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Effectiveness of a Tailored Colorectal Cancer Educational Seminar in Enhancing the Awareness, Knowledge, and Behavior of Korean Americans Living in the Los Angeles Koreatown Area

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Abstract

Background: Improving rates of colorectal cancer (CRC) screening can reduce CRC-related mortality, which is estimated to cause about 50,630 deaths in the U.S. by the end of 2018. There is a noted increasing prevalence of CRC among Korean Americans. Although CRC screening has been widely implemented, Korean Americans over the age of 50 have the lowest rates of proper CRC screening, compared to those of other Asian ethnicities. Barriers, such as language and culture, may be making participation in screening procedures difficult for those with immigrant backgrounds. Thus, this study aimed to determine whether proper CRC education can enhance awareness, knowledge, and behavior in screening among Korean Americans living in the Los Angeles Koreatown area.

Design: This study was conducted among 100 self-identified Korean Americans between the ages of 45–75, who voluntarily participated in this study through local community outreach from January to June 2018. Educational brochures were provided for those in the control group, while those in the intervention group attended an additional short educational seminar. All participants were asked to complete a questionnaire after, and data were collected on site.

Results: We found that intervention had a significant effect on awareness regarding colorectal polyps (OR (odds ratio): 22.47; 95% CI: 6.42–78.62; p-value <0.001) and fecal occult blood tests (FOBTs)/stool blood test (OR, 245.37; 95% CI: 34.55–1742.75; p-value <0.001). Willingness for CRC screening in following 6 months significantly increased (OR: 87.17; 95% CI: 19.01–399.63; p-value <0.001). Knowledge on options for CRC screening (OR: 126.63; 95% CI: 23.61–679.07; p-value <0.001) and stool blood tests (OR: 157.17; 95% CI: 18.02–1370.41; p-value <0.001) were significantly enhanced. In additional univariate analysis, we found that Korean Americans with

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higher level of education, birthplace in US or better general health showed better CRC awareness or knowledge.

Conclusion: There is a significant gap in our knowledge and understanding of the contributing factors that may be leading to low CRC screening rates in Korean Americans. This study suggests that well-tailored educational seminars can overcome certain barriers to screening and improve CRC knowledge and awareness, which is critical to achieving greater screening compliance. Our findings provide important references for designing effective strategies to increasing CRC screening rates among Korean Americans.

Keywords

Colorectal cancer screening; Korean Americans; Koreatown Los Angeles; Educational seminar; Inequality

Introduction

Colorectal cancer (CRC) is the third most common cancer and third leading cause of cancer-related deaths in both men and women in the United States (US) [1]. Changes in risk factors, improvements in treatment, and advancements in early detection have steadily lowered rates of CRC [2]. One of the most important factors that reduced CRC incidence and death is surveillance. A recent study found that, compared to no surveillance, one or two surveillance visits were associated with significantly lower CRC incidence [3]. While there are many options for CRC screening, including fecal occult blood testing, stool DNA analysis, and sigmoidoscopy, the gold standard remains to be colonoscopy [4]. According to statistics provided by the American Cancer Society (ACS), treatment options for CRC have greatly improved recently, resulting in more than 1 million CRC survivors in the US alone. Along with this development, early diagnosis through regular and timely screening can decrease CRC risk; however, there are certain populations that have shown a steady rise in CRC incidence. In particular, Asian communities have not only seen a higher rate of CRC, but an increasing trend as well [5].

Although there are no concrete explanations for this increase of CRC incidence among Asians, studies have shown some attribution to fatalistic attitudes, changes in diet, and education on screening [5–7]. This lapse in vigilant CRC monitoring is particularly evident in the Korean population [8]. CRC is ranked as one of the most common cancers in Korea and places an immense economic burden on patients and society at large [9]. This is not just limited to the Korean population overseas. Rates of colorectal cancer in immigrant patients have been found to be similar to those in their home countries, compared to Caucasians in the same area [10]. Additionally, studies on minority health have shown that the Korean American population has one of the lowest cancer screening rates [11]. Screening for CRC is further hindered by the socioeconomic and cultural barriers Korean Americans face [12]. A prior study found that less than 30% of Korean Americans in Los Angeles County had ever received screening for CRC [13]. Furthermore, a California Health Interview Survey found that, compared to other Asian American groups, Korean Americans had the lowest rates of CRC screening [14]. More than half of Japanese, Chinese, Filipino, and Vietnamese Americans between the ages of 50 to 64 years old received screening for CRC, while only

37% of Korean Americans in the same age range have [15]. Therefore, there is an urgent need to solve this increasing discrepancy in the Korean population.

Southern California, particularly Los Angeles (LA) and Orange County (OC), has the highest concentration of Koreans and Korean Americans in the US, making up about 25% of all Koreans residing in America. A majority of Koreans are concentrated around the LA Koreatown area. Koreatown is the most densely populated district, by population, in LA county, with an average of 42,611 people per square mile. There is an increasing burden of CRC in Korean populations. CRC is the most commonly occurring cancer in males particularly [16]. Koreans over the age of 50 had the lowest rate of proper colorectal screening compared to those of other Asian and Asian American ethnicities [17]. In addition, there is a significant knowledge gap in the comprehensive understanding of the contributing factors that affect colorectal screening in Korean Americans. Being that LA is home to such a large number of Koreans, it provides the ideal environment to study and attempt to resolve this troubling issue.

To better understand how to improve current knowledge and awareness of CRC in the Korean American immigrant population, we conducted a survey of general questions regarding CRC on two different Korean audiences in LA Koreatown. This area was ideal because it is one of the most densely populated districts in LA and is home to the largest concentrations of Koreans outside of Korea. This study broadens our knowledge of the contributing factors of low CRC screening in Korean Americans living in LA county. The questionnaire inquired about whether primary healthcare providers recommended CRC screening (lack of awareness), which CRC screening methods were preferred (screening method), and if their health insurance covered the cost of screening (access to care). The findings from this study suggest that implementing cultural and language appropriate seminars significantly increase both knowledge and interest in CRC screening among Korean Americans.

Methods and Materials

Data collection procedures

Eligible participants included men and women between the ages of 45 to 75, who self-identified as of Korean ethnicity, were Korean or English speaking, and were living or had contacts in the LA Koreatown area. Individuals with a prior history of CRC or significant medical problems that affected attendance to the educational seminar or survey were excluded. The sample size for this study was limited to 100 participants, who were all recruited from Korean churches, senior recreation centers, senior community colleges, language schools, college cultural organizations, grocery stores, coffee shops, and nail/hair salons (Cedars-Sinai Medical Center Institutional Review Board Approval number Pro00048053).

Our structured research questionnaire, Korean Community Health Survey: Colorectal Cancer, was administered in either Korean or English. It involved inquiries about demographics, general health concerns and lifestyle factors, such as age, weight, height, and

general health level (Table 1). The survey was designed to establish base information for future Korean community-based CRC epidemiologic research.

Those in the control group received an English-language brochure provided by Cedars-Sinai Medical Center. Participants in the intervention group received the brochure and an additional 30-min educational seminar with a slide presentation. American Cancer Society (ACS)-developed CRC educational materials and presentation slides were used after slight modifications and translation by a certified Korean translator. The presentation included information related to colon health and CRC (incidence rate, risk factors, diet and lifestyle recommendations, screening methods, etc.). During the seminar, participants were encouraged to ask their primary physicians about CRC and screening options.

Self-reported paper and pen-based surveys were distributed directly after intervention and confirmation of willingness to participate. Some demographic characteristics, such as sex, age range, marriage status, height, and weight (Q1-Q4) were asked. Participants' birth place, proportion of lifetime in the US, English proficiency, and education level were next questioned (Q5-Q8). Computer skills and usage of social network service were asked as well (Q10-Q11). To determine general information on healthcare utilization, participants gave responses to the three following questions; "How's your overall health?", "Do you frequently access a healthcare newsletter?", and "Where do you find health information from?" (Q9, Q12-Q13). The control group took the survey after only examining the brief brochure, while the intervention group took the survey after examining both the brochure and attending the seminar on CRC prevention, screening, and treatment.

Data analysis

Sociodemographic characteristics included age, sex, marital status, height, weight, birthplace, years lived in the US, English fluency, educational level, computer skill, and use of social networks. Health-related variables included self-perceived health status, family history of CRC, and reasons for reluctance to screen for CRC, if any. Self-reported CRC screening behavior was assessed as: 1) ever having had a fecal occult blood test (FOBT), colonoscopy, or any other test done, and 2) being up-to-date with CRC screening. Knowledge regarding CRC was assessed with 6 questions, which included knowing how many CRC screening tests exist, the age to begin screening, recommended frequency of tests, and awareness of gender differences in CRC risk. CRC awareness was measured by asking whether participants had ever heard of CRC, colon polyps, FOBT, and colonoscopy.

For statistical analysis, data are presented as frequency (percentage, %) for categorical variables and median (IQR, interquartile range) for continuous variables. Univariate associations were examined using Wilcoxon rank-sum tests for continuous variables, and chi-square test or Fisher's exact test for categorical variables, as appropriate. To avoid potential overfitting due to a large number of baseline characteristics and to balance potential confounding factors between the intervention and control groups, propensity score (PS) analysis was performed [18]. The propensity score of being in the intervention group (vs. control group) was estimated using a multivariable logistic regression model after adjusting for Q1 through Q11, Q13, and Q28-Q29 [18–20], and the estimated propensity scores were included as a covariate in the multivariable logistic regression model for each

outcome [19]. Analyses were performed using SAS 9.4 (SAS Institute, Inc., Cary, North Carolina) with two-sided tests and a significance level of 0.05.

Results

Participant characteristics

A total of 100 Korean American participants voluntarily participated in this study. Table 1 presents baseline characteristics of the participants in this study. Most of the participants (96%) were over the age of 50. There were more female participants (63%) than males (37%), and most participants were married (74%). Almost all the participants were born in the Korea (98%), and 70% had lived in the US for more than 20 years. Many participants reported not speaking English fluently or well; they self-reported their English-speaking abilities to be at a beginner's level (96%). Only 32% of participants had a high school education or higher. A majority of participants reported that their overall health levels were fair/poor (77%). Most of them find health-related information from television (85%). Nearly all participants were not familiar with social network services (97%) and lacked computer skills (84%).

Comparison of intervention and control groups

Conventional educational materials on CRC and screening methods were provided for the control group (n=50). In addition to these materials, the intervention group received a 30-min health lecture designed for seniors. Both groups were asked to complete a 1-page questionnaire, which was translated by a certified English-Korean translator. Participants were allowed to choose from either an English or Korean version.

Awareness test included four "yes or no" screening questions –

""Q14. Have you heard about colorectal cancer?"

"Q15. Have you heard about colorectal polyp?

"Q16. Have you heard about the fecal occult blood test (FOBT) or stool blood test?", and

"Q19. Have you heard about colonoscopy?" Behavior domain contained five questions -

"Q17. Have your doctor told you that you should be tested for colon cancer (FOBT)?" "Q18. Have you ever had a FOBT?"

"Q20. Have your doctor recommend colonoscopy?" "Q21. Have you ever had a colonoscopy?", and

"Q30. Are you willing to undergo colon cancer testing within 6 months?" Knowledge domain consisted of six questions –

"Q22. I believe that there is only one screening test for colon cancer",

"Q23. There is a stool blood test using a "home" test",

"Q24. I believe that people are supposed to start getting tested for colon cancer at age of 50",

"Q25. Once people start having stool blood test, they should have them every 3 years",

"Q26. In general, once people start having colonoscopy exams at age of 50, they should have them every 5 years", and

"Q27. I believe that colon cancer is mainly a problem for men" (Table 2).

Participants in the intervention group had significantly better awareness, behavior, and knowledge on compared to the control group. Both the control and intervention groups had awareness about CRC and colonoscopies; however, participants in the intervention group were significantly more aware on colorectal polyps (90% *vs.* 28%) and FOBT (94% *vs.* 8%) than the control group (Tables 2).

Willingness to undergo CRC screening within 6 months was significantly higher in the intervention group (88% *vs.* 8%). In addition, participant knowledge regarding CRC screening test options were higher in the intervention group. Most participants in the control group (90%) believed that there was only one screening test for CRC. The intervention group recognized other options for CRC screening, and only 8% thought there was only one form of screening. Only 2% of participants in the control group knew that the FOBT/stool blood test could be done at home, compared to 78% of intervention group.

There was no difference in knowledge on the recommended age for CRC screening and how often it should be conducted between the control and intervention groups (Tables 2).

Univariate and multivariable analyses of awareness, behavior, and knowledge

After propensity score (PS), we found that intervention remained a significant effect on awareness of colorectal polyps (OR (odds ratio): 22.47; 95% CI: 6.42–78.62; p-value <0.001) and FOBT or stool blood test (OR: 245.37; 95% CI: 34.55–1742.75; p-value <0.001). In the intervention group, willingness to screen for CRC in the following 6 months was significantly higher than the control group (OR: 87.17; 95% CI: 19.01–399.63; p-value <0.001). Knowledge on additional screening options (OR: 126.63; 95% CI: 23.61–679.07; p-value <0.001) and stool blood test (OR: 157.17; 95% CI: 18.02–1370.41; p-value <0.001) was also significantly enhanced (Table 3).

Further univariate analyses showed that, participants who reported overall health as "very good/good" were more likely to have heard about colorectal polyps than those who reported overall health as "fair/poor" (p-value=0.009, data not shown). Participants born in the US were more likely to have ever had a FOBT compared to those born in Korea (p-value=0.040, data not shown). Participants with higher education levels were more likely to answer yes regarding the possibility of using stool blood tests at home (p-value=0.006, data not shown). Overall health status was associated with increased knowledge regarding CRC and CRC screening (Q24. I believe that people are supposed to start getting tested for colon cancer at age of 50, p-value= 0.020; Q26. In general, once people start having colonoscopy exams at

age of 50, they should have them every 5 years, p-value=0.018; Q27. I believe that colon cancer is mainly a problem for men, p-value=0.023, data not shown).

Discussion

The current study showed that a tailored CRC seminar can improve knowledge, behavior, and awareness among Korean American immigrants facing language barriers or those of lower socioeconomic status. This study examined the associations between groups (intervention vs. control), and outcomes/domains, such as knowledge, behavior and awareness in univariate and multivariable analyses. By conducting multivariable analysis of each outcome/domain, we calculated a PS. We further examined the associations between questionnaires and outcomes/domains in univariate analyses and found that better general health, higher education level, and birthplace in US were significantly associated with greater CRC awareness or knowledge.

Due to cultural and language barriers, Korean Americans in the LA Koreatown area have been a difficult population to reach when implementing cancer education and prevention programs. Our results were consistent with other studies suggesting that a lack of acculturation in the US seems to be a critical barrier in receiving preventive health services [21]. Providing culturally integrated and tailored cancer education to Korean Americans could significantly improve knowledge regarding CRC and screening; thereby, ultimately reducing CRC screening disparities in the Korean population. Our present study suggests several associated factors related to knowledge improvement of CRC after educational intervention. These results should be taken into consideration by local academic medical centers when creating culturally integrated educational programs.

Several previous reports have demonstrated that health education intervention can improve preventative cancer screening in the Asian American populations, including Vietnamese Americans, Chinese Americans, Hmong Americans, Korean Americans, Filipino Americans et al. [22–26]. Gu et al. suggested that small group-based education programs prepared by Chinese-speaking community health workers can enhance the implementation fidelity for breast cancer screening by mammography [27]. Aligned with these findings, our results strongly argue for the necessity and importance of raising self-awareness about CRC screening in Korean Americans. After health education, participants were more likely to be aware of and willing to try CRC screening options. Their own knowledge and inquiry influenced physicians who were also motivated by the specific request from their patients (action-reaction). We also found that detailed information could not be delivered efficiently or memorized by participants, particularly those were older. Considering the age range of our participants, we suggest that follow-up information via phone call, text, or voicemail regarding future CRC screenings should be considered by healthcare providers.

Findings from this pilot study indicate a strong need for education programs that are linguistically and culturally customized for the Korean American population. Although further studies should be conducted to determine the feasibility of such interventions and to ascertain their long-term impact on actual screening rates, tailored education will nevertheless be critically necessary for reducing CRC-related mortality and morbidity

among Korean Americans. However, we are aware that there are several limitations in our study. First, considering that our study was based on self-reported responses and that the extent of reliability and validity of self-reporting is somewhat limited, we believe that an additional study assessing objective and quantitative results should be designed. Second, this study was restricted to concentrated populations living in the LA Koreatown area, and it may not be generalizable to Korean American populations based in other regions. Third, the study was not able to determine the long-term effects of intervention, such as actual CRC screening rates. Fourth, our voluntary participants may be more active and self-motivated about health issues in general, so the findings from this study cannot be expected to be the same in a less motivated population. Lastly, our sample size was relatively small, so conclusive statements cannot be made.

Despite our limitations, a major strength of our study was the finding that culturally and linguistically integrated seminars by trusted community leaders in the academic field can support the wellbeing of participants. Our educational seminar included a short slide presentation and provided a point-by-point lecture on layman's terminology, to particularly assist the older or less educated participants. This approach created a friendly and informal environment to help participants clearly understand the health messages in the educational materials. Participants were encouraged to ask questions in their own languages during and after the seminar.

Conclusion

In conclusion, our tailored intervention made a significant improvement in awareness, knowledge, and behavior related to CRC and screening in Korean Americans residing in Koreatown, many of whom could be considered underserved. Although further larger scale community-based studies are required to validate this finding, the results from our current study suggest that providing culturally and linguistically integrated educational community programs may greatly improve cancer prevention in high risk subgroups of Asian Americans and reduce disparities in CRC screening.

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Table 1:

Characteristics of Korean American Participants in Colorectal Cancer Screening Survey in Los Angeles, California: 2018

Variable	All participants (N=100)	Control (N=50)	Intervention (N=50)	P-value
Q1. Gender				
Female	63 (63)	30 (60)	33 (66)	0.534
Male	37 (37)	20 (40)	17 (34)	
Q2. Age (years)				
45	1 (1)	0 (0)	1 (2)	0.146
45–49	3 (3)	2 (4)	1 (2)	
50–64	45 (45)	27 (54)	18 (36)	
65 or over	51 (51)	21 (42)	30 (60)	
Q3. Marital status				
No	26 (26)	13 (26)	13 (26)	1.000
Yes	74 (74)	37 (74)	37 (74)	
Q4. Height (cm)				
Median (IQR)	153 (151 – 158)	153 (151 – 158)	154 (151 – 158)	0.206
Q4. Weight (kg)				
Median (IQR)	55 (45.5 – 61)	55 (45.5 – 61)	55 (45.5 – 61)	0.992
Q5. Where were you born?				
Korea	98 (98)	50 (100)	48 (96)	0.495
USA	2 (2)	0 (0)	2 (4)	
Q6. About how many years have you lived In the United States?				
< 11 years	12 (12)	4 (8)	8 (16)	0.184
11–20 years	18 (18)	12 (24)	6 (12)	
More than 20 years	70 (70)	34 (68)	36 (72)	
Q7. What is your level of English?				
Beginner	96 (96)	48 (96)	48 (96)	1.000
Low intermediate	2 (2)	1 (2)	1 (2)	
Intermediate	2 (2)	1 (2)	1 (2)	
Q8. What is the highest grade of education you have completed?				

Variable	All participants (N=100)	Control (N=50)	Intervention (N=50)	P-value
First through 11th grade	68 (68)	36 (72)	32 (64)	0.293
High School graduate	25 (25)	13 (26)	12 (24)	
One to three years of college	4 (4)	1 (2)	3 (6)	
College graduate	3 (3)	0 (0)	3 (6)	
Q9. How's your overall health?				
Poor	2 (2)	0 (0)	2 (4)	0.022
Fair	75 (75)	41 (82)	34 (68)	
Good	11 (11)	7 (14)	4 (8)	
Very good	12 (12)	2 (4)	10 (20)	
Q9. How's your overall health? (combined)				
Fair/Poor	77 (77)	36 (72)	41 (82)	0.235
Very good/Good	23 (23)	14 (28)	9 (18)	
Q10. How would you rate your computer skills (your skill on the internet)?				
Great. I find most anything I search for	2 (2)	0 (0)	2 (4)	0.525
Ok, sometimes I have trouble finding information	14 (14)	6 (12)	8 (16)	
Not so great, I struggle with how to use it	69 (69)	37 (74)	32 (64)	
I have little to no experience	15 (15)	7 (14)	8 (16)	
Q11. Do you frequently use Social Network Service?				
No	97 (97)	48 (96)	49 (98)	1.000
Yes	3 (3)	2 (4)	1 (2)	
Q13. Where do you find health information from?				
Television	85 (85)	43 (86)	42 (84)	1.000
Internet	10 (10)	5 (10)	5 (10)	
Newspaper	5 (5)	2 (4)	3 (6)	
Q28. Have any of your relatives ever had colon cancer?				
No	94 (94)	47 (94)	47 (94)	1.000
Yes	6 (6)	3 (6)	3 (6)	
Q29. If you may be reluctant to have test for colon cancer, what is the reason for that?				
It Is because of the cost	78 (78)	39 (78)	39 (78)	

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Variable	All participants (N=100)	Control (N=50)	Intervention (N=50)	P-value
Having the tests done would be embarrassing	10 (10)	4 (8)	6 (12)	
I am worried that testing will show that I have colon cancer	12 (12)	7 (14)	5 (10)	

Data are presented as number of patients (column %) or median (IQR, interquartile range).

P-value is calculated by Wilcoxon rank-sum test for numerical variables, and chi-square or Fisher's exact test for categorical variables.

Note: All subjects answered 'Yes' to 'Q12: Do you frequently access health care newsletter?'

Table 2:

Domains stratified by group.

Domain	All participants (N=100)	Control (N=50)	Intervention (N=50)
Awareness			
Q14. Have you heard about colorectal cancer?			
No	5 (5)	2 (4)	3 (6)
Yes	95 (95)	48 (96)	47 (94)
Q15. Have you heard about colorectal polyp?			
No	41 (41)	36 (72)	5 (10)
Yes	59 (59)	14 (28)	45 (90)
Q16. Have you heard about the fecal occult blood test (FOBT) or stool blood test?			
No	49 (49)	46 (92)	3 (6)
Yes	51 (51)	4 (8)	47 (94)
Q19. Have you heard about colonoscopy?			
No	9 (9)	3 (6)	6 (12)
Yes	91 (91)	47 (94)	44 (88)
Behavior			
Q17. Have your doctor told you that you should be tested for colon cancer (FOBT)?			
No	50 (50)	47 (94)	3 (6)
Yes	50 (50)	3 (6)	47 (94)
Q18. Have you ever had a FOBT?			
No	98 (98)	49 (98)	49 (98)
Yes	2 (2)	1 (2)	1 (2)
Q20. Have your doctor recommend colonoscopy?			
No	39 (39)	37 (74)	2 (4)
Yes	61 (61)	13 (26)	48 (96)
Q21. Have you ever had a colonoscopy?			
No	87 (87)	46 (92)	41 (82)
Yes	13 (13)	4 (8)	9 (18)

Domain	All participants (N=100)	Control (N=50)	Intervention (N=50)
Q30. Are you willing to undergo colon cancer testing within 6 months?			
No	52 (52)	46 (92)	6 (12)
Yes	48 (48)	4 (8)	44 (88)
Knowledge			
Q22. I believe that there is only one screening test for colon cancer.			
No	51 (51)	5 (10)	46 (92)
Yes	49 (49)	45 (90)	4 (8)
Q23. There is a stool blood test using a "home" test			
No	60 (60)	49 (98)	11 (22)
Yes	40 (40)	1 (2)	39 (78)
Q24. I believe that people are supposed to start getting tested for colon cancer at age of 50.			
No	64 (64)	32 (64)	32 (64)
Yes	36 (36)	18 (36)	18 (36)
Q25. Once people start having stool blood test, they should have them every 3 years.			
No	68 (68)	29 (58)	39 (78)
Yes	32 (32)	21 (42)	11 (22)
Q26. In general, once people start having colonoscopy exams at age of 50, they should have them every 5 years.			
No	52 (52)	28 (56)	24 (48)
Yes	48 (48)	22 (44)	26 (52)
Q27. I believe that colon cancer is mainly a problem for men.			
No	50 (50)	43 (86)	7 (14)
Yes	50 (50)	7 (14)	43 (86)

Data are presented as number of patients (column %).

Table 3:

Comparison in awareness, behavior, and knowledge between Korean American participants in the post-intervention and control groups. Univariate and multivariable analyses of each domain for post-intervention vs. control are shown.

Domain	Univariate		Multivariable *	
	Odds Ratio (95% CI)	P-value	Odds Ratio (95% CI)	P-value
Awareness				
Q14. Heard about colorectal cancer	0.65 (0.10–4.08)	0.649	0.97 (0.11–8.30)	0.980
Q15. Heard about colorectal polyp	23.14 (7.62–70.31)	<0.001	22.47 (6.42–78.62)	<0.001
Q16. Heard about the FOBT or stool blood test	180.17 (38.20–849.83)	<0.001	245.37 (34.55–1742.75)	<0.001
Q19. Heard about colonoscopy	0.47 (0.11–1.99)	0.303	0.64 (0.12–3.32)	0.593
Behavior				
Q17. Ever been recommended for colon cancer (FOBT) test	245.44 (47.11–1278.77)	<0.001	1473.56 (68.58–31660.02)	<0.001
Q18. Ever had a FOBT	1.00 (0.06–16.44)	1.000	0.23 (0.01–9.56)	0.437
Q20. Ever been recommended for colonoscopy	68.31 (14.51–321.58)	<0.001	91.90 (15.06–560.96)	<0.001
Q21. Ever had a colonoscopy	2.52 (0.72–8.82)	0.147	2.08 (0.51–8.50)	0.309
Q30. Are you willing to undergo colon cancer testing within 6 months?	84.33 (22.28–319.14)	<0.001	87.17 (19.01–399.63)	<0.001
Knowledge				
Q22. I do not believe that there is only one screening test for colon cancer. **	158.39 (32.45–773.18)	<0.001	126.63 (23.61–679.07)	<0.001
Q23. There is a stool blood test using a “home” test.	173.73 (21.49–1404.51)	<0.001	157.17 (18.02–1370.41)	<0.001
Q24. I believe that people are supposed to start getting tested for colon cancer at age of 50.	1.00 (0.44–2.26)	1.000	0.75 (0.29–1.95)	0.561
Q25. Once people start having stool blood test, they should have them every 3 years **.	2.57 (1.07–6.15)	0.034	2.64 (0.97–7.21)	0.057
Q26. In general, once people start having colonoscopy exams at age of 50, they should have them every 5 years **.	0.73 (0.33–1.59)	0.424	0.87 (0.35–2.14)	0.761

Abbreviations: FOBT, fecal occult blood test.

Odds ratio is for the intervention group relative to the control group. 100 observations were used in the multivariable models.

* The propensity score (PS) of being in the intervention group was estimated using a multivariable logistic regression model including Q1 through Q11, Q13, and Q28-Q29. Then, the multivariable model was adjusted for the PS.

** Models were fitted with a response ‘No’ vs. ‘Yes’ as ‘No’ is the correct answer.