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Heterogeneous Demographic and Cultural Profiles of Non-adherent Chinese-American Patients to Colorectal Cancer Screening: A Latent Class Analysis

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Abstract

Background—Colorectal cancer (CRC) is one of the leading causes of cancer death for Chinese Americans, but their CRC screening rates remain low.

Objective—We examined subgroups of Chinese-American patients non-adherent to CRC screening guidelines to better inform clinical practices to effectively promote screening.

Methods—Using latent class analysis (LCA) of data from 327 participants recruited from 18 primary care clinics, we classified non-adherent patients based on sociodemographics, screening barriers, attitudinal and clinical factors for CRC screening.

Results—The best-fitting LCA model described three distinctive classes: Western Healthcare Class (WHC, 35%), Eastern Healthcare Class (EHC, 18%) and Mixed Healthcare Class (MHC, 46%). WHC patients were highly-educated with average 20 years of U.S. residency, high level of English proficiency, the least Eastern cultural views of care and the greatest exposure to physician recommendations, but reported having no time for screenings. EHC patients were highly-educated seniors and recent immigrants with the least CRC knowledge and the more Eastern cultural views. MHC patients had low level of education, resided in the U.S. for 20 years, and had relatively long relationships with physicians, but their knowledge and cultural views were similar to those of EHC patients.

Conclusions—Non-adherent Chinese-American patients are heterogeneous. It is essential to have future intervention programs tailored to address specific screening beliefs and barriers for subtypes of non-adherent patients.

Implications for Practice—Training primary care physicians to recognize patients' different demographic characteristics and healthcare beliefs may facilitate physician's communication with patients to overcome their barriers and improve screening behaviors.

Keywords

colorectal cancer screening; Chinese Americans; cultural view of healthcare; latent class analysis

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Introduction

Colorectal cancer (CRC) is the second most common cancer type and one of the top three leading causes of cancer death among Chinese Americans.¹ Various CRC screening methods are proven effective in early detection of CRC, such as fecal occult blood test (FOBT) and colonoscopy.²⁻⁴ Yet the CRC screening rates among Chinese Americans are lower than those among non-Hispanic White Americans⁵⁻⁷ and are heterogeneously presented in the subgroups of Chinese Americans. For example, recent literature showed that about 54% of Chinese Americans adhered to CRC screening guidelines,⁶ whereas other research indicated that only 40% of less-acclulturated Chinese Americans used recommended CRC screening tests.⁸

A few studies have examined predictive factors for the utilization of CRC screening in Chinese Americans.⁸⁻¹³ As in other ethnic groups,^{14,15} Chinese Americans' low utilization of CRC screening is significantly related to the lack of physician recommendation^{13,16} and health insurance,^{8,12} recent immigrant status or low-accluturation level,^{10,13,16} and low perceived susceptibility of CRC and cancer worry.^{10,13} In addition, previous studies found that Chinese-American traditional views of healthcare (e.g., preferring primary prevention methods, such as diet over medical checkups) predicted their CRC screening behavior.^{9,17}

Chinese Americans are one of the fastest growing populations in the U.S.¹⁸ It is notable that the majority of Chinese Americans are foreign born (~70%)¹⁸ and more than half have limited English proficiency.¹⁹ Previous study showed that the incidence of colon cancer among Chinese Americans was higher than that reported in mainland China,²⁰ suggesting that Chinese who migrated to the U.S. might have increased risk for developing CRC.²¹ Therefore, it is important to increase Chinese Americans' awareness of CRC risk and screening behavior. There is limited knowledge about the homogeneity of Chinese Americans who are non-adherent to recommended CRC screening guidelines. Research indicates that identifying the subtypes of patients is advantageous for healthcare providers to tailor their communication with patients by focusing on their particular needs and barriers and consequently promote their health-seeking behaviors.²²⁻²⁴

To increase Chinese Americans' participation in CRC screening, it is important to understand whether there are different demographic, clinical, and psychosocial characteristics associated with their non-adherence to the US Preventive Services Task Force (USPSTF) CRC screening guidelines. In the guidelines, average risk patients aged 50-75 should have either 1) annual high-sensitivity FOBT, or 2) sigmoidoscopy every 5 years combined with high-sensitivity FOBT every 3 years, or 3) screening colonoscopy at intervals of 10 years.²⁵ Thus, average-risk patients who have not had one of the three CRC screening tests in the recommended intervals are known as non-adherent. For this purpose, we utilize baseline data from an ongoing physician-based CRC intervention trial that enrolled Chinese Americans non-adherent to the above USPSTF guidelines from Chinese-speaking primary care physician's offices to classify the subtypes of non-adherent Chinese-American patients and provide clinical implications for promoting their adherence to CRC screening. This study was not designed to test health behavior models, but included constructs related to Chinese-American patients' CRC screening behavior, such as knowledge, attitudes (i.e. barriers and cancer worry) and beliefs (i.e. cultural views) at baseline in addition to their clinical access factors (i.e. physicians' recommendations and length of relationship) to understand their non-adherent behaviors and to inform the content of our physician-based CRC intervention.

Methods

Sample and Procedures

This physician-based randomized controlled trial has been approved by Georgetown University and Temple University Institutional Review Boards. We enrolled Chinese-American primary care physicians and their Chinese-American patients from the metropolitan Washington DC, New York, and Philadelphia areas. All participating physicians, who were bilingual and able to speak Chinese (i.e. Mandarin and/or Cantonese) and English languages, were randomized into either an intervention arm or a control arm. Physicians in the intervention arm received Chinese-language educational materials (describing cognitive, cultural, and attitudinal factors contributing to explain Chinese-American patients' CRC screening behavior) and two rounds of in-office educational training (using standardized patients to train physicians how to speak with patients about their barriers to CRC screening). In contrast, physicians in the control arm practiced usual care without any educational training and materials. Participating patients would take two telephone interviews: 1) baseline assessment and 2) follow-up interview one year after the completion of baseline interviews. For this analysis, we only used the baseline assessment, which was independent of the randomization procedure.

Criteria for physicians participating in this study included: 1) being able to communicate with their patients in Chinese (i.e. Mandarin and Cantonese); 2) having more than 75 Chinese patients over 50 years old; and 3) practicing primary care, family medicine, or geriatrics. We identified 109 potentially eligible Chinese-American primary care physicians in the study areas (40 in DC and 69 in PA and NY) through different resources including Chinese-American physician directories, Yellow Pages, local newspaper advertisements, existing Asian Community Cancer networks (NCI funded, PI: Grace Ma), and the American Medical Association (AMA) master file. Their Chinese ethnicity was identified by their last name on the list. Bilingual research staff were hired to recruit physicians and their patients. From October 2008 to December 2011, we were able to contact 62 physicians. Among them, 25 physicians consented to participate in the study (a 40% response rate), 25 refused and 12 had too small practices to achieve the accrual goal. Each physician office was expected to enroll at least 24 Chinese-American patients, but some offices enrolled fewer than 24 patients for various reasons. Patients from 18 out of the 25 physicians were included for our analysis since the other seven physicians were newly enrolled and in the process of enrolling patients for participation.

Eligible patients were: 1) aged 50 to 75 years old, 2) active patients of participating physicians, who had visited the physicians at least once in the past two years from the enrollment point, 3) no personal or family history of CRC, and 4) non-adherent to the USPSTF CRC screening guidelines for persons at average risk who have not had a FOBT for more than 1 year, or a sigmoidoscopy for more than 5 years, or a colonoscopy for more than 10 years, including those who had never screened.²⁵ Patients were enrolled according to the following procedures. First, research staff used patients' first and last names to identify potential age-appropriate Chinese-American patients from the physician's database or billing records and then they randomly selected patients from the potentials to generate a calling list for this study. Second, our research staff called potential patients to invite their participation and screen their eligibility. Currently, 327 out of 671 eligible patients (49%) from the 18 physicians consented to participate in this study and have completed baseline assessment via telephone.

Measures

Sociodemographics include gender, age, years of residency in the U.S., English proficiency, employment (yes vs. no), and education (college or higher vs. high school or lower). English proficiency was assessed by asking about the patients' ability to speak, read and write in English on a 5-point scale ($\alpha=.99$).²⁶ Higher scores suggest better proficiency.

Clinical care factors included whether they received physician recommendation for CRC screening in the past two years (yes vs. no), length of patient-physician relationship (≥ 3 vs. < 3 years), prior CRC screening (ever vs. never screened) and whether they had any kind of health insurance coverage (yes vs. no).

Patients' knowledge of CRC screening was assessed by asking 1) at which age average-risk adults should start CRC screening, and 2) the different time intervals for CRC screening modalities including fecal occult blood test (FOBT), sigmoidoscopy, and colonoscopy. A correct answer to each question earned one point. The total score of CRC screening knowledge were summed and divided into two groups: "high" (≥ 2 points) and "low" (0 or 1 point).

Chinese cultural views of cancer and health were assessed by 20 items from the previously validated Cultural Views of Health Care scale in Chinese-American populations ($\alpha=.82$).^{27,28} Examples of questions included asking about their fatalistic beliefs about cancer, healthcare, self-care, and traditional Chinese medicine. Patients responded to each item with a range of options from 1=strongly agree to 5=strongly disagree. High standardized mean scores on cultural views indicate a more Eastern view of care, while low scores reflect a more Western view of care.

Attitudinal factors include worry about developing CRC and barriers to CRC screening. *Cancer worry* was assessed by one item ("Overall, how worried are you that you might get colorectal cancer someday?"), which has been used in our previous research in Chinese Americans.¹⁷ Patients responded to the item with choices from 1=very worried to 4=not worried. The answers were dichotomized into worried (including "somewhat worried," "worried," and "very worried") vs. not worried at all.

Barriers to CRC screening were inquired with a list of reasons presented for interviewers to choose. Multiple responses were an option, but we only used the top three commonly cited reasons for analysis. They are: 1) no symptoms, 2) no time, and 3) access barriers (including at least one of: language barrier, no physician recommendation, no transportation, or no health insurance coverage). Patients answered "yes" or "no" for each of the barriers separately.

Data Analysis

Latent class analysis (LCA) was conducted to profile differences in measured variables among non-adherent Chinese-American patients. Latent class analysis is a method widely used to detect homogeneity in a potentially heterogeneous group by evaluating associations among responses to a set of indicators. The LCA is based on an assumption that people differ in their behaviors as a result of some observable latent trait.²⁹ We used Mplus version 7 to conduct LCA and the following assessments to determine the number of classes.³⁰

To determine the number of classes, we used various information criteria like AIC (Akaike's Information Criterion), BIC (Bayesian Information Criterion), and CAIC (Consistent Akaike's Information Criterion). Participants were assigned to latent classes according to their maximal posterior probabilities. The smaller the BIC, AIC and CAIC, the better the model fits the data.³¹ We further compared the improvement of fit between neighboring

models (k class vs. k-1 class) by the Lo-Mendell-Rubin likelihood ratio test (LMR LRT) and the Vouong-Lo-Mendell-Rubin likelihood ratio test (VLMR LRT). We reported the p values of these tests to verify whether the improvement of fit was significant.³²

After classes were identified, multilevel regression analyses were conducted for pairwise comparisons. Since the patients were nested under physicians, a multilevel contrast analysis was conducted to model this within physician dependency assessing the differences in mean values of the continuous variables and in proportional values of the categorical variables across the classes. A combination of multilevel logit and continuous models were used to obtain the standard errors and 95% CIs.

Results

The characteristics of the overall sample were presented in Table 1. In general, the mean age of the study sample was 59 years (SD=7.41) and on average, years staying in the U.S. are about 19 years (SD=9.34). Approximately 53% of the sample were female, 51% were college graduates or above, and 59% were employed. The majority of our sample had health insurance coverage (87%). About 42% of the patients reported having received physician recommendation for CRC screening and 47% have been seeing a current physician for more than 3 years. However, ninety percent of our participants had never had CRC screening.

Results from the LCA showed that the 3-class model had the lowest values of BIC and CAIC and a fairly low AIC value, indicating the best goodness-of-fit to the data (see Table 2). Results from both likelihood ratio tests confirmed that the 3-class model has significant improvement of fit to data compared to the two-class model. Furthermore, the results of the VLMR LRT and LRM LRT indicated that the 4-class model did not improve the model fit compared to the 3-class model. Given that the results of both likelihood ratio tests agreed on the choice of a 3-class model and that it had better values of BIC and CAIC, the 3-class model solution was warranted to address the goodness-of-fit to our data.

We compared differences in demographics, clinical access factors, knowledge, cultural beliefs, and attitudinal factors among the three classes after adjusting standard errors. We presented the mean scores and percentage distribution of variables for each class in Table 3 and described the significance of pairwise comparisons between classes in Table 4. As shown in Table 3, patients in class 1 (36% of the sample) had the youngest age (mean=53 years old, SD=2.55), the longest residency in the U.S. (mean=20.25 years, SD=11.05), and highest level of English proficiency (mean=3.01, SD=0.68) among the three classes. Approximately 91% of them were college-educated and full-time employed. Most of them (60%) had a relationship with their physicians for over three years, similar to the rate of receiving their physician's recommendation for CRC screening (59%) in contrast to approximately one-third of patients in the other two classes reporting the receipt of physician recommendation. Furthermore, as shown in Table 4, patients in class 1 had the highest level of CRC screening knowledge among the three classes and the lowest Chinese cultural views of cancer and health (both $p < .05$). Although, they were more likely to worry about developing CRC ($p < .01$) than the other two classes, more patients in class 1 reported that time was a salient barrier to obtaining timely CRC screening ($p < .001$) in contrast to patients in the other two classes whose key barriers were attributed to having no symptoms and encountering access barriers to screening such as lack of transportation, insurance coverage, and English ability ($p < .05$). In short, patients in class 1 were more likely to associate with Western primary care and were less likely to face language and cultural barriers to health care access. They were labeled as the *Western Healthcare Class (WHC)*.

In contrast, patients in class 2 (18% of the sample) were distinguished as the *Eastern Healthcare Class (EHC)*. Their average age was 71 years old ($SD=2.65$). Ninety-eight percent of them were unemployed or retired (Table 3). These patients had an average US residency of 12 years ($SD=5.93$), much shorter than the other two classes who had lived in the U.S. for about 20 years on average ($p<0.001$, see Table 4). They had lowest level of English proficiency than the other two classes ($p<.001$). Only 26% of them had a relationship with their primary care physicians over three years and only 29% received physician recommendations for screening, $p<.001$). They had lower knowledge about CRC screening and expressed less cancer worry relative to the WHC group (percentage differences =0.11 and 0.21, respectively, both $p<.05$). These patients had the highest score on Chinese cultural views of cancer and health among the three classes (mean difference=-.43 to the WHC, $p<.01$). Over 70% of them attributed their non-adherence to having no symptoms. Apparently, the EHC were more inclined to a traditional way of care.

The third class (46% of the sample) was named the Mixed Healthcare Class (MHC). The average age of MHC was 59 years old ($SD=5.56$) and the length of residency in the U.S. was about 20 years ($SD=6.12$; see Table 3). While they had similar age and length of years in the U.S. to the WHC, they had much lower level of education and employment status ($p<.001$) and were less likely to receive physician recommendation for CRC screening (34%) than the WHC (percentage difference = 25%, $p<.001$; see Table 4). Patients in MHC did utilize Western care as more than 50% of them reported seeing their current primary care physician for at least three years. However, despite their relatively long residency in the US and relationship with physicians, the MHC were not significantly different from the EHC in knowledge, Chinese cultural views of cancer and health, worry about developing CRC, and perceived barriers. These results differentially characterized the MHC from the Western and Eastern Healthcare Classes.

Discussion

The results of this study suggest that Chinese-American patients who were non-adherent to CRC screening were differentiated in their demographics, cultural views of cancer and health, and attitudes toward CRC screening. They were generally characterized by three patterns: Western, Mixed, and Eastern Healthcare Classes. The Western Healthcare Class is distinct in their high socio-economic status and less traditional views of healthcare, perhaps resulting from their high English ability and long U.S. residency that have led to greater exposure to Western healthcare resources. Compared to the Western Healthcare Class, the Mixed Healthcare Class who also had resided in the U.S. over 20 years but had poor English ability, were significantly less likely to receive recommendation from physicians and hold Western views of healthcare. Surprisingly, the Mixed Healthcare Class's attitudes and barriers to CRC screening were similar to the Eastern Healthcare Class who had much shorter length of stay in the U.S. and relationship with physicians than the Western and Mixed Healthcare Classes.

People in Western Healthcare Class were more likely to receive screening advice (59%) and have longer visits with a physician; however, they do not adhere to their physician's recommendation for CRC screening. In addition, forty percent of this class did not receive physician recommendation. It could be that people in Western Healthcare Class have insufficient knowledge about CRC and screening. Although this group had higher screening knowledge and were more worried about developing CRC than the other two groups, their average knowledge scores were actually low and more than 50% of them reported lacking symptoms as a reason for being non-adherent. Along with their high employment rate, the Western Healthcare Class was significantly more likely to report being too busy to have a CRC test. It can be understood that when people are busy with work and lack accurate

knowledge about CRC, they are less likely to make time for CRC screening. Adherence to clinical recommendations may be improved by enhancing patient-physician communication in order to influence patients' decision making and outweigh the benefit of screening over the inconvenience of screening. Research showed that patients who have received thorough information about CRC screening were motivated to discuss CRC screening with their provider and those who were counseled about their barriers were able to participate in CRC screening.³³ Some research reported that physicians often did not discuss the full varieties of CRC screening options or emphasize the importance of adherence when making recommendations.^{34,35} How Chinese-speaking physicians provide recommendations and communicate with their Chinese-speaking patients is understudied. While our patients have shown poor knowledge and low adherence to physician recommendation, it is suggested that providers may stress the benefits of early detection to assist patients in the Western Healthcare Class to weigh the pros and cons of CRC screening and provide options for time-saving methods, such as take-home fecal occult blood tests.

It is notable that people in the Mixed Healthcare Class are similar to those in the Western Healthcare Class at their age level, length of seeing physicians, and U.S. residency; however, the former was significantly less likely to receive a CRC screening recommendation from their physician. Nevertheless, even though those in the Mixed Healthcare Class were more acculturated than those in the Eastern Healthcare Class, by measure of residency in the US and English proficiency used as proxies, their CRC knowledge level, Chinese cultural views of cancer and health, and barriers to CRC screening were similar to those of the Eastern Healthcare Class. This is deviant from the typical notion that the longer an immigrant stays in the U.S., the more likely he or she is acculturated to the mainstream lifestyle including healthcare practices.^{36,37} Our data show that the length of U.S. residency is not linearly related to patients' receipt of CRC screening information and recommendations in a sample of non-adherent patients. Perhaps, the lower educational level and poor English proficiency among people in the Mixed Healthcare Class make them less capable of accessing the mainstream healthcare resources. This reflects a need to develop linguistically and culturally appropriate programs for these less acculturated and less educated patients about CRC and evidence-based screening modalities for early detection. Research has shown that a multicomponent and culturally tailored intervention program distributed in a clinical setting, which included Chinese-language educational videos and brochures, have facilitated Chinese Americans' use of FOBT.³⁸ It is unknown why physicians are less likely to recommend CRC screening to patients in the Mixed Healthcare Class. Further investigation of Chinese-speaking patient-physician communication during medical encounters will be needed.

Multiple reasons could contribute to explaining the non-adherence to CRC screening guidelines in the Eastern Healthcare Class. Eastern Healthcare Class is an elderly population that has resided in the U.S. for fewer years and holds more traditional views of self-care. Their poorer level of English proficiency might have limited their learning and understanding about preventive cancer screening in the U.S. Previous studies found that Chinese immigrants with traditional views of care were more likely to have decreased screening adherence.^{17,39} This is probably due to their misconceptions about CRC and screening.¹⁷ For instance, despite the fact that the risk of developing CRC increases with age, our senior patients reported less worry about getting CRC and 70% of them attributed their non-adherence to the lack of symptoms. Patients in the Eastern Healthcare Class who were seeing Chinese-speaking physicians reported the lowest likelihood of receiving physician recommendation (29%) for screening. Previous studies in other ethnicities have shown that physicians are less likely to recommend CRC screening for the very elderly due to consideration of the potential benefits and harm given the patients' physical health status.^{40,41} Although USPSTF does not recommend routine screening for asymptomatic

adults over age 75,²⁵ the average age of the Eastern Healthcare Class is about 71 years old and most of them should still be screened. It is possible that those senior Chinese-American patients see physicians for other chronic diseases, making any recommendation for CRC screening less focused. We need future studies to examine whether having major concerns for other diseases interfere with physicians' cancer screening recommendation agenda and consequently makes physicians less likely to recommend CRC screening for patients. On the other hand, it may be explained by low awareness and knowledge among our senior patients. As a result, they are least likely to initiate communication with physicians about CRC screening and see the necessity of regular screening.

Our study has a few limitations. First, the study sample was elder Chinese American patients collected via Chinese American primary care physicians in metropolitan DC, Philadelphia, and New York areas. Our findings will not be generalizable to other Chinese-American immigrants residing in other areas and those who do not go to Chinese-American physicians for medical advice. Second, our study examined various sociodemographics, clinical factors, beliefs and attitudes toward CRC screening to classify homogenous subtypes in this population, but there may be more factors that contribute to non-adherent behaviors that we can further consider in future studies, such as trust in physicians and the utilization of traditional Chinese medicine practices or the availability of a Chinese-speaking gastroenterologist.

This is the first study to identify subgroups of Chinese-American patients who were non-adherent to CRC screening guidelines. These findings extend previous literature and demonstrate that there are different sociodemographic and behavioral factors to account for non-adherent screening behaviors of older Chinese immigrants. Training primary care physicians to understand that there are distinctive heterogeneous subgroups among non-adherent patients and recognize patients' different demographic characteristics (i.e. SES status, years in the U.S.) and healthcare beliefs (e.g. cancer screening) during encounters may facilitate physicians' communication with patients to overcome their barriers and consequently promote their screening behaviors. In addition, culturally and linguistically appropriate educational materials will be needed to educate immigrant patients and assist them to communicate with physicians or vice versa. Our findings recommend that future intervention programs tailored to address specific screening beliefs and barriers for subtypes of Chinese should be essential in effectively improving CRC screening for non-adherent Chinese immigrants.

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Table 1

Patient Sociodemographic Characteristics and Clinical Access Factors (n=327)

Patient characteristics	mean (sd)/%
Demographics	
Female, %	53%
Age, mean (sd)	59.00 (7.41)
Years in the U.S., mean (sd)	18.60 (9.34)
English proficiency, mean (sd)	2.19 (0.90)
Employed (vs. no), %	59%
College-educated (vs. high school), %	51%
Clinical access factors	
Had health insurance coverage (vs. no), %	87%
Had physician recommendation (vs. no), %	42%
Length seeing a physician ≥ 3 yrs (vs. < 3 yrs), %	47%
[†] Had ever screened for CRC (vs. never screened), %	10%

Abbreviations: sd, standard deviation.

[†]The ever screened participants were over due for CRC screening since they had their last FOBT over one year ago, or had their last sigmoidoscopy more than 5 years ago, or had their colonoscopy more than 10 years ago. Never screened indicates participants have never had any of the three CRC screening modalities.

Table 2

Goodness-of-Fit Statistics and Likelihood Ratio Tests of Latent Class Analysis Models Containing Different Numbers of Classes

Goodness-of-Fit Statistics			
Latent Class Models	BIC	AIC	CAIC
1-Class Model	10310.10	10238.09	10329.10
2-Class Model	9972.83	9832.60	10009.83
3-Class Model	9949.62	9741.17	10004.62
4-Class Model	9962.88	9686.21	10035.88
Likelihood Ratio Tests (LRT)			
Class comparison	VLMR LRT	LRM LRT	
1-class model vs. 2-class model	364.26, p = 0.08	360.60, p = 0.08	
2-class model vs. 3-class model	178.02, p < 0.001	176.23, p < 0.001	
3-class model vs. 4-class model	59.34, p = 0.546	58.74, p = 0.551	

Table 3

Mean Values and Percentage Distribution of Indicators by Latent Class (n=327)

Indicators	Classes		
	Western Healthcare (N=118)	Eastern Healthcare (N=60)	Mixed HealthCare (N=149)
Sociodemographics			
Age ^a	53.13 (2.55)	70.63 (2.65)	58.73 (5.56)
Years in the U.S. ^a	20.25 (11.05)	11.99 (5.93)	20.12 (6.12)
English proficiency ^a	3.01 (0.68)	1.54 (0.56)	1.86 (0.67)
Employed (vs. no)	92%	2%	59%
College-educated (vs. high school)	91%	46%	27%
Clinical access factors			
Had physician recommendation (vs. no)	59%	29%	34%
Length seeing a physician 3 yrs (vs. < 3 yrs)	60%	26%	51%
Had ever screened for CRC (vs. never screened)	14%	14%	7%
High screening knowledge (vs. low)	15%	4%	7%
Chinese cultural views of cancer and health ^a	-0.27 (1.05)	0.16 (0.98)	0.13 (0.90)
Attitudinal factors			
Worry about getting CRC (vs. not worried)	48%	27%	27%
Barriers to CRC screening (vs. did not report this barrier)			
Had no symptoms	51%	70%	66%
Had no time	39%	7%	18%
Had access barriers	21%	38%	33%

Abbreviations: CI, confidence interval; CRC, colorectal cancer; yrs, years.

^aContinuous variables: mean estimates with standard deviations in parentheses were presented; Otherwise, they are categorical variables: proportions were presented.

Table 4
Pairwise Comparisons for Mean and Percentage Differences in Indicators for the Three Latent Classes (n=327)

Indicators	Mean and Percentage Differences between Paired Classes (95%CI)		
	Western vs. Eastern Healthcare classes	Western vs. Mixed Healthcare classes	Eastern vs. Mixed Healthcare classes
Sociodemographics			
Age ^a	-17.50 (-18.50, -16.80) ^d	-5.60 (-7.15, -4.36) ^c	11.90 (10.70, 13.10) ^d
Years in the U.S. ^a	8.26 (5.71, 10.63) ^d	0.13 (-2.41, 2.34)	-8.13 (-10.70, -5.70) ^d
English proficiency ^a	1.47 (1.31, 1.69) ^d	1.15 (0.93, 1.40) ^c	-0.03 (-0.52, -0.16) ^d
Employed (vs. no)	90% (81%, 94%) ^d	33% (22%, 41%) ^d	-57% (-65%, -47%) ^d
College-educated (vs. high school)	45% (31%, 58%) ^d	64% (54%, 71%) ^d	19% (4%, 33%) ^b
Clinical access factors			
Had physician recommendation (vs. no)	30% (14%, 43%) ^d	25% (13%, 36%) ^d	-5% (-18%, 9%)
Length seeing a physician 3 yrs (vs. < 3 yrs)	34% (19%, 47%) ^d	9% (-3%, 2%)	-25% (-38%, -11%) ^d
Had ever screened for CRC (vs. never screened)	0% (-10%, 11%)	7% (-0%, 15%)	7% (-1%, 18%)
High screening knowledge (vs. low)			
11% (2%, 20%) ^b	8% (0.5%, 16%) ^b	-3% (-9%, 5%)	
Chinese cultural views of cancer and health^a			
-0.43 (-0.70, -0.18) ^c	-0.39 (-0.73, -0.10) ^b	0.04 (-0.18, 0.23)	
Attitudinal factors			
Worry about getting CRC (vs. not worried)	21% (5%, 34%) ^c	21% (8%, 31%) ^d	0% (-13%, 13%)
Barriers to CRC screening (vs. did not report this barrier)			
Had no symptoms	-19% (-33%, -3%) ^b	-15% (-26%, -3%) ^b	4% (-10%, 17%)
Had no time	32% (19%, 42%) ^d	21% (10%, 31%) ^d	-11% (-19%, 0%)
Had access barriers	-17% (-31%, -2%) ^b	-12% (-22%, -1%) ^b	5% (-8%, 20%)

Abbreviations: CI, confidence interval; CRC, colorectal cancer; yrs, years.

^a Continuous variables: mean estimates with standard deviations in parentheses were presented; Otherwise, they are categorical variables: proportions were presented.

^b $p < .05$,

^c $p < .01$,

^d $p < .001$