Published in final edited form as:
Fam Med. 2009 June ; 41(6): 427–433.

Factors Associated with a Physician's Recommendation for Colorectal Cancer Testing in a Diverse Population

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Abstract

Background and Objectives—Colorectal cancer (CRC) screening is widely recommended but underutilized. A doctor's recommendation for CRC screening has been consistently associated with CRC screening, but a better understanding of factors influencing a doctor recommendation for CRC screening is needed. The purpose of this study was to describe patient and physician factors associated with a doctor's recommendation for CRC screening.

Methods—A cross sectional survey was conducted in a primary care clinic population during 2004-2005, to determine the association between self reported doctor recommendation for CRC testing and patient sociodemographic factors, health characteristics, other health behaviors and physician and patient-physician factors including patient-physician gender and racial/ethnic congruence. Bivariate and multivariate logistic regression was conducted.

Results—560 patients aged 50-80 were recruited, mean age 63 years, 47.5% were male, 36% were non-Hispanic whites 34% were African Americans and 30% were Hispanics. Sixty-one percent reported receiving a doctor recommendation for CRC testing. In multivariate testing, a doctor's recommendation for CRC testing was associated with having a female physician, being a male patient, having gastrointestinal disease, and better health status.

Conclusions—Further studies in other settings are needed to confirm these findings and to explore cultural influences on physician recommendation for screening.

Keywords

Colorectal Carcinoma; Cancer Screening; Primary care; Prevention and Control; African Americans; Hispanic Americans

INTRODUCTION

Colorectal (CRC) cancer is the second leading cause of cancer deaths in the USA. Screening for CRC is widely recommended because of compelling evidence that it reduces incidence and mortality from CRC,[1-6] however it remains underutilized even in populations having insurance and access to care.

Studies investigating determinants of CRC screening have found that a doctor's recommendation for screening is an important predictor of screening status,[7-12] especially in

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patients having health insurance who have seen a doctor in the last year.[9] However, relatively little is known about patient or physician factors that are associated with doctor recommendation for screening, especially within diverse populations. Nor is it known whether patient-physician gender or race congruence affects whether a doctor recommendation is given. An enhanced understanding of these factors can guide interventions to improve CRC screening rates.

The purpose of this study was to elucidate factors influencing a doctor's recommendation for CRC screening, so that interventions to increase CRC screening can be appropriately targeted. Since we studied an insured population attending the same health care system, it gave us an opportunity to focus on patient and physician factors that influence whether a recommendation for screening is made. We hypothesized that patient sociodemographic factors, health characteristics, other health behaviors, physician sociodemographic factors and patient-physician gender or race congruence would be associated with a doctor's recommendation for CRC screening.

METHODS

Subjects and setting

The data was obtained from a study designed to evaluate the prevalence of CRC screening in a university-based family medicine clinic in Texas during 2004 and 2005.[13] The clinic was staffed by 25 faculty, two physician assistants and 24 residents. The clinic serves a racial/ethnically diverse population with an annual patient visit volume in excess of 40, 000 visits. Participants were aged 50 years or above; Hispanic and African American patients were over sampled. The sampling was stratified by age, gender and race/ethnicity in order to recruit an equal number of males and females of younger and older ages from each racial/ethnic group. Exclusion criteria were self reported past history of CRC or high risk of CRC (familial polyposis syndromes or ulcerative colitis). Bilingual interviewers approached patients attending the clinic for any reason, checked eligibility and invited them to participate in the study. The study was approved by the institutional IRB and informed written consent was obtained from each subject. The survey was orally administered with the subject following along on a typed copy. Interviews were conducted in a private room around the time of the doctor visit and lasted about 45 minutes. Pilot testing was done on the first 30 surveys to check comprehension of the survey items and to finalize the recruiting procedure.

Measures

The measures used in the study were adapted from national surveys,[14-16] from other studies[17, 18] or based on our qualitative work.[19] The outcome variable of interest was doctor recommendation for CRC screening, this was evaluated with a yes/no response to has a physician or doctor ever recommended that you have a test for colon cancer? The question was preceded by a description of each of the four tests that were recommended for colorectal cancer screening at the time of the study: fecal occult blood testing, colonoscopy, double contrast barium enema and flexible sigmoidoscopy. We then evaluated four sets of variables that could be associated with a doctor's recommendation for CRC screening, based on literature review and on our own hypotheses.

Socio-demographic factors included were patient's self-reported age, race/ethnicity, gender, educational level, income and insurance type.[15] We also hypothesized that a doctor's recommendation would be dependent on the ***health characteristics*** of the patient; we assessed their self reported *overall health status* with a single question assessing how they rated their health in comparison to others of their own age, there were 5 response categories ranging from excellent to poor. We dichotomized responses into poor/fair or good/ very good or excellent.

Previous gastrointestinal (GI) diagnoses were determined and considered to be positive if the patients answered yes to any of the following: polyps in the bowel, irritable bowel syndrome, diverticulosis, or abdominal hernia. Past history of *cancer of any type* and a *family history* of colorectal cancer were elicited these with a yes/no response format.

The next set of variables we evaluated were ***health behavior*** characteristics, we hypothesized that the physicians perception of patient interest in prevention, based on certain patient behaviors, could determine whether a recommendation was made for testing. We evaluated participant's *current smoking status* and we calculated their *BMI* from their weight and height. We also included *frequency of doctor visits* in the last 6 months, whether they ever had an *annual health exam*, or had a *regular primary care doctor*. The last group of variables was *physician and patient-physician factors*. We hypothesized that physician characteristics and the physician-patient congruence for race/ethnicity and gender could be important in determining whether a recommendation for screening was made. Those patients that answered yes to having a regular doctor were therefore asked to list the *gender* and *race/ethnicity of* their regular doctor. Physician-patient gender and race congruence was determined as congruent (if the same) or non congruent (if not the same). Physician rank was determined by checking the patient's named physician with our records.

Analysis

We completed data checks for accuracy; missing data were excluded from analysis. The outcome variable was doctor recommendation for screening with any type of test currently included in the guidelines (fecal occult blood testing, flexible sigmoidoscopy, double contrast barium enema or colonoscopy). The sociodemographic variables were categorized; univariate statistics were utilized to describe overall sample characteristics. Bivariate testing with chi square was performed to determine the association between doctor recommendation for screening and each sociodemographic factor, health characteristic, health behavior, and physician and patient-physician variable, including physician gender, rank, race/ethnicity and patient-physician race and gender congruence, in the subset naming a regular primary care doctor.

In order to examine the effect of patient-physician race and gender congruence when other factors were controlled for, we performed a multivariable logistic regression analysis in the subset of patients reporting a named regular doctor. We included all variables that had a P value of <0.2 in bivariate testing. SPSS version 10.0 was used for all analyses.

RESULTS

In total, 1079 eligible patients were approached for the study, 602 were recruited (response rate 56%); thirty surveys were used for piloting and twelve were incomplete, leaving 560 surveys completed for analysis. We tested for statistical bias and observed no statistical differences between the respondents and non respondents by race/ethnicity, age, or gender. The mean age of the sample was 64 years; 36% were non-Hispanic white, 35% African American and 30.0% Hispanic, and almost all (97%) were insured. The sample fell at the low end of the socioeconomic scale. Overall, 61 % reported receiving a doctor recommendation for CRC screening. (table 1)

The vast majority of the sample reported having a regular primary care physician and having had an annual health exam. 508 patients named a total of 53 physicians or mid level providers. 21 providers were male; there were 12 Asian providers, 7 African American and 7 Hispanic providers, 3 were listed as other, and the remainder were reported as being non-Hispanic white. Nineteen faculty physicians were listed by 373 different subjects, 29 different resident physicians were listed by 131 subjects, and 2 physician assistants were named by two patients;

three providers were not known to us. Most patients reported having a non-Hispanic white physician, followed by an Asian physician. Just over half reported having a female physician. Most patient-physician combinations were non congruent for race/ethnicity but congruent for gender. Of note, African American patients were least likely to see a physician of the same racial/ethnic type. Doctors saw a higher proportion of patients of their own race/ethnicity, although Asian physicians were equally divided amongst the racial/ethnic subgroups (table 2).

In bivariate testing, the following variables were significantly associated with doctor recommendation for screening at $p<0.05$: higher educational level, better health status, having a GI diagnosis, having a non-Hispanic physician, and having a female physician. The following variables were associated with doctor recommendation at a level of $p<0.2$ level and were therefore included in the logistic model as well: male patient gender, no alcohol ingestion, having a regular doctor, having had an annual health exam, and having a congruent physician-patient race/ethnicity combination. Income was excluded from further analysis, because it was correlated with education and because of a high number of missing values. The following variables were not associated with receipt of a doctor recommendation: insurance type, smoking status, BMI, visit frequency, family history and a history of cancer of any type.

When all the qualifying variables were put into the multivariable logistic regression analysis (table 3), we observed the following to be associated with receiving a doctor recommendation for CRC testing: having a female physician (OR 1.82,[CI: 1.20, 2.75]), being a male patient (OR 1.67 [CI: 1.12, 2.49]), having better health status (OR 1.62, [CI: 1.08, 2.49]), and having a previous GI diagnosis (OR 1.54, [CI: 1.06, 2.36]); having a Hispanic physician was associated with lower reported rates of receiving a doctor's recommendation for screening (OR 0.47, [CI: 0.16, 0.94]).

DISCUSSION

CRC screening rates remain suboptimal and have not significantly improved over time, remaining at around 50%.[20] In this study we found that almost two fifths of eligible patients did not report ever receiving a doctor's recommendation for CRC testing. Yet, receipt of a doctor's recommendation for screening remains one of the strongest predictors of CRC screening, [7-12] it is a necessary step in the process of getting screened, and is reported to be a powerful motivator by patients.[21] Clearly more emphasis is needed to encourage physicians to strongly recommend screening. We also investigated factors associated with receipt of a recommendation and found that the strongest association with doctor recommendation for CRC testing was having a female physician, being a male patient, having better overall health status and previous gastrointestinal disease; having a Hispanic physician was associated with lower reported rates of receiving a recommendation. Thus, we have identified some possible targets for further research and for interventions to improve screening rates. However, it is also evident from other work that a broader strategy will be needed because rates of completion remain suboptimal even when a recommendation is made.[22]

We observed that two physician characteristics were associated with screening recommendations. Female physicians were far more likely to recommend screening compared to their male counterparts, and this supports the findings of a study amongst internal medicine residents[23] that included only female patients. Our other finding was that patients having a Hispanic physician reported lower rates of receiving a recommendation for screening. However, the numbers are small, only 7 such physicians were reported by 37 subjects. Six of these physicians were residents, but we did not observe an effect of rank in our bivariate analyses, so this an unlikely explanation. According to the literature, when physicians are asked about barriers to doctor recommendation, they cite inconsistent recommendations, uncertainty about cost effectiveness,[24] concerns about patient acceptance of the tests[25] the financial costs

to the patient[9, 26, 27] that they feel that the patient does not understand the pros and cons of testing and will not be compliant,[28] or because of competing demands and lack of awareness that the patient is due for screening.[28] However, little is known about gender or racial/ethnic or cultural differences in these beliefs amongst physicians, further research in this area is warranted, so that these beliefs can be targeted for change.

The patient characteristic most strongly associated with receiving a doctor's recommendation for screening was being male. We found one other study that investigated the effect of a patient's gender on receiving a doctor's recommendation for CRC screening.[12] That study included both men and women and found that women were more likely to be offered one particular type of test for CRC screening (the fecal occult blood test), however, when all test types were taken into account, as in our study, there was not any difference in the receipt of a doctor recommendation between men and women. Studies assessing the relationship between gender and actual CRC screening have mixed findings, some studies in the past have suggested that females are more likely to test with fecal occult blood testing, and less likely to be tested by flexible sigmoidoscopy,[29-31] however, more recent data suggests no differences in gender rates for CRC screening.[32] In our main study we did not observe gender differences in CRC screening,[13] suggesting that in our population, females are screening at the same rate as males, even though they are less likely to receive a doctor's recommendation. This finding implies that a greater proportion of females are compliant with a doctor's recommendation for screening, compared to males. This area certainly warrants more research and suggests that different approaches may be needed in male and female patients.

Our other main findings were that better overall health status is associated with higher reported rates of recommendation, and this is consistent with the literature.[12] This suggests that physicians may not be addressing preventive health issues as much in patients with poorer health, because of competing demands or other disease priorities for the visit. This suggests that physicians may need extra support for recommending screening to those that have other illnesses or health issues. This is contrast to the finding that a history of GI disease is associated with higher rates of reporting a recommendation for screening, However, since the timing of the diagnosis relative to the recommendation is not known, it is unclear whether a GI diagnosis prompted more recommendations for testing or whether the presence of a GI diagnosis simply improved patient recall of the recommendation.

We found no association with patients' age, race/ethnicity or other socioeconomic characteristics and a doctor's recommendation for CRC screening. However, Wee et al[12] found that younger patients, Hispanics, and those of lower educational level were less likely to receive doctor recommendation in a national sample. These differences in findings may be attributable to the fact that our low socioeconomic status sample had insurance and access to care, so this may have mitigated some of the sociodemographic differences observed in the other study.

We hypothesized that gender or racial/ethnic congruence could influence the likelihood of a recommendation for CRC screening, however we did not find this to be the case, This is in contrast to the findings of a study that found that African Americans with African American physicians were more likely to report receipt of BP checks, pap smears and cholesterol checks.[33] This suggests other factors in the patient-provider interaction may be more important. Of note, we observed that two thirds of patient-physician combinations were not racial/ethnically congruent, whereas the majority were gender congruent, suggesting that a shared cultural background is less important in the doctor-patient relationship than gender type.

We had also hypothesized that those at high risk of CRC because of family history would report greater levels of doctor recommendation for CRC screening, but we did not observe this. This

suggests that physicians either need more education about high risk groups, or need help in identifying those at increased risk.

Limitations of our study include the fact that we studied patients attending a family medicine clinic in an academic health center and these findings may not be generalizable to patients in community settings or individuals without access to primary care. We also relied on patient recall of receiving a doctor's recommendation for CRC testing and this may be open to recall bias, although work suggests that information from patient recall and medical record abstraction are comparable in accuracy. In some situations, patient report may actually be more reliable than the medical record, for instance physicians severely under document counseling and educational advice.[34, 35]The cross sectional nature of the study also precludes causal inferences. Although our response rate of 56% is a limitation of the study, we observed no differences between respondents and non respondents on age, gender or race/ethnicity, increasing our confidence in the representativeness of the sample. We used logistic regression to calculate odds ratios in this cross sectional study, a common practice in both epidemiologic and clinical research. However, there is some debate in the literature about the validity of this approach versus the use of poisson regression to calculate prevalence ratios.[36,37] Some have suggested that this could lead to an overestimation of the effect in certain situations,[36] whereas others have argued that this concern is offset by other advantages.[37] A final point is that although we cannot distinguish between recommendations made for screening from those made for diagnosis of symptoms, the difference may not be important because both result in the patient being up to date for screening. The strengths of our study include the fact that we were able to study a diverse population while controlling for differences in health care access and health insurance status, that we studied the effect of both patient and physician characteristics together and were able to examine the contribution of different gender and racial/ethnic patient-physician combinations to recommendations for screening.

In conclusion, we found that rates of receipt of a doctor's recommendation for CRC screening were suboptimal and were associated with having a female physician, being a male patient, having GI disease and better health status; having a Hispanic physician was associated with lower rates of reported physician recommendation. Clearly physicians need to be encouraged to improve rates of recommendation for CRC screening; further studies should also determine cultural and gender influences on physician behavior.

Acknowledgement

The funding sources for the study were the John Sealy Memorial Endowment Fund for Biomedical Research and NCI K07 CA107052. We would like to acknowledge Carol Carlson, for ensuring the successful implementation of the project. We also would like to thank Alma Salazar and April Moreno for assistance with data collection.

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Table 1

Sociodemographic, Health, Health Behavior Characteristics and Their Association with a Doctor's Recommendation for Screening

	Number and percent in sample		Percent receiving recommendation for screening	
	N	%	%	P value
Sociodemographics				
Age				
50-64	297	53.0	60.3%	0.558
65+	263	47.0	62.7%	
Gender				
Male	266	47.5	65.5	0.057
Female	294	52.5	57.7	
Race/ Ethnicity*				
non-Hispanic white	204	36.4	67.8	0.001
African American	194	34.6	64.2	
Hispanic	162	28.9	50.0	
Education*				
0-11 years	174	31.1	53.4	0.032
12 years	168	30.0	66.1	
13 and over yrs	218	38.9	64.2	
Income				
<15k	235	43.4	55.4	0.062
15-25K	104	19.2	64.1	
25-50K	103	19.0	64.1	
>50K	100	18.5	70.0	
Insurance				
public	156	30.4	56.5	0.254
private	151	29.4	62.9	
mix	206	40.2	64.9	
Health Characteristics				
Health status*				
Poor/Fair	217	38.9	53.9	0.004
Good/Excellent	343	61.3	66.2	
GI diagnosis*				
No	322	57.6	56.3	0.004
yes	237	42.4	68.2	
Health Behavior				
Alcohol				
Any	405	72.3	59.1	0.066
None	155	27.7	67.5	
Annual health exam				
No	53	9.5	52.8	0.178

	Number and percent in sample		Percent receiving recommendation for screening	
	N	**%**	**%**	**P value**
Yes	507	90.5	62.3	
Regular doctor				
No	52	9.3	51.0	0.109
Yes	508	90.7	62.5	

Only those health behavior and health characteristic variables that were significant at $p<0.2$ level are displayed.

* indicates statistical significance at $p<0.05$

Table 2

Physician And Patient-Physician Characteristics and Their Association with a Doctor's Recommendation for CRC Screening

Physician And Patient-Physician Characteristics	Percent in sample Total n= 508		Proportion receiving doctor recommendation	
	n	%	%	P value
Physician race/ethnicity*				
Non-Hispanic White	297	58.8	66.2	0.007
Black or African American	35	6.9	68.6	
Hispanic or Latino	37	7.3	37.8	
Asian	131	25.0	60.0	
Other††	5	1.0	-	
Physician gender*				
Male	213	41.9	56.1	0.013
Female	295	58.1	67.0	
Physician rank				
Resident	131	25.8	60.8	0.706
Faculty	373	73.4	62.6	
Physician Assistant†	2	0.4	-	
Patient-physician racial/ethnic congruence				
Yes	175	34.7	66.1	0.125
No	330	65.3	59.3	
Patient-physician gender congruence				
Yes	309	60.8	62.7	0.496
No	199	39.2	59.8	

*indicates $p<0.05$;

†indicates row excluded from bivariate analysis because of small sample size.

Table 3

Multivariable Logistic Regression Showing Odds Ratios for Receiving a Doctor Recommendation for Screening in Those Having a Regular Doctor

n=497	OR	95% CI
Gender *		
Female	1.00	
Male	1.67	[1.12 2.49]
Educational level (yrs)		
0 - 11	1.00	
12	1.47	[.87 2.48]
≥13	1.12	[.68 1.84]
Race/ethnicity		
Non-Hispanic whites	1.00	
African Americans	1.41	[].77 2.58]
Hispanics	0.81	[.43 1.51]
GI diagnosis *		
No	1.00	
Yes	1.54	[1.06 2.36]
Health status *		
Poor/fair	1.00	
Good/excellent	1.62	[1.08 2.49]
Any Alcohol		
None	1.00	
Yes	.92	[.67 1.64]
Annual health check		
No	1.00	
yes	.77	[.37 1.61]
Physician Gender †		
Male	1.00	
Female	1.82	[1.20 2.75]
Physician Race/ethnicity		
Non-Hispanic white	1.00	
African American	1.03	[.47 2.28]
Hispanic*	.47	[.16 0.94]
Asians	1.18	[.71 1.97]
Patient-physician racial/ethnic congruence		
No	1.00	
Yes	1.53	[.80 2.71]

Sample includes those who had a named regular physician.

* Indicates $p<0.05$

† Indicates $p<0.01$