Short communication

Provider-perceived barriers to patient adherence to colorectal cancer screening

Xuan Zhu [a], Emily Weiser [b,*], Debra J. Jacobson [c], Joan M. Griffin [a,d], Paul J. Limburg [e], Lila J. Finney Rutten [f]

[a] *Mayo Clinic Robert D. and Patricia E. Kern Center for the Science of Healthcare Delivery, Rochester, MN, USA*
[b] *Exact Sciences Corporation, Madison, WI, USA*
[c] *Division of Clinical Trials and Biostatistics, Mayo Clinic, Rochester, MN, USA*
[d] *Division of Health Care Delivery Research, Mayo Clinic, Rochester, MN, USA*
[e] *Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, MN, USA*
[f] *Division of Epidemiology, Mayo Clinic, Rochester, MN, USA*

ABSTRACT

Background: Average-risk colorectal cancer (CRC) screening remains underutilized in the US. Provider recommendation is strongly associated with CRC screening completion. To inform interventions aimed at improving screening uptake, we examined providers' perspectives on patient and health system barriers to CRC screening adherence, along with associated system-level interventions to improve uptake.
Methods: We conducted an online survey between November and December 2019 with a sample of primary care clinicians (PCCs) and gastroenterologists (GIs) from a validated panel of US clinicians (814 PCCs, 159 GIs; completion rates: 25.3% for PCCs, 29.6% for GIs). Clinicians rated the extent to which each patient and health system factor interferes with patient adherence with CRC screening recommendations and the availability of practice interventions to improve screening rates.
Results: Provider-reported top barriers to CRC screening included patient discomfort with offered screening method (66%), cost (62–64%), and perceived low importance of screening (62%). Additional barriers included providers prioritizing urgent health concerns over screening (45–48%), not offering a choice of screening options (42–48%), lacking time to educate patients about screening (38–45%), and lacking education about available screening options (37–40%). Most frequently reported system-level interventions to improve CRC screening rates included patient education materials (57–62%) and point of care prompts (56–61%). Other interventions were less frequently reported, although variations existed by clinical specialty regarding barriers and interventions.
Conclusions: Addressing barriers to CRC screening requires system-level interventions, including provider training on shared decision-making, automated scheduling and reminder processes, and policies to increase clinician time for preventive screening consultations.

1. Introduction

Colorectal cancer (CRC) is the second leading cause of cancer-related death in the US among women and men combined (Cronin et al., 2018; Siegel et al., 2020). There is clear evidence that regular screening among asymptomatic, average-risk populations reduces CRC mortality. A randomized controlled trial of annual gFOBT screening has shown 33% reduction in CRC mortality and observational studies of screening colonoscopy suggest an effect of greater than 50% reduction in CRC mortality (Zauber, 2015). Major guideline organizations recommend

CRC screening among average-risk adults between the ages of 45–75 (Wolf et al., 2018; Davidson et al., 2021). Recommended screening options include stool-based tests such as the fecal immunochemical test/guaiac-based fecal occult blood test (FIT/gFOBT) every year and multi-target stool DNA (mt-sDNA) test every one to three years, as well as direct visualization methods such as screening colonoscopy every ten years. (Wolf et al., 2018; Davidson et al., 2021). In the US, except for integrated health care systems, CRC screening among average-risk patients occurs on a largely opportunistic, non-programmatic basis, where patients either self-refer for screening or receive a recommendation for

screening from a healthcare provider during an unrelated healthcare visit (Levin et al., 2011; Schreuders et al., 2015). Despite the availability of multiple effective screening methods, CRC screening continues to be underutilized in the US. Approximately 1 in 3 screening-eligible adults in the US were not up to date with CRC screening, according to 2018 Behavioral Risk Factor Surveillance System data (Joseph et al., 2020).

Previous research has identified an array of patient-, provider-, and system-level factors contributing to underutilization of CRC screening, with provider recommendation consistently reported to play a strong role in CRC screening completion and adherence among average-risk patients (Honein-AbouHaidar et al., 2016; Peterson et al., 2016). While patient-reported barriers to CRC screening have been studied extensively, few recent studies have examined provider perspectives on patient and health system barriers to patient adherence with CRC screening recommendations (Meissner et al., 2012; Klabunde et al., 2005). This information is important as providers may base CRC screening recommendations on their perceptions about patient and health system barriers, which may in turn impact patient adherence to CRC screening. Previous research has shown that primary care providers' perceptions of patient barriers were associated with lower uptake of preventive services (Rutten et al., 2017). Understanding provider perceptions of patient barriers will also inform provider training and education efforts to better address patient concerns during CRC screening consultations. Additionally, there is a dearth of data on the prevalence of system-level interventions in US clinical practices to improve CRC screening. Better understanding of clinicians' perspectives on multi-level barriers to patient adherence with CRC screening recommendations and system-level interventions to improve CRC screening rates in clinical practices across the US is critical to inform future interventions to improve CRC screening completion and adherence rates. To address these gaps, this study aims to 1) describe provider-perceived patient- and health system barriers to patient adherence with CRC screening recommendations and 2) characterize the availability of system-level interventions to improve CRC screening rates.

2. Methods

2.1. Study population

Data were collected via an online survey developed by the authors and implemented between November and December 2019 by the National Opinion Research Center (NORC) at the University of Chicago (http://www.norc.org) using a third-party vendor, Dynata, who maintains a validated panel[1] of over 200,000 US healthcare providers. We aimed to obtain completed surveys from 750 practicing primary care clinicians (PCCs) and 150 practicing gastroenterologists (GIs) (900 providers in total). A total of 3,837 initial invitations to complete the survey were sent out and up to two reminders were sent to non-responders within a 21-day period. Providers received remunerations for participation based on fair market value hourly rate. The study was deemed exempt by NORC Institutional Review Board.

2.2. Measures

Survey questions were adapted, in part, from the National Cancer Institute's Physician Survey on Colorectal Cancer Screening (Meissner

et al., 2012; Klabunde et al., 2005). Providers reported the extent to which a list of patient and health system factors (e.g., patient fear of finding cancer, provider's lack of education about screening options) discourage patient adherence with CRC screening recommendations (5-point scale: 1 = not at all a barrier, 3 = moderate barrier, 5 = very significant barrier). Providers also reported whether five types of system-level interventions to improve CRC screening rates were offered in their practice, including patient education materials, CRC screening decision aids, point of care prompts or EMR reminders, automatic scheduling of health maintenance visits, and postcards, letters, and/or calls to remind patients that they are due for screening. All items are listed in Table 2. Pretest interviews were conducted with 11 clinicians from the panel to validate the survey length, survey programming, and data collection methodology prior to administering the survey.

2.3. Analysis

Exclusion criteria include reporting specializations other than primary care or gastroenterology and not recommending CRC screening to average-risk patients. Frequencies for provider and clinical practice characteristics were summarized separately for PCCs and GIs. Responses to the patient and health system barrier questions were recoded into three categories with 1 or 2 = not a barrier, 3 = moderate barrier, and 4 or 5 = significant barrier. We summarized frequency of responses and examined differences by clinical specialty using ordered logistic regression for patient and health system barriers and chi-square test for availability of interventions. We adjusted for multiple testing using the Benjamini-Hochberg procedure. All analyses were conducted in R (version 3.6.2).

3. Results

Out of 3,299 PCCs and 538 GIs who were invited to participate, a total of 993 providers completed the survey, with 428 indicating board certification in internal medicine, 387 in family medicine, and 159 in gastroenterology. Providers who indicated other specializations (e.g., pediatrics, cardiology; N = 19) and those who indicated not recommending CRC screening to average-risk patients (N = 5) were excluded, resulting in a sample of 814 PCCs and 159 GIs (completion rates: 24.7% for PCCs and 29.6% for GIs). Table 1 summarizes provider and practice characteristics by clinical specialty.

Table 2 summarizes provider perspectives on patient and health system barriers to patient adherence to CRC screening recommendations and the availability of system-level interventions to improve CRC screening rates in participants' practices. Here, we report findings from the "Significant barrier" response category. The most frequently reported patient-level barriers for PCCs and GIs, respectively, included patient discomfort with CRC screening methods offered (66% and 66%), concern regarding cost/insurance coverage (64% and 62%), patient does not believe in screening (63% and 62%), patient does not perceive CRC is a significant threat (54% and 58%), patient prioritizes other health issues over preventive screening (51% and 53%) and patient lack of awareness of the need to be screened (44% versus 54%).

The most frequently reported health system barriers for PCCs and GIs included provider prioritization of patients' urgent health concerns over preventive screening (48% and 45%), provider failure to offer choice of CRC screening options (42% and 48%), insufficient time for providers to educate patients about the need to get screened (45% and 38%), and providers not proactively recommending screening to patients (37% and 46%). Additionally, over a 1/3 of providers reported lack of education about the various CRC screening options that exist (37% and 40%) and having insufficient time to recommend screening as significant barriers (42% and 33%). GIs more frequently than PCCs reported providers not routinely/consistently recommending screening to patients (50% versus 39%, p = .047) as a significant barrier. In general, both PCCs and GIs more frequently reported patient-level factors as more significant

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Table 1
Provider and practice characteristics of participants by specialty.

	Primary Care Clinicians (Cronin et al., 2018) (N = 814)	Gastroenterologists (N = 159)
	N (%)	N (%)
Age in years		
27–39	107 (13.1)	41 (25.8)
40–49	254 (31.2)	42 (26.4)
50–59	236 (29)	45 (28.3)
60 and older	217 (26.7)	31 (19.5)
Sex[b]		
Male	586 (72.2)	131 (82.9)
Female	226 (27.8)	27 (17.1)
Race/ethnicity		
White, non-Hispanic (NH)	534 (65.6)	88 (55.4)
Black, NH	19 (2.3)	4 (2.5)
Hispanic	26 (3.2)	10 (6.3)
Asian/Pacific Islander, NH	193 (23.7)	42 (26.4)
Other/Multiple Race, NH	42 (5.2)	15 (9.4)
Annual household income		
Less than $74,999	43 (5.3)	4 (2.5)
$75,000 to $124,999	104 (12.8)	9 (5.7)
$125,000 to $174,999	115 (14.1)	12 (7.6)
$175,000 to $199,999	86 (10.6)	16 (10.1)
$200,000 or more	466 (57.2)	118 (74.2)
Board certification		
Internal medicine	387 (47.5)	–
Family medicine	427 (52.5)	–
Gastroenterology	0 (0)	159 (100)
Number of years practicing medicine post-residency		
0–9	116 (14.3)	42 (26.4%)
10–19	277 (34)	53 (33.3%)
20–29	271 (33.3)	45 (28.3%)
30+	150 (18.4)	19 (12.0%)
Average number of patients seen on typical day		
0–15	163 (20)	41 (25.8%)
16–20	291 (35.7)	49 (30.8%)
21–25	188 (23.1)	30 (18.9%)
greater than25	172 (21.1)	39 (24.5%)
Number of clinicians in practice		
1–15	591 (72.6)	103 (64.8)
16+	223 (27.4)	56 (35.2)
Characterization of clinical practice location		
Urban	262 (32.2)	81 (50.9)
Suburban	447 (54.9)	69 (43.4)
Rural	105 (12.9)	9 (5.7)

[a]Includes Internal Medicine and Family Medicine.
[b]missing = 2 for primary care, missing = 1 for gastroenterology.

barriers to CRC screening than health system barriers (40%-66% versus 25%-50%).

The most frequently reported interventions in both PCCs' and GIs' practices included patient education materials (57% and 62%), point of care prompts or EMR reminders (56% and 61%), and CRC screening decision aids (39% and 48%). About a 1/3 of providers reported their practices have automatic scheduling of health maintenance visits (30% and 39%). PCCs less frequently than GIs reported that their practices use postcards, letters, and/or calls to remind patients that they are due for screening (36% versus 64%, p < .001) and more frequently than GIs reported that their practices have no system-level interventions for improving CRC screening rates (12% versus 4%, p = .007).

4. Discussion

Our national survey of PCCs and GIs showed that provider-perceived key patient-level barriers to CRC screening include patient discomfort with the screening method offered, cost, and perceived low importance of screening. These findings are concordant with patient-reported

barriers in previous research (Honein-AbouHaidar et al., 2016). The persistent overreliance on colonoscopy as the preferred CRC screening method in US clinical practices is likely a major reason why patient discomfort with screening method offered was the most frequently reported patient-level barrier by providers (Klabunde et al., 2009). This barrier can be remedied through provider training and education to improve providers' knowledge of and attitude toward alternative screening methods, as well as their skills in engaging patients in shared decision-making to align screening recommendations with patient preferences, needs, and values (Barry and Edgman-Levitan, 2012). Patients' lack of understanding of the importance of CRC screening could be improved through population-level educational interventions that utilize mass media to maximize reach (Wakefield et al., 2010) and community-based participatory approaches to culturally tailor educational interventions to specific hard-to-reach populations (Naylor et al., 2012).

Regarding health system barriers, competing healthcare demands, failure to routinely recommend screening, and failure to offer multiple CRC screening options were reported by nearly half of the providers surveyed, followed by lack of education about CRC screening options and lack of time to discuss screening. The variations between PCCs and GIs in reported availability of system-level interventions may be due to differences in clinical practice priorities and availability of resources supporting systematic CRC screening interventions. Addressing system-level barriers will require organizational changes and system-level interventions tailored to local contexts. Clinical practices interested in increasing CRC screening rates may benefit from implementing system-level policies allocating physicians more time for consultations related to preventive healthcare services, designating cancer screening service responsibilities to nonphysician staff, or establishing dedicated programs for preventive healthcare services. Additionally, clinical practices may benefit from implementing automated systems for scheduling health maintenance visits and patient reminder and recall interventions (Dougherty et al., 2018). Provider knowledge deficiencies regarding CRC screening methods and guidelines may be improved through education and academic detailing.

Limitations of this study include reliance on self-report for availability of system-level CRC screening interventions in clinical practices, which may suffer from recall bias. Second, we did not measure the sociodemographic characteristics of the providers' patient populations and had limited information on the characteristics of the clinical practices thus unable to assess how provider perceptions of patient and system-level barriers to CRC screening vary by the patient population they serve or the type of healthcare organization they practice in. Third, providers in our survey sample were predominately non-Hispanic white. Future research with a more diverse sample of providers are needed to examine how provider perceptions of patient and system-level barriers vary by provider sociodemographic characteristics. Finally, although consistent with declining and generally lower response rates of clinician surveys, the study's completion rate may introduce selection bias (Asch et al., 2000; McLeod et al., 2013). Non-respondents may have patient populations that are different in size and/or sociodemographic characteristics from the respondents, and perceived patient and system level barriers may therefore differ.

5. Conclusions

Our national survey of providers identified provider-perceived patient and health system barriers to patient adherence to CRC screening and availability of system-level interventions. Our findings reinforce the need for clinician training and patient education to improve knowledge of available CRC screening methods and support a shared decision-making approach toward CRC screening recommendations. Additionally, there is a need for clinical practices to automate scheduling and reminder processes, to develop system-level policies which allow clinicians more time for preventive healthcare services or designate cancer

Table 2

Provider perceived barriers to patient CRC screening adherence and availability of system-level interventions to improve CRC screening rates.

Perceived barriers to patient CRC screening adherence by specialty							
In your opinion, how much do each of the following factors discourage patient adherence with CRC screening recommendations? [a]	Primary Care Clinicians			Gastroenterologists			
	Not a barrier	Moderate barrier	Significant barrier	Not a barrier	Moderate barrier	Significant barrier	
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	Adjusted p-value [b]
Patient-level factors							
Patient fear of finding cancer	166 (20.5)	310 (38.3)	334 (41.2)	46 (29.3)	49 (31.2)	62 (39.5)	0.614
Patient does not believe in screening	86 (10.6)	217 (26.9)	505 (62.5)	23 (14.6)	37 (23.4)	98 (62.0)	0.939
Patient unaware of need to be screened	205 (25.3)	249 (30.7)	357 (44.0)	34 (21.5)	39 (24.7)	85 (53.8)	0.336
Patient does not perceive CRC is a significant threat	88 (10.8)	282 (34.7)	442 (54.4)	30 (19.0)	37 (23.4)	91 (57.6)	0.939
Patient prioritizes other health issues over preventive screening	84 (10.4)	309 (38.3)	414 (51.3)	23 (14.6)	51 (32.3)	84 (53.2)	0.939
Patient uncomfortable with CRC screening methods offered	54 (6.7)	221 (27.3)	536 (66.1)	14 (8.9)	40 (25.5)	103 (65.6)	0.939
Patient unaware that multiple CRC screening methods exist	170 (21.0)	263 (32.5)	377 (46.5)	41 (25.9)	48 (30.4)	69 (43.7)	0.763
Patient concern regarding cost/insurance coverage	85 (10.5)	205 (25.2)	522 (64.3)	21 (13.4)	38 (24.2)	98 (62.4)	0.939
Health system-level factors							
Practices have challenges identifying patients who are due for screening	329 (40.7)	227 (28.1)	252 (31.2)	58 (36.5)	45 (28.3)	56 (35.2)	0.459
Providers do not proactively recommend screening to patients	259 (32.2)	247 (30.7)	299 (37.1)	41 (25.9)	45 (28.5)	72 (45.6)	0.113
Providers do not routinely/consistently recommend screening to patients	249 (30.9)	245 (30.4)	311 (38.6)	34 (21.4)	46 (28.9)	79 (49.7)	0.047
Providers do not offer a choice of CRC screening options to patients	202 (25.1)	262 (32.5)	341 (42.4)	37 (23.3)	45 (28.3)	77 (48.4)	0.459
Providers lack education about the various CRC screening options that exist	269 (33.5)	237 (29.5)	298 (37.1)	47 (29.6)	49 (30.8)	63 (39.6)	0.523
There is an insufficient number of providers who can perform CRC screening procedures	334 (41.5)	206 (25.6)	264 (32.8)	69 (43.4)	39 (24.5)	51 (32.1)	0.718
There is insufficient time for providers to recommend screening	268 (33.2)	203 (25.1)	337 (41.7)	64 (40.3)	42 (26.4)	53 (33.3)	0.113
There is insufficient time for providers to educate patients about the need to get screened	216 (26.8)	232 (28.7)	359 (44.5)	44 (27.7)	54 (34.0)	61 (38.4)	0.459
Practice restrictions prevent providers from recommending screening options that patients will complete	383 (48.0)	188 (23.6)	227 (28.4)	69 (43.7)	45 (28.5)	44 (27.8)	0.627
Providers do not believe current CRC screening methods are effective at detecting cancer	439 (54.7)	167 (20.8)	197 (24.5)	79 (49.7)	22 (13.8)	58 (36.5)	0.113
Providers prioritize patients' urgent health concerns over preventive screening	159 (19.7)	261 (32.4)	386 (47.9)	33 (20.8)	54 (34.0)	72 (45.3)	0.627
Availability of system-level interventions to improve CRC screening rates in clinical practices by specialty							
Several system-level interventions can help improve CRC screening rates. Which of the following strategies are currently used in your clinical practice?	Primary Care Clinicians			Gastroenterologists			
	N (%) Yes			N (%) Yes			Adjusted p-value [c]
Patient education materials	465 (57.1)			99 (62.3)			0.300
CRC screening decision aids	321 (39.4)			77 (48.4)			0.061
Point of care prompts or EMR reminders	457 (56.1)			97 (61.0)			0.300
Automatic scheduling of health maintenance visits	247 (30.3)			62 (39.0)			0.061
Postcards, letters, and/or calls to remind patients that they are due for screening	291 (35.7)			101 (63.5)			<0.001
No system-level interventions used	99 (12.2)			6 (3.8)			0.007

[a] Each statement was measured on a 5-point scale with 1 = not at all a barrier, 3 = moderate barrier, 5 = very significant barrier. Responses were recoded into 3 categories with 1 or 2 = not a barrier, 3 = moderate barrier, 4 or 5 = significant barrier.

[b] P-values obtained from ordinal logistic regression and adjusted for multiple testing using the Benjamini-Hochberg procedure.

[c] P-values obtained from chi-square tests and adjusted for multiple testing using the Benjamini-Hochberg procedure.

screening responsibilities to nonphysician staff, and to implement evidence-based CRC screening interventions tailored to local contexts.

6. Authors' contributions

XZ was responsible for the conceptualization, formal analysis, writing the original draft, and reviewing and editing the manuscript. EW contributed to the conceptualization, funding acquisition, methodology, project administration, and writing, reviewing, and editing the manuscript. DJJ provided analytical support and contributed to reviewing and editing the manuscript. JMG contributed to reviewing and editing the manuscript. PJL contributed to the conceptualization, funding acquisition, methodology, project administration, supervision, and writing, reviewing, and editing the manuscript. LJFR contributed to the conceptualization, methodology, project administration, supervision, and writing, review, and editing the manuscript.

Declaration of Competing Interest

The authors declare the following financial interests/personal

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