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Information experiences, needs, and preferences of colonoscopy patients

A pre-colonoscopy survey

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Abstract

Better pre-colonoscopy education may lead to improved bowel preparation, decreased anxiety, and a willingness to go direct-to-colonoscopy. We assessed information experiences, needs, and preferences of patients undergoing colonoscopy.

A self-administered survey was distributed between 08/2015 and 06/2016 to patients in Winnipeg, Canada when they attended an outpatient colonoscopy. The amount, type, helpfulness, and satisfaction with information provided were analyzed. Linear and logistic regression analyses were used to assess predictors of satisfaction with various aspects of the information received, as well as overall satisfaction with the provided information.

Although the majority of the 1580 respondents were satisfied with the information they received, only 68% of respondents coming for a repeat colonoscopy and 59% of those coming for first colonoscopy perceived receiving just the right amount of information from their endoscopy doctor. One quarter or less of the respondents indicated they received just the right amount of information from any source other than their colonoscopy doctor. 38% coming for a first colonoscopy and 44% coming for a repeat colonoscopy indicated they received no information from their family physician. Those coming for their first colonoscopy had a lower average score (9.7 vs 11.1; $P < .001$) for amount of information received (scale 0-15), were less satisfied with the information they received ($P = .005$) and found the information to be less clear ($P = .004$).

Many patients going for colonoscopy in a large urban practice are inadequately informed about the various aspects of the procedure and it is worse for those going for first rather than repeat colonoscopy.

Abbreviation: BP = bowel preparation.

Keywords: direct-to-colonoscopy, knowledge translation, patient preference

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What is known?

Information disseminated pre-colonoscopy can be associated with the quality of the bowel preparation and anxiety level pre-colonoscopy.

There are limited data on the adequacy of information provided pre-colonoscopy and what types of information patients find most helpful.

What is new?

Many patients coming for colonoscopy report receiving inadequate information about various aspects of colonoscopy.

Those coming for their first colonoscopy are less clear and less satisfied with the information they receive than those coming for repeat colonoscopy.

Patients who receive information from multiple sources are more satisfied with the information they receive and have greater clarity of information.

Adequacy of disseminated information should become an endoscopy practice quality measure.

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1. Introduction

Colonoscopy is a common procedure that many people will encounter in their lives, be it for screening, surveillance, or assessment of symptoms. Inadequate preparation for the colonoscopy is associated with a number of poor outcomes, including missed diagnoses,[1–4] and avoidable repeat procedures.[5] Better pre-colonoscopy education may lead to improved colonoscopy preparation both directly and indirectly. Directly, pre-colonoscopy education leads to a better understanding of the importance of bowel preparation (BP), and a more informed understanding of how to prepare.[6] Indirectly, better education may help to alleviate anxiety about the colonoscopy.[7,8] Anxiety has been reported to be a major barrier to acceptance of a colonoscopy,[9–11] so reduced anxiety may lead to better acceptance of the procedure as well as better preparation for the procedure.

Additionally, to alleviate wait times, patients frequently go direct-to-colonoscopy without first seeing their endoscopist, so the opportunity to obtain information about the procedure from an endoscopist visit is missed. Pre-colonoscopy education is therefore, an even more important part of preparing for the procedure among the increasing number of patients who go direct-to-colonoscopy.

A number of pre-colonoscopy educational information tools can be provided to patients. These include brochures, videos, internet websites, mobile applications, and appointments with healthcare professionals.[12,13] Often, however, the information provided is too complex or not well explained.[14,15] There are limited data on the adequacy of information provided pre-colonoscopy and what types of information patients find most helpful.[12,13] Specifically, few studies assess predictors of patients' ability to understand the provided information and how well the provided information meets patient needs.

The aim of this study was to explore how patients view the information they receive before a colonoscopy in a city-wide clinical practice and to assess their preferences for receiving information in the future.

2. Methods

This study is part of a larger project investigating and designing processes to improve the appropriateness, efficiency, and pre-procedure patient experience of colonoscopy procedures. Planning for the project was guided by Professional and Patient Advisory Committees. A self-administered anonymous survey (shown in the Supplementary Appendix A, http://links.lww.com/MD/C991) was distributed between August 2015 and June 2016 to adult patients immediately before their outpatient colonoscopy in six hospitals and two ambulatory care centers in Winnipeg, Manitoba, Canada. The questionnaire was first pilot tested among eight patients experienced with colonoscopies and eight endoscopists. It was then modified based on the feedback received. The questionnaire was created to address the content areas considered important for the overall project. Approximately 85% of the colonoscopies in Winnipeg are performed in the six hospital-based endoscopy units in the city by 52 endoscopists, while the rest are carried out in the two ambulatory care centers.

Consecutive participants were invited into the study. Inclusion criteria included patients' willingness to complete the self-administered survey while sitting in the waiting room, the ability to read and respond in English and there being sufficient time between arrival to the unit and being taken in for endoscopy. There were no exclusion criteria. The survey included items on demographic characteristics, reason for the current colonoscopy, previous experience with colonoscopy, whether or not the patient was going direct-to-colonoscopy (i.e., meeting the endoscopist for the first time on the day of the procedure), BP type used, anxiety about the colonoscopy, knowledge/information needs around colonoscopy and how willing the patient would be to wake early in the morning to complete the BP for their next colonoscopy. We have previously reported on the patients' opinions about waking up for BP early in the morning, factors associated with reluctance to conduct early morning BP, magnitude of anxiety and factors associated with anxiety related to different aspects of the colonoscopy process.[16,17] For this report, we analyzed the information needs and experiences of patients undergoing colonoscopy.

We asked individuals how much information they received before the procedure, whom they received it from, what topics were covered, how clear they found the information and how satisfied they were with it. We compared the information needs of those coming for a first colonoscopy to those coming for a repeat colonoscopy, and those coming direct-to-colonoscopy to those who saw their endoscopist prior to the colonoscopy appointment. We also asked about preferences for receiving information in the future. We explored predictors of whether patients found that the information they received was adequate in terms of both quantity and clarity.

Fisher's exact tests and *t*-tests were used to assess differences in proportions and continuous measures, respectively. Logistic regression was performed to assess predictors of overall satisfaction with information received. Included in potential predictors was the amount of information received from different sources and about different topics, clarity of information, age (categorized by median age of respondents), sex, education (categorized grade 12 or less vs more than grade 12), regular use of an electronic device, first or repeat colonoscopy, and direct-to-colonoscopy or not. Linear regression was performed to explore associations with the total amount of information received, using a point scoring system. The five questions that comprised the *total information received composite score* were: information on the reason it was recommended to have a colonoscopy, BP for the colonoscopy, benefits of colonoscopy, risks of colonoscopy, and information that would be received after the colonoscopy. Each of these areas was rated on a six-point scale which was in turn summarized into a three-point scoring system. In this system responses were given scores of no information or don't recall, a little or a moderate amount, and just the right amount. For each question participants also received a response option of "too much" information. Only 0.8% of patients answered too much to any question and these were excluded from analysis. The maximum score per question was three for an overall maximum score of 15 on the *total information received* composite score.

For both the logistic regression described above (predicting satisfaction with information received) and the linear regression (predicting the composite score for amount of information received), we hypothesized that the associations may differ, depending on whether this was the first colonoscopy or a repeat colonoscopy. We also hypothesized that the associations may differ, depending on whether or not the patient went direct-to-colonoscopy without seeing their endoscopist first. For these reasons, we stratified our regression analyses by number of previous colonoscopies (0 or 1+), and by direct-to-colonoscopy or not.

Finally, we explored in a logistic regression whether being well informed had an impact on whether the patient felt willing to go

direct-to-colonoscopy for a future colonoscopy. Responses about willingness to go direct-to-colonoscopy were: very willing, willing, neutral, reluctant, and very reluctant. In logistic regression, we grouped very willing and willing, and compared that to neutral, reluctant, or very reluctant. In addition to demographic characteristics (age, sex, and educational background), the potential predictors of willingness to go direct-to-colonoscopy included amount of information received, satisfaction with information received, clarity of information received, whether this was their first colonoscopy or a repeat colonoscopy, and whether the patient had come direct-to-colonoscopy for their current colonoscopy.

2.1. Ethics

This study and the larger overall project were approved by the Health Research Ethics Board at the University of Manitoba.

3. Results

At two of the hospitals, the survey was distributed and collected by clinical staff and the response rate could be assessed, which was 89% at both locations. The other locations were not able to collect response rate information as staff was too busy to document the number of persons who refused to complete the surveys, but all locations indicated that the survey was well accepted. A total of 1580 respondents answered parts of or all of the survey questions. Sample size varied by question but was always greater than 1000. Responses to questions that were asked in a grid (e.g., how much information was received from different sources) were fewer than responses to other parts of the survey. That said, at least 1015 participants answered each of the eight questions about amount of information received from different sources. The number of responses varied by source, with 1015 answering the question about how much information they received from internet videos, and 1185 answering the question about how much information they received from a colonoscopy doctor. In total, 1463 participants responded to the question asking how satisfied they were with the information received.

3.1. Background characteristics and descriptive analysis

Characteristics of the surveyed population are provided (Table 1), stratified by first or repeat colonoscopy, and by direct-to-

Table 1

Characteristics of study participants—N (%).

Patient characteristic	By colonoscopy number		By direct- to-colonoscopy	
	First	Second+	Direct	Not direct*
Gender				
Male	267 (49)	358 (47)	371 (48)	252 (48)
Female	275 (51)	408 (53)	400 (52)	274 (52)
Age				
16–34	62 (12)	33 (4)	64 (8)	28 (5)
35–54	243 (45)	216 (29)	274 (36)	183 (35)
55–91	234 (43)	513 (67)	430 (56)	310 (60)
Education				
< Grade 12	62 (12)	132 (19)	117 (16)	75 (15)
Grade 12	108 (21)	142 (20)	144 (20)	104 (21)
< 4 years post-secondary	207 (41)	278 (39)	296 (41)	187 (39)
4+ Years post-secondary	134 (26)	154 (22)	167 (23)	119 (25)
Amount of Info received on 0-15 score†—mean (SD) (N = 1197)	9.7 (4.0)	11.1 (4.0)	9.8 (4.2)	11.0 (3.9)
Satisfaction with info received				
Very satisfied/satisfied	474 (78)	710 (84)	710 (84)	460 (78)
Neutral	116 (19)	123 (15)	124 (15)	115 (19)
Dissatisfied/very dissatisfied	18 (3)	11 (1)	12 (1)	16 (3)
Clarity of info received				
Very clear/clear	477 (78)	726 (85)	704 (82)	490 (82)
Somewhat clear/unclear	126 (21)	124 (15)	142 (17)	103 (17)
Confusing/very confusing	8 (1)	7 (1)	9 (1)	6 (1)
Regular use of electronic devices‡				
0 devices	29 (7)	64 (11)	46 (7)	46 (11)
1 device	55 (12)	104 (18)	88 (14)	70 (17)
2 devices	142 (32)	157 (26)	202 (33)	96 (24)
3 devices	216 (49)	269 (45)	287 (46)	195 (48)
Colonoscopy number				
First	N/A		355 (40)	271 (44)
Second or later			532 (60)	349 (56)
Saw endoscopist before colonoscopy				
No	271 (43)	349 (40)	N/A	
Yes	355 (57)	532 (60)		

This is an ordinal variable and hence n (%) not applicable.

N = number; N/A = not applicable.

* Saw endoscopist prior to colonoscopy.

† 0-3 points for each of the following 5 information topics, for a total score of 0-15: reason it was recommended to have colonoscopy, bowel preparation, benefits of colonoscopy, risks of colonoscopy, the kind of information patient can expect to receive after colonoscopy.

‡ Devices asked about were: desktop/laptop computer, tablet computer (e.g., iPad), smart phone.

colonoscopy or saw an endoscopist first. Just over half of respondents were female, with >50% being 55 years or older. Those coming for a repeat colonoscopy were older on average than those coming for a first colonoscopy. Approximately 41% of respondents were direct-to-colonoscopy and 58% had undergone at least one prior colonoscopy.

Those coming for a repeat colonoscopy had a higher average composite score for amount of information received on a 0-15 scale (11.1 vs 9.7; $P < .001$). Given the standard deviation of 4.0, the difference in average composite scores corresponds to an effect size of 0.35. This translates into approximately 64% of those coming for their first colonoscopy having a lower composite score on information received than the average score among those coming for a repeat colonoscopy. In addition, those coming for a repeat colonoscopy were somewhat more likely to be satisfied or very satisfied with the information they received (84% among those coming for a repeat colonoscopy vs 78% among those coming for their first colonoscopy, $P = .005$) and were more likely to have found the information clear or very clear (85% vs 78%, $P = .004$).

Those who saw an endoscopist prior to their colonoscopy also had a higher average score for amount of information received (11.0 vs 9.8, effect size 0.30; $P < .001$) but were less likely to be satisfied or very satisfied with the information they received (78% vs 84%, $P = .009$) and were no more likely to find the information they received to be clear or very clear than those who went direct-to-colonoscopy (82% among both groups, $P > .10$).

Details about the amount of information received are summarized in Table 2. Only half of the respondents coming for a repeat colonoscopy indicated that they had received just the right amount of information by speaking with their endoscopy doctor or from a brochure from their endoscopy doctor. Among those coming for a first colonoscopy, 40% and 44% responded that they had received just the right amount of information from these two sources, respectively. One quarter or less of the respondents indicated that they had received just the right amount of information from any source other than their colonoscopy doctor, and many indicated that they had received no information from the other sources. More than half of all patients (whether first colonoscopy or repeat colonoscopy) indicated they did not receive any information from the following: brochure from their family physician, phone call from a staff member at the colonoscopy facility, internet, online video, and/or reading material in books or magazines (Table 2). Friends and family provided more information for those coming for a first colonoscopy (23% indicated just the right amount of information from this source) than those coming for a repeated colonoscopy (6%).

Over half of the first colonoscopy respondents felt that they had received the right amount of information about why the colonoscopy was recommended and about BP, and nearly 70% of repeat colonoscopy respondents felt that they had received the right amount of information about these topics (Table 2, bottom half). By contrast, less than half of all respondents felt that they had received the right amount of information about the risks of a colonoscopy, or about what information they should expect to receive after the colonoscopy.

The amount of information received from different sources should be taken in the context of how helpful the respondent felt that different sources of information would be. Although only about one quarter of all respondents felt that they had received the right amount of information by speaking with their family doctor (Table 2), 90% felt that information from this source would be helpful or very helpful before a future colonoscopy (Table 3). Similarly, 80% felt that a brochure from their family doctor would be helpful or very helpful. In general, with the exception of a video or an app about BP, 70% or more of the respondents felt that information from each source would be helpful or very helpful to receive (Table 3).

3.2. Predictors of satisfaction with information received and amount of information received

Predictors of satisfaction with information received (Table 4) varied, depending on whether this was a first colonoscopy or a repeat colonoscopy, as well as whether the patient came direct-to-

Table 2

Amount of information received by source and type*.

Amount of information by source	First colonoscopy—% (moe)†			Second or later colonoscopy—% (moe)†		
	None	Little/moderate	Right amount	None	Little/moderate	Right amount
Brochure from family doctor	77.0 (±3.8)	9.8 (±2.7)	13.2 (±3.0)	73.0 (±3.5)	7.8 (±2.1)	19.2 (±3.1)
Speaking with family doctor	37.7 (±4.3)	41.3 (±4.4)	20.9 (±3.6)	43.6 (±3.8)	30.3 (±3.6)	26.1 (±3.4)
Brochure from colonoscopy doctor	43.4 (±4.4)	16.4 (±3.3)	40.1 (±4.4)	35.6 (±3.6)	14.5 (±2.6)	49.9 (±3.8)
Speaking with colonoscopy doctor	32.1 (±4.2)	23.6 (±3.8)	44.3 (±4.4)	33.1 (±3.6)	16.5 (±2.9)	50.4 (±3.9)
Phone call from facility	59.4 (±4.4)	19.9 (±3.6)	20.1 (±3.6)	60.9 (±3.9)	16.9 (±3.0)	21.9 (±3.3)
Information found on internet	55.1 (±4.5)	29.0 (±4.1)	13.3 (±3.1)	72.1 (±3.7)	18.5 (±3.2)	9.1 (±2.4)
Video found on internet	87.2 (±3.1)	7.3 (±2.4)	4.4 (±1.9)	91.7 (±2.3)	4.7 (±1.8)	3.2 (±1.5)
Friends and family	20.6 (±3.6)	52.5 (±4.4)	23.4 (±3.7)	61.6 (±4.0)	32.8 (±3.9)	5.5 (±1.9)
Books or magazines	84.5 (±3.4)	10.6 (±2.9)	4.7 (±2.0)	84.6 (±3.0)	12.4 (±2.7)	2.9 (±1.4)
Amount of information by type						
Reason colonoscopy was recommended	8.4 (±2.3)	39.0 (±4.0)	52.1 (±4.1)	5.5 (±1.6)	26.8 (±3.0)	67.7 (±3.2)
Bowel preparation	6.7 (±2.0)	35.1 (±3.9)	57.2 (±4.0)	3.4 (±1.3)	26.0 (±3.0)	70.0 (±3.2)
Benefits of colonoscopy	15.1 (±2.9)	40.5 (±4.0)	43.6 (±4.1)	12.0 (±2.3)	26.9 (±3.1)	60.9 (±3.4)
Risks of colonoscopy	19.8 (±3.2)	41.5 (±4.0)	38.2 (±4.0)	18.7 (±2.7)	33.3 (±3.3)	47.9 (±3.5)
Type of information patient should expect to receive after colonoscopy	31.9 (±3.9)	37.4 (±4.1)	30.6 (±3.9)	23.9 (±3.1)	29.2 (±3.3)	46.9 (±3.7)

* Response categories were: none, a little, a moderate amount, just the right amount, too much, and don't recall. Don't recall was combined with none and a little was combined with a moderate amount. Very few people responded "too much" so this category is not included in the analysis.

† moe = margin of error; that is, the boundaries of the 95% confidence interval.

Table 3

How helpful or unhelpful do you think it would be to receive information in the following ways?—% (± moe)[*].

Method of receiving information	N	Helpful/very helpful	Neither helpful nor unhelpful	Unhelpful/very unhelpful
Speak with family doctor	1365	90.0 (± 1.6)	7.8 (± 1.4)	2.1 (± 0.8)
Brochure from family doctor	1244	79.6 (± 2.2)	15.5 (± 2.0)	4.9 (± 1.2)
Brochure from colonoscopy service	1304	88.7 (± 1.7)	8.5 (± 1.5)	2.8 (± 0.9)
Meeting with colonoscopy doctor	1307	79.0 (± 2.2)	18.0 (± 2.1)	3.1 (± 0.9)
Phone call from colonoscopy service	1262	70.9 (± 2.5)	23.9 (± 2.4)	5.2 (± 1.2)
Video on Internet	1197	47.8 (± 2.8)	37.5 (± 2.7)	14.7 (± 2.0)
Website on Internet	1215	69.5 (± 2.6)	23.4 (± 2.4)	7.2 (± 1.5)
An app about bowel preparation	1184	33.8 (± 2.7)	47.0 (± 2.8)	19.2 (± 2.2)

[*] moe = margin of error.

colonoscopy or saw their endoscopist prior to the colonoscopy. More sources of information (e.g., talking with doctor, brochure, internet, etc) was associated with greater satisfaction among those undergoing their first colonoscopy or going direct-to-colonoscopy, but was not associated with greater satisfaction among those undergoing a repeat colonoscopy or for those who had seen their endoscopist prior to the colonoscopy. In addition to predicting satisfaction with the composite score for source of information, we also conducted a logistic regression analysis in which we entered each specific source of information as predictors (data not shown) but did not find that any specific source of information was associated with satisfaction.

Clarity of information received was highly associated with satisfaction of information received. This was true, regardless of which sub-group of patients was analyzed; that is, first or later colonoscopy or whether the patient was going direct to scope or not. Furthermore, the one type of information received that was consistently associated with satisfaction with information was an explanation of the type of information that the patient should expect to receive after the colonoscopy. Patients who were told what information to expect after the colonoscopy were from 2 to 14 times more likely (depending on the subgroup: first or repeat colonoscopy, direct to colonoscopy, visit with endoscopy physician first), to be satisfied with the information they received than patients who were not told what to expect.

Both more sources of information received and satisfaction with information received were consistently associated with the composite 0-15 score for questions related to being well-informed (Table 5). Other than among those who saw their endoscopist prior to the colonoscopy, clarity of information was associated with having received more types information about different aspects of the colonoscopy. Similarly, other than among those

Table 4

Multivariable logistic regression analysis for satisfaction with information received[*]—odds ratio (95% confidence interval).

	By colonoscopy number		By direct-to-colonoscopy	
	First (N = 245)	Second or later (N = 322)	Direct (N = 385)	Not direct[†] (N = 182)
Female (reference = male)	1.5 (0.7–3.0)	1.1 (0.6–2.0)	**2.0 (1.1–3.7)**	0.4 (0.2–0.9)
Age (reference = 55–91)				
16–34	0.4 (0.1–1.1)	0.4 (0.1–1.1)	**0.4 (0.2–0.9)**	0.3 (0.1–2.1)
35–54	1.2 (0.5–2.6)	0.6 (0.3–1.2)	1.0 (0.5–2.0)	0.6 (0.2–1.5)
Education > grade 12	1.2 (0.5–2.6)	1.4 (0.7–2.8)	1.0 (0.5–1.9)	1.8 (0.7–4.8)
Clear or very clear info received	**8.0 (3.7–15.9)**	**6.7 (3.3–13.7)**	**5.8 (3.1–10.9)**	**22.8 (7.0–54.2)**
Regular use of 1 or more electronic device[‡]	0.4 (0.1–4.0)	0.3 (0.1–1.5)	0.4 (0.1–2.2)	0.4 (0.1–2.6)
Source of information received[§]	**1.2 (1.0–1.3)**	1.1 (0.9–1.2)	**1.1 (1.0–1.2)**	1.0 (0.8–1.1)
Type of information received[‖]				
Reason colonoscopy was commended	2.8 (0.7–11.0)	0.4 (0.1–1.7)	2.0 (0.5–8.4)	0.5 (0.1–2.2)
Bowel preparation	1.5 (0.4–5.8)	2.6 (0.6–10.8)	1.1 (0.3–4.3)	**5.9 (1.2–28.3)**
Benefits of colonoscopy	0.7 (0.2–2.1)	1.8 (0.6–5.9)	1.2 (0.4–3.6)	1.3 (0.3–5.5)
Risks of colonoscopy	1.2 (0.5–2.9)	1.6 (0.6–3.9)	1.9 (0.8–4.1)	0.8 (0.3–2.8)
Type of information patient could expect to receive after colonoscopy	**4.0 (1.8–8.6)**	**3.3 (1.6–6.7)**	**2.1 (1.1–4.0)**	**14.4 (4.6–34.5)**
First colonoscopy	N/A	N/A	0.8 (0.4–1.4)	1.4 (0.6–3.7)
Direct-to-colonoscopy	1.1 (0.5–2.3)	1.4 (0.7–2.8)	N/A	N/A

Bolded data indicate odds ratios that do not cross the 1.0 level.

N/A = not applicable.

[*] Response options were: very satisfied, satisfied, neither satisfied nor unsatisfied, unsatisfied, and very unsatisfied. We are predicting the grouped response of satisfied or very satisfied.

[†] Saw endoscopist prior to colonoscopy.

[‡] Devices asked about were: desktop/laptop computer, tablet computer (e.g., iPad), smart phone.

[§] Modelling how well-informed patient is on 0-27 scale. Each of the 9 sources from which a patient could get information has a score of 0-none received, 1-little received, 2-moderate received, 3-right amount received. An odds ratio of 1.2 represents the increased odds of satisfaction per unit increase on the scale. For example, an individual with a score of 15 on the scale would be 2.5 times more likely to be satisfied with the information they received than an individual with a score of 10. (15-10 = a difference of 5. The odds ratio is then $1.2^5 = 2.5$.)

[‖] Modelling any information received, e.g., little, moderate, or right amount. Reference is "none."

Table 5

Amount of information received[*] — multivariable linear regression coefficient (95% confidence interval).

	By colonoscopy number		By direct-to-colonoscopy or not	
	First (N = 242)	Second or later (N = 321)	Direct (N = 383)	Not direct[†] (N = 180)
Female (reference = male)	−0.0 (−0.9, 0.8)	0.0 (−0.7, 0.8)	−0.3 (−1.0, 0.4)	0.6 (−0.4, 1.7)
Age (reference = 55–91)				
16–34	−0.8 (−2.1, 0.5)	−0.4 (−2.0, 1.1)	−0.2 (−1.3, 0.9)	−1.6 (−3.9, 0.6)
35–54	−0.8 (−1.8, 0.2)	−0.2 (−1.0, 0.6)	−0.3 (−1.0, 0.5)	−0.7 (−1.9, 0.4)
Education > Grade 12	**1.1 (0.2, 2.1)**	0.4 (−0.4, 1.2)	0.3 (−0.4, 1.1)	**1.5 (0.3, 2.7)**
Clear or very clear info received	**1.6 (0.5, 2.7)**	**1.2 (0.1, 2.3)**	**1.8 (0.9, 2.8)**	0.5 (−0.9, 1.9)
Regular use of 1 or more electronic device[‡]	**3.2 (0.5, 6.0)**	**1.5 (0.1, 2.9)**	1.1 (−0.4, 2.7)	**2.8 (0.8, 4.8)**
Source of information received[§]	**0.2 (0.1, 0.3)**	**0.2 (0.1, 0.3)**	**0.2 (0.1, 0.3)**	**0.3 (0.1, 0.4)**
Satisfaction with info received	**2.9 (1.9, 3.9)**	**3.0 (1.9, 4.0)**	**2.6 (1.7, 3.5)**	**3.7 (2.4, 4.9)**
First colonoscopy	N/A	N/A	**−1.7 (−2.4, −1.0)**	**−1.2 (−2.3, −0.1)**
Direct-to-colonoscopy	0.2 (−0.7, 1.2)	**0.9 (0.1, 1.8)**	N/A	N/A
Constant	0.8 (−2.1, 3.7)	4.1 (2.3, 5.9)	5.5 (3.7, 7.3)	1.6 (−0.8, 4.0)

Bolded data indicate statistical significance ($P < .05$).

N/A = not applicable.

[*] Predicting score on the 0-15 scale for amount of information received of the following 5 types: reason colonoscopy recommended, bowel preparation, benefits of colonoscopy, risks of colonoscopy, information patient should expect to receive after colonoscopy.

[†] Saw endoscopist prior to colonoscopy.

[‡] Devices asked about were: desktop/laptop computer, tablet computer (e.g., iPad), smart phone.

[§] Modelling how well-informed the patient is on 0-27 scale. Each of the 9 sources from which a patient could get information has a score of 0-3, for a composite total score range of 0-27. 0-none received, 1-little received, 2-moderate received, 3-right amount received. Example of interpretation: among those undergoing their first colonoscopy, each one unit increase on our sources of information scale is associated with an increase of 0.2 on our amount of information scale.

going direct-to-colonoscopy, patients who regularly used one or more electronic device felt that they had received more information about different aspects of the colonoscopy.

3.3. Willingness to go direct-to-colonoscopy for future colonoscopy

The predictors of willingness to go direct-to-colonoscopy for a future colonoscopy (Table 6) were the composite score for amount of information received before their current colonoscopy (OR 1.05 per unit increase on amount of information received scale; 95% C.I. 1.01–1.10), whether the individual had come direct-to-colonoscopy for their current colonoscopy (OR 5.0; 95% C.I. 3.3–10.0), and being satisfied with the information received for the current colonoscopy (OR 1.5; 95% C.I. 1.0–2.4).

4. Discussion

Our study results suggest that there is room for improvement in all aspects of information provided to patients prior to colonoscopy. The information provided needs to be enhanced particularly among those patients going direct-to-colonoscopy and those going for their first colonoscopy.

4.1. Amount of information received

Patients indicated overwhelmingly that they would like to receive some type of information from their family physician, endoscopist, or the colonoscopy service. Not surprisingly, 90% of patients want to receive information from their family physicians as they are their first point of contact. Yet, only a small minority (25%) report receiving adequate information and a large proportion (40%) report receiving no information from their family physicians. Similarly, 33% report no information directly from their endoscopist (17% reported no information directly nor in a brochure). Thus there is a large room for improvement in collaboration between family physicians and endoscopists to ensure that patients have high quality information before their colonoscopy.

In addition to the amount of information received by source (e.g., endoscopist, family physician), our study also explored the amount of information received by type. Historically, information may not be presented in ways that are easily understandable by patients. There has been research in recent years on presenting information in ways that are more easily understood by patients.[18] In terms of receiving the right amount of information, it appears that patients feel that information focused on why the colonoscopy is recommended and instructions for BP are more effectively communicated. Our study suggests, there is considerably more room for improvement for discussing the risks of colonoscopy and what information patients can expect to receive after their procedure. This is an area of concern as patients should feel confident that they understand the risks of a colonoscopy prior to the procedure day but almost one in five received no information at all regarding risks. Also, patients should understand what will happen after their procedure. Patients who received information about what to expect after their colonoscopy in terms of both results and post-procedure symptoms were significantly more likely to be satisfied with the total amount of information received. Lack of awareness about their post procedure information could potentially lead to anxiety regarding results and could increase the chance for errors to occur. For example, a patient who is unaware that they are to follow-up the results of their test, e.g., polypectomy, may miss a follow-up appointment to discuss the results of the colonoscopy and/or future colonoscopy. Immediately after colonoscopy, patients often have amnesia due to the sedation drugs and may not recall information provided to them or a companion orally immediately after the colonoscopy. This suggests that it is important to provide clear written reports to patients after the colonoscopy.

4.2. Sources and satisfaction with information received

In terms of what source of resource specifically is more helpful (e.g., from a brochure, from talking to a doctor, etc), our data indicate that the source was not significant in predicting satisfaction but that the

Table 6

Multivariable logistic regression analysis for predictors of willingness to go direct-to-colonoscopy for future colonoscopy.

	Total number responding to this question	N (%) willing to go direct to colonoscopy for future colonoscopy	Odds ratio (95% confidence interval)
Gender			
Male	625	419 (67)	1.3 (0.9–1.7)
Female	680	430 (63)	Reference
Age			
16–34	93	55 (59)	1.1 (0.6–1.9)
35–54	462	310 (67)	1.3 (0.9–1.9)
55–91	742	479 (65)	Reference
Education			
> Grade 12	773	511 (66)	1.1 (0.8–1.6)
≤ Grade 12	441	275 (62)	Reference
Clarity of information received			
Clear or very clear information received	1088	735 (68)	1.4 (0.9–2.2)
Somewhat clear/unclear Confusing/very confusing	246	131 (53)	Reference
Regular use of electronic devices			
Regular use of 1 or more electronic device	942	627 (67)	1.6 (0.8–3.0)
No regular use of electronic devices	94	52 (55)	Reference
Satisfaction with information received			
Very satisfied/satisfied	1079	735 (68)	1.5 (1.0–2.4)
Neutral/dissatisfied/very dissatisfied	247	131 (53)	Reference
Amount of information received by type (0-15 scale)*	–	–	1.05 (1.01–1.10)
Colonoscopy number			
Second or later (i.e., repeat colonoscopy)	792	522 (66)	1.1 (0.8–1.4)
First (i.e., no previous colonoscopy)	553	356 (64)	Reference
Saw endoscopist prior to current colonoscopy			
No	519	416 (80)	5.0 (3.3–10.0)
Yes	765	422 (55)	Reference

Bolded data indicate odds ratios that do not cross the 1.0 level.

* The odds ratio is 1.05 for each additional point on the information received scale. For example, a person with a score that is 3 points higher than another person (e.g., a score of 12 versus a score of 9) would be 1.16 times more likely to be willing to go direct to colonoscopy. (1.05 times more likely for each point so: 1.05 * 1.05 * 1.05=1.16). This is an ordinal variable and hence n (%) not applicable.

more sources of information received, the higher the satisfaction; satisfaction rose with each additional source of information, up to the maximum number of sources that we analyzed (9 sources—listed in Table 2). Previous research on the information needs of patients suggests that there are wide variations in information preferences among patients[19] and that it is best to provide information to patients in a variety of different formats (e.g., brochure, discussion with a provider, video examples) to deal with the information preferences of different patients.

When considering the sources of information that would be helpful, patients particularly mentioned traditional sources of information such as discussion with a health care provider and brochures from the provider. Fewer people endorsed video content or a mobile application as likely to be helpful. However, previous data have shown that watching a video prior to endoscopy can improve BP as well as patient comfort around having the procedure.[20–23] While the format of the content is important, the content in the material is also important. Not all studies evaluating video content, for example, show improvement in tolerability or anxiety around the colonoscopy.[24] As for mobile applications, prior data on colonoscopy preparation have shown improved outcomes including better quality of BP, overall tolerability, and increased cecal intubation rates.[25,26] In our study, although fewer patients felt that these sources of information would be helpful, a significant minority of patients would still find these sources beneficial (48% would find a video on the internet helpful, and 34% would find a mobile app helpful) and so these sources should not be eliminated. It would be helpful to have research in the future concerning the content and the style of content that fits well with patient needs.

4.3. Information received, satisfaction with information, and willingness to go direct-to-colonoscopy

Since there is increasing use of direct-to-colonoscopy procedures to reduce wait times,[27,28] it is important to determine what type of information might make patients more comfortable with such a process. In our study, the predictors of willingness to go direct-to-colonoscopy for a future colonoscopy were the amount of different types of information received, being satisfied with the information received for the current colonoscopy and coming direct-to-colonoscopy for their current colonoscopy. The first two are not surprising as the more information one has prior to going for their procedure and higher satisfaction with the information received, the more comfortable they are. Those coming direct-to-colonoscopy were much more willing to do so again. This could be reflective of a self-selection effect in that those who were not comfortable with the concept of direct-to-colonoscopy requested a meeting with their endoscopy physician prior to the current colonoscopy. Nevertheless, it is reassuring that those who come direct-to-colonoscopy continue to be highly receptive to do so again, as this likely reflects a good experience for these patients.

4.4. Information received, satisfaction with information, and repeat versus first colonoscopy

As can be expected, those coming for a repeat colonoscopy were more informed and more satisfied with the information provided to them than those going for their first colonoscopy. This likely reflects the fact that people who have already had a colonoscopy had received this information previously and it was reinforced at the latest colonoscopy. Another hypothesis is that having done the procedure at least once already, repeat patients are more confident in the information received and thus found it clearer and were more satisfied. That being said, a substantial number of repeat colonoscopy patients felt inadequately informed. We need to do better with this group as well and it is important we should not assume that because they are coming for a repeat colonoscopy that they are well informed.

Not surprisingly, those patients seeing their endoscopist prior to colonoscopy felt that they had received more information than those coming direct-to-colonoscopy. What was surprising was that despite this, there was no difference in satisfaction or clarity of the information provided when compared to the direct-to-colonoscopy group (Table 1). One reason for this could be that those coming direct-to-colonoscopy were already confident in the information provided and those who wanted more information sought out to visit the endoscopist prior to the colonoscopy-however, visiting the endoscopist prior to colonoscopy is often not an option offered in most systems when the patients are booked direct-to-colonoscopy by their family physicians.

4.5. Information technology and newly developed information tools

It is likely that in the next decades the population of patients undergoing colonoscopy screening and surveillance will be more technologically sophisticated than the current population. This is perhaps where smartphone apps and web-based informational resources will become more useful to the majority of the population. In any case, the ability to provide adequate pre-colonoscopy information should ultimately allow more patients to be comfortable going forward with their colonoscopies as well as allow more patients to go direct-to-colonoscopy. Should it come to fruition that more patients are willing to go direct-to-colonoscopy without seeing their endoscopist first, this will likely help to alleviate some of the constraints of our medical system with regards to wait times for colonoscopy.

Based on the results of this study and other studies that are part of the larger overall project[16,17] as well as literature review, we have developed (with input from patients, health care providers, our advisory committees) patient-friendly written information, downloadable pages, and brief videos to demonstrate optimal BP, information about the procedure, and common findings to address common concerns and answer common questions for patients. These resources are freely available on the web (http://www.mycolonoscopy.ca/) and are in comparative analyses preferred by patients than previous materials (data will be reported in separate manuscript). These resources are now routinely distributed to patients in our healthcare region and we are in the process of communicating with endoscopists across Canada for dissemination across the country.

4.6. Strengths and limitations

The strengths of our study include the large number of respondents assessed from a city-wide practice. We assessed different sources and types of information. Of note, our survey was performed in a system where information brochures were revamped in the preceding couple of years, albeit without public input—our survey results suggest it is important to involve end-users (public) in the development of information tools. Limitations of our study include not assessing the effect of information received by patients on their clinical outcomes (including adherence to instructions or quality of BP). We did not collect all the pre-colonoscopy information being distributed in the time period of the study—each endoscopist decided what information they distributed; our objective was to assess patients' average experience in a city wide usual clinical practice. In absences of prior literature to guide sample size collection for the content of this survey, sample size was empirically decided to collect data for a variety of stratified analyses. We intentionally collected information prior to colonoscopy on what was patients' expectations and knowledge of potential findings, as expected findings are a known source of anxiety among patients.[8] Our study results should prompt others to perform similar surveys and we believe our results should promote the development of a new endoscopy quality measure: adequacy of disseminated information.

5. Conclusion

Our data show that patients undergoing colonoscopy in usual practice want information from multiple sources and multiple types of information and are satisfied with information when they are provided with it. However, there is a need to improve dissemination through family physicians and endoscopists. There is also room for improvement to discuss risks and follow-up for the procedure. Providing information to patients requires a patient-centered approach. Being able to offer a patient multiple sources of information such as a brochure, in-person time with a physician, a video, or an application will ultimately allow the patient to gather the information they need and be better prepared for their procedure.

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