



Enhanced instructions improve the quality of bowel preparation for colonoscopy: a meta-analysis of randomized controlled trials

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Background and Aims: The success of a colonoscopy is highly dependent on the quality of bowel preparation (BP). Many patients have poor BP due to non-compliance with regular instructions. Reports concerning the effects of enhanced instructions on BP quality are inconsistent. The aim of this meta-analysis was to compare BP quality between patients receiving enhanced instructions in addition to regular instructions and those who received regular instructions only.

Methods: MEDLINE, EMBASE, Web of Science, and the Cochrane Library were searched to identify relevant studies published for August 2015. The quality of BP (adequate/inadequate), adenoma detection rate, polyp detection rate, willingness to repeat preparation, and adverse events were estimated by using odds ratios (OR) and 95% confidence intervals (CI) with random effects models.

Results: Eight randomized controlled trials (n = 3795) were included. Patients who received enhanced instructions showed significantly better BP quality than those receiving only regular instructions (OR, 2.35; 95% CI, 1.65-3.35; $P < .001$). Subgroup analysis showed that the beneficial effects of enhanced instructions on BP quality were consistent among patients receiving different purgative types, administration methods, or diet restriction (all $P < .05$). Patients in the enhanced instructions group showed more willingness to repeat the preparation (OR, 1.91; 95% CI, 1.20-3.04; $P = .006$).

Conclusions: Enhanced instructions significantly improved the quality of BP and willingness to repeat the preparation in patients undergoing colonoscopy. Factors related to patient instructions appear to be as important as the preparation method itself in improving BP quality. (Gastrointest Endosc 2017;85:90-7.)

INTRODUCTION

Colonoscopy is considered to be the standard method for the diagnosis, screening, and surveillance of colorectal lesions. Screening colonoscopies have been shown to

Abbreviations: ADR, adenoma detection rate; BBPS, Boston Bowel Preparation Scale; BMI, body mass index; BP, bowel preparation; CI, confidence interval; CRC, colorectal cancer; EI, enhanced instructions; HCS, Harefield Cleansing Scale; MD, mean difference; OBPS, Ottawa Bowel Preparation Scale; OR, odds ratio; PDR, polyp detection rate; PEG, polyethylene glycol; RCT, randomized controlled trial; RI, regular instructions; SMS, short message service; UPAS, Universal Preparation Assessment Scale.

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decrease colorectal cancer (CRC) incidence and mortality.^{1,2} The success of colonoscopy is highly dependent on the quality of bowel preparation (BP). However, previous studies have shown that 18% to 30.5% of patients had inadequate BP.³⁻⁵ Suboptimal BP can decrease the adenoma detection rate (ADR) and cecal intubation rate, reduce the time interval for surveillance, and prolong the procedural time.⁶⁻⁸

BP is a relatively complicated procedure, and many factors may influence the quality, including proper diet restriction, use of split-dose purgatives, and appropriate interval between the end of preparation and the start of colonoscopy. The adequacy of BP is also associated with patient-related factors, such as age, body mass index (BMI), comorbidities (eg, constipation and diabetes), and more importantly, patient compliance.⁹⁻¹¹ Although many intrinsic factors cannot be altered by interventions, patient compliance may be relatively easily improved by comprehensive communication. It has been found that nearly 20% of patients with poor BP had failed to follow

preparation instructions.¹² Chan et al¹³ showed that non-compliance with instructions, lower education level, and longer waiting time were independent risk factors associated with poor BP, among which non-compliance had the highest odds ratio (OR) (4.76). Therefore, it is reasonable to hypothesize that improvement in compliance through enhanced instructions (EI) during the preparatory period might increase the adequacy of BP.

Usually, patients receive a written booklet and/or verbal instructions from medical practitioners weeks before colonoscopy for BP, which are defined as regular instructions (RI). However, RI were often found to be less effective in achieving adequate BP.⁵ Several tools have been developed to enhance RI, including cartoon pictures,¹⁴ phone calls,^{12,15} social media applications,⁵ and smart phone applications.¹⁶ The roles of these tools in improving BP quality have been investigated in some high-quality randomized controlled trials (RCTs). However, these studies have yielded conflicting results. Although BP quality was not improved in 2 studies in which patients received EI with additional explanation¹⁷ or visual aids,¹⁸ improvement was documented in many others.^{5,12,14-16,19} We performed a meta-analysis to evaluate the influence of different kinds of EIs on BP quality, ADR, polyp detection rate (PDR), and other outcomes.

METHODS

Search strategies

English studies were identified by a comprehensive search of MEDLINE, EMBASE, Web of Science, and the Cochrane Library for August 2015. Our key words and search strategies were as follows: 1, (“education” [All Fields] OR educate [All Fields]) AND (“colonoscopy” [All Fields] OR “colonoscopy” [MeSH Terms]); 2, (“instruction” [All Fields] OR “instruct” [All Fields]) AND (“colonoscopy” [All Fields] OR “colonoscopy” [MeSH Terms]); 3, (“education” [All Fields] OR “educate” [All Fields]) AND (“bowel preparation” [All Fields] OR “bowel preparation” [MeSH Terms] OR “bowel cleansing” [All Fields]); 4, (“instruction” [All Fields] OR “instruct” [All Fields]) AND (“bowel preparation” [All Fields] OR “bowel preparation” [MeSH Terms] OR “bowel cleansing” [All Fields]). Reference lists of primary study publications, reviews, editorials, and the proceedings of international congresses were searched manually. We did not consider abstracts or unpublished reports for inclusion.

Study selection

We included only RCTs comparing RI with EI. Study participants included patients more than 18 years old who underwent colonoscopy. Study interventions included EI plus RI versus RI only. The primary outcome was the rate of adequate BP. Four BP scales were used to assess BP quality: Boston Bowel Preparation Scale (BBPS), Ottawa Bowel

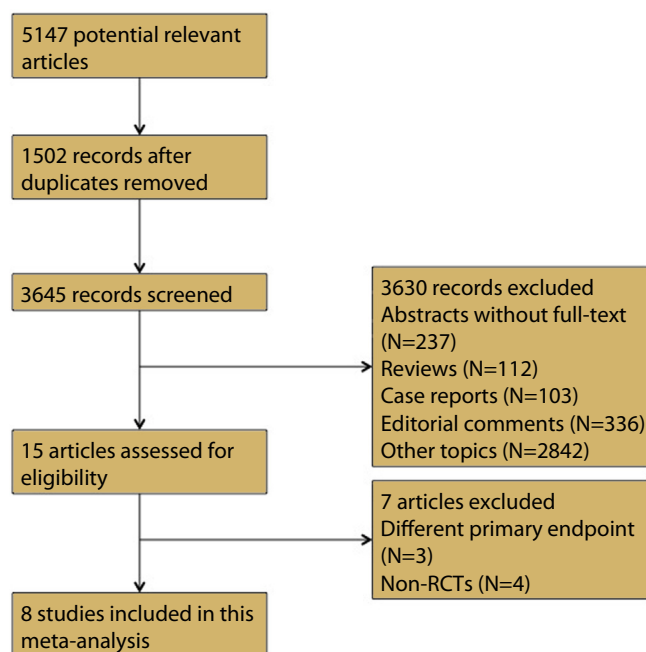


Figure 1. Search strategies. *RCT*, randomized controlled trial.

Preparation Scale (OBPS), Universal Preparation Assessment Scale (UPAS), and Harefield Cleansing Scale (HCS). The adequacy of BP was defined by a BBPS score ≥ 5 , an OBPS score < 6 , a UBPS score < 3 , or an HCS grade A or B.

Data extraction

Two investigators (X.Y.G. and S.G.Y.) extracted the data independently. Agreements and disagreements were resolved through discussion. The following data were extracted for each eligible study: author, year of publication, geographic location, study design, blinding, inclusion criteria, exclusion criteria, number of patients screened, number of patients allocated to each group, detailed information of interventions and controls, indications for colonoscopy, primary and secondary endpoints, BP scales, purgatives, diet restrictions, methods of administration, cecal intubation rates, insertion times, and withdrawal times.

Quality assessment

Two tools were used to evaluate study quality, including the Cochrane Risk Bias Tool ([Supplementary Fig. 1](#)) and Jadad score.²⁰ Only one study¹⁶ used a non-random component in the sequence generation process. Jadad scores were 2 in 2 studies and 3 in 6 studies (mean, 2.75; 95% confidence interval [CI], 2.36-3.14) ([Supplementary Table 1](#)). Because patients could not be blinded to instruction methods, all trials were only single blinded.

Statistical methods

All statistical analyses were performed using Review Manager (version 5.2) and Stata (version 12.0). Random

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