

# Effect of Evidence-Based Bundled Nursing Care on Bowel Preparation Cleanliness, Adverse Reactions, and Nursing Satisfaction in Colonoscopy Patients

**Authors:** Yang Qin, Yang Qin

**Date:** 2024-01-26T00:00:00+00:00

## Abstract

**Objective** To investigate the application effect of evidence-based bundle nursing in colonoscopy patients and observe its influence on bowel preparation cleanliness, adverse reactions, and nursing satisfaction. **Methods** A total of 126 patients undergoing colonoscopy in our hospital from March 2020 to March 2023 were selected and randomly divided into a control group (n=63), which received routine pre-colonoscopy nursing, and an observation group (n=63), which received evidence-based bundle nursing in addition to routine care. Bowel cleanliness, colonoscopy duration, success rate, changes in stress indicators before and after examination, incidence of adverse reactions, and patient satisfaction were compared between the two groups. **Results** Compared with the control group, the observation group demonstrated higher bowel cleanliness, success rate, and patient satisfaction, shorter colonoscopy duration, and lower incidence of adverse reactions ( $P<0.05$ ). The stress indicators of both groups after examination were higher than before examination ( $P<0.05$ ). Compared with the control group, the stress indicators in the observation group after examination were lower than those in the control group ( $P<0.05$ ). **Conclusion** Evidence-based bundle nursing can improve bowel preparation cleanliness and patient satisfaction, alleviate patient stress response, and reduce the incidence of adverse reactions.

## Full Text

### Preamble

**Effects of Cluster Nursing Based on Evidence-Based Theory on Bowel Preparation Quality, Adverse Reactions, and Nursing Satisfaction in Colonoscopy Patients**

Yang Qin  
Department of Anorectal Surgery, Wuhan Eighth Hospital (Houhu Campus),  
Hubei, Wuhan 430010, China  
Correspondence Email: 78549212@qq.com

## Abstract

**Objective:** To investigate the application effects of cluster nursing based on evidence-based theory in colonoscopy patients and observe its impact on bowel preparation quality, adverse reactions, and nursing satisfaction.

**Methods:** A total of 126 patients who underwent colonoscopy at our hospital from March 2020 to March 2023 were randomly divided into a control group (n=63) receiving routine pre-colonoscopy care and an observation group (n=63) receiving cluster nursing based on evidence-based theory in addition to routine care. The two groups were compared in terms of bowel cleanliness, colonoscopy duration, success rate, changes in stress indicators before and after examination, incidence of adverse reactions, and patient satisfaction.

**Results:** Compared with the control group, the observation group demonstrated higher bowel cleanliness scores, higher success rates, and greater patient satisfaction, along with shorter colonoscopy duration and lower incidence of adverse reactions ( $P<0.05$ ). Stress indicators after examination were elevated compared with pre-examination levels in both groups ( $P<0.05$ ). However, post-examination stress indicators in the observation group were significantly lower than those in the control group ( $P<0.05$ ).

**Conclusion:** Cluster nursing based on evidence-based theory can improve bowel preparation quality and patient satisfaction, reduce patients' stress response, and decrease the incidence of adverse reactions.

**Keywords:** cluster nursing; colonoscopy; bowel cleanliness; adverse reactions

## Introduction

With continuous social progress and improved living standards, dietary habits have undergone significant changes, with diets increasingly favoring high-protein, high-calorie, and high-fat foods that can readily lead to intestinal diseases [1]. When experiencing long-term gastrointestinal discomfort, patients require hospital examination, and colonoscopy represents the most effective clinical method for examining intestinal diseases. It enables direct visualization of the intestinal mucosa to identify lesions, facilitates biopsy for pathological examination, and allows for therapeutic interventions such as hemostasis and polypectomy [2,3]. However, colonoscopy is an invasive procedure that can easily cause gastrointestinal discomfort, including nausea, abdominal distension, and vomiting [4]. The procedure demands high-quality bowel preparation; inadequate preparation increases risks of choking, aspiration, and reflux, threatening patient safety [5]. Bowel preparation quality also directly

affects procedural success, making pre-examination preparation critically important for colonoscopy patients [6].

Cluster nursing, guided by evidence-based theory, integrates proven, effective, and scientific nursing methods for clinical application to provide optimal patient care and improve nursing quality [7-9]. This study investigates the application effects of cluster nursing based on evidence-based theory in colonoscopy patients and examines its influence on bowel preparation quality, adverse reactions, and nursing satisfaction.

## 1. Materials and Methods

### 1.1 General Information

A total of 126 patients undergoing colonoscopy at our hospital from March 2020 to March 2023 were randomly divided into an observation group and a control group, each comprising 63 cases. Comparison of general data between the two groups showed no statistically significant differences ( $P > 0.05$ ), indicating comparability .

**Table 1** Comparison of baseline data between the two groups (n=63)

### 1.2 Inclusion and Exclusion Criteria

**Inclusion criteria:** (1) Age  $\geq 18$  years; (2) First-time colonoscopy; (3) Signed informed consent; (4) Clear consciousness without communication barriers.

**Exclusion criteria:** (1) Significant organ damage to heart, liver, or kidney; (2) Acute or chronic infectious diseases; (3) Coagulation disorders or autoimmune deficiency diseases; (4) Hypertension or diabetes.

### 1.3 Methods

**Control group** patients received routine pre-colonoscopy care, including a semi-liquid, soft diet 72 hours before examination, fasting and fluid restriction on the examination day, 750ml of polyethylene glycol electrolyte solution orally 12 hours before examination (to be consumed within 30 minutes), and 2250ml of polyethylene glycol electrolyte solution at 8:00 AM on the examination day (to be consumed within 2 hours). Pre-examination education covered precautions and colonoscopy knowledge, with 24-hour post-procedure observation.

**Observation group** patients received cluster nursing based on evidence-based theory in addition to routine care. (1) **Establishment of a cluster nursing team:** The team consisted of 2 gastroenterologists, 2 specialized endoscopy nurses, and 2 anesthesiologists who summarized deficiencies in routine care. Based on clinical experience and literature review, they used evidence-based methods to develop pre-colonoscopy preparation protocols, educational materials, and quality control standards, followed by training and assessment for all endoscopy center staff. (2) **Pre-examination care:** Nurses comprehensively

assessed patient conditions, physical status, medication contraindications, and allergy history, informing patients and families about anesthesia timing and precautions; Psychological care: Acknowledging that some patients experience fear and anxiety about colonoscopy, nurses addressed emotional concerns through encouragement and comfort, explained colonoscopy procedures, and shared successful case examples to alleviate fear and improve cooperation; Medication guidance: Using illustrated booklets and videos, nurses explained the importance of bowel cleansing, drug effects, and administration methods, guided patients through bowel preparation medication intake, and monitored physical responses. If vomiting occurred or dosage was insufficient, timely supplementation was provided. For patients with poor gastrointestinal motility, prokinetic agents were administered under physician guidance, and abdominal massage was performed to promote peristalsis and facilitate defecation. (3) **Post-examination care:** Vital signs and consciousness were closely monitored with attention to warmth maintenance; Upon returning to the observation room, nurses monitored for adverse reactions such as vomiting, nausea, or sore throat, positioned patients with head turned to one side, promptly cleared airway secretions, and maintained airway patency to prevent aspiration; When patients regained consciousness, post-procedure precautions were explained to patients and families, including initial small amounts of water intake for those without sore throat, gradual progression to liquid diet if no choking occurred, avoidance of spicy foods with emphasis on light, easily digestible meals, and prohibition of driving or operating machinery for 24 hours. (4) **Quality control:** Cluster nursing team members conducted monthly quality control reviews of pre-colonoscopy preparation work to refine cluster nursing measures and improve care quality.

#### 1.4 Observation Indicators

- (1) **Bowel cleanliness:** Endoscopists assessed bowel preparation quality using the Boston Bowel Preparation Scale (BBPS) [10], dividing the colon into left colon, transverse colon, and right colon segments. Each segment scored 0-3 points, with total scores ranging from 0-9. A score of 0 indicated solid stool preventing mucosal visualization; 1 indicated small portions of mucosa visible with substantial retained stool obscuring other areas; 2 indicated most mucosa visible with residual fluid in some areas; and 3 indicated entire mucosa clearly visible. Higher scores indicated better bowel cleanliness.
- (2) **Colonoscopy duration and success rate.**
- (3) **Changes in stress indicators before and after examination:** Stress indicators included epinephrine, cortisol, and norepinephrine. Epinephrine and norepinephrine were measured by high-performance liquid chromatography (manufacturer: Shanghai Longju Technology Co., Ltd.), and cortisol was measured by radioimmunoassay.

- (4) **Incidence of adverse reactions:** Including nausea, abdominal distension, dizziness, vomiting, transient hypotension, and transient oxygen saturation decrease ( $SpO_2 < 90\%$ ).
- (5) **Patient satisfaction:** A self-designed satisfaction questionnaire (maximum score 100) was administered: 0-60 indicated dissatisfied, 60-79 indicated satisfied, 80-89 indicated basically satisfied, and 90-100 indicated very satisfied. Satisfaction rate = (satisfied + basically satisfied + very satisfied)/total cases  $\times 100\%$ .

### 1.5 Statistical Methods

Data were analyzed using SPSS 21.0 software. Measurement data were expressed as mean  $\pm$  standard deviation ( $\bar{x} \pm s$ ) and compared between groups using independent samples t-test; within-group comparisons used paired t-test. Count data were expressed as number (%) and compared using  $\chi^2$  test for success rates and satisfaction rates.  $P < 0.05$  indicated statistically significant differences.

## 2. Results

### 2.1 Comparison of Bowel Cleanliness Between Groups

Compared with the control group, the observation group demonstrated significantly higher scores for left colon, transverse colon, right colon, and total BBPS scores ( $P < 0.05$ ).

**Table 2** Comparison of bowel cleanliness between groups ( $\bar{x} \pm s$ , points)

### 2.2 Comparison of Colonoscopy Duration and Success Rate

Compared with the control group, the observation group showed shorter colonoscopy duration and higher success rate ( $P < 0.05$ ).

**Table 3** Comparison of colonoscopy duration and success rate between groups (n=63)

### 2.3 Comparison of Stress Indicator Changes

Stress indicators after examination were elevated compared with pre-examination levels in both groups ( $P < 0.05$ ). However, post-examination stress indicators in the observation group were significantly lower than those in the control group ( $P < 0.05$ ).

**Table 4** Comparison of stress indicator changes before and after examination (n=63)

*Note:*  $P < 0.05$  compared with pre-examination values within each group.\*

## 2.4 Comparison of Adverse Reaction Incidence

The incidence of adverse reactions in the observation group (4.76%) was significantly lower than that in the control group (15.87%) ( $P < 0.05$ ).

**Table 5** Comparison of adverse reaction incidence between groups [n(%)]

## 2.5 Comparison of Nursing Satisfaction

Patient satisfaction in the observation group (98.41%) was significantly higher than that in the control group (88.89%) ( $P < 0.05$ ).

**Table 6** Comparison of nursing satisfaction between groups [n(%)]

## Discussion

Colonoscopy is a commonly used examination for diagnosing gastrointestinal diseases. This invasive procedure causes patient discomfort requiring anesthesia for symptom relief [11]. Additionally, colonoscopy demands high-quality bowel preparation, which represents a critical factor affecting procedural success. Inadequate bowel cleanliness can obscure lesions and prevent clear visualization of colonic mucosa, leading to misdiagnosis or procedure failure [12]. Causes of inadequate bowel preparation include nurses' pre-examination neglect of patients' psychological status, insufficient education, inadequate fasting duration, insufficient bowel preparation medication dosage, and lack of predictive nursing for adverse reactions [13]. Cluster nursing integrates previously fragmented nursing measures for clinical application with regular quality control [14], addressing deficiencies in traditional nursing and facilitating colonoscopy procedures [15]. Evidence-based theory utilizes research findings for clinical practice, and their combination achieves superior outcomes. Previous studies have extensively examined cluster nursing's effects on adverse reactions and bowel preparation quality in colonoscopy patients [2-3], but few have investigated its impact on stress response. Therefore, this study explored the effects of evidence-based cluster nursing on bowel preparation quality, adverse reactions, stress response, and nursing satisfaction in colonoscopy patients.

In this study, the control group received routine pre-colonoscopy care while the observation group received cluster nursing. Results showed that compared with the control group, the observation group achieved higher scores for left colon, transverse colon, right colon, and total BBPS scores; shorter colonoscopy duration; and higher success rates. These findings suggest that cluster nursing improves bowel preparation quality and procedural success while reducing examination time, consistent with Jiang et al. [8]—though their study focused on cluster nursing in painless colonoscopy. The rationale is that routine care relies solely on verbal education and basic colonoscopy knowledge, employing a singular approach that ignores patients' comprehension abilities and fails to comprehensively understand conditions affecting bowel cleanliness. In contrast, cluster

nursing utilizes diverse methods including illustrated booklets and videos to educate patients about colonoscopy, emphasize bowel cleanliness importance, and guide medication administration, thereby enhancing patient cooperation with pre-examination preparation, improving bowel preparation quality, shortening examination time, and increasing success rates.

Epinephrine, cortisol, and norepinephrine are all stress indicators that increase when the body experiences stimulation or psychological tension, with higher values indicating stronger stress responses [9]. In this study, stress indicators after examination were elevated in both groups compared with baseline, but post-examination levels in the observation group were significantly lower than those in the control group. This suggests that cluster nursing alleviates patients' stress responses, consistent with Li et al. [9]. The explanation is that colonoscopy, as an invasive procedure, stimulates stress responses, thus elevating stress indicators. While routine nursing neglects patients' psychological status, cluster nursing provides encouragement and comfort before examination, eliminating fear and thereby reducing stress responses. Additionally, this study found that the observation group had lower adverse reaction incidence and higher patient satisfaction than the control group, indicating that cluster nursing reduces colonoscopy-related adverse events and improves satisfaction. This is attributed to comprehensive education, adequate pre-examination preparation, close post-procedure monitoring, and clear communication of post-procedure precautions to patients and families.

## Conclusion

In summary, evidence-based cluster nursing improves pre-examination bowel preparation quality, procedural success rate, and patient satisfaction while shortening colonoscopy duration, alleviating stress responses, and reducing adverse reaction incidence through comprehensive education, thorough bowel preparation, and psychological care.

## References

- [1] Liu Z, Zhong C. Effect of whole-course nursing intervention on cooperation degree of patients undergoing painless gastroscopy combined with colonoscopy [J]. *Chongqing Medicine*, 2022, 51(S01): 385-387.
- [2] Bie X, Huang Y, Fan T, et al. Effect of cluster nursing on bowel preparation cleanliness in colonoscopy patients [J]. *Journal of Xuzhou Medical University*, 2018, 38(5): 348-350.
- [3] Li Y. Application of cluster nursing in bowel preparation for colonoscopy diagnosis and treatment [J]. *Chinese and Foreign Medical Research*, 2022, 20(10): 85-88.
- [4] Zhang X, Yang Y, Guo C. Analysis of influencing factors and nursing strategies for inadequate bowel preparation before colonoscopy in patients with

- chronic constipation [J]. *Journal of Qilu Nursing*, 2022, 28(24): 63-66.
- [5] Chen G, Liang L. Effect of cluster nursing on bowel cleanliness and adverse reactions in painless gastrointestinal endoscopy combined examination [J]. *Contemporary Medical Symposium*, 2022, 20(10): 194-196.
- [6] Huang Z, Yu X, Qi J. Application value of targeted individualized nursing protocol in colonoscopy bowel preparation [J]. *Primary Medical Forum*, 2020, 24(21): 2969-2971.
- [7] Yang S, Yang G, Tian G, et al. Effect of cluster nursing on reducing incidence of pulmonary infection in acute leukemia patients undergoing chemotherapy [J]. *Chinese Journal of Infection Control*, 2023, 22(4): 435-441.
- [8] Jiang X, Shen F. Effect of cluster nursing strategy on bowel preparation quality in patients undergoing painless gastrointestinal endoscopy combined examination [J]. *Nursing Practice and Research*, 2021, 18(5): 718-721.
- [9] Li H, Rong J, Tang J. Effect of cluster nursing on bowel preparation, comfort, and satisfaction in colonoscopy patients [J]. *Journal of Navy Medicine*, 2022, 43(4): 400-405.
- [10] Dik VK, Moons LM, Hüyük M, et al. Predicting inadequate bowel preparation for colonoscopy in participants receiving split-dose bowel preparation: development and validation of a prediction score [J]. *Gastrointest Endosc*, 2015, 81(3): 665-672.
- [11] Frazzoni L, Radaelli F, Spada C, et al. The diagnostic yield of colonoscopy in hospitalized patients. An observational multicenter prospective study [J]. *Dig Liver Dis*, 2021, 53(2): 224-230.
- [12] Liu J, Li M, Feng Y, et al. Application effect of PPT combined with WeChat video education in colonoscopy preparation for elderly inpatients [J]. *International Journal of Nursing*, 2020, 39(17): 3240-3244.
- [13] Qiu M. Application analysis of cluster nursing in bowel preparation for colonoscopy [J]. *Chinese Community Physician*, 2022, 38(25): 127-129.
- [14] Du X, Chen C, Chen Y, et al. Cluster nursing practice to reduce incidence of catheter-associated urinary tract infection in elderly inpatients [J]. *Journal of Nursing*, 2021, 28(18): 12-16.
- [15] Yu H, Zhang Y, Gao X. Effect evaluation of cluster nursing on reducing hypoglycemia incidence during colonoscopy in elderly diabetic patients [J]. *Qiqihar Medical College Journal*, 2018, 39(12): 2.

*Note: Figure translations are in progress. See original paper for figures.*

*Source: ChinaXiv — Machine translation. Verify with original.*