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Authors

Jung, Mary Y
Holt, Cheryl L
Ng, Diane
[et al.](#)

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The Chinese and Korean American immigrant experience: A mixed-methods examination of facilitators and barriers of colorectal cancer screening

Mary Y. Jung¹, Cheryl L. Holt², Diane Ng¹, Hwa J. Sim¹, Xiaoxiao Lu¹, Daisy Le², Hee-Soon Juon³, Jun Li⁴, and Sunmin Lee¹

¹Department of Epidemiology and Biostatistics, University of Maryland School of Public Health, College Park, USA

²Department of Behavioral and Community Health, University of Maryland School of Public Health, College Park, USA

³Division of Population Science, Department of Medical Oncology, Thomas Jefferson University, Philadelphia, USA

⁴Epidemiology and Applied Research Branch, Division of Cancer Prevention and Control, Centers for Disease Control and Prevention, Atlanta, USA

Abstract

Objective—Among Asian Americans, colorectal cancer (CRC) is the second leading cause of cancer deaths. Despite strong evidence that screening can reduce CRC-related mortality, fewer Chinese and Koreans receive screening as compared to non-Hispanic whites and blacks. The objective of this study was to examine facilitators and barriers as well as strategies to promote CRC screening in this population.

Design—This study employed a mixed-methods design. We conducted 17 key informant interviews and 12 focus groups in the Washington, D.C. metropolitan area. 120 Chinese and Korean focus group participants, aged 50 to 85, also provided quantitative data through self-administered surveys. All participants were asked to discuss facilitators and barriers of CRC screening, including in relation to culture.

Results—Participants who had a regular physician and doctor’s recommendation for CRC screening were more likely to ever receive a colonoscopy (adjusted odds ratio (aOR)= 3.51; 95% confidence interval (CI): 1.26, 9.79 and aOR=6.61; 95% CI: 2.63, 16.65, respectively). A doctor’s recommendation was also significantly associated with receipt of a fecal occult blood test (FOBT) (aOR=4.00; 95% CI: 1.43, 11.15). In terms of barriers, those who reported having no time and not having symptoms were less likely to have a colonoscopy (aOR=0.15; 95% CI: 0.03, 0.82 and aOR= 0.02; 95% CI: 0.002, 0.23, respectively) than those who had time and symptoms. Preventive healthcare was often not viewed as a priority, particularly for those living the “immigrant life,” who gave precedence to work. Cultural barriers to CRC screening included language (e.g., limited English proficiency and low health literacy); fear of finding CRC and burdening the family especially children; fatalism; and stigma towards cancer.

Conclusions—Future interventions and programs aiming to increase CRC screening among Chinese and Korean Americans should address both cultural and non-cultural factors that influence CRC screening uptake.

Keywords

Colorectal Cancer; Cancer Screening; Chinese; Koreans; Mixed-methods study

Introduction

Among Asian Americans and Pacific Islanders, colorectal cancer (CRC) is the third most diagnosed cancer and the second leading cause of cancer mortality (Centers for Disease Control and Prevention and National Cancer Institute 2015a, 2015b; Gomez et al. 2013; Miller et al. 2008). However, screening can effectively reduce CRC incidence and mortality (American Cancer Society 2014). The U.S. Preventive Services Task Force (USPSTF) recommends CRC screening for average-risk adults, aged 50 to 75 years, and selectively offering screening for adults, aged 76 to 85 years, depending on individual circumstances (U.S. Preventive Services Task Force 2008). Despite these recommendations, Asian Americans (henceforth noted as Asians) report lower percentages of CRC screening than non-Hispanic whites and blacks (Centers for Disease Control and Prevention 2012; Sabatino et al. 2015).

Compared to other racial groups, fewer Asians are up-to-date on CRC screening recommendations and have ever received CRC screening (American Cancer Society 2014; Steele et al. 2013). Data from the 2005 California Health Interview Survey found that 78%, 76%, and 62% of whites, blacks, and Asians had ever received CRC screening, respectively, while 64% of Chinese and only 33% of Koreans had ever received CRC screening (Maxwell and Crespi 2009). Among Asian subgroups, Koreans had the lowest prevalence of ever having CRC screening and showed a significant decrease in CRC screening of 16 percentage points from 2001 to 2005.

Based on the 2010 U.S. Census, Asians are the fastest growing minority population having grown by 43 percent from 2000, which is more than four times faster than that of the total U.S. population (Hoeffel et al. 2012). Our research focused specifically on Chinese and Korean Americans who comprise about 4 million and 1.5 million of the U.S. population, respectively (U.S. Census Bureau 2014). Given the low screening percentages among Chinese (Yip et al. 2006) and Korean Americans (Oh and Jacobsen 2014; Lee and Im 2013; Maxwell, Bastani, and Warda 2000; Kim et al. 1998), there are major implications for public health research and practice to improve CRC screening.

To our knowledge, studies examining factors associated with CRC screening among Chinese or Koreans, mostly collected data from quantitative surveys (Maxwell, Bastani, and Warda 2000; Jo et al. 2008; Oh, Kreps, and Jun 2013; Sun et al. 2004; Tang, Solomon, and McCracken 2001; Teng, Friedman, and Green 2006; Yu et al. 2001). Few studies have utilized qualitative methods and even fewer, if any, have employed a mixed-methods approach in these populations. Some major facilitators previously identified include having a physician's recommendation, health insurance, and education/awareness about CRC (Jo et

al. 2008; Oh, Kreps, and Jun 2013; Tang, Solomon, and McCracken 2001; Teng, Friedman, and Green 2006; Yu et al. 2001; Liang et al. 2004; Juon et al. 2003; Lee et al. 2014). Several studies have also found positive associations between older age and greater years of U.S. residence with CRC screening (Hwang 2013; Wong et al. 2013). Common barriers to CRC screening include fear of test results, low perceived susceptibility, lack of symptoms, lack of awareness, lack of insurance, and lack of time (Jo et al. 2008; Sun et al. 2004; Choe et al. 2006; Ma et al. 2009; Atkin et al. 2010).

For Asians, commonly observed cultural barriers to CRC screening were language, self-care, and fatalism (Liang et al. 2004; Choe et al. 2006; Le et al. 2014), which can hinder and reduce communication with medical professionals. Also, self-care can result in a deviation from western medical practices as individuals rely on their own traditional approaches and habits. Although healthy behaviors are important in maintaining good health, self-care promotes the belief that regular exercise and a healthy diet alone are enough to prevent cancer. Furthermore, fatalism decreases one's perceived control of disease, leading to the belief that screening is not necessary.

The purpose of this study was to identify facilitators and barriers that influence CRC screening behavior among Chinese and Korean Americans. Unlike most prior studies, we employed mixed methods to further explore non-cultural and cultural factors associated with having had a fecal occult blood test (FOBT) and colonoscopy through surveys, key informant interviews, and focus groups. Using quantitative analysis, we corroborated previous findings by testing facilitators and barriers that are associated with screening outcomes, adjusting for potential confounders, and evaluating the associations. Using qualitative analysis, we examined facilitators and barriers to CRC screening more comprehensively, including how these can be overcome.

Methods

Participants and Recruitment

Key informant interviewees (n=17) were chosen due to their familiarity with CRC screening or the Chinese and/or Korean communities in regards to their health and health behaviors. Additional interviewees were included based on recommendations from prior key informants. Key informants included physicians (primary care physicians, oncologists, and colorectal surgeons), local health department employees, patient navigators, and leaders in the communities of interest.

Twelve focus groups, ranging from 8 to 10 people in each group and lasting for 1.5 to 2 hours, were conducted with 59 Chinese and 61 Korean Americans in the Washington, D.C. metropolitan area. Participants were recruited through local Chinese and Korean newspaper advertisements, community organizations, and senior centers using a non-probability sampling method. Inclusion criteria included being a Chinese or Korean adult between the ages 50 to 85, having no history of CRC, and having lived in the U.S. for at least one year. Data collection was completed in 2014. This study was approved by the University of Maryland, College Park Institutional Review Board.

Quantitative Methods

Survey items were formulated based on the Health Belief Model and previous literature. Participants completed surveys prior to the interviews and focus groups. Both surveys included demographic characteristics and CRC screening history. In addition to these items, interviewees were also asked about their medical practice or service in the targeted community dependent on if they were a physician or community leader, while focus group participants also provided information on CRC knowledge, CRC screening, and acculturation (Holt et al., 2012).

Measures

Outcome variables: Focus group participants were asked in the survey whether they had ever used a FOBT and if they ever had a colonoscopy, which were analyzed as separate outcomes. These questions were derived from those used in the Behavioral Risk Factor Surveillance System (Centers for Disease Control and Prevention 2013).

Socio-demographic characteristics: In the focus group survey, participants provided their age, years of U.S. residence, gender, self-identified ethnicity, education, income, marital status, and health insurance status in the past 12 months.

CRC screening facilitators and barriers: The focus group survey contained items on general facilitators and barriers to CRC screening as well as specific facilitators and barriers related to receiving a FOBT and colonoscopy.

Only those who responded that they had heard about a FOBT (n=73) and colonoscopy (n=94) answered the test-specific items, since a lack of general awareness regarding the screening tests would result in guessing on the knowledge questions. For FOBT and colonoscopy specific facilitators and barriers, participants were asked whether they agreed, disagreed, or were not sure with statements about the screenings. We also asked about how confident they felt about their abilities to do a FOBT and to schedule and complete a colonoscopy (dichotomized to confident and not confident).

The survey contained 17 questions related to knowledge and beliefs of CRC risk and screening methods. Participants marked agree, disagree, or not sure. Knowledge questions included questions like “both men and women are at risk for colorectal cancer” and “colorectal cancer screening begins at age 50”. The internal reliability for the knowledge instrument in a previous sample was $\alpha=0.67$ (Tseng et al. 2009) but was slightly lower in the current study (Cronbach’s $\alpha=0.61$). Those who answered “disagree” and “not sure” were grouped together as in prior studies (Christou and Thompson 2012; Green and Kelly 2004), and correct responses were summed to obtain an index score. Further detailed analyses were conducted on six individual items that were considered to be important facilitators (belief that finding CRC early will save one’s life and CRC treatment may not be as bad if the cancer is found early) and barriers (belief that there is nothing to prevent CRC; CRC is fatal; screening is not needed if there are no symptoms; and screening is not covered by insurance).

Quantitative Data Analysis—For FOBT and colonoscopy, those who had ever received CRC screening were compared with those who had never received screening. Continuous variables, including age and years of U.S. residency, were compared by screening status for FOBT and colonoscopy using t-tests, while Fisher's exact tests and chi-square tests were conducted for categorical variables by screening status. Bivariate analysis was performed for both outcomes to calculate the odds ratios of screening based on facilitators and barriers asked about in the survey. Previous literature and bivariate analysis was used to identify potential key confounders (Maxwell, Bastani, and Warda 2000; Jo et al. 2008; Atkin et al. 2010; Kim, Chapman, and Vallina 2012). For the multivariable-adjusted logistic regression, the final models for ever having a colonoscopy as the outcome adjusted for age, years of U.S. residency, income, and marital status, while the final models for ever having a FOBT adjusted for ethnicity in addition to the aforementioned variables.

Qualitative Methods

Key Informant Interviews and Focus Groups—Moderator guides, consisting of semi-structured open-ended questions, were used to facilitate discussions in key informant interviews and focus groups. Qualitative data were collected until saturation was achieved at which point new information did not arise. Using the Health Belief Model, an extensive literature review, and prior study materials (Holt et al. 2009), guides were developed and adapted to stimulate discussions on CRC screening behaviors. The final guide used to moderate focus groups was updated based on key informant interviews and included further questions related to healthcare utilization, CRC knowledge, and potential intervention strategies. Both moderator guides included questions, such as what factors would encourage or prevent CRC screening among Chinese/Koreans, while the focus group moderator guide consisted of additional questions, such as are you familiar with any tests for detecting CRC and what kind of information would you want to learn about CRC.

Qualitative Data Analysis—Key informant interviews were conducted in English and audiotaped. After interviews, a research team member transcribed the audio verbatim. Focus groups were conducted in Chinese or Korean and were also audiotaped. Then, three independent bilingual research team members transcribed the audio, translated the transcript into English, and checked the resulting transcript for accuracy by comparing it to the original Chinese/Korean transcript.

Transcription and thematic analysis were done after the completion of interviews and again after the focus groups. Research team members (n=10) individually reviewed each transcript to generate an initial list of overall themes. These themes and the interview and focus group guides were used to generate a codebook. The research team was divided into pairs and assigned a set of codes to code each transcript. First, coding was done individually, followed by a meeting between partners to discuss discrepancies until consensus was reached. The inter-coder percent agreement was high (96.4–100%). Thus, no further modifications of the codebook were made. Following the analysis in pairs, the entire research team discussed findings, reviewed representative quotes for each code, and generated overall thoughts about the data.

We categorized barriers and facilitators into non-cultural and cultural. Cultural barriers and facilitators were unique to Chinese and Korean participants, and included language, health related attitudes and beliefs, perceived susceptibility, and burden to family (Sun et al. 2004; Liang et al. 2004; Choe et al. 2006; Ma et al. 2009; Le et al. 2014).

This study utilized triangulation resulting from different methods (i.e., quantitative and qualitative) and collecting data from different sources (i.e., key informant interviews and focus groups) to inform the interpretation of findings (Fenech Adami and Kiger 2005). Using this triangulation approach, we were able to compare and contrast barriers and facilitators of CRC screening to validate major findings.

Results

Focus Group Participant Characteristics by Screening Status

The focus group demographic characteristics by screening status for colonoscopy and FOBT are shown in Table 1. Overall, the average age was 62.9 years ($SD=7.5$) and the average years of U.S. residency was 19.3 ($SD=12.2$). Of the 120 focus group participants, 41.7% ($n=50$) reported ever having had a colonoscopy and 37.5% ($n=45$) reported ever having had a FOBT. Those who reported ever having had colonoscopy tended to have lived in the U.S. longer ($p=0.007$) and have health insurance coverage ($p=0.004$) than those who never had a colonoscopy. When examining FOBT status, Chinese participants were more likely to ever have had a FOBT as compared to Korean participants (68.9% vs. 31.1%).

Key Informant Interviewee Characteristics

Table 2 shows the key informant interviewee characteristics. Out of the 17 interviewees, 7 were community leaders, patient navigators, and local health department employees, and 10 were physicians. Eight were Chinese, eight were Korean, and one interviewee was African American. The average age was 52 years ($SD=12.3$), and 58.8% ($n=10$) were men and 41.2% ($n=7$) were women. Community leaders on average had worked with the Chinese and Korean communities for 10.6 years ($SD=13.6$) and served about 2,235 individuals per year. The physicians had treated Chinese and Korean patients for an average of 13.3 years ($SD=8.9$) and saw about 2,256 patients per year. 80% of physicians reported speaking Chinese or Korean to their patients all of the time ($n=8$).

Non-Cultural Barriers and Facilitators

Non-cultural barriers and facilitators evaluated in the quantitative analysis for ever having had a colonoscopy and FOBT can be found in Tables 3 and 4, respectively, while findings identified from the qualitative analysis are listed in Tables 5.

Logistics and the Healthcare System—Common logistical barriers that were noted by focus group participants and key informant interviewees included lack of time often due to busy work schedules, lack of transportation, the complex healthcare system (e.g., difficulty finding a doctor and making an appointment), and lack of a comprehensive health examination as offered in China and Korea. For instance, participants often mentioned the convenience of having a one-day health check-up that includes all important health

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screenings and tests offered in China and Korea. In the quantitative analyses, those who agreed that they do not have time for a colonoscopy were less likely to have a colonoscopy (aOR= 0.15; 95% CI: 0.03, 0.82). One focus group participant shared, “In an immigrant’s life... we’re too busy to live... we have to work until Saturday so we cannot go at the time that we want.” Moreover, participants often expressed, “I don’t really understand the U.S. healthcare system,” noting finding a doctor, making an appointment, and going through a primary care physician to see a specialist as specific challenges. In the survey, those who were confident that they could schedule and complete a colonoscopy had greater odds of ever having a colonoscopy as compared to those who were not confident (aOR= 2.77; 95% CI: 1.05, 7.32).

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Awareness and Knowledge—In the quantitative analyses, CRC knowledge was significantly associated with ever having a colonoscopy (aOR=1.24; 95% CI: 1.04, 1.49) and marginally associated with ever having a FOBT (aOR=1.18; 95% CI: 0.99, 1.42) after adjusting for covariates. These findings were supported by focus groups and key informant interviews where a lack of knowledge and awareness about CRC and CRC screening were often noted as major barriers for screening. Moreover, CRC was identified as being less known in the Chinese and Korean communities as compared to other cancers. One focus group participant shared, “Everyone knows about breast cancer and liver cancer, but rarely people know about this cancer [CRC]”. Another significant barrier related to knowledge was not knowing how to do a FOBT (aOR= 0.01; 95% CI: <0.01, 0.20).

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Focus group participants identified awareness and knowledge as being important facilitating factors. The crude quantitative analyses supported these findings in that those who agreed that CRC screening would save their lives were more likely to have ever received a colonoscopy (cOR= 6.00; 95% CI: 1.30, 27.74) and FOBT (cOR= 4.93; 95% CI: 1.07, 22.84). However after adjusting for covariates, these associations became marginally significant (aOR= 4.69; 95% CI: 0.95, 23.15 and aOR=4.49; 95% CI: 0.89, 22.79, respectively).

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Procedures—The CRC screening procedures were also viewed as barriers due to the invasiveness, concerns about complications, health concerns related to anesthesia exposure, and embarrassment as particularly noted by Korean focus group participants. However based on quantitative analyses, only finding a colonoscopy to be embarrassing was marginally significant (aOR= 0.37; 95% CI: 0.12, 1.19) after adjusting for covariates. Some focus group participants expressed concerns about complications that may arise, such as getting an infection and having the colon damaged during the procedure, as well as potential adverse health effects of being sedated with anesthesia.

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Cost and Insurance Coverage—Cost and insurance were major themes that were repeatedly brought up in focus groups and interviews. From the survey data, we found that those without health insurance had significantly lower odds of ever having a colonoscopy (aOR= 0.39; 95% CI: 0.17, 0.93), but not for FOBT. In addition, some participants were not aware that insurance coverage for CRC screening is available with no cost-sharing under the Affordable Care Act (ACA). One focus group participant said, “Obama Care [ACA] is now

available. But, the deductible is so high that I cannot go. I have been meaning to go after I get health insurance, but there is no practical benefit of the health insurance.”

Focus group participants also mentioned that there is greater financial burden on individuals who have low income but are not eligible for financial assistance. Offering free or low-cost CRC screening was identified by focus group and key informant interview participants as being one potential promoting factor to address this issue.

Physicians—Focus group participants identified not having a regular physician, not having a physician’s recommendation to have screening, and mistrust of physicians among Korean participants as barriers to screening. Those with a regular primary care doctor had greater odds of ever having a colonoscopy (aOR=3.51; 95% CI: 1.26, 9.79) as compared to those without. The importance of having a regular primary care physician was reiterated by the focus group participants and interviewees. In addition, a physician’s recommendation was an important factor for ever having a colonoscopy and FOBT. Those who received a doctor’s recommendation for CRC screening had greater odds of having a colonoscopy (aOR= 6.61; 95% CI: 2.63, 16.65) and FOBT (aOR= 4.00; 95% CI: 1.43, 11.15) as compared to those who did not. Focus group participants often stated that “Whatever the doctors suggest, we would follow it.”

In terms of having mistrust of physicians, one Korean participant stated, “Nowadays even if you are not sick, doctors do not end with just one appointment...there are some doctors who do it for money. Even if it’s not necessary to go, they say to come.” This mistrust was also noted by a physician who stated, “If I said do it, do it, do it, then...they might think, maybe doctors get paid [to promote CRC screening].”

Family and Friends—Family and friends also helped to increase awareness and knowledge about CRC and promoting CRC screening. Those having family or friends that had CRC screening (aOR= 4.22; 95% CI: 1.68, 10.63) were significantly more likely to ever have had a FOBT, but not colonoscopy. In the focus groups, a participant noted, “I might not have heard about this disease if my friend did not have this” and “Only when someone close to us has this condition then will we be aware of it.”

Cultural Barriers and Facilitators

Cultural barriers and facilitators from the quantitative analysis for having had a colonoscopy and FOBT can be found in Tables 3 and 4, respectively, while findings identified from the qualitative analysis are listed in Table 6.

Language—Participants expressed that cultural and linguistic challenges are major barriers to CRC screening. Specifically, they identified difficulties speaking English with a healthcare provider and understanding medical terminology. Participants often expressed, “we always went to see Chinese speaking doctors so we could express our concerns.” Another alluded to the issue of health literacy stating, “Even if you speak English in your daily life, you still won’t understand a lot of medical language. You don’t know what he [the physician] is saying.” Due to difficulties with language, Chinese and Korean patients often rely on their children for translation. Key informant interviewees observed that sometimes

patients “see themselves as a burden [to their children]” and that “it’s hard for them to reach out to them [their children] to [say] ‘oh okay, I need to go see a doctor. Can you not go to work and come and help me see a doctor?’”

One key informant interviewee, who is a patient navigator, highlighted the need to assist patients with finding a doctor, making the appointments, and explaining procedures stating, “I mean with the language problem, if without our help, they cannot manage.” Another key informant interviewee stated, “If they can find the people who can speak their language and know their culture, then they feel much more comfortable.”

Health-Related Attitudes—A major barrier to CRC screening was not seeking preventive healthcare when asymptomatic. Those who agreed that a colonoscopy or FOBT is not needed when an individual does not have any problems were significantly less likely to ever have a colonoscopy (aOR= 0.02; 95% CI: 0.002, 0.23) and FOBT (aOR= 0.16; 95% CI: 0.03, 0.72) as compared to those who disagreed. In addition, many participants expressed fatalistic views that there is nothing that can be done to prevent CRC as well as notions of self-care, meaning that they can take care of their own health through diet and exercise. One focus group participant stated, “It’s all fate. Living and dying is up to God. We can’t change it.” Another common cultural barrier expressed by participants included fears about finding cancer and cancer stigma, which impedes open conversations about CRC and CRC screening. One focus group participant explained, “There is a view that it is better not to know and for things to happen later. There are people who think that if it is cancer it will be too difficult, so they do not get screening.”

Views about Susceptibility—Another cultural barrier identified was the perception that CRC is a Western disease. Chinese and Korean participants felt that they were at less risk and thus CRC was not a serious concern. Participants expressed that “Most people think it’s other people’s disease, instead of something of their own” and that “CRC is something that Western people get often.” Others felt that they were not susceptible to CRC because of their diet and how it differs from Western diets. One participant stated, “In my case I don’t really like meat. Since my diet is mostly vegetable based, I don’t think that I will get CRC.”

Other Themes—Other cultural barriers to CRC screening included having a high pain tolerance, seeking complementary and alternative medicine, having less emphasis on preventive healthcare in China, and lacking exposure to screening media campaigns due to language barriers. In terms of pain tolerance, one focus group participant shared, “Most Koreans usually hold it in and endure pain. They seek care when it becomes severe, but they cannot do anything about it because it is in later stages.” When some Chinese and Koreans do not have insurance or experience pain, participants stated that they turn to Eastern medicine and complementary and alternative medicine. One participant stated, “I did not have health insurance until last year before I got Obama care [ACA], so I sought an acupuncturist for treatment.” In terms of media exposure, Chinese and Koreans were seen by key informant interviewees as not benefiting from media campaigns that raise CRC and CRC screening awareness. One physician stated, “It’s not like they’re watching TV to see Katie Couric tell them that you should get a colonoscopy because it can save your life” and

another physician referring to Asian Americans said, “they’re more...shielded from NBC (National Broadcasting Company) news talking about screening.”

Discussion

The low CRC screening rates among Chinese and Korean Americans is a multifaceted issue, which is influenced by non-cultural and cultural barriers and facilitators. These factors can be nuanced as found in the qualitative analyses, which provided new perspectives that were sometimes not captured by the quantitative data. For instance, a physician’s recommendation is known to be a strong facilitator for CRC screening. However if there is patient mistrust towards the physician, the recommendation will likely be disregarded. Taking into account non-cultural and cultural factors provides a more comprehensive and enriching understanding of CRC screening behavior among Chinese and Korean Americans. Corroboration of previous literature, potential explanations for differences, and unique contributions of this study are further discussed.

Non-Cultural Barriers and Facilitators

As found in prior studies examining CRC screening behavior in Asians, barriers and facilitators related to logistics and the healthcare system (Maxwell, Bastani, and Warda 2000; Oh, Kreps, and Jun 2013; Yu et al. 2001; Juon et al. 2003; Ma et al. 2012); awareness and knowledge (Oh, Kreps, and Jun 2013; Yu et al. 2001); fears and feelings towards CRC screening procedures (Jo et al. 2009; Klabunde et al. 2005); costs and insurance coverage (Juon et al. 2003; Ma et al. 2012; Jo et al. 2009; Klabunde et al. 2005); and physician communication and relationships (Jo et al. 2009; Klabunde et al. 2005; Teng, Friedman, and Green 2006) were identified by participants. Some factors strongly noted in the focus group discussions were not significant in the quantitative analyses. For instance, cost was repeatedly noted by focus group participants and interviewees as a major barrier to CRC screening. However in the quantitative analyses, this association was not significant. The small sample size may contribute to these inconsistencies since screening test-specific items were answered by only a subset of participants (n=94 for colonoscopy specific items and n=73 for FOBT specific items). From the qualitative data, new insights regarding insurance and CRC screening were elucidated by participants who indicated that they were not aware that screening was covered under the Affordable Care Act (ACA). This finding underscores the need for further education not only on why CRC screening is necessary for prevention and early detection but also on how to utilize available resources.

In addition, embarrassment related to CRC screening procedures has been noted in the literature as being a potential barrier. In a prior study using data from the National Health Interview Survey (NHIS), 56% of physicians identified embarrassment or anxiety about CRC screening tests as a major barrier for patients, while only 1% of adults identified these barriers (Klabunde et al. 2005). In this study, only the crude estimate for the association between anxiety and ever having a colonoscopy was significant (cOR= 0.23; 95% CI: 0.07, 0.78). Moreover, a cultural distinction that was observed in the qualitative analyses was that only Korean participants identified embarrassment as a barrier of CRC screening, particularly colonoscopies, while Chinese participants denied embarrassment as hindering

CRC screening. In another prior study, 9% of Chinese participants (n=25) identified fear of pain/embarrassment to be CRC screening barriers whereas 3% of Korean participants (n=6) did (Maxwell et al. 2010). The different findings may in part be due to the grouping of pain and embarrassment in the prior study.

Consistent with previous literature, physicians were found to play a key role in promoting CRC screening (Kim et al. 1998; Jo et al. 2008; Tang, Solomon, and McCracken 2001; Wang et al. 2006). Particularly, having a physician's recommendation and regular physician were strongly supported as key facilitators in the quantitative and qualitative data. An interesting barrier identified by Korean focus group participants and key informant interviewees was mistrust between patients and physicians. In particular, Korean patients were skeptical about the necessity of CRC screening tests and whether these are performed for financial reasons to benefit physicians. Similar findings have been found in other populations including African Americans, but do not appear to be explained among Asian Americans (Guerra et al. 2007; Holmes-Rovner et al. 2002; Jones et al. 2010).

Focus group discussions revealed logistical factors that can facilitate CRC screening including having doctors' offices with more flexible hours, transportation, and assistance navigating the healthcare system. In addition, many participants expressed that they would receive CRC screening if there was a comprehensive health exam that included multiple screenings in one visit, similar to what can be found in China and Korea.

Cultural Barriers and Facilitators

A major barrier that was supported by the survey, focus groups, and interview discussions included not seeking healthcare when asymptomatic. This association was not significant when participants were asked about general CRC screening. However when asked about colonoscopy and FOBT specifically, significant associations were found between having this attitude towards healthcare and receipt of CRC screening. The focus groups also drew attention to other health related attitudes and beliefs in relation to CRC screening such as stigma around discussing CRC and cancer, fatalism, and concerns about burdening their family if diagnosed with CRC.

Key informant interviews also noted a lack of exposure to American media as being a barrier to CRC screening due to language barriers, which was not specifically identified in previous literature. Unlike the general population who has benefited from CRC media efforts (Schroy III et al. 2008), interviewees articulated that Asians do not receive the same exposure since they tend to rely on ethnic media. A prior study among 151 Korean Americans, 40 to 70 years of age, found that 83% of participants selected Korean media as a favorable method for receiving educational information about CRC screening, behind educational seminars (Jo et al. 2008). Potential media campaigns should be culturally and linguistically appropriate with tailored messages that dispel misconceptions and lack of knowledge.

There are some limitations of this study. A non-probability sampling method for screening status and socioeconomic status was employed for recruitment in the Washington, D.C. metropolitan area, which may limit this study's generalizability. Despite efforts to recruit individuals with varying socio-demographic characteristics, focus group participants had

fairly high education with 45% having at least an undergraduate degree (n= 54). In addition, ever screened instead of up-to-date screening was examined due to limited sample size, particularly for FOBT. However, barriers and facilitators of ever having CRC screening are still important and can reveal factors that can encourage CRC screening in these under-screened populations. Moreover, no causal inferences can be made since these data are cross-sectional.

Despite these limitations, this study has several strengths. The mixed-methods approach provided an in-depth examination of CRC screening behaviors among Chinese and Korean Americans and enriched the existing information on the barriers and facilitators of CRC screening in these populations. The survey helped to quantify the associations between barriers and facilitators and CRC screening, while the focus groups and key informant interviews provided depth by allowing participants to freely express their thoughts and opinions in their respective languages. Furthermore, triangulation of quantitative and qualitative data provided a more comprehensive understanding of CRC screening behaviors among Chinese and Korean Americans.

Findings from this study have important public health implications in addressing CRC screening disparities among Asians. For instance, education and interventions that address the identified barriers and facilitators and are tailored for Chinese and Korean Americans are needed. For example, a physician's recommendation was found to be one of the strongest factors in increasing CRC screening, and therefore, future interventions involving primary care physicians may be helpful that promote open dialogue about CRC screening between patients and physicians to help dispel mistrust. Furthermore, participants indicated the difficulty of getting CRC screening due to language barriers and the complexity of navigating the health care system. Thus, interventions incorporating patient navigators, who help to explain misunderstandings and address lack of knowledge regarding screening procedures and insurance coverage, may promote CRC screening. Strategies that address the identified facilitators and barriers can not only increase CRC screening but also potentially reduce CRC related morbidity and mortality through early detection and treatment in these populations. One of the Healthy People 2020's objectives is to increase the proportion of adults who receive a CRC screening to 70.5% (U.S. Department of Health and Human Services 2014). However, as of 2013, only 49.5% of Asians received CRC screening (Sabatino et al. 2015). Without reducing disparities in CRC screening, including those among Chinese and Korean Americans, this objective may not be reached.

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Table 1
Socio-demographic characteristics of focus group participants by screening status.

	Colonoscopy				FOBT ^b				p-value ^d		
	Total (n = 120)	Ever Screened (n=50)	Never Screened (n=70)	p-value ^a	Ever Screened (n=45)	Never Screened (n=75)	p-value ^a				
Age in Years (mean, SD)	62.9	7.5	64.3	6.7	61.9	7.9	0.083**	7.1	62.1	7.6	0.125
Years of U.S. Residency (mean, SD)	19.3	12.2	22.8	11.6	16.8	12	0.007*	12.2	20.1	12.2	0.351
Gender (n, %)							0.327				0.595
Male	47	39.2	17	34.0	30	42.9		19	42.2	28	37.3
Female	73	60.8	33	66.0	40	57.1		26	57.8	47	62.7
Ethnicity (n, %)							0.558				0.001*
Chinese	59	49.2	23	46.0	36	51.4		31	68.9	28	37.3
Korean	61	50.8	27	54.0	34	48.6		14	31.1	47	62.7
Education (n, %)							0.890				0.368
Less than high school	17	14.2	6	12.0	11	15.7		3	6.7	14	18.7
High school graduate	24	20.0	10	20.0	14	20.0		10	22.2	14	18.7
Some college	25	20.8	9	18.0	16	22.9		9	20	16	21.3
College graduate	36	30.0	17	34.0	19	27.1		14	31.1	22	29.3
Graduate school or more	18	15.0	8	16.0	10	14.3		9	20.0	9	12.0
Income (n, %)							0.146				0.073**
Less than \$10,000	38	31.7	12	24.0	26	37.1		13	28.9	25	33.3
\$10,001 – \$25,000	31	25.8	15	30.0	16	22.9		13	28.9	18	24.0
\$25,001 – \$50,000	19	15.8	5	10.0	14	20.0		3	6.7	16	21.3
\$50,001 – \$75,000	14	11.7	8	16.0	6	8.6		5	11.1	9	12.0
More than \$75,000	18	15.0	10	20.0	8	11.4		11	24.4	7	9.3
Marital Status (n, %)							0.364				0.096**
Married	104	86.7	45	90.0	59	84.3		42	93.3	62	82.7
Not married	16	13.3	5	10.0	11	15.7		3	6.7	13	17.3
Without health insurance (n,%)							0.004*				0.809
Yes	47	39.2	12	24.0	35	50.0		17	37.8	30	40.0

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	Colonoscopy				FOBT ^b			
	Total (n= 120)	Ever Screened (n=50)	Never Screened (n=70)	p-value ^a	Ever Screened (n=45)	Never Screened (n=75)	p-value ^a	
No	76	38	35	50.0	28	45	60.0	
	60.8	76.0	50.0		62.2	60.0		

^a p-values were calculated from t-tests, Fisher's exact tests, or chi-square tests.

^b FOBT= fecal occult blood test.

* p < .05;

** p < .1

Table 2

Characteristics of key informant interviewees (n= 17).

	n	(%)
Age in years (mean, SD)	52.1	12.3
Gender		
Male	10	(58.8)
Female	7	(41.2)
Ethnicity		
Chinese	8	(47.1)
Korean	8	(47.1)
Other	1	(5.8)
Position		
Community leader	7	(41.2)
Physician	10	(58.8)
Community leaders (n= 7)		
Years serving C/K communities (mean, SD) ^a	10.6	13.6
How many C/K served per year (mean, SD) ^a	2,235	4,785
Physicians (n=10)		
Years treating C/K patients (mean, SD) ^a	13.3	8.9
How many C/K patients per year (mean, SD) ^a	2,256	3,585
How often C/K is spoken with patients ^a		
All the time	8	(80.0)
Sometimes	1	(10.0)
Not at all	1	(10.0)

^aC= Chinese; K= Korean.

Table 3

Barriers and facilitators for ever having had a colonoscopy: Odds ratios and 95% confidence intervals.

	cOR	95% CI	aOR ^d	95% CI
General Barriers (n=120)				
1. Without health insurance at any time in the past 12 months				
No (had insurance in the past year)	1.00	-	1.00	-
Yes (no insurance some time in past year)	0.32*	(0.14, 0.70)	0.39*	(0.17, 0.93)
2. Ever told by doctor not to get screening				
No	1.00	-	1.00	-
Yes	0.75	(0.24, 2.40)	1.04	(0.28, 3.87)
3. Belief that there is nothing to prevent CRC				
Disagree	1.00	-	1.00	-
Agree	0.60	(0.19, 1.84)	0.66	(0.20, 2.19)
4. Belief that CRC is fatal				
Disagree	1.00	-	1.00	-
Agree	1.04	(0.50, 2.14)	1.20	(0.53, 2.73)
5. Belief that screening is not needed if asymptomatic				
Disagree	1.00	-	1.00	-
Agree	0.48	(0.19, 1.19)	0.41**	(0.14, 1.16)
6. Belief that screening is not covered by insurance				
Disagree	1.00	-	1.00	-
Agree	1.06	(0.41, 2.75)	0.91	(0.32, 2.63)
General Facilitators (n=120)				
1. General CRC knowledge				
	1.24*	(1.06, 1.45)	1.24*	(1.04, 1.49)
2. Family CRC history				
No	1.00	-	1.00	-
Yes	0.93	(0.25, 3.48)	0.67	(0.15, 3.02)
3. Family/friends got CRC screening				
No	1.00	-	1.00	-
Yes	1.36	(0.66, 2.82)	1.00	(0.45, 2.24)

	cOR	95% CI	aOR ^a	95% CI
4. Have a regular primary care doctor				
No	1.00	-	1.00	-
Yes	5.17 *	(2.05, 13.07)	3.51 *	(1.26, 9.79)
5. Ever brought up CRC screening with a doctor				
No	1.00	-	1.00	-
Yes	4.67 *	(2.10, 10.37)	3.51 *	(1.45, 8.52)
6. Ever told by friends/family to get screening				
No	1.00	-	1.00	-
Yes	2.49 *	(1.18, 5.23)	2.06	(0.87, 4.89)
7. Doctor ever talked about CRC screening				
No	1.00	-	1.00	-
Yes	6.43 *	(2.87, 14.40)	6.06 *	(2.38, 15.44)
8. Doctor recommended CRC screening				
No	1.00	-	1.00	-
Yes	8.02 *	(3.52, 18.28)	6.61 *	(2.63, 16.65)
9. Patient looks for information about needed medical tests and screening				
No	1.00	-	1.00	-
Yes	1.14	(0.55, 2.35)	1.48	(0.64, 3.41)
10. Belief that finding CRC early will save life				
No	1.00	-	1.00	-
Yes	6.00 *	(1.30, 27.74)	4.69 **	(0.95, 23.15)
11. Belief that treatment of CRC may not be as bad if cancer found early				
No	1.00	-	1.00	-
Yes	1.08	(0.29, 4.04)	1.55	(0.36, 6.79)
Colonoscopy-Specific Barriers (n=94)				
1. Afraid of colonoscopy because may find that something is wrong				
Disagree	1.00	-	1.00	-
Agree	0.39	(0.11, 1.40)	0.36	(0.09, 1.47)
2. Belief that colonoscopy is embarrassing				
Disagree	1.00	-	1.00	-

	cOR	95% CI	aOR ^d	95% CI
Agree	0.26 *	(0.09, 0.76)	0.37 **	(0.12, 1.19)
3. No time for colonoscopy				
Disagree	1.00	-	1.00	-
Agree	0.14 *	(0.03, 0.69)	0.15 *	(0.03, 0.82)
4. Colonoscopy cost				
Disagree	1.00	-	1.00	-
Agree	0.66	(0.24, 1.78)	1.10	(0.36, 3.35)
5. No colonoscopy since asymptomatic				
Disagree	1.00	-	1.00	-
Agree	0.06 *	(0.01, 0.50)	0.02 *	(0.002, 0.23)
6. Would have trouble having a colonoscopy because of no health insurance				
Disagree	1.00	-	1.00	-
Agree	1.17	(0.47, 2.93)	1.85	(0.63, 5.38)
7. Doctor did not say I needed a colonoscopy				
Disagree	1.00	-	1.00	-
Agree	0.38 *	(0.16, 0.91)	0.26 *	(0.09, 0.72)
8. Anxious about colonoscopy				
Disagree	1.00	-	1.00	-
Agree	0.23 *	(0.07, 0.78)	0.35	(0.10, 1.30)
9. Colonoscopy is painful				
Disagree	1.00	-	1.00	-
Agree	0.33 *	(0.13, 0.88)	0.44	(0.16, 1.26)
10. Special diet and laxatives				
Disagree	1.00	-	1.00	-
Agree	0.68	(0.29, 1.63)	0.92	(0.35, 2.40)
11. Fear of bleeding or tearing of colon				
Disagree	1.00	-	1.00	-
Agree	0.45	(0.17, 1.23)	0.46	(0.16, 1.35)

Colonoscopy-Specific Facilitators (n=94)

1. Confidence that patient can schedule and complete a colonoscopy

	cOR	95% CI	aOR ^a	95% CI
Not confident	1.00	-	1.00	-
Confident	2.82*	(1.20, 6.62)	2.77*	(1.05, 7.32)

^aModels were adjusted for age, years of U.S. residency, income, and marital status.

* p < .05;

** p < .1

Abbreviations: cOR=crude odds ratio; aOR=adjusted odds ratio

Table 4

Barriers and facilitators for ever having had a Fecal Occult Blood Test (FOBT): Odds ratios and 95% confidence intervals.

	cOR	95% CI	aOR ^e	95% CI
General Barriers (n=120)				
1. Without health insurance at any time in the past 12 months				
No (had insurance in the past year)	1.00	-	1.00	-
Yes (no insurance some time in past year)	0.91	(0.43, 1.95)	0.73	(0.30, 1.76)
2. Ever told by doctor not to get screening				
No	1.00	-	1.00	-
Yes	0.42	(0.11, 1.58)	0.66	(0.15, 2.91)
3. Belief that there is nothing to prevent CRC				
Disagree	1.00	-	1.00	-
Agree	0.51	(0.16, 1.70)	0.71	(0.19, 2.64)
4. Belief that CRC is fatal				
Disagree	1.00	-	1.00	-
Agree	1.68	(0.80, 3.54)	3.32*	(1.29, 8.54)
5. Belief that screening is not needed if asymptomatic				
Disagree	1.00	-	1.00	-
Agree	0.74	(0.30, 1.81)	0.33**	(0.11, 1.02)
6. Belief that screening is not covered by insurance				
Disagree	1.00	-	1.00	-
Agree	0.33**	(0.10, 1.06)	0.35	(0.09, 1.32)
General Facilitators (n=120)				
1. General CRC knowledge				
	1.12	(0.97, 1.30)	1.18**	(0.99, 1.42)
2. Family CRC history				
No	1.00	-	1.00	-
Yes	4.42*	(1.08, 18.08)	2.61	(0.53, 12.97)
3. Family/friends got CRC screening				
No	1.00	-	1.00	-
Yes	3.56*	(1.63, 7.75)	4.22*	(1.68, 10.63)

	cOR	95% CI	aOR ^a	95% CI
4. Have a regular primary care doctor				
No	1.00	-	1.00	-
Yes	1.84	(0.81, 4.20)	1.36	(0.49, 3.77)
5. Ever brought up CRC screening with doctor				
No	1.00	-	1.00	-
Yes	1.81	(0.84, 3.89)	1.67	(0.66, 4.23)
6. Ever told by friends/family to get screening				
No	1.00	-	1.00	-
Yes	1.71	(0.81, 3.61)	2.04	(0.80, 5.19)
7. Doctor ever talked about CRC screening				
No	1.00	-	1.00	-
Yes	2.05**	(0.97, 4.55)	3.09*	(1.13, 8.49)
8. Doctor recommended CRC screening				
No	1.00	-	1.00	-
Yes	2.83*	(1.32, 6.06)	4.00*	(1.43, 11.15)
9. Patient looks for information about needed medical tests and screening				
No	1.00	-	1.00	-
Yes	2.29*	(1.06, 4.93)	1.81	(0.74, 4.40)
10. Belief that finding CRC early will save life				
No	1.00	-	1.00	-
Yes	4.93*	(1.07, 22.84)	4.49**	(0.89, 22.79)
11. Belief that treatment of CRC may not be as bad if cancer found early				
No	1.00	-	1.00	-
Yes	1.44	(0.35, 5.88)	1.77	(0.36, 8.84)

FOBT-Specific Barriers (n=73)

1. Afraid of FOBT because may find that something is wrong				
Disagree	1.00	-	1.00	-
Agree	0.81	(0.17, 3.94)	0.90	(0.16, 5.13)
2. FOBT is embarrassing				
Disagree	1.00	-	1.00	-

	cOR	95% CI	aOR ^a	95% CI
Agree	0.58	(0.15, 2.20)	0.73	(0.17, 3.17)
3. No time for FOBT				
Disagree	1.00	-	1.00	-
Agree	0.19	(0.02, 1.92)	0.20	(0.02, 2.54)
4. FOBT cost				
Disagree	1.00	-	1.00	-
Agree	0.60	(0.11, 3.18)	0.65	(0.11, 3.82)
5. No FOBT since asymptomatic				
Disagree	1.00	-	1.00	-
Agree	0.24*	(0.07, 0.91)	0.16*	(0.03, 0.72)
6. Would have trouble having a colonoscopy because of no health insurance				
Disagree	1.00	-	1.00	-
Agree	0.31***	(0.09, 1.08)	0.24*	(0.06, 0.97)
7. Doctor did not say FOBT was needed				
Disagree	1.00	-	1.00	-
Agree	0.10*	(0.03, 0.31)	0.03*	(0.01, 0.17)
8. Do not know how to do FOBT				
Disagree	1.00	-	1.00	-
Agree	0.05*	(0.01, 0.41)	0.01*	(<0.01, 0.20)
9. No private place for FOBT				
Disagree	1.00	-	1.00	-
Agree	0.08*	(0.01, 0.74)	0.05*	(0.01, 0.52)
10. Collecting sample is unpleasant				
Disagree	1.00	-	1.00	-
Agree	0.28	(0.05, 1.64)	0.36	(0.06, 2.24)
FOBT Specific Facilitators (n=73)				
1. Confidence that patient can do a FOBT				
Not confident	1.00	-	1.00	-
Confident	0.83	(0.32, 2.13)	0.90	(0.29, 2.80)

^aModels were adjusted for age, years of U.S. residency, race, income, and marital status.

Abbreviations: cOR=crude odds ratio; aOR=adjusted odds ratio

† p < .05

**

p < .05; †

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Table 5

Non-cultural barriers and facilitators of CRC screening identified from qualitative analysis.

Non-Cultural Factors	Barriers	Facilitators
Logistics and the Healthcare System	<ul style="list-style-type: none"> • Lack of time often due to busy work schedules • Lack of transportation • Complex healthcare system • Lack of a comprehensive health examination as offered in China/Korea 	<ul style="list-style-type: none"> • Doctors' offices having flexible hours • Having transportation • Having assistance with navigating the healthcare system • Having a comprehensive health examination
Awareness and Knowledge	<ul style="list-style-type: none"> • Lack of awareness about CRC • Lack of knowledge about CRC and the importance of CRC screening 	<ul style="list-style-type: none"> • Having awareness about CRC • Having knowledge about CRC and the importance of CRC screening • Receiving education about CRC
Procedures	<ul style="list-style-type: none"> • Invasiveness • Concerns about complications • Health concerns related to anesthesia • Embarrassment [Koreans] 	<ul style="list-style-type: none"> • Benefit of having the colon cleaned during colonoscopy preparations
Cost and Insurance Coverage	<ul style="list-style-type: none"> • Concern about high costs • Concerns about unnecessary tests • Concerns about not having insurance or lacking insurance coverage 	<ul style="list-style-type: none"> • Free or low cost screening programs in the community
Physician Communication and Relationship	<ul style="list-style-type: none"> • No physicians' recommendation • No regular physician • Mistrust of physicians [Koreans] 	<ul style="list-style-type: none"> • Strong physicians' recommendation • Having a regular physician • Having a reputable and experienced physician
Family and Friends		<ul style="list-style-type: none"> • Having a family member or friend with CRC • Having a family member or friend who had CRC screening • Having a family member or friend encourage CRC screening

Note: [] Brackets indicate racial subgroup specific themes.

Table 6

Cultural barriers and facilitators of CRC screening identified from qualitative analysis.

Cultural Factors	Barriers	Facilitators
Language	<ul style="list-style-type: none"> • Difficulty with English • Low health literacy • Reliance on children for translation 	<ul style="list-style-type: none"> • Having linguistically appropriate services • Having a patient navigator^a
Health-Related Attitudes And Beliefs	<ul style="list-style-type: none"> • Prevention not being a priority • No need to see a doctor if asymptomatic • Fear of finding CRC • Fatalism • Self-care • Stigma towards cancer 	
Views about Susceptibility	<ul style="list-style-type: none"> • CRC seen as a western disease 	
Other	<ul style="list-style-type: none"> • Having a high tolerance for pain • Use of CAM instead of western medicine • Lack of emphasis on preventive healthcare in China [Chinese] • Lack of exposure to American media^a 	<ul style="list-style-type: none"> • Use of ethnic media to promote CRC screening • Respect for elders^a

Note: [] Brackets indicate racial subgroup specific themes.

^aThemes were mentioned only in the key informant interviews.