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ABOUT COVER

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Case Control Study

PDCA nursing in improving quality management efficacy in endoscopic submucosal dissection

Yan-Hua He, Fang Wang

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Endoscopic submucosal dissection (ESD) is a common surgical strategy for the treatment of early gastrointestinal tumors and precancerous lesions. PDCA nursing can effectively prevent potential risks in the nursing process, protect patient privacy, and improve patient satisfaction, nursing integrity, and service quality.

AIM

To explore the effects of PDCA nursing model on the quality management of gastrointestinal ESD, the 36-item Short-Form Health Survey (SF-36) score, and negative emotions.

METHODS

A total of 178 patients who underwent ESD between January 2020 and January 2021 were divided into two groups. The usual care mode was the control group, with 80 cases from January to July 2020; from July 2020 to January 2021, 98 patients were enrolled in the PDCA care mode as the research group. The length of hospital stay and the costs of the two groups were statistically analyzed. The visual analog scale (VAS), SF-36 score, Zung self-rating scale for anxiety and depression, and postoperative complications were also assessed.

RESULTS

The length of hospitalization and cost in the research group were lower than in the control group ($P < 0.05$), and the VAS scores were lower than those before care ($P < 0.05$). Moreover, the VAS score of the research group was lower than that of the control group ($P < 0.05$). The SF-36 scores for physical function, role status, social function, pain, mental health, and physical strength were higher in the research group than in the control group ($P < 0.05$). Depression and anxiety scores of the research group were lower than those of the control group ($P < 0.05$). The postoperative complication rate in the research group (6.12%) was lower than in

the control group (32.50%) ($P < 0.05$).

CONCLUSION

PDCA nursing can improve the quality of management of ESD surgery, shorten the length of hospital stay and cost, reduce the VAS and Zung scale scores to alleviate adverse emotions, improve the SF-36 score, and reduce postoperative complications.

Key Words: PDCA care; Endoscopic submucosal dissection; 36-item Shot-Form Health Survey; Zung scale score; Postoperative complications

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Core Tip: PDCA nursing can effectively shorten the length of hospital stay and hospitalization costs, reduce the visual analog scale and Zung scale scores, relieve the pain and negative emotions of patients, improve the 36-item Shot-Form Health Survey score, reduce the occurrence of postoperative complications, and significantly impact the quality management of gastrointestinal endoscopic submucosal dissection.

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INTRODUCTION

Endoscopic submucosal dissection (ESD) is a common surgical strategy with light trauma, safety, curative effects, and wide clinical application for the treatment of early cancerous or precancerous lesions of the digestive tract, but it requires advanced technology[1]. First, the operating room should be fully equipped with medical staff and treatment accessories. Second, the operators should be proficient in various endoscopic hemostasis and titanium sutures, should have received comprehensive ESD training and be able to perform ESD independently[2]. However, postoperative complications affect the postoperative recovery of all clinical operations[3], including ESD. Multiple complications of ESD place higher demands on operating room nurses. They provide targeted psychological guidance to people with disabilities before surgery, improve various preoperative preparations, and closely observe postoperative conditions, which contribute to the smooth progress of surgery[4]. The key to the success of the operation is tacit cooperation between the operator and nurse so that the lesions can be safely resected, and complications can be reduced or avoided. Therefore, effective cooperation between nurses and meticulous and comprehensive care are necessary for successful surgery[5]. Recently, with the continuous improvement in medical levels, PDCA is more effective. It mainly represents the four stages of nursing work: plan (P), DO (D), check (C), and ACT (A). Compared to traditional clinical nursing management, the PDCA cycle management model can effectively improve the quality of hospital nursing work, enhance nurses' teamwork ability, improve their work efficiency and enthusiasm, increase the sense of accomplishment in clinical nursing, effectively prevent potential risks in the nursing process, and protect patients' privacy. It also improves patient satisfaction, nursing integrity, and service quality[6,7]. This study mainly discusses the effect of PDCA nursing on the quality management of ESD surgery under gastrointestinal endoscopy and its impact on invalid 36-item Shot-Form Health Survey (SF-36) scores and negative emotions to provide a reference for the quality management of ESD surgery under clinical gastrointestinal endoscopy.

MATERIALS AND METHODS

General information

A total of 178 patients who underwent ESD in our hospital between January 2020 and January 2021 were selected as research subjects. The inclusion criteria were as follows: (1) The people with disabilities had no mental or cognitive impairment; (2) The ability to cooperate with the study, good understanding, and communication; (3) All people with disabilities provided informed consent before participation in the study; (4) There were no contraindications to ESD; and (5) The general information was complete. The exclusion criterion was the presence of other major diseases. All people with

disabilities were divided into two groups based on July 2020 boundary. From January 2020 to July 2020, the usual care mode was set as the control group, with the total of 80 cases. From July 2020 to January 2021, the PDCA care mode was established as the research group, with a total of 98 cases. In the control group, there were 28 females and 52 males, the age ranged from 23 to 67 years old, with composite life of 47.09 ± 6.04 years old, and lesions included 33 rectal lesions, 27 gastric lesions, and 20 esophageal lesions. The research group included 64 males and 34 females, the age ranged from 22 to 65 years old, with composite life 46.17 ± 5.92 years old, and the lesions included 41 rectal lesions, 35 gastric lesions, and 22 esophageal lesions. There was no significant difference between the two groups ($P > 0.05$), indicating that the results were comparable. This study complied with the principles of the Declaration of Helsinki.

The care of the control group

The control group adopted the usual care mode, which mainly included the following: (1) Preoperative care: when the patient is admitted to the hospital, the nursing staff should follow the doctor's advice, assist the patient in completing routine blood tests, chest radiography, and other related examinations, check the equipment and drugs required for the operation and report to the doctor. The patient then confirms the operation information; (2) Intraoperative care: the nursing staff should actively cooperate with the doctor to disinfect and lay towels, cooperate with the doctor to operate, follow the aseptic principle, and closely observe the working state of the system and the patient's state, and deal with emergencies timely; (3) Postoperative care: nurses should observe the patient's vital signs, keep the patient in the postoperative position, prevent aspiration caused by anesthesia, and closely observe the patient's abdominal pain, surgical wound, and other abdominal conditions. Nurses should also guide patients and their families to pay attention to the placement of drainage tubes to prevent deformation and guide them to go to bed after the operation to promote gastrointestinal movement and blood circulation and reduce complications; and (4) Psychological care: For fear, anxiety, and other negative psychologies of people with disabilities before and after the operation, the nurses should explain the successful cases to the people with disabilities, inform the people with disabilities of the general process and the possible situations of the operation, and indicate that the nurses have taken sufficient countermeasures to obtain the trust of those people, eliminate their negative psychology, and improve their cooperation.

The care of the research group

The research group adopted a PDCA care mode based on the control group. The details are as follows: (1) Planning stage (P): The head nurse held a care meeting to investigate the current situation of ESD surgery, including the requirements for nurses, the content of perioperative care for people with disabilities, and medication guidance, summarized the experience and continued to improve the deficiencies in the previous nursing process. The nursing staff established a continuous nursing quality improvement team headed by a head nurse, regularly controlled the nursing quality of the department, and improved the head nurse functions. For problems and details in nursing, such as preoperative psychological care, experienced nurses should conduct psychological assessments before psychological counseling, and the preparation of preoperative instruments and drugs should be checked repeatedly and communicated to doctors and anesthesiologists promptly. Adverse reactions and psychological changes that invalidate postoperative drainage in life and care are often ignored by nurses and their families. Nurses should understand possible adverse reactions and psychological changes of people with disabilities in advance, formulate countermeasures, and strive to effectively control every aspect of the nursing process; (2) Implementation stage (D): Nurses should improve various systems, implement their duties, improve the rationality of shift scheduling, ensure the implementation of various nursing tasks, and adjust human resources for shortage positions. The head nurse supervised the implementation of nursing measures and conducted regular spot checks. Before ESD, nurses were uniformly trained; (3) Inspection stage (C): During the implementation process, the head nurse improved the problems, supervised and spot-checked the improvement, observed whether the nurses implemented the nursing measures according to the nursing plan, held regular meetings, constantly summarized and improved the problems encountered in the implementation process, and maintained records. The head nurse also ensured a timely understanding of the dissatisfaction of people with disabilities and their families, implementing nursing measures, and making corrections; and (4) Processing stage (A): The head nurse regularly announced the quality of department nursing, surgical nursing measures, patient satisfaction, etc., and scored these items. Items with a score greater than 90 were regarded as an important part of the nursing plan. They explained and corrected most existing problems and transferred the remaining problems to the next PDCA cycle as the quality control focus of the next cycle.

Observation indicators

(1) The duration of hospitalization and expenses for the two groups were counted; (2) Pain score: Using the visual analog scale (VAS)[8], taking a 10 cm long walking scale with 10 scales and a score ranging from 1 to 10, the patient was instructed to mark the position of the scale that represented themselves. The pain level was scored according to the marked location, with higher scores indicating more severe

pain; (3) The quality of life was evaluated using the SF-36 scale[9]. The SF-36 is a medical outcome research scale developed by Stewart in 1988 and Boston Health Research in the United States. There were 36 items, including six dimensions: physical function, role status, social function, pain, mental health, and physical status. Each dimension was scored from 0 to 100. The score was proportional to the functional status; (4) Poor mood indicators. The Zung Anxiety and Depression Self-Rating Scale[10] was used to evaluate the patients' negative emotions. The Zung scale was used to evaluate the depression and anxiety subscales. The total possible score was 100. The higher the score, the more serious the negative emotion; and (5) Complication rate. The incidence of postoperative complications (infection, tissue damage, *etc.*) was compared between the two groups.

Statistical analysis

SPSS 20.0 software was used to analyze the data. n (%) is expressed as enumeration data, and the χ^2 test was used. mean \pm SD were expressed as measurement data. The t -test was used for comparisons between groups, and statistical significance was set at $P < 0.05$.

RESULTS

Comparison of time of hospitalization and hospitalization costs between the two groups of people with disabilities

The duration and cost of hospitalization in the research group were lower than those in the control group ($P < 0.05$) (Table 1).

Comparison of VAS scores before and after care in the two groups

The VAS scores of the two groups of people with disabilities after care were lower than those before care ($P < 0.05$), and the VAS scores of the research group after care were lower than those of the control group ($P < 0.05$) (Table 2).

Comparison of SF-36 scores in the two groups after care

After care, SF-36 scores for physical function, role status, social function, pain, mental health, and physical condition were higher in the research group than in the control group ($P < 0.05$) (Table 3).

Comparison of Zung scale scores between the two groups of people with disabilities after care

Depression and anxiety scores after care were lower in the research group than in the control group ($P < 0.05$) (Table 4).

Comparison of postoperative complications between the two groups of people with disabilities

The incidence of postoperative complications was lower in the research group (6.12%) than in the control group (32.50%) ($P < 0.05$) (Table 5).

DISCUSSION

ESD was based on endoscopic mucosal resection. ESD is less traumatic and painful than the traditional surgery. It is a minimally invasive surgery that can promote recovery of people with disabilities after surgery. For patients with digestive tract disease, ESD can ensure normal gastrointestinal function and postoperative quality of life while removing the lesions[11]. However, in the process of implementing ESD, the surgical technique is difficult and takes a long time, with many complications. Therefore, it is necessary to strengthen the perioperative care of ESD people with disabilities, identify the causes of postoperative complications, and implement effective nursing measures[12]. The PDCA management aimed to formulate a nursing plan in the early stages of nursing, the nursing plan in the execution stage, determine the implementation steps of the nursing plan in the inspection stage, check the nursing plan in the action stage, and improve it. Therefore, the PDCA management model was adopted for ESD people with disabilities, the causes of postoperative complications were analyzed, effective prevention and intervention measures were formulated, and the implementation effect was continuously revised to further improve the nursing process for postoperative complications[13].

The results of this study showed that the length of stay, charge of hospitalization, VAS score, and Zung scale score in the research group were lower than those in the control group ($P < 0.05$), which proved that the PDCA nursing model affected the details and improvement of nursing measures and provided a timely understanding of the people with disabilities. Intraoperative problems and postoperative discomfort can be resolved in time; the physical and mental state, prognosis, and the quality of life of people with disabilities can be improved; and the time and charge of hospitalization can be shortened. Therefore, it is essential to conserve medical resources. Pain and adverse effects of

Table 1 Comparison of time of hospitalization and hospitalization costs between

Groups	Time of hospitalization (d)	Hospitalization costs (Ten thousand)
Research group (<i>n</i> = 98)	4.39 ± 1.03	1.79 ± 0.03
Control group (<i>n</i> = 80)	5.69 ± 1.06	2.64 ± 0.05
<i>t</i> value	8.249	140.234
<i>P</i> value	0.000	0.000

the two groups of people with disabilities

Table 2 Comparison of visual analog scale scores before and after care in the two groups

Groups	VAS scores		<i>t</i> value	<i>P</i> value
	Before	After		
Research group (<i>n</i> = 98)	7.55 ± 0.50	4.94 ± 0.24	84.954	0.000
Control group (<i>n</i> = 80)	7.60 ± 0.49	6.16 ± 0.37	43.173	0.000
<i>t</i> value	0.654	26.508		
<i>P</i> value	0.514	0.000		

VAS: Visual analog scale.

Table 3 Comparison of the 36-item Short-Form Health Survey scores in the two groups after care

Groups	Physical function (score)	Role status (score)	Social function (score)	Pain (score)	Mental health (score)	Physical condition (score)
Research group (<i>n</i> = 98)	69.23 ± 5.12	75.06 ± 6.01	63.12 ± 4.23	70.24 ± 5.13	79.22 ± 7.03	64.15 ± 6.13
Control group (<i>n</i> = 80)	60.23 ± 6.12	68.23 ± 6.12	60.13 ± 5.19	65.23 ± 6.03	72.06 ± 7.04	58.23 ± 6.17
<i>t</i> value	10.697	7.480	4.235	5.989	6.755	6.397
<i>P</i> value	0.000	0.000	0.000	0.000	0.000	0.000

Table 4 Comparison of Zung scale scores between the two groups of people with disabilities after care

Groups	Depression scores	Anxiety scores
Research group (<i>n</i> = 98)	36.22 ± 4.06	47.16 ± 5.13
Control group (<i>n</i> = 80)	50.23 ± 4.16	53.26 ± 5.17
<i>t</i> value	22.638	7.864
<i>P</i> value	0.000	0.000

surgery can cause mood swings. The PDCA nursing model can provide psychological counseling to the patient, communicate the actual situation of the patient, effectively relieve the patient's emotional fluctuation, and elevate the patient's mood[14]. The results of this study also showed that the SF-36 scores of the research group after nursing were higher than those of the control group ($P < 0.05$), and the incidence of complications was lower than that in the control group ($P < 0.05$), indicating that the PDCA cycle nursing mode had a significant effect on improving the prognosis and the quality of life of patients who underwent ESD. The formulation of nursing plans and improvement of the nursing system can facilitate planned and targeted nursing work, which is conducive to the implementation of targeted nursing for people with disabilities while avoiding nursing blindness, reducing nursing errors, and implementing comprehensive and specific nursing interventions[15]. The active and effective implementation of measures, nursing management systems, a combination of nursing plans with the

Table 5 Comparison of postoperative complications between the two groups of people with disabilities, *n* (%)

Groups	Infection	Tissue damage	Overall incidence
Research group (<i>n</i> = 98)	4	2	6 (6.12)
Control group (<i>n</i> = 80)	10	5	15 (18.75)
<i>t</i> value			6.749
<i>P</i> value			0.009

actual nursing behaviors, strengthening of health education, psychological, behavioral, and dietary nursing interventions for people with disabilities, and strengthening the prevention of postoperative complications can improve physical and mental health of people with disabilities, promote disease recovery, and reduce postoperative complications[16]. Strengthening the inspection and supervision of nursing behavior would help in the timely identification of problems and present rectification suggestions, thus promoting the overall improvement of the quality of nursing management. During the intervention, possible risk issues in digestive endoscopy were classified and analyzed, and solutions were developed. Simultaneously, the operation of nursing staff and related equipment and medicines was strictly regulated to prevent the occurrence of adverse events, such as infections. Management measures were then assessed, and nursing efforts were regularly reviewed[17]. Finally, a meeting was held to discuss the problems that arise in the nursing process, conduct an in-depth analysis with examples, and develop methods for improvement, which would be incorporated into the next cycle of nursing. Therefore, the PDCA cycle mode not only improves the professional level and nursing quality of nurses but also prevents the leakage of patient privacy, increases the protection of people with disabilities, and provides them with more professional and standardized nursing services, thereby improving their quality of life[18].

The main limitation of this study is a small sample size, and future studies with larger sample sizes are needed to support the conclusions. Additionally, this study was conducted on a Chinese population, and the geographical area involved was not wide enough, which may result in cultural and ethnic differences. It is suggested that this study be conducted in other populations in the future.

CONCLUSION

In summary, PDCA nursing has a significant effect on the quality management of ESD surgery under gastrointestinal endoscopy, which can effectively shorten the length of hospital stay and hospitalization costs, reduce VAS and Zung scale scores, relieve the patient's negative emotions, improve their SF-36 scores, and reduce the occurrence of postoperative complications.

ARTICLE HIGHLIGHTS

Research background

Endoscopic submucosal dissection (ESD) is a common surgical strategy for the treatment of early gastrointestinal cancers or precancerous lesions and is widely used in clinical practice. The key to the success of the operation is tacit cooperation between surgeons and nurses so that the lesions can be safely excised, and the occurrence of complications can be reduced or avoided. Therefore, effective cooperation of nursing staff and meticulous and comprehensive nursing are necessary for the success of the surgery. Recently, with the continuous improvement in medical levels, PDCA has been found to be more effective. It can prevent potential risks in the nursing process, protect patient privacy, and improve patient satisfaction, nursing integrity, and service quality.

Research motivation

This study mainly discussed the effect of PDCA nursing on improving the quality management of ESD surgery under gastrointestinal endoscopy and its impact on the 36-item Short-Form Health Survey (SF-36) scores and negative emotions, to provide a reference for the quality management of ESD surgery under clinical gastrointestinal endoscopy.

Research objectives

This study aimed to explore the effect of the PDCA circulation (plan/do/check/act) nursing mode on improving the quality management of gastrointestinal ESD and its effect on the SF-36 score and negative emotions.

Research methods

Patients who underwent ESD surgery from January 2020 to January 2021 were divided into two groups: the control group was treated with the conventional nursing mode, and the study group was treated with the PDCA nursing mode. The length of hospital stay and expenses in the two groups were statistically analyzed. The visual analog scale (VAS) score, SF-36 score, Zung self-rating scale for anxiety and depression, and incidence of postoperative complications were assessed before and after nursing.

Research results

The length and cost of hospitalization in the research group were lower than those in the control group, and the VAS scores were lower than those before care. Moreover, the VAS score of the research group was lower than that of the control group. The SF-36 scores for physical function, role status, social function, pain, mental health, and physical strength were higher in the experimental group than in the control group. The depression and anxiety scores of the research group were lower than those of the control group. The postoperative complication rate in the research group was lower than the control group.

Research conclusions

PDCA nursing has a significant effect on the quality management of ESD surgery under gastrointestinal endoscopy, which can effectively shorten the length of hospital stay and hospitalization costs, reduce VAS and Zung scale scores, relieve patients' negative emotions, improve their SF-36 scores, and reduce the occurrence of postoperative complications.

Research perspectives

The quality management effect of PDCA nursing on gastrointestinal ESD surgery is remarkable as it can effectively shorten the time and charge of hospitalization, reduce the VAS and Zung scale scores, relieve the bad mood of people with disabilities, improve their SF-36 score, and reduce the occurrence of postoperative complications.

FOOTNOTES

Author contributions: Wang F conducted the experiments; He YH performed the data collection, collation, and analysis; He YH and Wang F jointly completed the writing of this manuscript.

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