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Colorectal Cancer Screening Among Latinos in Three Communities on the Texas–Mexico Border

María E. Fernández, PhD¹, Lara S. Savas, PhD¹, Katherine M. Wilson, PhD, MPH², Theresa L. Byrd, BSN, MPH, DrPH³, John Atkinson, DrPH¹, Isabel Torres-Vigil, DrPH^{4,5}, and Sally W. Vernon, MA, PhD¹

¹University of Texas School of Public Health, Houston, TX, USA

²Centers for Disease Control and Prevention, Atlanta, GA, USA

³Department of Family and Community Medicine, Texas Tech Paul L. Foster School of Medicine, Texas Tech University Health Sciences Center, El Paso, TX, USA

⁴Department of Palliative Care and Rehabilitation Medicine, The University of Texas M. D. Anderson Cancer Center, Houston, TX, USA

⁵Dorothy I. Height Center for Health Equity & Evaluation Research, University of Houston Graduate College of Social Work, Houston, TX, USA

Abstract

Objective—To assess colorectal cancer screening (CRCS) prevalence and psychosocial predictors among Texas Latinos in South Texas.

Method—Using multivariable analysis, we examined adjusted effects of perceived susceptibility, self-efficacy, pros and cons of CRCS, subjective norms, knowledge and fatalism on CRCS, in 544 Latinos (50 years and older).

Results—In this socioeconomically disadvantaged population 40% had never heard of any CRCS test and only 34% reported ever completing a CRCS test. Insurance status, perceived cons, and self-efficacy were significantly associated with CRCS.

Conclusion—CRCS interventions in this population should focus on improving access, increasing self-efficacy and decreasing negative perceptions of CRCS.

Keywords

colorectal cancer; cancer screening; Hispanic Americans

Corresponding Author: María E. Fernández, PhD, University of Texas School of Public Health, Division of Health Promotion and Behavioral Sciences, 7000 Fannin Street, Suite 2558, Houston, TX 77030, USA. Maria.E.Fernandez@uth.tmc.edu.

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Introduction

The American Cancer Society (ACS) estimates that during 2013 in the U.S., 73,680 men and 69,140 women will be diagnosed with colon and rectal cancer (CRC) (American Cancer Society, 2013a).¹ Among Hispanics, CRC is the second and third leading cause of cancer mortality among men (11% of cancer deaths) and women (10% of all cancer deaths), respectively.² While Hispanics have lower CRC incidence and mortality rates, they are more likely than non-Hispanic whites to be diagnosed at advanced stages of CRC when the 5-year survival rate declines from 89% (localized stage at diagnosis) compared to 68% (regional stage at diagnosis) and 15% (distant stage at diagnosis) (American Cancer Society, 2012; O'Brien et al., 2003; Chien, Morimoto, Tom, & Li, 2005). Additionally, Hispanics have not experienced the decline in CRC incidence observed in non-Hispanic whites (American Cancer Society, 2012).² Texas Hispanics have higher age-adjusted mortality rates compared with Hispanics nationwide (16.9 per 100,000 and 15.1 per 100,000 respectively) (U.S. Cancer Statistics Working Group, 2013).

Differences in mortality trends may be due to disparities in screening, (O'Brien et al., 2003) early detection, and therefore, survival (Smith, Cokkinides, & Brawley, 2009). Defining screening as a fecal occult blood test in the past year; sigmoidoscopy within the past five years; or a colonoscopy within the past 10 years, Hispanics 50 years old and older had an age-adjusted CRC screening (CRCS) rate of 47% in 2010. This compares with 62% for non-Hispanic whites, 56% for blacks, 48% for American Indian/Alaskan natives, and 46% for Asians (American Cancer Society, 2013b). Two literature reviews (Vernon, 1997; Peterson & Vernon, 2000) report inconsistent patterns of association between age, sex, marital status, or race/ethnicity and CRCS, depending on study population and study design. Socioeconomic status indicators, such as higher education, income, and access to health care (e.g., health insurance coverage), however, have a consistent positive association with CRCS (Ioannou, Chapko, & Dominitz, 2003; Siegel, Jemal, Thun, Hao, & Ward, 2008; Swan, Breen, Coates, Rimer, & Lee, 2003; Seelf et al., 2004).

Few studies report psychosocial factors associated with CRCS among Hispanics. In a qualitative study, Fernandez et al. (2003) reported that low levels of knowledge and lack of physician recommendation were associated with low levels of screening among border Hispanics. Other studies among Hispanics have reported that physician discussion or recommendation was associated with CRCS (Ypes-Rios, Reimann, Talavera, Ruiz, & Talavera, 2006; Jandorf et al., 2010). Jandorf et al. (2010) showed that fear was associated with lower levels of CRCS and knowledge of tests was associated with increased use of sigmoidoscopy only.

Guided by findings from our qualitative study and constructs of health behavior theories including the health belief model (Rosenstock, 1974), social cognitive theory Bandura (1986), and the transtheoretical model (Prochaska & Velicer, 1997), this study examined the association between CRCS knowledge, perceived susceptibility, subjective norms, self-efficacy, decisional balance, fatalism, and cancer worries with CRCS behavior. Ultimately, this research is intended to guide health promotion programs aimed at increasing CRCS uptake and adherence to recommended guidelines among Hispanics.

Methods

Study Design and Data Collection

We conducted a cross-sectional study using face-to-face interviews with Hispanics living on the US side of the Texas-Mexico border. We collected data in three counties: Cameron County (Brownsville), Webb County (Laredo), and El Paso County (El Paso). In Cameron and Webb county participants lived in *colonias*, unincorporated neighborhoods typically characterized by high rates of poverty and unemployment and low levels of community infrastructure (Ramos, May, & Ramos, 2001). Participants in El Paso County were low income, primarily Hispanic, residents of selected census tracts.

In Cameron and Webb Counties, we recruited participants in selected *colonias* by conducting door-to-door visits using the EPI Sampling Quadrants Scheme (Bennett, Radalowicz, Vella, & Tomkins, 1994). After dividing *colonias* into four quadrants, data collectors approached dwellings in each quadrant and systematically conducted door-to-door visits to recruit and interview eligible men and women. We recruited participants in El Paso County census tracts with the highest percent of Hispanics. The census tracts were broken down into block groups, and block groups were randomly selected. Within each block group, data collectors approached dwellings, systematically conducting door-to-door visits to recruit and interview eligible men and women. Eligibility criteria included age 50 years or older, Hispanic/Latino ethnicity, and no cancer diagnosis (excluding skin cancer). Data collectors gave participants a \$20 dollar incentive upon completion of the interview. Interviews were conducted in Spanish and lasted approximately 1½ hours. Interviewers and data collection supervisors were bilingual community members who completed a two-day training program. During the training, data collectors reviewed the study protocol, completed certification in the protection of human subjects, reviewed the survey instrument and practiced conducting structured interviews. Data collectors conducted the interviews according to study protocols during a two month period; investigators and staff supervised data collection at each site.

Measurement

The questionnaire consisted of 175 closed-ended items, including questions assessing sociodemographic factors such as age, education, place of birth, income insurance, and marital status. It also included psychosocial measures of perceived susceptibility to colorectal cancer, self-efficacy for CRCS, CRCS pros (positive factors or perceived benefits associated with screening), cons of CRCS (negative factors or perceived barriers associated with screening), subjective norms of CRCS, knowledge of colorectal cancer and cancer fatalism (belief that death is inevitable when cancer is diagnosed), and questions assessing barriers to screening for each CRCS.

We used questions to assess CRCS behavior that had been developed and refined through an iterative process by a working group sponsored by the Division of Cancer Control and Population Sciences (DCCPS) of the National Cancer Institute (NCI) (Vernon et al., 2004). We defined our primary outcome as having had any CRCS test in one's lifetime and calculated a dichotomous measure based on self-reported completion of at least one CRC

screening test. We measured adherence to CRCS recommendations, defined by having any screening test according to recommended guidelines. At the time of the study the ACS recommended screening using 1) FOBT annually, 2) sigmoidoscopy every five years, 3) annual FOBT plus flexible sigmoidoscopy every five years, 4) DCBE every five years, and 5) colonoscopy every ten years (Smith et al., 2001). Additionally, we calculated prevalence for having had a CRCS test in one's lifetime and adherence for each CRCS test.

Investigators conducted cognitive testing on these questions in 2002 during development of the NCI Health Information Trends Survey (HINTS) (Vernon et al., 2004). For our study, we translated and back-translated the items, making slight modifications in wording while retaining the original meaning. We then tested the items with participants from the priority population. After a short description of the test, interviewers asked participants the exact month and year of their most recent exam. Those unable to remember the month and year estimated the number of years by choosing among four categories.

We used 5-point Likert-type items for all psychosocial constructs except knowledge and fatalism. We used eleven items from the Powe Fatalism Inventory to measure cancer fatalism (Powe, 1995); responses were "yes," "no," or "don't know." To assess knowledge of CRC, we used a thirteen-item index with "yes," "no," or "don't know" responses adapted from other studies (Fernandez et al., 2009a). For the scales measuring perceived susceptibility (2 items), self-efficacy (10 items), pros (7 items) and cons (12 items), and subjective norms (6 item), we adapted items from pre-existing scales developed for breast and cervical cancer screening (Fernandez et al., 2009b). We assessed the internal consistency reliability of these scales; the Chronbach's alpha of each are as follows: perceived susceptibility to colorectal cancer (.85), colorectal cancer screening pros (.81) and cons (.73), self-efficacy for colorectal cancer screening (.94), subjective norms for colorectal cancer screening (.82) and cancer fatalism (.78).

Analysis

We calculated frequencies of demographic and screening outcome variables as well as barriers to screening among those participants who were non-adherent to all screening tests. With the exception of scales for subjective norms, knowledge, and fatalism, we determined scale scores for each psychosocial construct by calculating a mean of all items on each scale. For subjective norms, we calculated the scale score by multiplying items measuring perceived expectation of others with items measuring motivation to do what others expect. We calculated a scale score for cancer fatalism by adding one point for each item with a "Yes" response and calculated a knowledge scale score by adding one point for each item with a correct response. We conducted Chi-square tests to identify demographic variables associated with ever having received a CRCS (any test) and t-tests to identify psychosocial constructs associated with screening. We included in the final multivariable analysis, all variables significantly associated with screening in bivariate analysis at the $P < .25$ level. We conducted logistic regression to assess the independent association of the psychosocial constructs and CRCS, adjusting for relevant sociodemographic factors. We used SPSS software (SPSS, Inc.) for all analyses.

Results

Among the 601 participants eligible for the study, 544 (91%) agreed to complete the survey. Participant ages ranged between 50 and 89 years and the majority were female (73%) (Table 1). Almost all of the participants (98%) self-identified as Hispanic of Mexican American/Mexican decent, and over half (53%) were born in Mexico, but had lived in the U.S. for over 20 years. The majority of the participants had little formal education, were underinsured (49% had no form of health insurance coverage), and had low incomes (56% had an annual household income of less than \$10,000).

A large proportion of participants (40%) had never heard of any type of CRCS; only 36% were aware of FOBT and only 31% had heard of colonoscopy. Over one-third (34%) of respondents reported having at least one of the CRCS tests at some time in their lives but only 25% were adherent to recommended CRCS guidelines (Table 2). Among those screened, 67% reported only one test ever in their lifetime, most commonly FOBT (33%), followed by colonoscopy (12%), sigmoidoscopy (12%), and barium enema (9%). Lack of doctor recommendation was the most common barrier mentioned among non-adherent participants (36%–40%) (Table 2).

Socio-demographic factors significantly associated with CRCS in bivariate analyses included age, insurance status, and number of years residing in the U.S. (Table 3). Among the potential psychosocial constructs, self-efficacy, CRCS cons and fatalism were significantly associated with screening status (Table 4). Multivariate logistic analysis showed that self-efficacy (OR, 1.41; 95% CI, 1.15–1.71), CRCS cons (OR: 1.78; 95% CI, 1.24–2.55), and insurance status (adjusted OR, 3.52; 95% CI, 2.25, 5.50) were significantly associated with ever having CRCS (Table 5).

Discussion

In this primarily Spanish speaking population of Mexican Americans, we found low rates for ever having a CRCS test in one's lifetime (34%). We also found lower overall CRCS adherence (25%) in our study, compared to 2006 BRFSS reports, in which 47% of Hispanics had an FOBT or endoscopy test within recommended time frames (Centers for Disease Control and Prevention, 2006; Smith, Cokkinides, & Brawley, 2008).

The lower screening rates in our study may reflect screening barriers unique to communities on the Texas-Mexico border burdened by poverty. In our study over a third of participants had household incomes of less than \$10,000 (34%) and only 4.2 percent reported an income of \$20,000 or higher. Educational level, another proxy measure for socioeconomic status, was also very low with only 9% who completed high school (compared with 57% of Hispanics nationally) (Stoops, 2004). The relative homogeneity in the population across these SES measures makes it difficult to detect significant differences in screening by income or education levels.

Nonetheless, having health insurance coverage was an important factor influencing screening and those reporting coverage were three and a half times more likely to have ever had CRC screening test. This finding is consistent with previous reports that insufficient

insurance coverage represents an important barrier to CRCS (Seeff et al., 2004; Halpern, Ward, Pavluck, Schrag, Bian, & Chen, 2008. Wee, McCarthy, & Phillips, 2005), especially among Hispanics (Thompson, Coronado, Neuhaus, & Chen, 2005). In our study population, the significant effect of health insurance coverage, primarily representing Medicaid and Medicare coverage versus no insurance, may also reflect the effect of immigration status (e.g., length of time in the U.S. and documented status) that may be compounded by poverty status. Self-efficacy and CRCS cons (perceived barriers associated with screening) were significantly associated with completing at least one CRCS test in multivariate analyses.

Self-efficacy has been consistently associated with CRCS in several studies (Myers, Trock, Lerman, Wolf, Ross, & Engstrom, 1990; Vernon, Myers, & Tiley, 1997; Jerant, Kravitz, Rooney, Amerson, Dreuter, & Franks, 2007; McQueen, Vernon, Myers, Watts, Lee, & Tilley, 2007; Menon, Belue, Sugg, Rothwell, & Champion, 2007); however, to our knowledge, our finding is the first to report this association among an Hispanic population. Our study findings also supported previous work showing that perceived barriers to screening (cons) is associated with lower levels of CRCS. Other researchers have found this relationship in studies among non-Hispanic white participants (Menon, Belue, Sugg, Rothwell, & Champion, 2007) and among multi-ethnic participants (Shokar, Carlson, & Weller, 2008; Gorin & Heck, 2005; Christie et al., 2005; Greiner et al., 2005).

The presence of fatalistic beliefs has been suggested as an additional barrier to cancer screening in minority cultures (Powe & Johnson, 1995). A number of studies, however, have revealed inconsistent findings concerning the association between fatalism and CRCS. Some researchers, for example, have reported a significant association between FOBT compliance and fatalism using a modified 3-item fatalism scale. Others have reported that fatalism is negatively associated with return of FOBT kits within 90 days and a modified 12 item fatalism scale based on the Powe Fatalism Inventory (Corin & Heck, 2005; Greiner et al., 2005). However, our study (using the modified 11-item cancer fatalism scale) and other studies (using the original 15 item cancer fatalism scale developed by Powe) (Jandorf et al., 2010; Shokar, Carlson, & Weller, 2008; Christie et al., 2005; Powe & Johnson, 1995) found no significant association between fatalism and CRCS. Comparison between studies based on populations from different ethnic or cultural groups may further complicate the measurement issue (Pasic, D'Onofrio, & Otero-Sabogal, 1996). Nevertheless, studies conducted in Hispanics groups also provide inconsistent results describing the relationship between fatalism and cancer screening (Abraido-Lanzo, Viladrich, Florez, Cespedes, Aguirre, & De La Cruz, 2007). The inconsistent evidence may reflect differences in the definition and measurement of fatalism. While substantial evidence exists showing that the belief that a cancer diagnosis is "like a death sentence" is prevalent among Hispanics, and that this can lead to lower levels of screening (Perez-Stable, Sabogal, Otero-Sabogal, Hiatt, & McPhee, 1992), the other definitions of fatalism (measured in the Powe inventory), including the belief in predeterminism, do not seem to be significantly associated with CRCS. This finding is consistent with the qualitative study we conducted in these same three cities along the border (Fernandez et al., 2008). From a health education perspective, it is important to distinguish between different definitions of the fatalism construct. For example, the belief that a diagnosis of cancer means death can be addressed relatively easily using

strategies such as testimonials and role models who have survived CRCS. Predeterministic beliefs, on the other hand, tend to be more ingrained and difficult to change. More research is needed to elucidate the differences between various types of fatalistic beliefs and how these may or may not be associated with screening behaviors.

Our study had several limitations. First, the outcome variable was self-report of a CRCS test in one's lifetime. Relying on self-reports of screening behavior introduces the possibility of reporting or recall bias. However, Hiatt et al. reported that among a multiethnic study population, in which the majority (63%) were Hispanic, among Hispanics-only, specificity of self-reported sigmoidoscopy was high for men (91.5%) and women (96.2%), and sensitivity was also high for women (100%), but not so for men (40%). Among Hispanic women and men respectively, specificity of self-reported FOBT was 82.4% and 80.8%, and sensitivity was 53% and 61.2%. No statistically significant differences were detected between the two ethnic groups' self-report of screening using these tests (compared with medical record reviews) (Hiatt, Perez-Stable, Quesenberry, Sabogal, Otero-Sabogal, & McPhee, 1995). A validation study examining self-report of "ever" having a CRCS test reported endoscopy as a more reliably reported CRC test, compared with FOBT (Bradbury, Brooks, Brawarsky, & Mucci, 2005).

Due to the cross-sectional study design, associations found cannot be interpreted as predictors. It is also likely that our study population's socioeconomic homogeneity produced insufficient variance in income and education to detect an effect of these variables on CRCS. Lastly, these findings cannot be generalized to all US Hispanic populations, which represent many different countries of origin, levels of acculturation, socioeconomic and environmental circumstances.

Findings from this study suggest the need for health promotion interventions aimed at modifiable factors such as self-efficacy and cons of CRCS to help increase initiation of CRCS as recommended by current guidelines. Further work is also needed to understand the full complexity of personal level barriers affecting decisions to be screened as well as the access barriers experienced by this socioeconomically disadvantaged Mexican American population.

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Table 1

Sociodemographic characteristics of study participants (N=544).

	% (Valid)	Number
Age group		
50–59	48.9	248
60–69	27.2	160
70 and over	23.7	136
Gender		
Female	73.0	397
Male	27.0	147
Hispanic Origin		
Mexican American, Mexican, or Chicana	99.1	534
Marital Status		
Spouse/Partner	60.8	331
No Spouse/Partner	38.4	209
Education (years)		
None	9.2	50
1–5	39.5	215
6–11	38.2	208
12 and over	8.6	47
Birth Status		
Born in U.S.	21.9	119
Born in Mexico	76.8	418
Years Living in United States		
10 Years	12.7	69
11–19 Years	12.9	67
20 Years	73.2	398
Income		
Less than \$10,000	55.7	303
\$10,000 – \$19,999	17.6	96
\$20,000 or more	4.2	23
Don't Know	19.7	107
Insurance		
None	49.4	269
Any (More than one may apply)		
Medicaid	28.5	155
Medicare	30.9	168
Private	4.2	23
Veteran's or Military Insurance	.6	3
Other	4.5	25

Table 2

CRCs characteristics of study participants (N=544)

	Any CRCs %	Test-Specific %		
		FOBT	Colonoscopy	Sigmoidoscopy
Lifetime (Ever/Never)	34.0	20.8	11.0	8.8
Adherence	24.6	10.8	9.4	6.8
Barriers To Screening for NonAdherent Participants (N=410)				
Doctor/Nurse never recommended		35.6	35.9	38.5
No reason		29.8	33.9	32.2
Don't know what it is		22.2	20.5	19.0
Never had signs or symptoms of colon cancer		12.4	14.1	15.1
Too expensive		3.9	5.1	4.1
I keep putting it off		3.4	4.1	4.1
Other		2.9	2.2	2.2

Note: Lifetime CRCs refers to at least one recommended CRCs test in one's lifetime.

Adherence CRCs refers to completion of any one of the recommended CRCs tests according to ACS guidelines at the time of this study: FOBT annually, or sigmoidoscopy every five years, or annual FOBT plus flexible sigmoidoscopy every five years, or colonoscopy every ten years, or double-contrast barium enema every five years.²⁴

Table 3

Univariate analysis of sociodemographic factors by screening behavior

Variable	Recommended CRCs		
	YES (N=185)		
	%	N	P
Age (N=544)			.103*
50–59 years	30.6	76	
60–69 years	40.6	65	
70 years and older	32.4	44	
Gender (N=544)			.309
Female	35.3	140	
Male	30.6	45	
Marital Status (N=540)			.480
No Spouse/partner	35.9	75	
Spouse/partner	32.9	109	
Education (N=517)			.549
None	26.0	13	
1–5 years	34.0	73	
6–11 years	36.5	76	
12 or more years	36.2	17	
Birth Place (N=537)			.903
Born in Mexico	34.2	143	
Born in U.S.	33.6	40	
Years living in U.S. (N=537)			.002*
Less than 20 years in U.S.	22.8	31	
20 years or more in U.S.	37.7	150	
Income (N=529)			.454
Less than \$10,000	34.0	103	
More than \$10,000	38.7	46	
Don't Know	30.8	33	
Insurance (N=544)			.000*
Any	46.4	124	
None	29.9	59	

Table 4

Univariate analysis of theoretical constructs by screening behavior

	Had any Recommended CRCs Test			
	YES (SD)	NO (SD)	t	df P
Self Efficacy of colorectal cancer screening	3.88 (.95)	3.38 (1.17)	5.049	538 .000*
Perceived Susceptibility to Colorectal Cancer	3.43 (.95)	3.45 (.92)	-.255	538 .798
Knowledge of Colorectal Cancer	2.81 (3.21)	3.12 (3.72)	-.943	542 .346
CRCs Pros	4.22 (.51)	4.19 (.55)	.654	539 .514
CRCs Cons	2.88 (.60)	2.61 (.54)	5.208	539 .000*
Subjective Norms of CRCs	12.24 (4.90)	11.74 (5.32)	1.072	536 .284
Cancer Fatalism	6.04 (2.83)	6.41 (2.81)	-1.129	536 .153*

* Indicates significance at $P < .25$ level

Table 5

Multivariate Logistic Model Predicting CRCS Behavior (N=525)

	Odds Ratio	C.I
Self Efficacy	1.40	(1.15, 1.70) *
CRCS CONs	1.92	(1.33, 2.78) *
Cancer Fatalism	1.00	(.93, 1.08)
Age		
Referent: 50–59 years old		
60 –69 years old	.99	(0.61, 1.63)
70 years and older	.70	(0.40, 1.22)
Years in the US		
Referent: <20 years in U.S.		
20 years in U.S.	1.52	(0.93, 2.48)
Insurance Referent: None		
Any	3.52	(2.23, 5.55) *

* Indicates significance at $P < .05$