Consistency of Reported Barriers for Colorectal Cancer Screening among Adults Who Have Never Been Screened

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Abstract

Morbidity and mortality from colorectal cancer can be decreased by addressing patient barriers to colorectal cancer screening; especially among adults who have never been screened. Assessing changes in barriers over time may help practitioners better tailor interventions to address patient barriers. We assessed among adults ages 50 -75 who have never been screened for colorectal cancer (CRC) which barriers predict prospective screening. A sample of 560 adults who had never been screened, recruited from Growth for Knowledge's online panel, completed a baseline and a six-month follow-up survey. Both surveys assessed screening barriers after an online intervention that involved conveying tailored comparative risk estimates and message framing. Among those who did not get screened, we examined the consistency between reported barriers at baseline and at six-month follow-up. At baseline, participants identified 27 barriers; some reported no barriers. Among those never screened ($n = 362$), there was a significant increase from baseline to follow-up in five barriers: 'time/too busy', 'no symptoms', 'in good health', 'no motivation', and 'hadn't thought about it'. Reporting 'no barriers' at baseline was a significant predictor of being screened at follow-up (OR = 3.67, 95% CI = 1.44-9.30, $p < .007$). Among people who have never been screened, interventions should focus on addressing the most consistently reported barriers (i.e., 'time/too busy', and on improving knowledge and beliefs about who should be screened and when, as well as attitudes toward screening, to design more efficacious and tailored interventions.

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Introduction

In the United States, colorectal cancer (CRC) is the second leading cause of cancer-related deaths (Honein-AbouHaidar et al., 2016). CRC screening among average risk adults ages 50 - 75 is effective at reducing incidence, morbidity, and mortality of CRC (Green et al., 2017). It is recommended that adults ages 50 - 75 are screened (Centers for Disease Control and Prevention, 2019) and there are multiple effective modalities available for CRC screening (Gupta et al., 2013). Guaiac and immunochemical-based fecal occult blood tests (FOBT/FIT) check stool for blood and can be conducted by individuals at home while sigmoidoscopy and colonoscopy procedures allow providers to visually inspect the colon for abnormalities (Gupta et al., 2013). Despite effective screening modalities, in 2016 only 67% of adults in the target age range of 50 - 75 years were up to date with screening; 25% have never been screened (Centers for Disease Control and Prevention, 2019). Because screening saves lives, understanding what

inhibits screening among those who have never been screened, that is barriers, is essential (Redmond Knight et al., 2015).

Barriers between adults who have ever versus never been screened vary (Jones, Woolf, et al., 2010; Redmond-Knight et al., 2015). Among adults who have ever or never been screened, not having a physician's recommendation (Janz, Wren, Schottenfeld, & Guire, 2003; Klabunde, Schenck, & Davis, 2006), bowel preparation (Jones, Devers, Kuzel, & Woolf, 2010), and being asymptomatic (Jandorf et al., 2010) are often the most significant barriers for any type of screening modality. For those who have never been screened, barriers more frequently reported are not knowing the importance of the test (Klabunde et al., 2006), lack of trust of doctors (Lasser, Ayanian, Fletcher, & DelVecchio Good, 2008), fear, anxiety, and generally negative feelings about the procedure (Dillard, Fagerlin, Dal Cin, Zikmund-Fisher, & Ubel, 2010; Janz et al., 2007).

Beyond variations in reported barriers between adults who have ever and never been screened, most research is cross-sectional; this limits our ability to identify which barriers affect future screening (Murphy et al., 2014). Assessing barriers at multiple time points can capture changes in barriers that may naturally occur over time without intervention (Bastani, Maxwell, & Bradford, 1996), uncover potential changes in barriers that can affect staying up to date with screening (Murphy et al., 2014), and highlight whether or not interventions affect the types of barriers that people find most important (Dillard et al., 2010). Critically, after looking at barriers to cancer screening, authors of one study found that barriers which predicted future screening were different from those that predicted having been screened in the past. Therefore in this case, interventions designed using only cross-sectional barrier data would have targeted the wrong barriers (Bastani et al., 1996). Thus, it is important to identify among adults who have not been screened which barriers remain stable and change over time as potential targets of intervention, especially if further attempts are made to encourage screening. To this end, as part of a six-month screening intervention study among men and women ages 50 - 75 who have never been screened, we explore: 1) which baseline barriers predict screening; and 2) which barriers change from the start to the end of the trial.

Methods

Full study details can be found in Lipkus, Johnson, Amarasekara, Pan, and Updegraff (2018). In brief, 560 participants were recruited from the panel of the online survey organization, Growth for Knowledge (GfK). GfK sampling covers 97% of the U.S. adult population based on address. A random sample of panelists aged 50 - 75 were invited to participate in an online tailored intervention that included a baseline and a six-month post-baseline follow-up. Those invited completed an eligibility screener and were consented if they had no history of any type of CRC screening, reported never having CRC, and were interested in participation. The intervention consisted of participants first being informed online of their comparative CRC risk (e.g., average, above average) relative to others their age and sex. This was followed by embedding within each level of risk educational information, including different screening modalities, that provided the pros of getting screened (gain-frame messages) or the cons of not getting screening (loss-frame messages).

After review of the educational materials, participants answered questions that included barriers. Participants were asked as an open-ended question, "please tell us what, if anything, may keep you from getting screened for CRC in the next six months?" At follow-up, participants

who did not get screened were asked: "please tell us what has kept you from getting screened for CRC within the last six months?" A list of barriers was generated from prior barriers mentioned for CRC screening (Katz, Young, Zimmermann, Tatum, & Paskett, 2018; Murphy et al., 2014) and participants' answers. They were coded by two independent researchers; discrepancies were resolved by a third researcher. CRC screening was assessed by self-report at follow-up. Participants received $15 as well as an incentive through GfK's incentive structure. The Duke University Medical Center IRB approved this study.

Data Analysis

Participant characteristics for the entire sample were calculated using frequencies for categorical variables and means for continuous variables. Chi-square tests were used to assess any significant demographic differences between participants who did and did not follow up and between participants who had been screened and had not been screened at follow-up. Each barrier was coded as either reported or not reported for each participant. Fisher's exact test was done to assess any relationships between age, education, or ethnicity and barriers reported. Frequencies were used to calculate, rank, and determine reporting of barriers at baseline and follow-up. The McNemar's exact test for paired samples was used to assess changes in reported barriers from baseline to follow-up. While the purpose of the intervention was not to change barriers, it is possible that receiving risk messages may have influenced perceived barriers. Therefore, logistic regression was done to test the main effects and interactions of risk score and message framing on each baseline and follow-up barrier, and on changes in reported barriers. Regression analysis was done to determine if number of barriers reported predicted screening at follow-up (logistic) and to check for any relationship between number of barriers reported and risk score or message framing (linear). All analyses were conducted using SAS version 9.3 (SAS Institute Inc).

Results

Participant Characteristics

Of the 560 baseline participants, 400 participants completed the follow-up survey; of these, 362 never received screening. Most participants at baseline were white (77%), female (53%), and married (80%), and had some college or higher level of education (54%). The mean age was 60 (SD = 6.24). A significantly higher proportion of people who followed up ($p = 0.032$), and who received screening ($p = 0.037$), had more years of education than those who did not.

Frequency of Barriers at Baseline and Follow-up

Of the 27 identified barriers at baseline (See Table 1), among participants who did not get screened (n = 362), the most frequently reported were (1) 'time/too busy' (7.7%), (2) 'fear of the procedure' (6.9%), and (3) 'cost' (6.3%). At follow-up, the most frequently reported barriers were (1) 'time/too busy' (12.4%), (2) 'cost' (8%), and (3) 'lack of motivation' (7.7%). Risk score and message framing had no effect on type of barrier reported at baseline or follow-up.

Table 1

Number of Participants Reporting Each Barrier at Baseline and Follow-Up among Those Who Have Never Been Screened (n = 362)

Barrier Reported	Baseline *n* (%)	Follow-Up *n* (%)	McNemar's Test Statistic	(*p*-value)
Time/too busy	28 (7.7)	45 (12.4)	7.049	(0.012)*
Fear of procedure/associated risks	25 (6.9)	20 (5.5)	0.807	(0.437)
Too costly/insurance doesn't cover	23 (6.3)	29 (8.0)	1.059	(0.391)
None/no barriers[a]	21 (5.8)	13 (3.6)	2.461	(0.168)
Dislike the preparation	16 (4.4)	11 (3.0)	1.191	(0.383)
No insurance	14 (3.9)	21 (5.8)	2.333	(0.189)
General no need	14 (3.9)	22 (6.1)	2.462	(0.169)
General lack of motivation	12 (3.3)	24 (7.7)	4.800	(0.043)*
Dislike/distrust of doctors/medical personnel	11 (3.0)	12 (3.3)	0.067	(1.000)
Just don't want one	10 (2.8)	15 (4.1)	1.190	(0.383)
General fear	8 (2.2)	6 (1.7)	0.400	(0.754)
Have other health problems/issues that interfere	8 (2.2)	11 (3.0)	0.692	(0.581)
Low risk	7 (1.9)	3 (0.8)	2.000	(0.289)
Knowing someone who had a negative experience	7 (1.9)	5 (1.4)	0.400	(0.754)
No family history	5 (1.4)	10 (2.8)	1.923	(0.267)
Physician did not recommend	5 (1.4)	8 (2.2)	0.818	(0.549)
Perceive self in good health	4 (1.1)	13 (3.6)	5.400	(0.035)*
Other[a]	4 (1.1)	5 (1.4)	0.100	(1.000)
Tests are not effective/do not trust tests	4 (1.1)	6 (1.7)	0.400	(0.754)
Transportation problems/ride home	4 (1.1)	3 (0.8)	0.200	(1.000)
General dislike of medical procedures	4 (1.1)	4 (1.1)	0.000	(1.000)
Embarrassment/disgust	4 (1.1)	1 (0.2)	1.800	(0.380)
Fear of doctors	4 (1.1)	0 (0.0)	-	-
Fear/anxiety about negative results	4 (1.1)	3 (0.8)	0.200	(1.000)
Fate (whatever happens will happen) or God's plan	4 (1.1)	1 (0.2)	1.800	(0.375)
No symptoms	3 (0.8)	16 (4.4)	9.940	(0.002)*
Have not thought about it before	2 (0.5)	11 (3.0)	6.231	(0.023)*
Pain	2 (0.5)	4 (1.1)	0.667	(0.688)
Not aware of relevance/not aware why it's important	0 (0.0)	1 (0.2)	-	-
No response given[a]	159 (43.92)	90 (24.86)		

Note. [a] 'No response given', 'other', and 'no barriers' were not considered barriers and were not included in the group of 27 reported barriers.
*p-value significant at < 0.05 level

We also explored the effect of race/ethnicity, level of education, and age on each barrier reported. No significant relationship was found between any reported barrier and demographic characteristics.

Barriers Predicting Screening at Follow-up

Of the 400 participants reached at follow-up, 38 (9.5%) reported screening. No individual barrier predicted screening. Participants who explicitly stated not having any barrier at baseline ($n = 21$) were more likely to have screened than participants who reported any barrier (OR = 3.67, 95% CI = 1.44-9.30, $p < .007$). Number of barriers at baseline, message framing, and risk score did not predict screening.

Changes in Barriers Reported

Five barriers showed significant increases from baseline to follow-up: (1) 'time/too busy' ($p = 0.012$), (2) 'lack of motivation' ($p = 0.043$), (3) 'had not thought about it before' ($p = 0.023$), (4) 'in good health' ($p = 0.035$), and (5) 'no symptoms' ($p = 0.002$) (see Table 1). Barriers 'fear of the procedure' and 'dislike of preparation' were reported less frequently at follow-up; however, these changes were not significant. There were no significant relationships between risk score and message framing and changes in barriers reported.

Discussion

In this sample of adults who have never been screened, the most frequently reported barriers – 'fear', 'cost', and 'time/too busy' – were similar to those reported in prior studies of adults who have never or ever been screened (Jones, Devers, et al., 2010; Katz et al., 2018; Kimura, Sin, Spigner, Tran, & Tu, 2014). Among adults who have never been screened, 'not knowing the importance of the screening test' (Klabunde et al., 2006) and 'lack of trust in doctors' are more likely to be reported (Lasser et al., 2008). Our findings did not support this. One possible reason is that recruitment from an online panel may indicate additional knowledge and access to health-related information (Baker et al., 2010). Also in this study, 77% of participants were white, and over 50% had some college education – a population more likely to have insurance, and receive physician recommendations for screening (Williams et al., 2016); although we found no significant relationship between ethnicity and education and reporting of any barriers.

Individuals who have never been screened report being more fearful than those who have been screened (Janz et al., 2007). We found different fears were reported less frequently, though not significantly so, at follow-up. This suggests that fear may not be as salient of a barrier as reported initially relative to other barriers. Because fear was not consistently reported as a top barrier at follow-up, this suggests that barriers to screening should be assessed more than once and that barriers which are reported frequently at both time periods are important to prioritize when addressing barriers to screening.

Study findings showed significant increases in reported barriers related to perceiving one's self as being healthy and not needing the test, (i.e., 'no symptoms', 'good health'), and attitudes about screening (e.g., 'no motivation', 'hadn't thought about it'). These may indicate more intense education is needed about the disease process as well as screening visit reminders.

Our analysis showed that receiving a CRC risk score and message framing had no significant effect on reporting of barriers related to perceptions of personal health (or any others) at baseline or follow-up. This finding is consistent with results from the original study which showed higher risk adults resisted accepting their comparative risk status (Lipkus et al., 2018).

Reporting 'no barriers' at baseline was a strong predictor of screening. The importance of having no barriers indicates the need to assist patients to identify multiple potential barriers (Jones, Devers, et al., 2010) along with ways to overcome these barriers such as hearing in narratives how others overcame barriers (Dillard et al., 2010), using patient navigators to identify and work through barriers (Rice et al., 2017), and encountering tailored messages to address patient-specific barriers (Oyalowo, Forde, Lamanna, & Kochman, 2019).

This study had several limitations. First, although the population of adults who have not been screened is disproportionately non-white and of lower socioeconomic position (Jackson, Oman, Patel, & Vega, 2016), this sample was more educated and mostly white. Though our analysis showed no relationship between ethnicity or education and selected barriers, generalizability to the population of adults who have never been screened may be limited. Second, we did not ask about barriers in relation to specific screening modalities. Different tests may have different barriers; however, by not specifying, participants were free to name any and all barriers considered, a potential benefit. Third, this study did not have a control group, which may prevent understanding the extent to which the intervention affected results. Hence, the causal inferences which can be made are limited. Regardless, regression analysis indicated no significant relationships between message framing, risk score, and barriers.

Implications

Strategies are needed to help adults who have never been screened to achieve greater insight into and overcome barriers that are most frequently and consistently reported and those that become more salient over time. These strategies can help providers target those barriers and effectively tailor interventions that encourage screening for the first time and keeping up to date with screenings. Successful interventions based on the Health Belief Model that increase feelings of susceptibility in the absence of symptoms (Gholampour, Jaderipour, Jeihooni, Kashfi, & Harsini, 2018; Moattar, Roozitalab, Gholamzadeh, Firoozi & Zare, 2014) and that increase self-efficacy to address each barrier may be especially helpful in this population.

Discussion Questions

1. Based on our results, screening rates may be increased if patients are assisted in identifying and addressing all barriers – especially in clinic settings. What are the most feasible and effective strategies to accomplish this?
2. Our findings show that 'time/too busy' is the most often reported barrier. What types of solutions, from new health technologies to community-based approaches, might help patients and providers better address this barrier?

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