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Journal

Journal of Immigrant and Minority Health, 20(6)

ISSN

1557-1912

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Publication Date

2018-12-01

DOI

10.1007/s10903-017-0679-0

Peer reviewed

Journal of Immigrant and Minority Health
https://doi.org/10.1007/s10903-017-0679-0

ORIGINAL PAPER

The Role of Physician Recommendation in Colorectal Cancer Screening Receipt Among Immigrant Chinese Americans

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Abstract

Chinese Americans have low colorectal cancer (CRC) screening rates. It is unclear whether physicians should offer all CRC screening modalities (fecal occult blood test [FOBT], sigmoidoscopy, colonoscopy) to Chinese Americans to increase screening. Seven hundred and twenty-five Chinese Americans were asked in a survey if their physician had ever recommended CRC screening and to self-report receipt and type of CRC screening. Participants whose physician had recommended all CRC screening modalities were significantly more likely to report ever having screening (adjusted odds ratio 4.29, 95% CI 1.26–14.68) and being up-to-date (4.06, 95% CI 2.13–7.74) than those who reported that their physician only recommended FOBT. Participants who received a recommendation of only one type of screening did not report a significant difference in ever having or being up-to-date for screening. A potential strategy to increase CRC screening among Chinese Americans is for clinicians to recommend all available CRC screening modalities to each patient.

Keywords Colorectal cancer screening · Chinese Americans · Physician recommendation · Disparities

Background

Colorectal cancer (CRC) is the third most common cancer in the United States (U.S.) [1]. Regular CRC screening can detect and remove precursor lesions or find early stage CRC that can be cured. However, receipt of CRC screening remains suboptimal, particularly among Asian Americans [2–6]. Chinese Americans, the largest Asian American group, have lower rates of CRC screening than non-Hispanic Whites, African Americans and Latinos [6, 7]. Chinese Americans are also more likely to be diagnosed with late stage CRC than non-Hispanic Whites [8].

Inadequate access to health care, patient-physician communication barriers, limited health literacy, culturally-based beliefs, and language barriers are known factors limiting CRC screening among Chinese Americans [9–12]. The combination of low health literacy and limited English proficiency has been negatively associated with being up-to-date for CRC screening in Chinese Americans [11]. Additional markers for low acculturation, such as being foreign born and fewer years in the U.S., are also barriers [2, 13].

However, these factors alone are insufficient to explain the low screening rates found among Chinese Americans [14, 15]. While physician recommendation is one of the

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Published online: 22 November 2017

most consistent predictors of adherence to CRC screening [16–19], Chinese Americans reported lower rates of such recommendations compared to other ethnic groups [3, 19]. Furthermore, another potential barrier to screening among Chinese Americans is a lack of awareness of CRC screening as a preventive health practice [4].

There are multiple effective CRC screening tests, including the fecal occult blood test (FOBT), sigmoidoscopy, and colonoscopy [20]. A prior study suggested screening discussions without considering patients' preferences of CRC screening tests could lead to screening non-adherence [21]. Discussing all tests with each patient may increase screening by matching a test to the patient's preference, but it is unknown how physician recommendation of different screening options affect Chinese American patients' decision to get screened. Using the baseline survey of 725 Chinese Americans enrolled in a randomized controlled trial (RCT) to compare the effectiveness of lay health worker (LHW) education versus a brochure to increase CRC screening, the present study examines the relationship between physician recommendation of CRC screening options and reported adherence to CRC screening.

Theoretical Framework

We used the Andersen's model of health services use as a conceptual framework to select potentially confounding socio-demographic, health and health care access factors on reported CRC screening [22]. Predisposing factors included socio-demographic factors described below. We included having health insurance and having a primary care physician (PCP) as enabling factors. Health status and presence of chronic diseases were included as a surrogate for perceived need to use health services.

Methods

Participants

Participant eligibility criteria were self-identification as Chinese or Chinese American, age 50–75 years old, being a Cantonese, Mandarin, or English speaker, living in San Francisco and planning to stay for at least 6 months, there being no other participants in their household, and having no personal history of colorectal cancer. The participants were recruited by 58 LHWs through their social networks. Research staff trained the LHWs in recruitment. Each LHW was encouraged to recruit about 12 participants, about half of whom had never been screened for CRC. On average, each LHW recruited 12 participants (SD = 1.9; range = 4–15).

Data Collection

Participants completed a face-to-face baseline survey in Chinese or English before the start of intervention and control study procedures. Each participant received $20 USD for completing the survey. The pre-intervention data were collected in four waves from 2010 to 2013.

Measures

Socio-Demographics

Socio-demographic variables assessed included age, sex, birthplace (China, Hong Kong or Taiwan versus U.S. versus other), years lived in the U.S., spoken English proficiency (using a 5-point scale: "Fluently," "Well," "So-so," "Poorly," or "Not at all"), highest educational attainment (< high school graduation vs. ≥ high school diploma), marital status (married vs. other), employment status (employed vs. retired vs. unemployed) and annual household income (< $20,000 vs. ≥ $20,000 vs. don't know/refused).

Health and Health Care Access

Self-perceived health status was assessed by a single item that asked, "In general, would you say your health is…?" with response options of "excellent," "very good," "good," "fair," or "poor" [23, 24]. Participants were asked if they had ever been told by a physician that they had any of these chronic diseases: heart disease, stroke, diabetes, hypertension, or high cholesterol. Having health insurance, having a regular place for Western (biomedical) health care, and having a PCP were also assessed. PCP characteristics (sex of PCP, Chinese ethnicity or not, and use of Chinese language during clinic visits) were also collected. Health care utilization was assessed by asking if they had seen a physician within the last 12 months.

CRC Screening and Physician Recommendation for CRC Screening

After each test was defined, participants were asked if they had received a FOBT, a sigmoidoscopy, or a colonoscopy and, if they had received any tests, when they had the test(s) (in the last 1–10 + years). Ever having had CRC screening was defined as self-report of at least one receipt of any of the three tests. Based on 2008 national guidelines by the U.S. Preventive Services Task Force at the start of study [20], being up-to-date for CRC screening was defined as having an FOBT within the prior 1 year, a sigmoidoscopy within the prior 5 years, and/or a colonoscopy within the prior 10 years.

Participants were asked whether their physician had ever recommended an FOBT, and in a separate question whether their physician had ever recommended a sigmoidoscopy or a colonoscopy.

Analysis

Descriptive statistics were computed for all of the measures, including means, standard deviations and percentages. Odds ratios of CRC screening in relation to the predictors with 95% confidence intervals were estimated using logistic regression models. Because participants were recruited by LHWs, generalized estimating equations were used to account for clustering of participants by LHW in multivariable analyses. In order to obtain estimates of covariate effects averaged over the population, rather than conditional on the LHW, we used generalized estimating equations in our multivariable analyses to account for clustering of participants by LHW. Generalized estimating equations are appropriate for population averaged models of correlated data, whether the correlated data are longitudinal or are otherwise clustered [25]. Multivariable models were adjusted for age, sex, education level, employment status, income, marital status, English proficiency, number of years in the U.S, self-perceived health status, presence of at least one chronic disease, having a regular place of care, having seen a physician in the last 12 months, having health insurance, having a PCP, PCP sex, PCP language, PCP ethnicity, and the wave of the study. We created four models, two for each screening outcome. To examine whether health care access affected reported CRC screening in this population, Model 1 examined only socio-demographic, health, and health care access variables for ever having CRC screening and for being up-to-date for screening. Then, we completed a second multivariable model to assess the effect of recalling a physician recommendation for one test versus another for ever having CRC screening and being up-to-date for screening with physician recommendation of FOBT only as the referent group. The rationale for selecting physician recommendation of FOBT only as the referent group is that physician recommendation of CRC screening would be expected among patients age 50–75 with FOBT as the most convenient, readily accessible and least invasive screening modality. Statistical significance was assessed at the 0.05 level (two-sided). Statistical analyses were performed using SAS version 9.3 (SAS Institute, 2012; Cary, N.C.).

The Institutional Review Boards of the University of California San Francisco and San Francisco State University approved all study procedures. All procedures performed in this study involving human participants were in accordance with the ethical standards of the Institutional Review Boards and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

This manuscript does not contain any studies with animals.

Results

Table 1 shows the socio-demographic, health, health care access, and CRC screening characteristics of the 725 respondents. The mean age was 62.2 ± 6.9 years, and 81.1% were women. Most (92.8%) were immigrants from China, Hong Kong, or Taiwan with a mean of 17.1 ± 11.7 years of residence in the U.S. Most (95.7%) spoke English less than well and just over one-quarter (29.5%) had graduated from high school. About three-fourths (73.9%) were married or living with a partner, only 27.2% were employed, and 59.2% reported an annual household income < $20,000.

One-third (35.1%) of respondents reported their health as "excellent," "very good," or "good." About 60% had at least one chronic disease including hypertension, high cholesterol and diabetes. Most had some health insurance (90.9%), had a regular place for health care (89.6%), and had seen a physician in the last 12 months (80.3%). Most (88.6%) had a PCP. Among those with a PCP, 51.6% reported that their PCP was male, and most reported that their PCP was Chinese (80.3%) or spoke a Chinese language (84.8%).

About half (56.1%) reported having heard of a colon polyp, and four-fifths (79.7%) had heard of one or more of the three CRC screening tests. About half (56.6%) of respondents reported that their physician had recommended an FOBT and only 30.7% a sigmoidoscopy or colonoscopy. Overall, 64.4% reported that their physician had recommended at least one of the three tests. A third (35.6%) reported that their physician had recommended none of them. About three-fourths (73.1%) of participants reported that they ever had any CRC screening (67.2% had had an FOBT, 18.2% a sigmoidoscopy, and 30.9% a colonoscopy). Only 59.0% were up-to-date for any CRC screening. Among all participants, 37.7% planned on obtaining CRC screening in the next 6 months.

In model 1 analyses to examine the effect of socio-demographic, health and health care access factors on reported CRC screening (Table 2), the only socio-demographic factor significantly associated with ever having had any CRC screening was longer duration of U.S. residence (adjusted odds ratio (AOR) 1.98, 95% Confidence Interval (CI) 1.23–3.20 for those who had lived in the U.S. for ≥ 10 years versus those who had lived here for < 10 years). Those who reported having seen a physician in the last 12 months were more likely to have had screening than those who had not (AOR 2.69, 95% CI 1.71–4.21). Participants who had a PCP were more likely to have had screening than those who did

Table 1 Sociodemographic and self-reported health and health care access characteristics, and use of CRC screening of Chinese-American participants (N = 725)

Socio-demographics	% or mean +/− standard deviation
Age (years)	62.2 ± 6.9
Female	81.1
Birthplace	
China/Hong Kong/Taiwan	92.8
U.S.	0.6
Other	6.6
Years in the U.S.	17.1 ± 11.7
Spoken English proficiency	
Fluently	1.8
Well	2.5
So-so	28.5
Poorly	38.9
Not at all	28.4
High school graduation or more	29.5
Married or living with partner	73.9
Currently employed	27.2
Annual household income	
< $20,000	59.2
≥ $20,000	22.4
Don't know	18.5
Health and health care access	
Self-perceived health status	
Excellent	1.8
Very good	5.7
Good	27.6
Fair	57.5
Poor	7.4
Has at least one chronic disease[a]	60.2
Has any health insurance	90.9
Has a regular place for health care	89.6
Saw a physician in the last 12 months	80.3
Has a PCP	88.6
If has PCP, PCP is male doctor	51.6
If has PCP, PCP is Chinese	80.3
If has PCP, PCP speaks Chinese (Cantonese or Mandarin)	84.8
CRC knowledge, physician recommendation and use of screening (among all participants)	
Had heard of colon polyp	56.1
Had heard of any CRC screening tests	79.7
Physician had recommended a FOBT	56.6
Physician had recommended a sigmoidoscopy or colonoscopy	30.7
Physician had recommended any CRC screening	64.4
Physician recommended none of the CRC screening tests	35.6
Ever had a FOBT	67.2
Ever had a sigmoidoscopy	18.2
Ever had a colonoscopy	30.9
Ever had any CRC screening	73.1
Up-to-date[b] for any CRC screening	59.0
Planned to obtain CRC screening	37.7

[a]Specifically, heart disease, stroke, diabetes, hypertension, or high cholesterol

[b]Up-to-date defined as FOBT within the prior 1 year, sigmoidoscopy within the prior 5 years, and/or colonoscopy within the prior 10 years [20]

Table 2 Multivariable analyses of associations between participants' use of CRC screening with socio-demographic, health and health care access factors without and with physician's CRC screening recommendation

	AOR (95% CI)			
	Ever had CRC screening		Up-to-date[a] for CRC screening	
	Model 1[b]	Model 2[c]	Model 1[b]	Model 2[c]
Lived in U.S. ≥ 10 years (ref. Lived in U.S. < 10 years)	**1.98 (1.23–3.20)**	1.29 (0.71–2.34)	**1.56 (1.00-2.44)**	1.11 (0.71–1.76)
Seen a physician in the last 12 months (ref. Did not see a physician in the last 12 months)	**2.69 (1.71–4.21)**	**1.79 (1.04–3.10)**	**2.08 (1.28–3.38)**	1.58 (0.91–2.74)
Has a PCP (ref. Does not have a PCP)	**4.10 (1.68–10.03)**	1.77 (0.66–4.76)	**4.65 (2.18–9.94)**	**2.39 (1.10–5.20)**
Has a Chinese PCP (ref. Has a non-Chinese PCP)	0.71 (0.33–1.52)	0.79 (0.34–1.83)	**0.44 (0.23–0.84)**	**0.44 (0.24–0.80)**
Has at least one chronic disease[d] (ref. Has no chronic disease)	1.42 (0.95–2.12)	1.43 (0.85–2.41)	**2.09 (1.49–2.91)**	**2.22 (1.47–3.34)**
Physician CRC screening recommendation				
Their physician recommended sigmoidoscopy/colonoscopy (but not FOBT) (ref. Their physician recommended ONLY FOBT)	–	0.42 (0.15–1.18)	–	1.66 (0.69–4.00)
Their physician recommended both FOBT and sigmoidoscopy/colonoscopy (ref. Their physician recommended ONLY FOBT)	–	**4.29 (1.26–14.68)**	–	**4.06 (2.13–7.74)**
Their physician recommended none of the CRC screening tests (ref. Their physician recommended ONLY FOBT)	–	**0.056 (0.031–0.10)**	–	**0.18 (0.11–0.31)**

All models accounted for clustering of participants by LHW

Bolded AORs are statistically significant with $p < 0.05$

[a]Up-to-date defined as having had FOBT within the prior 1 year, sigmoidoscopy within the prior 5 years, and/or colonoscopy within the prior 10 years [20]

[b]Model 1 adjusted for age, sex, education level, employment status, income, marital status, English proficiency, number of years in the U.S., self-perceived health status, presence of at least one chronic disease, having a regular place of care, having seen a physician in the last 12 months, having health insurance, having a PCP, PCP sex, PCP language, PCP ethnicity, and wave of the study

[c]Model 2 adjusted for age, sex, education level, employment status, income, marital status, English proficiency, number of years in the U.S., self-perceived health status, presence of at least one chronic disease, having a regular place of care, having seen a physician in the last 12 months, having health insurance, having a PCP, PCP sex, PCP language, PCP ethnicity, wave of the study, and physician recommendation of CRC screening

[d]Specifically, heart disease, stroke, diabetes, hypertension, or high cholesterol

not (AOR 4.10, 95% CI 1.68–10.03). A similar model for being up-to-date with CRC screening showed that these factors were significantly associated: having lived in the U.S. for ≥ 10 years (AOR 1.56, 95% CI 1.00–2.44), having seen a physician in the last 12 months (AOR 2.08, 95% CI 1.28–3.38); having a PCP (AOR 4.65, 95% CI 2.18–9.94); having a Chinese PCP (AOR 0.44, 95% CI 0.23–0.84); and having at least one chronic disease (AOR 2.09, 95% CI 1.49–2.91).

In model 2, multivariable analyses examined the effect on receipt of screening of participant recall of physician recommendation for one test versus another (Table 2). In this model, having a PCP versus not having a PCP was associated with being up-to-date with any CRC screening (AOR 2.39 95% CI 1.10–5.20). Having a PCP of Chinese ethnicity compared to having a PCP of non-Chinese ethnicity was associated with a lower odds of being up-to-date for any screening (AOR 0.44 95% CI 0.24–0.80). There were no differences in ever having had CRC screening or being up-to-date with screening if the participant had a physician recommendation for an FOBT versus one for sigmoidoscopy/colonoscopy. Compared to those whose physician only recommended an FOBT, participants whose physicians recommended FOBT and sigmoidoscopy/colonoscopy were more likely to have ever had any CRC screening (AOR 4.29, 95% CI 1.26–14.68) or to be up-to-date for any screening (AOR 4.06, 95% CI 2.13–7.74). Participants whose physicians recommended none of the CRC screening tests were significantly less likely to ever have CRC screening and being up-to-date with screening compared to participants whose physicians recommended only FOBT.

Discussion

In a sample of immigrant Chinese Americans with low English proficiency, CRC screening rates were suboptimal, with only 60% reporting that their physicians had ever recommended a CRC screening test. Adherence to CRC screening was associated with having a PCP and with physician recommendation of screening. Physician recommendation for both FOBT and sigmoidoscopy/colonoscopy as screening

modalities was more likely than recommendation for either test alone to be associated with ever screening and being up-to-date.

In this study of Chinese Americans, the rates for ever having received any CRC screening (73%) and for being up-to-date with any CRC screening (59%), are similar to prior population-based studies (5, 7, 15). Longer duration of residence in the U.S. was associated with higher likelihood of ever having screening and of being up-to-date for screening in our analysis of the 2001 California Health Interview Survey (CHIS) that includes limited English proficient Chinese Americans [5]. In the present study, longer U.S. residency was associated with ever having and being up-to-date with screening (in model 1 that did not include physician recommendation of CRC screening). The low rates of screening reinforce the need to understand what can improve such rates, particularly among more recent immigrants.

Despite physician recommendation of CRC screening being associated with adherence to CRC screening, in this study, only 64% of the participants reported that their physicians had recommended any CRC screening test, with about one-half reporting they recommended FOBT and one-third sigmoidoscopy/colonoscopy. These rates are lower than a study conducted in 2001 of Medicare patients from North and South Carolina, which found that 72, 56, and 53% of physicians had recommended any CRC screening, FOBT, and sigmoidoscopy/colonoscopy, respectively [26]. Klabunde's study also found a strong association between physician recommendation and screening receipt, with over 98% of those screened and only 7% with those unscreened reporting physician recommendation. In a study of 318 Japanese Americans in 2002, Honda found that 66% reported physicians recommending FOBT and 71% recommending sigmoidoscopy [27].

One strategy to increase the rate of CRC screening is for clinicians not only to recommend CRC screening in general but to offer each patient stool-based FOBT or endoscopic sigmoidoscopy/colonoscopy in the event that the patient may prefer one type of test over another [21, 28, 29]. In our study, Chinese American participants who reported that their physicians recommended both types of tests were more likely than those whose physicians recommended only one type of test to have ever been screened or to be up-to-date for screening. This finding emphasizes the importance of offering choices for screening whenever possible in order to reach the greatest number of patients. This underscores the importance and role of physician recommendation of CRC screening in the care of Chinese Americans.

In model 1 that did not include physician recommendation, health care access factors (having seen a physician within the last 12 months and having a PCP) were significantly associated with CRC screening among Chinese Americans. These findings are similar to those from our 2001 CHIS study [5] and other studies [30]. This finding underscores the importance of providing adequate access through having enough PCPs to address the low rates of CRC screening in this population. That said, having a Chinese PCP was associated with a lower likelihood of being up-to-date for CRC screening in model 2 including physician recommendation of CRC screening. It is not clear from our data why this is so. Possible explanations may include that some Chinese PCPs were trained in another country where screening tests were not a high priority [12, 31, 32] or that many Asian American PCPs may have very busy medical practices that are focused on acute care and less on preventive care [33, 34].

This study has several important limitations. First, the findings are based on participant self-report, which is subject to recall bias particularly on report of physician recommendations and receipt of screening tests, and the extent of recall bias is unknown. Second, the sample consisted mostly of women. Third, this was a cross-sectional study, so no inference regarding causality can be drawn between test receipt and physician recommendation. However, this study has strengths, including, first, the large sample size of an understudied population and, second, the survey being conducted in Chinese which allowed for a substantial low English proficiency Chinese American study population.

New Contribution to the Literature

Our results confirm the ongoing problem of low CRC screening rates among immigrant Chinese Americans and the need to increase such screening in this rapidly growing population. Efforts to do so should focus both on enhancing health care access and on promoting physician recommendation of CRC screening tests including emphasizing the availability of multiple screening tests, if they are, in fact, available, to appeal to patient preferences and targeting CRC screening education of ethnic physicians caring for large numbers of Chinese American patients.

Acknowledgements This study was funded by the National Institutes of Health/National Cancer Institute (Grant No. 1R01CA138778). Additional support was provided by grant U54 CA153499 funded by the National Cancer Institute's Center to Reduce Cancer Health Disparities. The funder had no role in study design, data collection, and analysis and preparation of the manuscript.

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