nursing and increases the nursing workload and intensity, posing an enormous challenge to the working attitude and nursing quality of nursing staff and putting their professional skills to the test. These emer-

gencies are also a common situation faced in nursing management in the Department of Gastrointestinal Surgery [3]. Therefore, it is particularly important to improve risk prevention awareness of nursing staff in the Department of Gastrointestinal Surgery [4].

In recent years, the concept of risk management has been widely adopted in clinical departments [5]. Through efforts to strengthen nursing risk-related training, improve the rules and regulations of nursing risk management in departments, and better schedule nurses, the nurses' awareness of risk management and professional level have been improved. The concept of nursing risk management is especially applicable to nursing risk management of complicated gastrointestinal diseases with many complications [6]. In daily nursing, regular nursing during the shifting of duty and admission of new patients are easily overlooked. In addition, the nursing staff is unfamiliar with the new patient's condition at the time of their admission, and there are many individuals on the scene when the patient applies for admission, so there may be management with negligence where nursing is not in place. Moreover, during the shifting of duty, the nursing staff is too busy to carry out the doctor's advice, and it is impossible to give care for one patient with one nurse, so there is likely to be nursing negligence during this period. In this context, the principle of seamless management came into being, and it gradually has received recognition from medical workers and patients. As a new nursing mode, nursing based on the principle of seamless management is characterized as follows: Efforts are made to constantly summarize the shortcomings in clinical nursing work, optimize the work flow and functional division, improve the fluency of nursing work, and give patients all-round and full-time nursing [7].

One previous study has pointed out that in the General Surgery Department, the principle of seamless management can help relieve anxiety and depression of patients during the perioperative period, alleviate their postoperative pain, and improve the professional level and comprehensive quality of nursing staff [8]. The Department of Gastrointestinal Surgery, as the main component of a general surgery department, admits many cases and faces complicated disease conditions, so it often encounters difficulty in nursing. Some of these problems need to be solved by improving the professional level of nursing staff, and the rest can be solved by optimizing nursing concepts. However, there are few clinical research reports on the specific application of the principle of seamless management in the Department of Gastrointestinal Surgery. Therefore, this study discussed it by exploring how to improve the professional level of nursing staff under a type of nursing risk management based on the principle of seamless management to better meet the needs of patients during the perioperative period, with a view to providing guidance for clinical nursing treatment. The study is reported as follows.

Materials and methods

General data

This study was a proactive study approved by the Medical Ethics Committee of Huzhou Central Hospital, Affiliated Hospital of Huzhou Normal University. A total of 62 patients with gastrointestinal diseases admitted to the Department of Gastrointestinal Surgery in Huzhou Central Hospital, Affiliated Hospital of Huzhou Normal University from July 2019 to December 2019 for nursing risk management based on the principle of seamless management were enrolled into a research group, and another 58 patients admitted to the department before the implementation of such management (January 2019 to June 2019) were enrolled into a control group. In addition, 19 in-service nurses who worked in the Department of Gastrointestinal Surgery from January 2019 to December 2019 were enrolled as research subjects, including 7 undergraduates, 8 junior college graduates, and 4 technical secondary school graduates. They consisted of 8 senior nurses, 10 intermediate nurses, 15 junior nurses, and 5 new nurses. All patients signed the informed consent.

The inclusion criteria of the patients: Patients who were diagnosed by imaging or endoscopy and met the indications of selective operation and emergency operation in the Department of Gastrointestinal Surgery, patients without other digestive system complications, patients without comorbid nervous system or mental diseases, and those who signed an informed consent form after being informed of the treatment scheme of this study [9].

The exclusion criteria: Patients with other comorbid digestive system diseases besides the diseases requiring surgical treatment, patients with mental or psychological diseases before operation, and those with a history of surgery for digestive system diseases.

Methods

The control group was not given nursing risk management based on the principle of seamless management, and was only given routine nursing intervention, including routine preoperative preparation, informing them of related matters, and psychological health education. Routine nursing intervention: (1) Preoperative preparations involved fasting from liquids and solids, skin preparation, an indwelling urinary catheter, and gastrointestinal decompression; (2) Related matters that they were informed of included possible complications after operation and corresponding nursing countermeasures; (3) Psychological health education that mainly covered helping patients relieve anxiety and stabilizing their sleep quality and vital signs.

The research group was given nursing risk management based on the seamless management principle as follows: Nursing risk management: (1) Strengthening nursing risk-related training: Through professional lectures, the department organized staff to study risk-related management skills, systems, and content for the prevention and nursing against possible postoperative complications such as gastrointestinal reactions and anastomotic leakage. In addition, In view of the depression of patients with gastrointestinal tumors after operation, the department also provided relevant psychological intervention training for nursing staff to prevent possible psychological problems in the patients. (2) Improving the rules and regulations of nursing risk management in the department: According to the actual situation of the department, efforts were made to further improve the current attendance system, and a reward and punishment system, after which the modified systems were reported to the hospital to print the relevant instruction manuals, so as to urge everyone to learn and ensure the smooth implementation of the new systems. In addition, efforts were also made to improve the accountability system to enhance the sense of responsibility among nursing staff. (3) Scheduling nurses well: It is the core principle of seamless management to ensure that all patients are in the charge of nursing staff 24 hours a day. Therefore, more effort was made to improve the shift system, inform relevant personnel of the shift schedule in advance, and ensure their early arrival. (4) Optimizing the bed-based management system: In view of the complexity and diversity of gastrointestinal surgical diseases, nursing staff in charge were assigned according to disease types instead of beds, so that patients with different diseases were nursed by specific nursing staff, and the nursing staff can handle possible complications and different psychological states of patients skillfully, thus improving nursing efficiency and reducing nursing workload. The principle of seamless management: (1) Admission reception: When the patient first arrived at the ward, the nursing staff were required to take the initiative to inquire about the patient's condition, understand the patient's basic situation, assign the patient to a corresponding treatment group, and introduce the basic information of the competent physician to the patient. After the work handover was initially completed, in view of the condition where newly admitted patients and their families were unfamiliar with the ward environment, the nursing staff were arranged to actively and carefully introduce the ward environment and hospital-related visiting regulations to the patients and their families, and provide convenience for the accompanying patients' families. (2) Preoperative nursing: There are many diseases in the department of gastrointestinal surgery, so different nursing plans should be developed according to the characteristics of different diseases. For emergencies including acute appendicitis and strangulated intestinal obstruction, priority should be given to operations related to surgery, such as carrying out electrocardiogram and laboratory hematological examination. The nursing staff was required to communicate with individuals involved in operating room. For emergency patients who had waited for more than one hour for surgery, besides making routine preoperative preparations, the staff was also required to ask the patients about their subjective feelings and pathogenesis, and introduce the treatment experience of other patients with the same disease before them who successfully recovered, so as to relieve their anxiety. For patients with gastrointestinal cancer who would undergo a selective operation,

the staff can work to fully understand the patient's condition, family situation, and education level while making preoperative preparations, and introduce possible postoperative complications and nursing countermeasures, so as to solve the questions raised by patients in time. In addition, the staff was required to actively involve themselves in preoperative visits by anesthesiologists, and assist anesthesiologists to communicate with patients and their families. (3) Postoperative nursing: Nursing staff were arranged to closely monitor the vital signs of patients and their drainage tubes, keep the ward clean and ventilated, provide TV programs in the ward to distract patients' attention and relieve their postoperative anxiety and depression caused by pain. In addition, the staff was also asked to encourage the patients to get out of bed as soon as possible to increase their gastrointestinal peristalsis and promote their postoperative recovery, and encourage those who were not allowed to get out of bed to do proper exercise in bed to prevent postoperative thrombosis.

Outcome measures

Primary outcome measures: (1) Comparison of postoperative complications: The two groups were compared in the pulmonary infection rate, incision infection rate, incidence of gastrointestinal reaction, and incidence of anastomotic leakage after gastrointestinal surgery. (2) Comparison of psychological state: Before and after the implementation of the principle of seamless management, the psychological state of each patient was evaluated with the Chinese Perceived Stress Scale (CPSS) and self-rating anxiety scale (SAS) [10, 11]. With Cronbach's α coefficient of 0.752, CPSS is composed of 14 questions reflecting tension. CPSS score is classified into 5 levels, and the total score is directly proportional to perceived stress. A total score between 29 and 42 points indicates stress and the requirement of psychological counseling or medical intervention, and a total score between 43 and 56 points indicates excessive pressure and the requirement of immediate decompression treatment. With a Cronbach's α coefficient of 0.956, SAS is composed of 20 items in total. It has a full score of 100 points, and each item is scored with 1-4 points. The integral part of the total score of each item s in total. It has a full score of 100 points, and suggests anxiety or depression. (3) Comparison of professional skills of nursing staff and nursing quality scores: The skills and scores were evaluated according to the criteria developed by the nursing department of Huzhou Central Hospital, Affiliated Hospital of Huzhou Normal University. We mainly compared the professional skills of nursing staff and nursing quality scores before and after the implementation of the principle of seamless management. The professional skills were evaluated from three items (health education, professional knowledge, and practical operation). Nursing quality was evaluated from 6 items (basic nursing, disinfection and isolation, ward management, intensive care, document writing, and nursing safety), and it had a total score of 100 points, with 90 points deemed as qualified.

Secondary outcome measures

Comparison of nursing satisfaction, medical complaints and disputes, and awareness rate of health knowledge: according to the daily nursing work content, a scoring sheet and questionnaire were developed, and the patients' nursing satisfaction and awareness of their own diseases were investigated before and after the implementation of the principle of seamless management. The scoring sheet and questionnaire totaled 100 points, and a score above 80 points was deemed as satisfactory or qualified. Moreover, the incidence of medical complaints and disputes was compared between the two groups during hospital stay.

Statistical analysis

All statistical data were analyzed by SPSS 21.0. All measurement data were expressed as the mean ± standard deviation ($\bar{x}$ ± sd), analyzed using the independent-samples t test, and expressed using t, while all enumeration data were expressed as the number of cases/percentage (n/%), analyzed by the χ^2, and expressed by χ^2. $P<0.05$ indicates a significant difference.

Results

Comparison of general data between the two groups

There was no significant difference between the two groups in general data (all $P>0.05$). Details are shown in **Table 1**.

Table 1. Basic date ($\bar{x}$ ± sd, n, %)

Index	Research group (n=62)	Control group (n=58)	χ^2/t	P
Gender (male/female)	34/28	30/28	0.117	0.733
Age (years)	44.8±5.4	43.3±4.9	1.380	0.171
Marriage (married/unmarried)	50/12	48/10	0.089	0.765
BMI (kg/m^2)	20.92±1.51	21.35±1.66	1.481	0.141
Time of operation (min)	204.22±3.97	205.23±4.11	1.368	0.174
Bleeding volume during operation (mL)	31.25±7.41	32.81±8.32	1.082	0.282
Disease type			0.500	0.973
Cancer of the stomach	18	19		
Colon cancer	17	14		
Gastric ulcer	8	7		
Inguinal hernia	12	10		
Appendicitis	7	8		
Operation type			0.020	0.990
Emergency surgery	8	7		
Operation within a time limit	21	20		
Elective surgery	33	31		
Complication				
Diabetes	10	13	0.764	0.382
Hypertension	8	9	0.168	0.682
Malnutrition	12	10	0.089	0.765

Note: BMI: body mass index.

Table 2. Comparison of postoperative complications (n, %)

Group	Research group (n=62)	Control group (n=58)	χ^2	P
Pulmonary infection	1 (1.61%)	6 (10.34%)	4.160	0.041
Incision infection	1 (1.61%)	6 (10.34%)	4.160	0.041
Gastrointestinal reaction	2 (3.23%)	8 (13.79%)	4.381	0.036
Anastomotic leakage	0 (0.00%)	4 (6.90%)	4.423	0.035

Table 3. Comparison of psychological state ($\bar{x}$ ± sd, score)

Group	CPSS score	SAS score
Research group (n=62)	29.28±2.14	52.38±3.21
Control group (n=58)	37.38±3.52	60.35±4.26
T	13.190	10.023
P	0.000	0.000

Note: CPSS: Chinese Perceived Stress Scale; SAS: self-rating anxiety scale.

Comparison of postoperative complications between the two groups

The pulmonary infection rate, incision infection rate, incidence of gastrointestinal reaction, and incidence of anastomotic leakage in the research group were all significantly lower than those in the control group (all P<0.05). Details are shown in **Table 2**.

Comparison of psychological state between the two groups

Comparison of psychological state between the two groups after operation showed that the CPSS and SAS scores of the research group were both significantly lower than those of the control group (all P<0.001). Details are shown in **Table 3**.

Comparison of nursing satisfaction, medical complaints and disputes, and awareness rate of health knowledge between the two groups

The nursing satisfaction and awareness rate of health knowledge of the research group were both significantly higher than those of the control group (both P<0.01), and there were significantly less medical complaints and disputes after the implementation of the principle of seamless management (P<0.01). Details are shown in **Table 4**.

Table 4. Comparison of nursing satisfaction, medical complaints and disputes, and awareness rate of health knowledge

Group	Nursing satisfaction	Medical complaints and disputes	Awareness rate of health knowledge
Research group (n=62)	60 (96.77%)	2 (3.23%)	59 (95.16%)
Control group (n=58)	47 (81.03%)	10 (17.24%)	46 (79.31%)
t	7.685	6.541	6.883
P	0.006	0.009	0.009

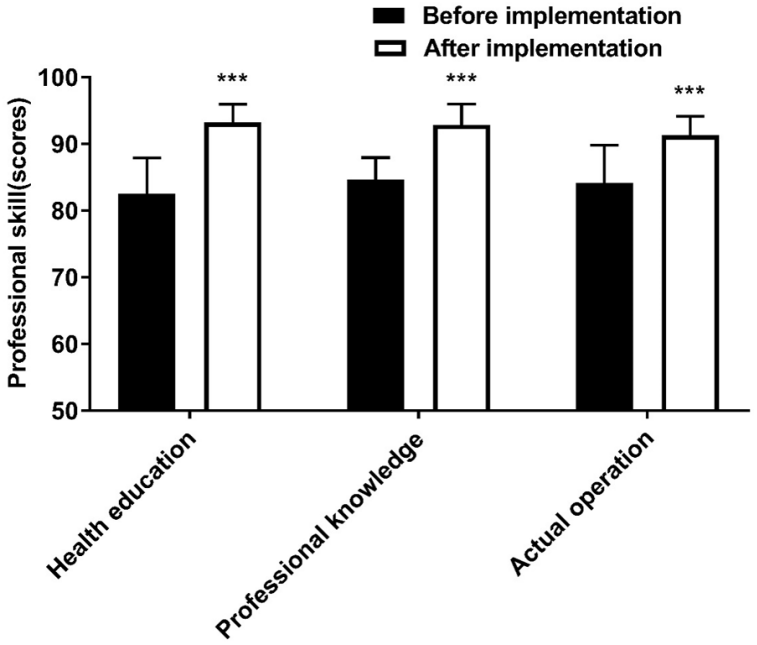

Figure 1. Comparison of professional skill scores before and after the implementation of the principle of seamless management of nursing staff. Compared with before implementation, ***P<0.001.

Comparison of nursing staff's professional skills scores before and after implementation of the principle of seamless management

After implementation of the principle of seamless management, nursing staff acquired significantly higher scores of health education, professional knowledge, and practical operation (all P<0.001). Details are shown in **Figure 1**.

Comparison of nursing quality delivered by nursing staff before and after implementation of the principle of seamless management

After implementation of the principle of seamless management, the scores of basic nursing, disinfection and isolation, ward management, intensive care, document writing, and nursing safety of nurses increased significantly (all P<0.001). Details are shown in **Figure 2**.

Discussion

Gastrointestinal diseases are common among Chinese residents, and surgery is still the most effective radical cure for over 70% gastrointestinal diseases such as gastrointestinal tumors, appendicitis and inguinal hernia [12]. Different from nursing of the Internal Medicine Department and other departments, postoperative nursing of the Department of Gastrointestinal Surgery is more difficult due to the fact that this department admits various cases and faces different priorities, so higher comprehensive requirements are made for nursing staff [13]. For operations against emergencies such as acute appendicitis, the lack of smooth coordination and cooperation of nursing staff will prolong the waiting for operation and delay medical treatment. For selective surgeries such as surgery against inguinal hernia, waiting before operation will intensify patients' anxiety, reduce their compliance, and thereby compromise their postoperative recovery. Therefore, it is necessary to develop different nursing countermeasures for different diseases and conditions of patients and optimize the process to minimize the treatment time of patients [14]. In addition, it is also necessary to arrange nursing staff to provide nursing and guidance for patients in the whole process of diagnosis and treatment, so as to relieve their strange senses and negative emotions during perioperative period and increase their nursing compliance [15].

Therefore, we need to pay more close attention to occupational risks and skills of nurses while attaching importance to the nursing quality of patients. American scholars Steege LM et al.

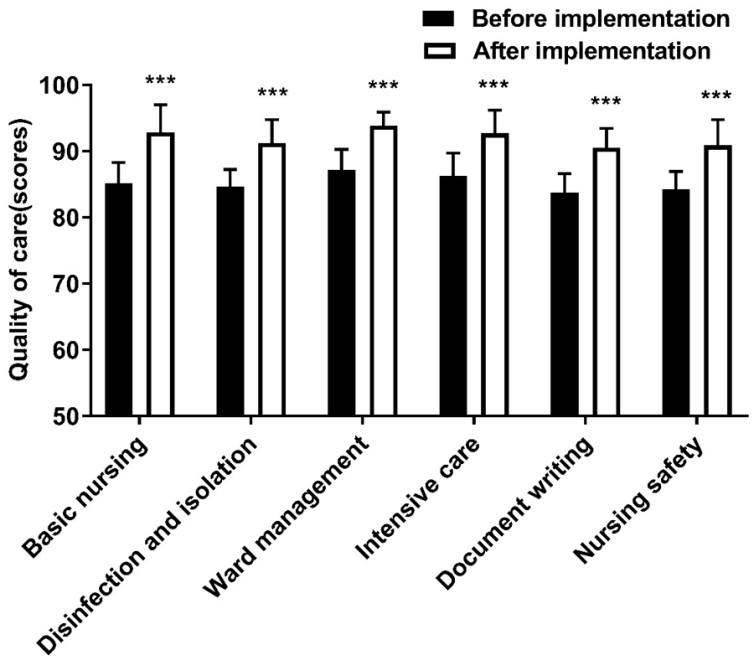

Figure 2. Comparison of nursing quality scores before and after the implementation of the principle of seamless management. Compared with before implementation, ***P<0.001.

have pointed out that fatigue of nurses and decline in their satisfaction towards their jobs directly leads to an increase in turnover rate of nurses and poor prognosis of patients [16]. Many organizations in the world have listed the solution of nurses' fatigue as a priority to the enhance safety consciousness among patients and health of nursing staff [17]. The concept of risk management is a patient-centered nursing method, under which the nursing scheme is developed mainly based on patient's body and disease conditions [18]. Application of the concept in nursing of patients in the Department of Gastrointestinal Surgery is to promote patients to better cooperate with the treatment of gastrointestinal diseases, which can not only reduce postoperative complications and promote the postoperative recovery of patients, but also improve the nursing staff's awareness of risk management and various items in nursing quality [19].

In this study, after implementation of the principle of seamless management in nursing risk control, the professional skills of nursing staff and nursing work quality were improved substantially. It can be explained by the following facts: An improved attendance system and reward and punishment system enhanced the sense of responsibility of nursing staff and urged them to study and practice theory more actively, and a perfected scheduling system and optimized bed-based management system contributed to clearer division of labor in nursing, and thus reduced the workload of nursing staff and relieved their fatigue, which brought a positive cycle between work attitude and workload. In addition, in our study, the Department of Gastrointestinal Surgery organized risk training for nursing staff in the form of professional nursing lectures. After studying relevant skills, systems, and contents about risk management, the nursing staff acquired a significant improvement in professional skills including health education, professional knowledge, and practical operations, delivered significantly higher quality of nursing including basic nursing, disinfection and isolation, ward management, intensive care, document writing, and nursing safety, and gradually had a stronger awareness of nursing risk prevention. The results verify that the principle of seamless management is also applicable to the Department of Gastrointestinal Surgery.

Seamless management is a novel nursing concept put forward in recent years, which emphasizes the seamless connection of nursing work from admission to discharge, and ensures the full implementation of nursing work, aiming to eliminate the loneliness and tension of patients, reduce postoperative complications, and promote recovery [20]. Compared with conventional nursing, the principle of seamless management running through the whole treatment process of patients can increase the dependence on nursing staff while familiarizing patients with the hospital environment as soon as possible [21]. In addition, seamless nursing management also emphasizes the optimization of nursing processes, especially for patients who need emergency treatment. Under such a management system, nursing staff are organized to

take training about risk management and have clear division of labor and responsibilities, so the treatment process of patients is smoother, which lays a foundation for the smooth rehabilitation of patients [22].

In addition, intraoperative nursing for patients is also a distinctive feature of seamless management. Lígia Pereira et al. have revealed that nurses can significantly reduce patients' nervousness by actively participating in anesthesiologists' preoperative visits to the patients and introducing them to the operating room environment, which extends the perioperative nursing of the ward to the operation [23]. Finally, in this study, based on the principle of seamless management, corresponding nursing schemes were developed according to the characteristics of different gastrointestinal surgical diseases, and the common problems in the implementation process of management were discussed and summarized to promote the smooth implementation of seamless nursing management, so as to make perioperative nursing more targeted, solve patients' problems faster, and thus improve nursing treatment and treatment effect.

Compared with conventional nursing modes, seamless nursing management not only helps to optimize the nursing process, but also contributes to more active attention to patients' emotional changes and psychological conditions and higher confidence of patients in fighting diseases [24]. In addition, in view of the gastrointestinal reactions that patients are prone to suffer after gastrointestinal surgery, under the principle of seamless management, the patients are encouraged to actively take rehabilitation training to effectively promote their recovery after surgery [25]. This study showed that the incidence of postoperative complications, CPSS, and SAS scores of the research group nursed under the principle of seamless management were significantly lower than those of the control group. The results indicate that the principle of seamless management can promote postoperative rehabilitation and help patients keep a positive mental state, which in turn helps patients to recover after operation, forming a virtuous circle, reducing the incidence of adverse outcomes, and improving medical quality. With good postoperative recovery and positive mental state, patients in the research group had significantly higher nursing satisfaction and awareness rate of health knowledge than the control group, and there were significantly less medical complaints and disputes after the implementation of the principle of seamless management. In this study, we have implemented seamless management for perioperative patients in the Department of Gastrointestinal Surgery, and have obtained satisfactory results. However, we also found that the nursing staff in the ward did not fully participate in the whole operation, so in the follow-up work, it is necessary to strengthen the cooperation with other relevant nursing staff in the operating room. Moreover, it is necessary to strengthen the vocational training among nursing staff so that patients can enjoy better nursing.

To sum up, nursing risk control based on the principle of seamless management can improve the comprehensive quality of nursing staff in the Department of Gastrointestinal Surgery and the overall quality of nursing, thus reducing the incidence of nursing risk, relieving patients' negative moods, and improving the nurse-patient relationship and satisfaction of nurses and patients, so it is worthy of promotion.

Disclosure of conflict of interest

None.

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