Published in final edited form as:

J Immigr Minor Health. 2015 June ; 17(3): 696–703. doi:10.1007/s10903-014-0061-4.

Effect of Acculturation and Access to Care on Colorectal Cancer Screening in Low-Income Latinos

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Abstract

Latinos have lower colorectal cancer screening (CRCS) and survival rates compared to other race/ethnic groups. This cross-sectional study examines relationships between acculturation, access to and utilization of health-care services, and CRCS in low-income Latinos. Bilingual data collectors conducted structured interviews with 544 Latino men and women (>50 years) residing in the Texas-Mexico border area. Using a hierarchical logistic regression model, we examined the relationship between lifetime history of any CRCS test and indicators of acculturation, healthcare utilization and access to care, adjusting for socio-demographic characteristics. Survey results revealed a 34 % prevalence of CRCS. Participants reporting a provider recommendation for screening, regular check-ups, higher acculturation level, and health insurance had significantly increased odds of CRCS. Findings indicate CRCS intervention research in Latinos should focus on (1) increasing physicians' recommendations for screening, (2) promoting regular check-ups, (3) and increasing CRC prevention efforts on less acculturated and uninsured groups.

Keywords

Colorectal cancer screening; Latinos; Acculturation; Access to healthcare; Utilization of healthcare services

Background

Among Latino men and women, colorectal cancer (CRC) is the second and third leading cause of cancer mortality, respectively [1]. Routine screening and removal of adenomatous polyps could prevent an estimated 60 % of CRC deaths [2], and potentially 60–90 % of CRC cases [3, 4]. In 2012, an estimated 3,500 Latinos will die from CRC [1]. Overall, Latinos have lower CRC mortality rates compared with non-Hispanic whites (NHWs) [1]. Latino's lower mortality risk compared to more economically advantaged ethnic groups is referred to as the "Hispanic Paradox." However, as Latinos become more acculturated, behaviors related to cancer risk may change, and the "paradox" may not endure. From 2000 to 2009,

CRC mortality rates declined at a slower rate in Latinos compared to NHWs (2 vs. 3 % per year, respectively). Similarly, during this period, Latinos experienced a slower annual decrease in CRC incidence rates (2.3 and 2.4 %, in Latino men and women respectively) compared with NHW men and women (3.5 and 2.8 %, respectively) [1]. CRC screening (CRCS) enables early detection and prevention of CRC through removal of precancerous adenomatous polyps and timely treatment of early stage tumors. Underscoring importance of improving routine screening, Latinos' 5-year CRC survival rates decrease from 89 %, when diagnosed at a localized-stage, to 68 % (regional stage) and 15 % (distant stage) [1]. In addition, contrary to the Hispanic paradox, one study using Surveillance, Epidemiology, and End Results Program (SEER) data revealed increased CRC mortality risk among Mexican-Americans, (63 % of U.S. Latinos [5]), compared with NHWs [6].

Underutilization of CRCS represents missed opportunities for CRC prevention and control [7–12]. Based on the 2008 Behavioral Risk Factor Surveillance System (BRFSS) survey, fewer Latinos (49.8 %) reported receiving an Fecal Occult Blood Test (FOBT) or endoscopy (sigmoidoscopy or colonoscopy) compared with NHWs (64.2 %) [13]. Higher rates of late-stage CRC diagnosis among Latinos contributes to lower 5-year survival rates reported among Latino men (63.7 %) and women (63.5 %) compared with non-Latino men (65.7 %) and women (64.3 %) [6, 10, 14, 15].

Personal factors associated with decreased CRCS include minority status [16], younger age [9, 11, 17, 18], less education [16], recent immigration to the U.S. or foreign born [16, 19–21], low knowledge/awareness about CRC [9, 12, 22–25], and limited contact with the health-care system [11, 23, 26]. Overall, Latinos experience a higher burden of access-related screening barriers, including living below poverty level (22 % of Latinos vs. 9 % of NHW) [15] and low insurance coverage (26 % of Latinos had no insurance for over a year compared to 7 % of NHWs, 11 % of blacks, and 9 % of Asians) [27]. Uninsured status is consistently associated with underutilization of CRCS, particularly among Latinos [28, 29].

Research reveals inconsistent associations between acculturation and CRCS in Latinos [26, 30–33]. Acculturation reflects immigrants' adaptation process including cultural customs, behavioral, norms, values or other changes. The process has been conceptualized as unidimensional, assimilating or adapting to the main (host) cultural group [34], or as bi-dimensional [35], reflecting assimilating to the main cultural group while maintaining attributes from one's own culture-of-origin [36, 37]. Inconsistencies in the acculturation-CRCS relationship may reflect differences by country-of-origin and different life circumstances predating migration (e.g., social capital, economic or education circumstances) [38]. Inconsistent findings may also reflect measurement differences [39]. Common acculturation measures include language (e.g., English vs. Spanish use, or proficiency), nativity, generational status, and length of U.S. residence, or scales representing different combinations of these attributes [34, 35, 40]. Limited language and cultural beliefs may increase barriers to CRCS [25, 41, 42], but these attributes may vary across the acculturation spectrum and pose barriers for different reasons. Reliance on foreign language may present functional-linguistic barriers to accessing information, limiting awareness of CRCS, access to health services, and opportunities to discuss or receive CRCS recommendations. Limited English proficiency could also represent socioeconomic and

cultural-related differences associated with pre-migration characteristics, which could present advantages and disadvantages in terms of CRCs behaviors.

We examined associations between CRCs and sociodemographic, acculturation, access, and utilization of health care. Findings from this community-based study could provide insight into effect of acculturation as a CRCs determinant among medically underserved Latinos. This research could guide future interventions targeting screening determinants in this growing population.

Methods

We implemented this cross-sectional study during a two-month period in 2004. The target population included self-identified Latinos, 50 years of age and over residing in U.S. communities located in *colonias* (unincorporated, semi-rural communities) near the Texas-Mexico border, and in El Paso County (El Paso). Those with prior or current cancer diagnosis (other than non-melanoma skin cancer) were ineligible to participate. Participants provided written consent before initiating face-to-face interviews, and received \$20 for participation. The Committee for the Human Subjects from the University of Texas Health Science Center at Houston approved the study.

Data Collection and Study Population

We trained bilingual and bicultural data collectors from the community to systematically recruit eligible participants, obtain written consent, and conduct approximately 1½ h-long interviews during house visits. Inter-rater reliability was assessed during data collector training, and indicated a high concordance of >98 %. Recruitment followed cluster sample survey methods to identify households based on the Expanded Programme on Immunization Sampling Quadrant Scheme [43]. We divided *colonias* into four quadrants and assigned one interviewer to each quadrant. The interviewer randomly chose a direction (by spinning a pen) to start recruitment from households. In El Paso census tracts with the highest percentage of Latinos were identified and partitioned into block groups, which were randomly selected. Data collectors worked within block groups to recruit households through systematic door-to-door visits. Interviewers invited one person per household, selecting resident with the most recent birthday when more than one qualified. When reaching the end of the street, or quadrant border, the interviewer proceeded clockwise to the next street.

Measures

Outcome Variable: Colorectal Cancer Screening Tests

The survey contained separate questions for each CRCs test recommended by the American Cancer Society (ACS) during the study [FOBT, sigmoidoscopy, colonoscopy and double-contrast barium enema (DCBE)] [44]. We calculated a dichotomous outcome measure combining any self-reported CRCs test (ever or never screened for CRC in one's lifetime). This outcome measure reflected intent to identify factors associated with not ever initiating screening.

Independent Variables

Data were collected on self-reported ethnicity, age, gender, educational attainment, income and marital status, and factors related to acculturation, healthcare utilization, structural access barriers, or financial access barriers to care, and participant's residence by target area (site) on the Texas-Mexico border (El Paso county vs. Laredo and Brownsville).

We measured acculturation with the 24-item Bidimensional Acculturation Scale for Hispanics (BAS) [35, 45]. Based on language, the BAS measures use of English or Spanish in different situations (e.g., "How often do you speak Spanish with your friends?"); perceived proficiency in English and Spanish (e.g., "How well do you speak English?") and understanding and use of media (e.g., "How well do you understand radio programs in Spanish?"). We calculated acculturation scores for each Hispanic and non-Hispanic domain (ranging from 1 to 4) and used a cutoff score of 2.5 to define low acculturation (score ≥ 2.5 in the Hispanic cultural domain and < 2.5 in the non-Hispanic domain), high acculturation (a score ≥ 2.5 in the non-Hispanic domain and < 2.5 in the Hispanic domain), and biculturalism (> 2.5 in both domains) [35]. Additional aspects of acculturation included generational status and years residing in the U.S. We defined participants' generational status as first-generation (foreign born), secondgeneration (born in U.S. at least one parent born outside the U.S.), or third generation (born in U.S. and both parents born in U.S.).

Access to and Utilization of Healthcare Indicators

The following measured access: (1) health insurance coverage; (2) physician or nurse recommendations for CRCS; (3) having a healthcare place/provider for usual use (dichotomous response to "Is there a particular clinic, health center, doctor's office, or other place that you usually go to if you are sick, need advice about your health or for routine care?") followed by (4) "What kind of place is it?" (doctor's office, hospital emergency room, outpatient clinic, migrant health clinic, doctor/clinic in Mexico, Other) to describe patterns of care. History of regular check-ups was used to determine utilization (dichotomous response to: "Do you ever go to visit the doctor when you are not sick, just for a checkup?").

Data Analysis

We computed descriptive statistics for independent variables, and used χ^2 statistics (for categorical variables) and t test (for mean age) to assess differences in ever having a CRCS. Statistically significant variables associated with CRCS at the $p < 0.25$ level in univariate analyses were included in multivariable logistic regression models [46]. In addition, factors significantly associated with acculturation ($p < 0.05$), the covariate of primary interest, were considered for the final logistic model. Because male gender [18, 23, 47] and older age are associated with CRCS in other studies [18, 23, 47–50], and due to their intuitive importance to health-seeking behaviors, these variables were retained in final analyses [46]. Insurance categories (i.e., none, public private, both public and private and other) were combined (i.e., any/none) to reduce problems of small cell sizes for the final regression models.

To examine associations between CRCS and acculturation and utilization of and access to healthcare, we used ordered hierarchical logistic regression using forced entry in

consecutive steps to produce a series of three models. Hierarchical regression enabled examination of each variable block's contribution to CRCs completion beyond previously entered block(s), starting with sociodemographics (model 1), acculturation-related factors (model 2), and access-related factors (model 3). Odds ratios and 95 % confidence ratios, Hosmer and Lemeshow Goodness-of-Fit Test (HL) statistics, and differences in log-likelihood ratio tests in the logistic models were computed to compare model fit at each step. All analyses were conducted using PASW/SPSS software, version 18.0, (SPSS Inc, Chicago, Ill).

Results

During the two-month recruitment period, among 601 people identified as eligible, 544 agreed to participate and completed the structured interview, nearly all in Spanish (91 % response rate). The majority (98 %) reported Mexican heritage and represented lower socioeconomic attainment. Among all participants, 73 % were female, 39 % were 65 years of age and over, 61 % were married, 78 % attained <12 years of education, 56 % lived in households with annual incomes <\$10,000, and 15 % were recruited from colonias in the El Paso area site. Thirty four percent (n = 185) had at least one CRCs test in their lifetime. CRCs rates varied across tests: 33 % had FOBT-only (n = 61), 24 % had endoscopy-only (n = 45), 9 % had BE-only (n = 17), and 34 % (n = 62) had more than one CRC test.

Based on BAS-defined acculturation, a low level of acculturation predominated (86 %). Highly acculturated (0.6 %) and bicultural (11 %) respondents were combined to create a dichotomous variable (more vs. less acculturated). Most were foreign-born (77 %) and had resided in the U.S. 20 years or more (73 %). Nearly half had no health insurance (49 %), <5 % had private health insurance, and 43 % had public coverage only (e.g., Medicaid, Medicare, or State). A majority reported having a usual place of care (70 %) and obtaining care from migrant, county-based or other outpatient health clinics (39 %). Approximately half had not visited a doctor for regular check-ups, and 75 % had never received a doctor's recommendation for a CRCs test.

There were no statistically significant differences in CRCs outcome by sociodemographic characteristics, or generational status (Table 1). While the multiple response variable indicating place of usual care was significant in univariate analysis there was a high rate of missing data. Instead, the dichotomous usual place of care variable (yes/no), which had a high response rate, was used. Acculturation, length of residence in the U.S., insurance coverage, regular check-ups, site (recruited in El Paso County vs. Brownsville/Laredo area), and provider screening recommendation were significantly associated with CRCs and included in final hierarchical models. Age and gender were retained in the regression model due to predetermined importance [46]. Sensitivity analysis omitting age and gender revealed no change in significant findings.

The first multivariable model assessed the block of sociodemographic factors (gender, age, income, education and location of residence). Among these covariates (model 1), only site was statistically significant with the CRCs outcome (Table 2). The second model added acculturation factors (BAS-defined acculturation, years residing in U.S., and generational

status), controlling for the first block of variables. Addition of acculturation factors did not change significance of site. More acculturated participants (bi or high BAS scores) had significantly increased odds of CRCS (OR: 2.88, 95 % CI 1.29–6.39). The addition of access to care factors to the final adjusted model did not significantly change the effect of acculturation, but site was no longer significant. The final model also produced significant associations between CRCS and three access factors: provider recommendation (OR: 4.83, 95 % CI 2.89–8.06), regular check-ups (OR: 3.07, 95 % CI 1.94–4.85), and having health insurance coverage (OR: 2.09, 95 % CI 1.20–3.63). The association between having a usual place for care and CRCS was not statistically significant (Table 2).

Discussion

Overall lifetime CRCS prevalence (34 %) was lower than previously reported in a Mexican-American patient population (41 %), surveyed at a community health center on the California-Mexico border in 2003 [31]. Acculturation remained significantly associated with CRCS after adjusting for income, educational attainment, and commonly reported access-related screening barriers, including physician recommendation [9, 12, 22–24, 51–56] and insurance status [11, 18]. Previous studies examining association between acculturation and CRCS behaviors in Latinos report inconsistent findings, perhaps reflecting variations in study methods (e.g., covariates, different acculturation measures or clinic- vs. community-based groups) and pre-migration characteristics (e.g., differences in socioeconomic or education characteristics of different immigrant groups) [30–32].

Analysis of 2005 California Health Interview Survey data revealed a positive association between Mexican-Americans' CRCS and acculturation (represented by English language use and proficiency, nativity, citizenship, and years in the U.S.), adjusting for socioeconomic status, health status, and access factors [32]. A study based on NHIS 2000, 2003, and 2005 data [33], reported significant associations among Mexican-Americans between CRCS and nativity (OR: 1.4, 95 % CI: 1.0–1.9) and speaking English (OR 1.4, 95 % CI: 1.0–2.0), adjusting for age, sex, income status, education, health status, access to healthcare (health insurance type and usual source of care), and other chronic diseases [33]. However, the same study reported no significant association between CRCS and acculturation indicators among Puerto Ricans and Cubans [33].

Two other studies examined 2000 NHIS data, including acculturation measured using the revised Marin Short Acculturation Scale. Shah et al. [30], reported a significant association between Latino low acculturation and CRCS adherence, adjusting for socio-demographic factors; however, the association was not significant after adjusting for utilization of other health services. Gorin and Heck [26] reported no association between acculturation (averaged score) and having an FOBT in the last year, or endoscopy exam in the last 5 years, controlling for socioeconomic characteristics, access to and utilization of care, health status, and Latino subgroup (e.g., country of origin). These findings underscore importance of understanding what acculturation represents, including potential modification of the association by other factors.

In a Mexican-American patient population residing near the U.S.-Mexico border, Yepes-Rios et al. [31] reported a non-significant association between CRCS and acculturation, adjusting for socio-demographic and access to care factors (sex, age, education, income, marital status, employment and insurance), and knowledge of CRC tests, attitudes towards screening, perceived barriers, perception of general health, and chance locus of control. Differing findings may reflect the Yepes-Rios et al. [31] study's use of another acculturation scale, the Acculturation Rating Scale for Mexican-Americans-II, based on ethnic self-identification and general culture-based practices. A major difference with our community-based study, is that the Yepes-Rios et al. study included a clinic-based patient population, which possibly overcame acculturation-related barriers to access the health care system. These differences may have also mitigated the effect of acculturation as a barrier to CRCS during the encounter with health care providers (e.g., communicating with providers).

In our study, physician recommendation increased screening odds nearly five-fold, indicating providers' key role in uptake of CRCS remains. Yepes-Rios et al. [31] reported discussing CRCS with a physician had the strongest and most consistent association across all screening tests [31], and Shokar et al. [9] reported increased adjusted odds of CRCS among 602 participants (27 % Latino) who received a physician recommendation (OR: 3.86, 95 % CI: 2.30–6.50).

The evidence is inconsistent regarding effect of healthcare coverage on CRCS disparities in Latinos [9, 14, 23, 25, 42, 57, 58]. In our study, including a large proportion of participants with public medical coverage (<5 % had private health insurance), we found a positive association between CRCS and having any kind of healthcare insurance. The association between health insurance and obtaining a CRCS test remained after controlling for other factors, including socio-demographic factors, acculturation-related factors, having usual health care, regular check-ups, physician recommendation and residency site (Table 2), suggesting importance of public coverage on CRCS among low-income Mexican-Americans.

While our study provides important insights, limitations include the cross-sectional design, preventing interpretation of associations as cause-effect. Reliance on self-reported data introduces potential recall bias, related to poor memory, and possibility of social desirability responses. In a multiethnic study conducted among Kaiser Permanente Medical Care Program members (63 % Latino and 37 % NHW) sensitivity for self-reporting FOBT and sigmoidoscopy compared with medical records was 53 and 100 % among Latina women, respectively [59]. Latino men's self-report sensitivity for FOBT and sigmoidoscopy was 62 and 40 %, respectively [59]. Specificity scores for FOBT and sigmoidoscopy ranged from 81 to 96 % for Latino men and women [59]. There were no statistically significant differences in selfreport accuracy (compared with medical record reviews) between Latinos and whites [59]. This study focused on Latinos' uptake of any recommended CRCS behavior, ever in one's lifetime, and eliminated reliance on recall of timing of test, minimizing potential inaccuracy problems related to self-report bias.

In summary, this community-based study highlights the important relationship between acculturation and utilization of CRCS services among Mexican-Americans residing in

underserved communities. More research in community settings is needed to understand barriers and facilitating factors related to CRCS behaviors in this growing population. Findings highlight important areas for future intervention research including: increasing patient-provider discussions/recommendations to increase CRCS, increasing use of regular health check-ups, and promoting access to CRCS exams.

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CRCS test completion among 544 Latinos, by sociodemographic, acculturation, access and utilization of health care variables

Table 1

	Never screened for CRC		Ever screened for CRC		<i>p</i>
	N	%	N	%	
Total sample	359	66	185	34	
<i>Sociodemographic variables</i>					
Gender					
Male	102	69.4	45	30.6	.309
Female	257	64.7	140	35.3	
Age, years					
50–64	221	66.6	111	33.4	.724
65 and greater	138	65.1	74	34.9	
Age, mean (SD)	62.92	(10.10)	63.65	(9.18)	.398
Marital status					
Married	222	67.1	109	32.9	.480
Not married ^a	134	64.1	75	35.9	
Missing (4)					
Education					
None	37	74.0	13	26.0	.416
< 12 years	274	64.8	149	35.2	
12 years or more	30	63.8	17	36.2	
Missing (24)					
Household income					
< \$10,000	200	66.0	103	34.0	.437
\$10–\$19,999	57	59.4	39	40.6	
\$20,000 or higher	16	69.6	7	30.4	
Missing (122)		70.5		29.5	
Site					<.001
El Paso	39	48.1	42	51.9	
Brownsville/Laredo	320	69.1	143	30.9	

	Never screened for CRC		Ever screened for CRC		<i>p</i>
	N	%	N	%	
Total sample	359	66	185	34	
<i>Acculturation</i>					
Acculturation (BAS scale)					
Low	315	67.6	151	32.4	.032
Bi-high	34	54.0	29	46.0	
Missing (15)					
Generational status					
First (foreign born)	277	65.8	144	34.2	.888
Second	56	65.1	30	34.9	
Third or higher	23	69.7	10	30.3	
Missing (4)					
Years in U.S.					
< 10 ^b	53	76.8	16	23.2	.007
11–19	52	77.6	15	22.4	
20	248	62.3	150	37.7	
Missing (15)					
<i>Access and utilization</i>					
Health insurance					
None	210	78.1	59	21.9	<.001
Public only	130	56.3	101	43.7	
Private only	8	42.1	11	57.9	
Both private and public	1	25.0	3	75.0	
Other	4	30.8	9	69.2	
Missing (8)					
Has a usual place for health care (<i>medical home</i>)					
No	113	79.6	29	20.4	<.001
Yes	231	60.3	152	39.7	
Missing (19)					
Place of usual care					

	Never screened for CRC		Ever screened for CRC		<i>p</i>
	N	%	N	%	
Total sample	359	66	185	34	
Private doctor's office	85	55.9	67	44.1	.214
Hospital ER/	8	72.7	3	27.3	
Outpatient clinic					
County/Migrant/	132	62.6	79	37.4	
Local clinic					
Doctor/clinic in Mexico	18	75.0	6	25.0	
Missing (146)					
Visits doctor for regular check-ups					
No	238	79.9	60	20.1	<.001
Yes	116	48.7	122	51.3	
Missing (8)					
Doctor or nurse recommended CRCs					
No	315	77.0	94	23.0	<.001
Yes	44	32.6	91	67.4	

Bold values indicate significance at the .05 level or better. Exact *p*-values are included

^aNot married includes: separated, widowed, never married, married includes lives with partner

^bIncluding 118 U.S. born Mexican-Americans

Table 2

Association between CRCS in low income Latinos and sociodemographic, acculturation, access and utilization variables

Characteristics	Model 1		Model 2		Model 3	
	Odds ratios	95 % CI	Odds ratios	95 % CI	Odds ratios	95 % CI
<i>Sociodemographic</i>						
Gender						
Female	1 (reference)					
Male	0.76	0.49–1.19	0.68	0.43–1.08	0.73	0.43–1.25
Age, years						
50–64	1 (reference)					
65+	1.27	0.84–1.90	1.19	0.78–1.80	0.81	0.47–1.40
Education						
None	1 (reference)					
0–11	1.79	0.86–3.71	1.72	0.82–3.61	1.44	0.64–3.25
12+	2.12	0.83–5.39	1.46	0.53–4.01	0.86	0.27–2.71
Site						
El Paso	1 (reference)					
Brownsville/Laredo	.43	0.26–0.72**	.41	.24–.70**	.62	.33–1.17
<i>Acculturation</i>						
(BAS scale)						
Low			1 (reference)			
Bi-high acculturation			2.88	1.29–6.39*	2.82	1.13–7.04*
Generation						
First			1 (reference)			
Second			0.59	0.31–1.11	0.57	0.28–1.19
Third or higher			0.42	0.16–1.12	0.56	0.18–1.72
Years residing in USA						
10			1 (reference)			
11–19			0.82	0.34–1.96	0.58	0.23–1.52
20			1.84	0.93–3.63	1.05	0.50–2.20
<i>Access, utilization and physician recommendation</i>						

Characteristics	Model 1		Model 2		Model 3	
	Odds ratios	95 % CI	Odds ratios	95 % CI	Odds ratios	95 % CI
Health insurance						
None					1 (reference)	
Any					2.09	1.20–3.63**
Has usual health provider						
No					1 (reference)	
Yes					1.58	0.89–2.80
Regular check-ups						
No					1 (reference)	
Yes					3.07	1.94–4.85***
Doctor/nurse recommended CRCs						
No					1 (reference)	
Yes					4.83	2.89–8.06***
Hosmer & Lemeshow test						
	$\chi^2_{(6)} = 2.91$, $p = .82$		$\chi^2_{(7)} = 10.73$, $p = .15$		$\chi^2_{(8)} = 5.37$, $p = .72$	
2 log likelihood	603.11		585.32		478.28	
Likelihood ratio χ^2 , p value	$\chi^2_{(5)} = 14.23$, $p = .01$		$\chi^2_{(10)} = 32.01$, $p < .001$		$\chi^2_{(14)} = 139.05$, $p < .001$	
Cox & snell R^2	.03		.07		.25	

Bold values indicate significance at the .05 level or better. Exact p -values are included

* $p < .05$;

** $p < .01$;

*** $p < .001$