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Gastroenterologists' Perceived Barriers to Optimal Pre-Colonoscopy Bowel Preparation: Results of a National Survey

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Abstract Poor quality bowel preparation has been reported in almost one third of all colonoscopies. To better understand factors associated with poor bowel preparation, we explored perceived patient barriers to optimal pre-colonoscopy bowel preparation from the perspective of the gastroenterologist. A random sample of physician members of the American College of Gastroenterology was surveyed via the internet and postal mailing. Demographic and practice characteristics and practice-related and perceived patient barriers to optimal bowel preparation were assessed among 288 respondents. Lack of time, no patient education reimbursement, and volume of information were not associated with physician level of suboptimal bowel preparation. Those reporting ≥10 % suboptimal bowel preparations were more likely to believe patients lack understanding of the importance of following instructions, have problems with diet, and experience trouble tolerating the purgative. Bowel preparation instruction communication and unmet patient educational needs contribute to suboptimal bowel preparation. Educational interventions should address both practice and patient-related factors.

Keywords Colorectal cancer screening · Colonoscopy · Bowel preparation · Physician survey

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Introduction

Colorectal cancer (CRC), the third leading cause of cancer and cancer-related death in the USA, is preventable through the detection and removal of precancerous polyps and curable if diagnosed in the early stages [1]. Rates of CRC cases and deaths for both men and women in the USA have decreased dramatically over the past two decades. Much of this decline has been attributed to the increase in CRC screening, particularly with colonoscopy, as well as improvements in diagnosis and treatment [1]. According to the 2010 Behavioral Risk Factor Surveillance Survey, from 2002 to 2010, the proportion of American adults aged 50–75 years reporting adequate CRC screening increased from 53.2 to 65.3 % [2].

Diagnostic accuracy of colonoscopy is dependent on the endoscopist's ability to adequately visualize the colonic mucosa [3], yet up to 30 % of all colonoscopies have suboptimal bowel preparation [4]. The ramifications of poorly prepared bowels are serious and include decreased adenoma detection rates, missed neoplasia [5], increased duration and cost of colonoscopy [6], and greater number of repeated procedures at shorter follow-up intervals [7, 8].

Predictors of suboptimal bowel preparation span the spectrum of patient, physician, and procedural factors. Individuals with lower educational level, Medicaid insurance, inpatient status, as well as those who are unmarried, have a procedural indication of constipation, take tricyclic antidepressants, have certain comorbidities, fail to ingest the full amount of purgative, or do not follow preparation instructions more often have suboptimal bowel preparations [9, 10]. Physician characteristics, such as practice type and hospital affiliation, also affect the quality of the bowel preparation [8], whereas procedure-related factors, such as morning vs. afternoon colonoscopy, extended period of elapsed time since the last dose of purgative, dietary restrictions, type of purgative recommended, and tolerability and efficacy of the purgative regimen, have also been implicated as reasons for high rates of suboptimal bowel preparation [11–13]. Of these predictors, the one most amenable to intervention is the education of the patient with regard to the bowel preparation and the importance of following instructions. Surprisingly, scant research is devoted to patient education and the barriers to bowel preparation encountered by the physicians providing the instruction and performing the procedure. The objectives of this study were to explore practice-related barriers to bowel preparation instruction communication and perceived patient barriers to optimal bowel preparation from the physician's perspective among a national sample of gastroenterologist members of a professional medical organization.

Materials and Methods

The design for this study was cross-sectional and responses represent the reports of gastroenterologist members of the American College of Gastroenterology using a survey instrument administered either on-line via e-mail or by hard copy sent through the postal mail between September 2010 and March 2011. All study-related materials were pilot tested among a sample of attending gastroenterologists, residents, and fellows in the Division of Digestive and Liver Disease at Columbia University Medical Center (CUMC). Materials were modified accordingly and approved by the CUMC Institutional Review Board prior to implementation.

The sampling frame was the full membership list supplied with permission by the organization and included a total of 10,228 members. Those with missing information, non-MDs, non-US residents, and inactive members were excluded, resulting in 6,777 active members. From this list, a sample of 20 % (n=1,355) of physicians (MD's and DO's) were selected at random for inclusion in this study. One identical entry was removed, and two members who participated in a pilot test were also removed. Through survey responses and telephone follow-up, an additional 353 participants were found to be ineligible (deceased, unable to locate or relocated out of the country, and retired) and were removed for a total of 999 active gastroenterologist members surveyed. Of all eligible gastroenterologists who were sent with surveys, 288 responded (29 %).

A cover letter accompanying the survey instrument detailed the purpose of the study, explained the selection process, assured that responses would be kept confidential, and urged the respondent to complete the survey and return it in a timely fashion. The on-line version of the survey was created in Qualtrics™, and a link was e-mailed to each participant. After the initial e-mail, follow-up emails were sent at 2 and 4 weeks. In addition, a postal mailing was completed with hard copies of the cover letter and survey. After the initial postal mailing, a follow-up mailing was sent to non-respondents approximately 4 weeks later.

The survey was comprised of four sections. Sociodemographic characteristics included age, gender, race/ethnicity, country of medical school, specialty/board certification, and years of experience performing colonoscopy. Practice characteristic questions consisted of geographic location and setting (urban, suburban, and rural), teaching hospital affiliation, practice type (private and hospital/university), number of colonoscopies performed per week (≤20 or >20), and self-reported rate of suboptimal bowel preparations encountered weekly (<5, 5–10, 11–15, 16–20, and >20 %).

To ascertain barriers to suboptimal bowel preparation, participants were asked about their agreement with a series of statements related to bowel preparation instruction communication in their practice (six items). Items based on key

informant input and a review of the literature included limited time to discuss information, the volume and complexity of information, lack of reimbursement for patient education, lack of patient educational materials written in languages other than English, and lack of staff to communicate instructions to patients. The participants were also queried about perceived patient barriers using yes/no responses. Perceived patient barriers included not understanding the importance of following the bowel preparation instructions thoroughly, having problems with altering their usual diet, confused about which foods were permissible, unable to tolerate the full course of the purgative, lack of translated/culturally sensitive written instructions, and having problems related to the bowel preparation such as the duration and convenience of the regimen and palatability of the purgative. Scores to each barrier measure (practice-related and perceived patient barriers) were summed to obtain an aggregate score.

Descriptive statistics, including frequencies and percentages and Pearson's chi-squared test of association, were determined. We calculated internal consistency reliability for practice-related barriers (Cronbach's alpha 0.78) and for perceived patient barriers (Cronbach's alpha 0.63). Mean and standard deviation were calculated and Student's *t* test was used to assess differences in means by self-reported proportion of suboptimal bowel preparations per week (<10 vs. ≥10 %) and level of perceived patient barriers (low <4 and high ≥4). We used multivariate logistic regression analysis to identify factors predictive of higher perceived patient barriers. All analyses were performed using SAS version 9.2 (SAS Institute, Cary, NC).

Results

Characteristics of the 288 study participants, their practices, and behaviors related to colonoscopy bowel preparation have been described elsewhere [8]. To summarize, physicians in our sample were, on average, 48.6 years of age with 17.2 years experience performing colonoscopy. The majority was male (85.1 %), white (72.1 %), educated in the USA (78.6 %), GI specialist/certified (85.8 %), and had, on average, 17.2 years experience performing colonoscopy. Participants were equally distributed geographically throughout the USA, with approximately one third located in the Northeast, one third in the South, and one third in the West. Most were in urban settings (55.1 %), private practice (64.8 %), performed more than 20 colonoscopies per week (55.0 %), and were affiliated with a teaching hospital (62.5 %). The self-reported proportion of suboptimal bowel preparations encountered weekly in practice was dichotomized as <10 and ≥10 % with 217 (81.2 %) reporting the lower proportion [8].

Table 1 displays the comparison of physician practice-related and perceived patient barriers to optimal bowel preparation by level of self-reported suboptimal bowel preparations per week. Physician practice-related barriers scores ranged from 0 to 6 with a mean of 2.2 (SD 1.8). Most agreed that lack of physician time presented a barrier (53.4 %), followed by lack of reimbursement for patient education (42.4 %), and volume of information (39.8 %). Most disagreed with statements that lack of patient materials in languages other than English (75.6 %) and lack of staff (72.5 %) were barriers to bowel preparation instruction communication. Physician practice-related barriers were not associated with the self-reported proportion of suboptimal bowel preparation per week.

Participants each reported three to four patient barriers to optimal bowel preparation (M=3.7, SD 1.8, range 0–7) (Table 1). Overall, the participants in our study perceived the patient's inability to tolerate the full course of purgative to be the most common barrier to optimal bowel preparation (78.7 %), followed by 72.5 % reporting that problems such as duration, convenience, and palatability of purgative, and 71.1 % stating that the patient's lack of understanding of the importance of following the bowel preparation instructions thoroughly.

By level of self-reported rates of suboptimal bowel preparation, those with ≥10 % per week reported greater perceived patient barriers (M=4.5 [SD 1.7] vs. M=3.5 [SD 1.7], p=0.0001) (Table 1). They were also more likely to believe that patient's barriers included the lack of understanding of the importance of following the bowel preparation instructions (83.3 vs. 67.6 %, p=0.03); problems with altering their diet (60.4 vs. 36.2 %, p=0.002); were confused about the pre-colonoscopy diet (55.3 vs. 35.3 %, p=0.01); and the ability to tolerate the purgative (91.7 vs. 75.9 %, p=0.01) compared to those with lower self-reported proportion of suboptimal bowel preparations.

A strong negative linear association between increasing age and number of perceived patient barriers was observed (Table 2). Those reporting low perceived patient barriers were more often older (67.9 % for age 60+), and conversely, the majority of those with higher perceived patient barriers were younger (62.9 % for age 25–39 years) (p=0.003). Number of years performing colonoscopy, geographic location, and practice setting were also associated with perceived patient barriers, with physicians who reported a greater number of perceived patient barriers more likely to have less experience performing colonoscopy (p=0.05), to be located in sections of the country other than the Northeast (p=0.026), practice in hospital, university, or other settings vs. private practice (p=0.02), and were more likely to report a higher (>10 %) self-reported proportion of suboptimal bowel preparations per week (68.0 vs. 32.0 %, p=0.0016).

The multivariate analysis confirmed the inverse relationship between age and high perceived patient barriers (Table 3). Compared to the youngest group of physicians, <40 years, older physicians were less likely to have high perceived

Table 1 Physician practice-related barriers to bowel preparation communication and perceived patient barriers to optimal bowel preparation among gastroenterologists (n=288), September 2010 through March 2011

	Total		<10 % Suboptimal		≥10 % Suboptimal		Statistic	
	M	SD	*M*	SD	*M*	SD	*t*	*p* value
Physician practice-related barriers[a]								
Mean physician practice-related barriers score (n=262)	2.2	1.82	2.2	1.82	2.1	1.83	0.35	0.73
	N	%	*N*	%	*N*	%	χ^2	*p* value
Lack of time to discuss information							0.013	0.91
Agree	140	53.4	114	53.3	26	54.2		
Disagree	122	46.6	100	46.7	22	45.8		
Volume of information							0.323	0.57
Agree	104	39.8	87	40.6	17	36.2		
Disagree	157	60.2	124	59.4	30	63.8		
Complexity of information							0.120	0.73
Agree	93	35.5	77	36.0	16	33.3		
Disagree	169	64.5	137	64.0	32	66.7		
Lack of reimbursement for patient education							0.570	0.45
Agree	111	42.4	93	43.5	18	37.5		
Disagree	151	57.6	121	56.5	30	62.5		
Lack of patient educational materials written in languages other than English							0.073	0.79
Agree	64	24.4	53	24.8	11	22.9		
Disagree	198	75.6	161	75.2	37	77.1		
Lack of staff to communicate instructions to patients							0.419	0.52
Agree	72	27.5	57	26.6	15	31.3		
Disagree	190	72.5	157	73.4	33	68.7		
	M	SD	*M*	SD	*M*	SD	*t*	*p* value
Perceived patient barriers[b,c]								
Mean patient barriers score (n=263)	3.7	1.8	3.5	1.7	4.5	1.7	−3.91	0.0001
	N	%	*N*	%	*N*	%	χ^2	*p* value
Lack of understanding of importance of following bowel preparation instructions thoroughly	187	71.1	140	67.6	40	83.3	4.63	0.03
Problems with altering their usual diet	110	41.8	75	36.2	29	60.4	9.44	0.002
Unwilling to follow instructions	126	48.1	93	45.2	29	60.4	3.64	0.05
Confused about which foods were permissible	103	39.3	73	35.3	26	55.3	6.48	0.01
Unable to tolerate full course of purgative	207	78.7	157	75.9	44	91.7	5.84	0.01
Lack of translated/culturally sensitive patient educational materials	47	17.9	34	16.4	11	22.9	1.13	0.29
Problems with duration, convenience of regimen, or palatability of purgative	190	72.5	145	70.4	39	81.3	2.30	0.13

[a] Range 0–6

[b] Range 0–7

[c] Not mutually exclusive, total >100 %

Table 2 Comparison of level of self-reported perceived patient barriers to optimal bowel preparation and physician and practice characteristics

	Low barriers (<4)		High barriers (≥4)		χ^2	*p* value
	N	%	*N*	%		
Age					13.85	0.003
25–39	26	37.1	44	62.9		
40–49	39	50.7	38	49.3		
50–59	47	60.3	31	39.7		
60+	38	67.9	18	32.1		
Gender					0.38	0.54
Male	130	53.1	115	46.9		
Female	25	58.1	18	41.9		
Race/ethnicity					0.99	0.91
White	108	52.9	96	47.1		
Hispanic	6	66.7	3	33.3		
Black	7	50.0	7	50.0		
Asian	26	53.1	23	46.9		
Other	5	62.5	3	37.5		
Medical school					1.75	0.19
USA	104	49.8	105	50.2		
Non-US	34	59.7	23	40.3		
Specialty/board certification					0.24	0.63
GI	131	54.1	111	45.9		
Non-GI	20	50.0	20	50.0		
Years experience performing colonoscopy					3.78	0.05
≤16	65	47.1	73	52.9		
>16	80	58.8	56	41.2		
Geographic location					4.97	0.026
Northeast	60	63.2	35	36.8		
Other	95	49.2	98	50.8		
Setting					3.33	0.19
Urban	77	48.1	83	51.9		
Suburban	61	58.6	43	41.4		
Rural	11	61.1	7	38.9		
Teaching hospital affiliation					1.56	0.21
Yes	91	50.6	89	49.4		
No	60	58.3	43	41.7		
Practice type					5.30	0.02
Private	104	58.4	74	41.6		
Hospital/university/other	47	44.3	59	55.7		
Colonoscopies per week					0.12	0.73
≤20	65	52.0	60	48.0		
>20	86	54.1	73	45.9		
Proportion of suboptimal bowel preparations per week					9.92	0.0016
<10	123	56.7	94	43.3		
≥10	16	32.0	34	68.0		

Table 3 Physician and practice characteristics associated with high perceived patient barriers

	OR	95 % CI
Age		
<40	1.00	Referent
40–49	0.46	0.21–1.00
50–59	0.17	0.05–0.62
60+	0.12	0.03–0.47
Years experience performing colonoscopy		
>16	1.00	Referent
≤16	0.42	0.14–1.23
Geographic location		
Other	1.00	Referent
Northeast	0.60	0.33–1.09
Teaching hospital affiliation		
No	1.00	Referent
Yes	1.26	0.66–2.39
Practice setting		
Hospital/university/other	1.00	Referent
Private	0.72	0.37–1.41
Colonoscopies per week		
>20	1.00	Referent
≤20	0.96	0.54–1.72
Proportion of suboptimal bowel preparations per week		
≤10	1.00	Referent
>10	2.66	1.26–5.63

patient barriers (50–59 years, OR 0.17, 95 % CI 0.05–0.62; and 60–76 years, OR 0.12, 95 % CI 0.03–0.47). Physicians with high self-reported level of suboptimal bowel preparation per week (≥10 %) were more than twice as likely to have high perceived patient barriers (OR 2.66, 95 % CI 1.26–5.63) compared to physicians with lower (≤10 %) self-reported suboptimal bowel preparations per week.

Discussion

Our study examined perceived barriers to optimal pre-colonoscopy quality bowel preparation from the perspective of gastroenterologists who were randomly selected from among the membership of a national American organization. The findings indicate that, within their practices around the country, most gastroenterologists believe that lack of time needed to discuss bowel preparation, the volume of information to be communicated to patients, and the lack of reimbursement for educational activities all pose barriers to optimal bowel preparation. This sample of gastroenterologists did not believe that there exists a lack of available patient educational materials in the language preferred by the patient or a lack of staff to

communicate these instructions. Practice-related barriers did not vary by level of self-reported suboptimal bowel preparation. When evaluating perceived patient barriers to optimal bowel preparation, however, those reporting a higher proportion of suboptimal bowel preparations per week, reported significantly more patient-related barriers. In particular, those with the highest level of suboptimal bowel preparation per week believed that patients are unwilling to follow preparation instructions, struggle with the prescribed diet, and are unable to tolerate the full course of purgative. It appears that, despite the availability of staff to communicate bowel preparation instructions and the availability of language-appropriate written materials, the respondents believe that the patient behaviors contribute to suboptimal bowel preparation quality substantially more than practice-related barriers. The bias created by such attribution deflects attention from social, cultural, institutional, policy, and practice-related issues [14] that influence suboptimal bowel preparation and instead magnifies the importance of patient-related factors.

This study of physicians' self-reported behaviors and opinions has limitations that should be noted. That the reported rate of suboptimal bowel preparation is lower than that reported by others [7] may reflect the fact that this pool of physician respondents was primarily in private practice where financial and other incentives likely reduce the occurrence of poor bowel preparation quality. Alternatively, this low rate may represent a social desirability bias whereby physicians were reluctant to reveal actual rates of suboptimal bowel preparation and reality is underestimated or that an unintentional bias was introduced through the sample selection process that favored better endoscopists. Additionally, the response rate of participants was relatively low, though comparable with other studies conducted among members of the American College of Gastroenterology [15, 16].

The importance of improving bowel preparation quality is not in dispute, but how to achieve this goal is unclear. Between 2003 and 2007, the New York City Department of Health made significant progress in increasing the quantity of colorectal cancer screening using colonoscopy [17]. Rates of screening increased from 41.7 to 61.7 % with gender and racial/ethnic disparities nearly eliminated. That campaign to increase use of CRC screening was multifaceted; it elicited support of key stakeholders, provided information to the public and practitioners, and developed infrastructure. These strategies and tactics may be transferable to increasing the quality of colonoscopy.

Despite the fact that most patients report the bowel preparation as a barrier to colonoscopy [18, 19] and that the preparation is the most difficult aspect of the examination [20], scant information regarding the communication of bowel preparation instructions and related patient education and the impact of these factors on bowel preparation quality exists. Further, of the interventions to increase bowel preparation quality in the literature, findings are mixed. Nurse delivered, in-person education supplemented with brochures [21], bowel preparation instructions plus educational pamphlet [22], and an educational booklet tailored to the cognitive needs of patients [23] increased the quality of bowel preparation compared to standard instructions alone. Other interventions, such as providing patients with photographs of "clean" and "dirty" colons in addition to writing bowel preparation instructions [24], or verbal and written instructions plus a question and answer session to provide additional information based on responses to a questionnaire, however, failed to improve bowel preparation quality [25].

Our study evaluated perceived barriers to optimal bowel preparation from the perspective of the physician. When the behavior of the patient is seen as the problem, the importance of policies and institutional factors is de-emphasized and the role of the healthcare system is seen as less essential [14]. Our findings demonstrate that there exists a gap with regard to communication of bowel preparation instructions and that the educational needs of patients are not being met. This gap may result in the lack of patient understanding and compliance to the prescribed regimen that subsequently leads to suboptimal bowel preparation. While patient-related barriers undoubtedly contribute to poor bowel quality, lack of understanding of the importance of adhering to the prescribed regimen, confusion regarding the diet, and inability to tolerate the preparation are all issues that can be addressed with patient education, improved patient–physician communication, and proper clinical management. The solution to improving bowel preparation quality lies with multilevel interventions that address both practice and patient-related factors.

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