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The colonoscopy booklet: The effect of a recipe resource on quality of colonoscopy bowel preparation and patient experience: A randomized controlled trial

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Abstract

Good bowel preparation is crucial for a successful colonoscopy; however, inadequate bowel preparation remains a frequent problem. We conducted a single-blind randomized controlled study to assess how a recipe booklet affects both the quality of bowel preparation and patient experience. This prospective trial involved 154 Turkish patients, irrespective of sex or underlying medical conditions. The booklet group (n=83) received a booklet containing visuals and step-by-step cooking instructions in addition to the standard colonoscopy preparation diet list, while the control group (n=71) was given only the routine colonoscopy diet list. The Boston Bowel Preparation Scale (BBPS) was employed to assess the quality of bowel cleansing. After adjusting for risk factors, the odds of poor bowel preparation were approximately three times higher in the control group compared to the booklet group (odds ratio 2.606, 95% confidence interval: 1.203-5.647, $p=.015$). A post-procedure survey was assessed, and the findings revealed that the booklet group reported a positive experience with colonoscopy preparation. Providing a recipe booklet with visuals in addition to a colonoscopy diet list may improve bowel preparation, enhance patient adherence to the diet, and positively impact the overall patient experience.

Keywords: Bowel preparation, colonoscopy, a recipe booklet, Boston Bowel Preparation Scale

Introduction

Colonoscopy is a specialized endoscopic procedure commonly used to diagnose colorectal diseases and is regarded as the gold standard for colon visualization [1]. Colon cancer screening, constipation, rectal bleeding, chronic diarrhea, abdominal pain, and anemia are used for diagnostic purposes for many conditions. Furthermore, it has numerous therapeutic applications, including polypectomy, bleeding control, dilation, and colonic decompression [2]. The success of colonoscopy depends on various factors such as age, sex, comorbid diseases, and adequate bowel preparation [3]. Clear visualization of the colon is crucial for the success and completion of colonoscopy or flexible sigmoidoscopy, and the quality of colonoscopy preparation plays a pivotal role in achieving this goal [4]. However, in clinical practice, approximately 18-30.5% of patients exhibit insufficiently prepared colons [5].

Poor bowel preparation results in a greater likelihood of overlooking polyps or adenomas, elevated healthcare expenses, extended overall procedural time, and cancellation of procedures [6]. Therefore, the Committee of the European Society of Gastrointestinal Endoscopy (ESGE) recently proposed a minimum standard of $\geq 90\%$ for satisfactory bowel preparation, evaluated through validated scales [7].

Traditionally, patients have been instructed to adhere to dietary restrictions such as consuming only clear liquids or following a low-residue diet prior to colonoscopy. Patients often find difficult to tolerate a clear liquid diet. Therefore, a low-residue diet can enhance patient adherence to bowel preparation regimens, improve the outcomes of bowel preparation, and encourage patients to undergo repeat colonoscopy procedures [8]. The success of a low-residue diet depends on patient compliance and an understanding of the significance of good

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bowel preparation. To improve the quality of bowel preparation, researchers recognized the inadequacy of conventional verbal or printed instructions and focused on reinforcing the guidance provided to patients before colonoscopy. They created pictures [9], cartoon visual aids [10], booklets [11], and video materials [12] to enhance patient adherence to dietary and medication instructions. With advancements in technology and economic development, efforts have been made to reinforce patient education through phone calls [13], mobile messages, and smartphone applications [14].

In our gastroenterology unit, patients scheduled for colonoscopy appointments are typically provided with written materials containing a 5-day low-residue diet plan for colonoscopy preparation. Low-residue diet instructions may offer lists of consumable foods but generally do not guide the suggested recipes. Although numerous recipe sources are available online, access to these sources is particularly limited for the elderly and low-educated patients.

This study aimed to develop a comprehensive recipe resource incorporating visual aids and detailed cooking instructions to facilitate adherence to a low-calorie diet among patients undergoing colonoscopy preparation. The inclusion of visuals and step-by-step cooking instructions was intended to enhance the understanding and compliance with the dietary plan. We hypothesize that this approach will increase adherence to current guidelines, improve the effectiveness of bowel preparation, and positively influence important clinical outcomes such as the detection rates of polyps and the duration of the procedure.

Material and Methods

This research was a prospective, single-blind, controlled, randomized study with two groups: the booklet group and the control group. The group allocation was concealed from the performing physicians.

Study Design

Patients aged 18 and older who requested a colonoscopy appointment at the Gastroenterology unit of Abdurrahman Yurtaslan Oncology Training and Research Hospital between September 2023 and November 2023 were enrolled in the study. The study excluded patients with any of the following: previous colonoscopy, use of anticholinergics or medications affecting gastrointestinal motility, severe chronic kidney disease, advanced heart failure, or a history of abdominal surgery.

This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Abdurrahman Yurtaslan Oncology Training and Research Hospital (Approval No. 2023-10/381 and date of approval: 4 October 2023). All patients gave their informed consent, both verbally and in writing. Clinical Trials number of this study is NCT06141122.

Bowel Preparation Procedure

Our institution follows a standardized bowel preparation protocol that encompasses a specialized colonoscopy diet,

medications for bowel cleansing, and sufficient fluid intake. The colonoscopy-specific diet, which was a low-residue diet was initiated five days before the procedure. Patients were prescribed two solutions (X-M 250 ml Diet Solution, Yenişehir Lab, Türkiye), each containing 500 ml (750 mg) of Sennoside A + B calcium, and were instructed to mix them with 2 liters of water and consume them at 18:00 on the day before the colonoscopy. Additionally, they were prescribed two enemas (BT enema 210 mL, Yenişehir Lab., Türkiye) containing monobasic and dibasic sodium phosphate for rectal use on the procedure day. Patients were informed that bowel cleansing was completed after the administration of enemas on the day of the procedure.

Patients

Demographic and clinical data from the participants, including age, educational level, accompanying diseases, and previous surgeries of the patients were asked and recorded at the time of application. A random number generator was used to allocate patients to treatment groups at the time of colonoscopy scheduling. Eligible patients were randomly assigned to either the booklet or control group. To guarantee a balanced distribution of participants between the two groups, a block randomization procedure with a block size of four was used during the colonoscopy scheduling phase. An independent researcher determined the block size for randomization. Patients were selected without considering age, sex, or the indication of colonoscopy. The appointments for the study group's colonoscopies were scheduled on the same days for data collection.

Patients assigned to the booklet group received an additional recipe booklet featuring visual representations of foods permitted in the colonoscopy diet, along with the corresponding recipes, in addition to the standard 5-day diet brochure. The nurse in charge of patient education in the endoscopy secretariat emphasized that strict adherence to the recipes in the booklet was essential for effective bowel preparation. On the day of the colonoscopy appointment, 83 patients from the booklet group were eligible for inclusion in the study, while 71 patients from the control group who had received the routine 5-day diet list were eligible for the study.

Design of the Booklet

In our study, the booklet was prepared using a list containing low-residue foods and meals commonly used in routine colonoscopy preparations at our hospital. The visuals and simple recipes for the foods featured in the brochure were sourced by our research team from the freely available general cooking recipe websites. The selection criteria for the recipes included simplicity of preparation and ease of adaptation to the low-residue diet. Subsequently, a dietitian was consulted to ensure that all the recipes were in line with the low-residue diet (Figure 1). Patients were informed that the meals listed in the booklet represented single servings and that they were free to consume them in desired quantities.



Figure 1. Excerpt from the recipe booklet; (A) rice soup, (B) boiled egg, (C) boiled chicken, (D) honey, molasses, seedless jam

Procedure

Due to high patient volume and insufficient recovery facilities in our clinic, colonoscopy procedures were conducted without sedation. All elective colonoscopies were planned to take place during the morning hours, specifically between 8:30 AM and 12:30 PM, and were performed by two endoscopists, each with over a decade of experience, utilizing the Fujinon EC-590WL4 colonoscope (Fujinon Inc., Tokyo, Japan). The charge nurse recorded the insertion time (from procedure start to appendiceal orifice identification) and withdrawal time (from cecum to patient removal). All polyps were resected during the withdrawal of the colonoscope. Physicians performing colonoscopies and nurses providing care to the patients were blinded to the allocation of patients to the booklet and control groups.

The Boston Bowel Preparation Scale (BBPS) served as the assessment tool for bowel preparation adequacy among endoscopists. The BBPS evaluates bowel preparation on a scale ranging from 0 to 9 (0=very poor, 9=excellent), with a total BBPS score of ≥ 6 and segments of the colon each scoring ≥ 2 , indicating good bowel preparation [15]. Patient-reported experience of the procedure was measured using a 3-point scale with options: "better than expected," "as expected," and "worse than expected". Following the procedure, an independent researcher administered a survey to the booklet group. This survey included inquiries regarding the ease of following recipes (ranging from very easy to very difficult), whether the booklet improved dietary compliance

(yes or no), and whether the booklet would be utilized again in the event of a repeat procedure (yes or no). Procedure duration, presence of polyps, and BBPS scores were documented from patient records.

Sample Size and Statistical Analysis

The sample size was determined by referencing the results of a previous study [10]. According to this study, the rates of good preparation were 96% and 73% in the intervention and control groups, respectively. Assuming that a 23% difference in good bowel preparation rates between the booklet and no-booklet groups would be considered significant, a sample size of at least 41 patients per group, totaling 82 patients, was calculated with 80% power and a 0.05 significance level.

The 27th version of SPSS software was used for statistical analysis. Continuous variables were reported as either mean $\pm$ standard deviation or median (25%-75% interquartile range). Each variable was assessed for normal distribution. For categorical variables, chi-square tests were conducted, while for continuous variables, either Student's t-tests or Mann-Whitney U tests were performed. Variables associated with good bowel preparation (defined as BBPS ≥ 6 or three-colon segment scores ≥ 2) were analyzed using logistic regression models, from which 95% confidence intervals (CI) and odds ratios (OR) were derived. Statistical significance was set at $p < 0.05$.

Results

Data were collected between September 2023 and November 2024. Of the 231 patients assessed for eligibility, 51 were found to be ineligible based on the predetermined exclusion criteria. Of the 180 patients enrolled in the study, 24 were excluded because they did not attend colonoscopy appointments. Two patients in the booklet group were excluded from the analysis because they did not fully adhere to the booklet during colonoscopy preparation. All 154 patients who participated in the study underwent the procedure, and all colonoscopic procedures were completed successfully. Of these, 83 were in the booklet group and 71 were in the control group (Figure 2). Cecal intubation was successful in all patients.

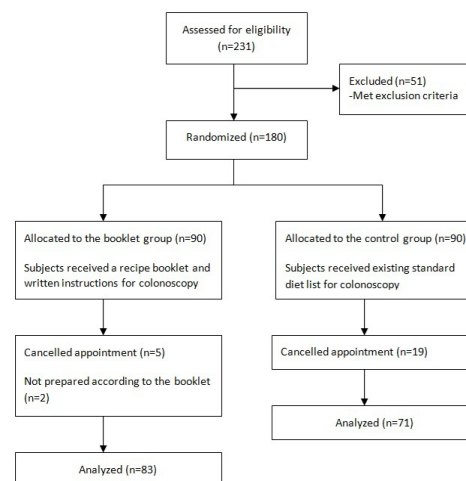


Figure 2. Flow diagram of the study

Table 1 summarizes the demographic characteristics and clinical data of patients. There were no statistically significant differences in age, sex, educational background, presence of diabetes, or indications of colonoscopy between the groups ($p>.05$). No significant differences were found in polyp detection rate or cecal insertion time between the groups ($p>.05$). However, the booklet group demonstrated a significantly shorter withdrawal time than that of the control group ($p<.05$). Additionally, a higher percentage of participants in the booklet group reported that their colonoscopy experience was better than expected than that of the control group (49.4% versus 29.6%, respectively).

Table 1. Patient characteristics and clinical data

Characteristics	Booklet group (n=83)	Control (n=71)	p
Age (year)	54.19±12.96	53.56±13.78	.771
Gender, male, n (%)	41 (49.4)	36 (50.7)	.872
Education level, n (%)			.278
Elementary school	25 (30.1)	25 (35.2)	
Secondary school	16 (19.3)	11 (15.5)	
High school	19 (22.9)	23 (32.4)	
University	23 (27.7)	12 (16.9)	
Colonoscopy indication, n (%)			.189
Chronic constipation	10 (12)	7 (9.9)	
Chronic diarrhea	10 (12)	9 (12.7)	
Cancer screening	21 (25.3)	20 (28.2)	
Iron or vitamin deficiency	14 (16.9)	18 (25.4)	
Polyp follow up	7 (8.4)	0 (0)	
Symptoms (pain, bleeding)	10 (12)	11 (15.5)	
Positive fecal occult blood	11 (13.3)	6 (8.5)	
Diabetes mellitus, n (%)	24 (28.9)	18 (25.4)	.621
Procedure time (minutes)			
Insertion time	5.51 (4.00,6.56)	5.20 (4.20,5.63)	.873
Withdrawal time	6.79 (6.05,7.01)	8.18 (6.33,9.51)	<.001
Patients with polyps, n (%)	26 (31.3)	27 (38)	.383
Patient experience			.034
Better than expected	41 (49.4)	21 (29.6)	
As expected	29 (34.9)	31 (43.7)	
Worse than expected	13 (15.7)	19 (26.8)	

Values are presented as the mean±SD, median (25%-75% interquartiles) and number (%); Statistically significant values are marked as bold

Table 2 shows the global and three-segment BBPS scores of the booklet and control groups. The booklet group showed a higher average BBPS score (7.33±1.67) than the control group (6.35±1.39, $p<.001$). The booklet group achieved significantly better bowel cleansing in all segments of the colon (left, transverse, and right) as indicated by the individual BBPS components. A significantly higher proportion of participants in the booklet group achieved good bowel preparation, as defined by a total BBPS score of ≥ 6 and segmental scores of ≥ 2 in all three colonic segments, compared with the control group (79.5% vs. 63.4%, $p=.013$).

Table 2. Cleansing score assessed by BBPS: global score and three-colon segment score

	Booklet group (n=83)	Control (n=71)	p
BBPS (≥ 6)	7.33±1.67	6.35±1.39	<.001
Left colon	2.65±0.52	2.38±0.59	.003
Transvers colon	2.38±0.69	2.12±0.69	.023
Right colon	2.22±0.77	1.83±0.75	.002
Good bowel preparation (BBPS ≥ 6 and three-colon segment scores ≥ 2), no, (%)	66 (79.5)	45 (63.4)	.013

Values are presented as the mean±SD and number (%); Statistically significant values are marked as bold; BBPS: Boston Bowel Preparation Scale

Table 3 provides an assessment of the experience of using the recipe resource with post-colonoscopy questions. Survey responses were obtained from 83 participants, with the majority indicating that the provided recipes were generally easy to prepare (38.6% very easy, 45.8% easy, and 12% neutral). The findings indicated a high level of patient satisfaction with the recipe resource, as 91.6% reported increased adherence to the dietary recommendations, and 96.4% expressed willingness to use the resource again for future colonoscopies.

Table 3. Survey response results (n=83)

		No. responders (%)
Easy to prepare the recipes	Very easy	32 (38.6)
	Easy	38 (45.8)
	Neutral	10 (12)
	Difficult	3 (3.6)
	Very difficult	0 (0)
The booklet increase dietary compliance	Yes	76 (91.6)
	No	7 (8.4)
Would use resource again	Yes	80 (96.4)
	No	2 (2.4)
	Maybe	1 (1.2)

Values are presented as the number (%)

Univariate logistic regression analyses and adjusted multiple logistic regression analyses with different variables are presented in Table 4. The odds of poor bowel preparation were three times higher in the control group than in the booklet group after adjustments for age, sex, educational level, and diabetes (odds ratio 2.606, 95% confidence interval: 1.203-5.647, p=.015). Additionally, the risk of poor bowel preparation was approximately 3.77 times higher in patients with diabetes (p=.003). Univariate analysis demonstrated that age, sex, and education level were not independent predictors of poor bowel cleansing. However, the presence of diabetes and non-use of booklets were found as significant risk factors for poor bowel preparation.

Table 4. Logistic regression analysis for poor bowel preparations (BBPS<6 or three-colon segment score <2)

	Univariate			Multivariate		
	OR	95% CI	p	OR	95% CI	p
Age	.996	.970–1.023	.778	-	-	-
Sex (male)	.723	.356–1.468	.370	-	-	-
Educational level						
University	1					
Primary school	1.176	.458–3.023	.736	-	-	-
Secondary school	1.053	.349–3.177	.927	-	-	-
High school	.682	.241–1.928	.470	-	-	-
Diabetes mellitus	3.029	1.421–6.457	.004	3.771	1.557–9.133	.003
Study group						
Booklet group	1					
Control group	2.243	1.093–4.605	.028	2.606	1.203–5.647	.015

Statistically significant values are presented in bold; OR: odds ratio, CI: confidence interval

Discussion

The effectiveness of colonoscopy as a preventive, diagnostic, and therapeutic tool depends on the success of preprocedural bowel preparation [16]. Optimal colonoscopy entails comprehensive examination of the entire colon, effective cleansing, and a withdrawal time typically ranging from 6 to 10 minutes,

ensuring thorough inspection from the cecum to the rectum [17]. Preparing for a colonoscopy is a challenging process that requires numerous steps. Better patient education increases the likelihood of a successful procedure. Consequently, researchers have sought to enhance bowel preparation quality through enhanced patient education, leading to several well-conducted randomized controlled trials. Beyond traditional oral or written education, a

straightforward educational approach incorporating visuals and featuring foods permissible in the diet alongside recipes is often more comprehensible, accessible, or engaging. Such methods can augment patients' understanding of bowel preparation and facilitate better compliance with instructions.

Our study is the first prospective trial integrating a recipe booklet into the standard colonoscopic diet list. This prospective randomized controlled trial demonstrated that providing patients with a recipe booklet alongside routine colonoscopic bowel preparation may improve bowel preparation quality, enhance patient adherence to the diet list, and enhance the overall patient experience. When the recipe booklet was provided, the probability of successful bowel preparation was approximately three times higher than when it was not provided. In a retrospective study conducted by Bennett et al. on 192 patients who were preparing for colonoscopy, similar to our study, 96 patients were prepared with a booklet containing low-residue diet recommendations for consumption during colonoscopy, whereas the control group of 96 patients was prepared with a routine diet list. Adequate bowel preparation assessed by the physician in the booklet group was approximately nine times higher than that in the control group [18]. In a study conducted by Spiegel et al. with 426 patients undergoing colonoscopy, a booklet containing written information and visual images explaining how appropriate bowel preparation and a clear liquid diet should be was provided. Bowel cleanliness was assessed using the Ottawa preparation scale. In this study, regression analysis demonstrated that the likelihood of achieving adequate bowel preparation was 3.7 times higher in the booklet group (95% CI: 2.3-5.8) [19].

In our study, the cecal insertion time did not show a significant difference between the booklet and control groups, while the withdrawal time was shorter in the booklet group. Consistent with our findings, a study by Tae et al., utilizing visual aids to explain achieving appropriate colon cleanliness, reported no difference in cecal insertion time between the intervention and control groups, but significant differences in withdrawal time [10]. Endoscopists may employ irrigation and suction techniques to ensure uniform colon cleanliness irrespective of the initial preparation quality. Colon assessment and polyp excision are usually performed during the withdrawal phase; thus, it can be anticipated that the withdrawal time will be longer in colons with poorer bowel cleanliness.

Colonic adenomatous polyps, in particular, have the potential to slowly develop from a benign condition to a malignant state in asymptomatic patients [20]. Thus, inadequate bowel preparation is significant as it is linked to reduced polyp detection rates and increased costs. The polyp detection rates did not differ significantly between the groups in our study. In patients with a record of poor preparation, Chokshi et al. reported a 48% miss rate for adenomas during repeat colonoscopy [21]. Similarly, in a study conducted by Lebwohl et al., the miss rates for adenomas and advanced adenomas were 42% and 27%,

respectively, in repeat colonoscopies performed one year later [22]. The positive association between colonic cleansing and polyp detection indicates that interventions aimed at optimizing bowel preparation, such as the use of recipe booklets, may contribute to a substantial enhancement of polyp detection rates in future large-scale investigations.

In contrast to some studies that have identified male sex as a risk factor for inadequate bowel preparation, our study did not find male sex to be a significant contributor to poor bowel cleanliness [23]. This difference may be due to the fact that men often struggle to fully adhere to laxative and enema instructions. In our study, the main risk factors for inadequate bowel preparation were the presence of diabetes and the lack of dietary booklet use. Diabetes emerged as an independent risk factor for insufficient bowel cleanliness, consistent with previous studies reporting a higher incidence of inadequate bowel preparation among diabetic patients [24].

Limitations

Our study has both strengths and limitations. The primary strength lies in its design as a randomized, controlled clinical trial, evaluating the effect on a primary outcome (BBPS score) applicable in clinical practice. Another strength is the achievement of colon cleanliness with a sennoside-based regimen rather than other more potent primary bowel preparations [25], potentially more accurately reflecting the effect of the booklet on colonic cleanliness. The absence of double-blinding is a limitation. The knowledge that the patients possessed regarding their exclusive use of the recipe booklet could have influenced their adherence to bowel preparation recommendations, potentially leading to improved preparation quality.

Conclusion

Providing a recipe booklet along with the standard colonoscopic diet list appears to be a promising modality for improving bowel preparation quality, patient adherence to the diet list, and patient experience. Our study demonstrates that patients who received the recipe booklet achieved higher BBPS scores compared to the control group. The increased proportion of patients in the booklet group who reported a better-than-expected experience indicates a higher level of satisfaction with the colonoscopy procedure. With these findings, the consideration of adding a recipe booklet to the standard colonoscopic diet list seems warranted. Further clinical studies with larger patient populations are warranted to evaluate colon polyp detection rates, procedure duration, and bowel preparation quality, and to determine the viability of incorporating the recipe booklet into routine colonoscopic preparation.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of Abdurrahman Yurtaslan Oncology Training and Research Hospital (Approval No. 2023-10/381 and date of approval: 4 October 2023). The Declaration of Helsinki's guiding principles were followed when conducting the study.

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References

- Lee SH, Chung IK, Kim SJ, et al. An adequate level of training for technical competence in screening and diagnostic colonoscopy: a prospective multicenter evaluation of the learning curve. *Gastrointest Endosc.* 2008;67:683-9.
- Cappell MS, Friedel D. The role of sigmoidoscopy and colonoscopy in the diagnosis and management of lower gastrointestinal disorders: technique, indications, and contraindications. *Med Clin North Am.* 2002;86:1217-52.
- Johnson DA, Barkun AN, Cohen LB, et al. Optimizing adequacy of bowel cleansing for colonoscopy: recommendations from the US Multi-Society Task Force on Colorectal Cancer. *Am J Gastroenterol.* 2014;109:1528-45.
- Gupta M, Holub JL, Eisen G. Do indication and demographics for colonoscopy affect completion? A large national database evaluation. *Eur J Gastroenterol Hepatol.* 2010;22:620-7.
- Ness RM, Manam R, Hoen H, Chalasani N. Predictors of inadequate bowel preparation for colonoscopy. *Am J Gastroenterol.* 2001;96:1797-802.
- Froehlich F, Wietlisbach V, Gonvers JJ, et al. Impact of colonic cleansing on quality and diagnostic yield of colonoscopy: the European Panel of Appropriateness of Gastrointestinal Endoscopy European multicenter study. *Gastrointest Endosc.* 2005;61:378-84.
- Kaminski MF, Thomas-Gibson S, Bugajski M, et al. Performance measures for lower gastrointestinal endoscopy: a European Society of Gastrointestinal Endoscopy (ESGE) Quality Improvement Initiative. *Endoscopy.* 2017;49:378-97.
- Nguyen DL, Jamal MM, Nguyen ET, et al. Low-residue versus clear liquid diet before colonoscopy: a meta-analysis of randomized, controlled trials. *Gastrointest Endosc.* 2016;83:499-507.e1.
- Calderwood AH, Lai EJ, Fix OK, Jacobson BC. An endoscopist-blinded, randomized, controlled trial of a simple visual aid to improve bowel preparation for screening colonoscopy. *Gastrointest Endosc.* 2011;73:307-14.
- Tae JW, Lee JC, Hong SJ, et al. Impact of patient education with cartoon visual aids on the quality of bowel preparation for colonoscopy. *Gastrointest Endosc.* 2012;76:804-11.
- Ergen WF, Pasricha T, Hubbard FJ, et al. Providing hospitalized patients with an educational booklet increases the quality of colonoscopy bowel preparation. *Clin Gastroenterol Hepatol.* 2016;14:858-64.
- Walker TB, Hengehold TA, Garza K, et al. An interactive video educational tool does not improve the quality of bowel preparation for colonoscopy: a randomized controlled study. *Dig Dis Sci.* 2022;67:2347-57.
- Liu X, Luo H, Zhang L, et al. Telephone-based re-education on the day before colonoscopy improves the quality of bowel preparation and the polyp detection rate: a prospective, colonoscopist-blinded, randomised, controlled study. *Gut.* 2014;63:125-30.
- Lorenzo-Zúñiga V, Moreno de Vega V, Marín I, et al. Improving the quality of colonoscopy bowel preparation using a smart phone application: a randomized trial. *Dig Endosc.* 2015;27:590-5.
- Lai EJ, Calderwood AH, Doros G, et al. The Boston bowel preparation scale: a valid and reliable instrument for colonoscopy-oriented research. *Gastrointest Endosc.* 2009;69:620-5.
- Johnson DA, Barkun AN, Cohen LB, et al. Optimizing adequacy of bowel cleansing for colonoscopy: recommendations from the U.S. multi-society task force on colorectal cancer. *Gastrointest Endosc.* 2014;80:543-62.
- Morán Sánchez S, Torrella E, Esteban Delgado P, et al. Colonoscopy quality assessment. *Rev Esp Enferm Dig.* 2009;101:107-16.
- Bennett L, Knox R, Luscombe G, et al. The colonoscopy cookbook: analysis of effect of a recipe resource on quality and experience of bowel preparation in colonoscopy. *Endosc Int Open.* 2023;11:E561-5.
- Spiegel BM, Talley J, Shekelle P, et al. Development and validation of a novel patient educational booklet to enhance colonoscopy preparation. *Am J Gastroenterol.* 2011;106:875-83.
- Penz D, Pammer D, Waldmann E, et al. Association between endoscopist adenoma detection rate and serrated polyp detection: retrospective analysis of over 200,000 screening colonoscopies. *Endosc Int Open.* 2024;12:E488-97.
- Chokshi RV, Hovis CE, Hollander T, et al. Prevalence of missed adenomas in patients with inadequate bowel preparation on screening colonoscopy. *Gastrointest Endosc.* 2012;75:1197-203.
- Lebwohl B, Kastrinos F, Glick M, et al. The impact of suboptimal bowel preparation on adenoma miss rates and the factors associated with early repeat colonoscopy. *Gastrointest Endosc.* 2011;73:1207-14.
- Lebwohl B, Wang TC, Neugut AI. Socioeconomic and other predictors of colonoscopy preparation quality. *Dig Dis Sci.* 2010;55:2014-20.
- Madhoun MF, Chaudrey KK, Chisholm SS, et al. Efficacy and tolerability of various bowel preparations in diabetic patients: a randomized controlled trial. *Endosc Int Open.* 2018;6:E1157-63.
- Hassan C, East J, Radaelli F, et al. Bowel preparation for colonoscopy: European Society of Gastrointestinal Endoscopy (ESGE) Guideline - Update 2019. *Endoscopy.* 2019;51:775-94.