Title

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Journal

Journal of Health Care for the Poor and Underserved, 25(3)

ISSN

1049-2089

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Publication Date

2014

DOI

10.1353/hpu.2014.0114

Peer reviewed

Published in final edited form as:

J Health Care Poor Underserved. 2014 August ; 25(3): 1079–1100. doi:10.1353/hpu.2014.0114.

Promoting Chinese-Speaking Primary Care Physicians' Communication with Immigrant Patients about Colorectal Cancer Screening: A Cluster Randomized Trial Design

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Abstract

Chinese Americans underutilize colorectal cancer screening. This study evaluated a physician-based intervention guided by social cognitive theory (SCT) to inform future research involving minority physicians and patients. Twenty-five Chinese-speaking primary care physicians were randomized into intervention or usual care arms. The intervention included two 45-minute in-

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office training sessions paired with a dual-language communication guide detailing strategies in addressing Chinese patients' screening barriers. Physicians' feedback on the intervention, their performance data during training, and pre-post intervention survey data were collected and analyzed. Most physicians (~85%) liked the intervention materials but ~84% spent less than 20 minutes reading the guide and only 46% found the length of time for in-office training acceptable. Despite this, the intervention increased physicians' perceived communication self-efficacy with patients ($p<.01$). This study demonstrated the feasibility of enrolling and intervening with minority physicians. Time constraints in primary care practice should be considered in the design and implementation of interventions.

Keywords

Colorectal cancer screening; physician-based intervention; cluster RCT; Chinese primary care physician; self-efficacy; patient-centered communication

Colorectal cancer (CRC) is one of the leading causes of cancer death in the U.S.[1] The U.S. Preventive Services Task Force (USPSTF) recommends that people over age 50 should obtain CRC screening to prevent or detect CRC early to reduce CRC incidence and mortality.[2] However, populations with limited English speaking ability, new immigrants (especially those who have not fully acculturated), and minorities all underutilize CRC screening.[3–5] Asian Americans have the lowest CRC screening rates among the different U.S. ethnic/racial minority groups.[6]

Chinese Americans, the largest Asian subgroup, have much higher proportions of immigrants (~76%) than other ethnic groups and over 48% of these immigrants have limited English ability.[7] Research has shown that the lack of a physician's recommendation and having an Eastern view about health are associated with Chinese American immigrants' low participation in CRC screening.[4,8] Conversely, Chinese Americans who speak English with their physicians are more likely to receive a CRC screening recommendation than those who do not.[9] Therefore, empowering physicians with effective strategies to interact with their immigrant patients, who have different language and health beliefs from the mainstream U.S. population, may increase Chinese immigrant patients' participation in CRC screening.

This paper reports on the development of and methods for a physician-based intervention trial designed to enhance Chinese-speaking primary care physicians' efficacy in addressing culturally-based and attitudinal barriers to CRC screening among their non-adherent Chinese-speaking immigrant patients. We also present physicians' feedback on the intervention. This is the first study that we are aware of in which Chinese American primary care physicians are recruited into a randomized controlled trial (RCT). Minority physicians have low participation in clinical research;[10,11] therefore, we include information about our recruitment strategies. The methods and results of in-office physician training are intended to inform the development of future interventions that target minority physicians as a means to increase cancer screening among their ethnic minority patients.

Methods

Study design.

This study, a cluster RCT, was approved by the Georgetown University and Temple University Institutional Review Boards. The intervention was theoretically grounded and included in-office physician training, using simulated patients (people who were trained in a standardized manner to simulate real patients in a medical encounter) to enhance physicians' ability to communicate with Chinese patients about barriers to CRC screening. The intervention physicians also received a communication guide and auxiliary office tools (i.e., a flip chart, reminder system advice, and a patient brochure) for use during encounters; these tools were mailed to physicians prior to the in-office training and reviewed with them during the training session. The control group was usual care, where patients received regular primary care. Each cluster consisted of the patients in a physician's practice and there were 25 physician practices in the study. Physicians completed a baseline survey about demographic characteristics, medical training, practice type, and key theoretical constructs (see measures below). We evaluated the quality of the intervention delivery and reported the results of our evaluation in this paper. Our physician enrollment and intervention process for this ongoing trial is depicted in Figure 1.

Theoretical framework.

The intervention was guided by Social Cognitive Theory (SCT), which posits that human motivation and behavior are reciprocally influenced by the self and social agents (e.g., physicians); using other terms, people can learn through reciprocal modeling.[12] For example, physicians can learn about patients' misconceptions and barriers to CRC screening from printed information and medical encounters, while patients can learn about accurate concepts and attitudes toward CRC screening through informative communication with physicians. Thus, our study developed a communication guide which provides strategies for physicians to address Chinese immigrant patients' various barriers to CRC screening. We trained some patients to act in a mock medical encounter as simulated patients to help our targeted physicians practice what they learned from our guide and to facilitate their communication skills. Both the in-office training and communication guide were developed to include three key SCT components: physicians' behavioral capacities (e.g., knowledge about CRC screening and Chinese patients' barriers to CRC screening), self-efficacy in communication, and outcome expectations (valuing an effective communication to enhance patients' positive attitudes toward CRC screening).[12]

In addition to the SCT constructs, we incorporated Chinese cultural views of health care and illness in the development of the communication guide. For example, traditional Chinese believe that taking care of one's health through a positive lifestyle and emotions (i.e., self-care) is more important in preventing illness than regular medical checkups, and that developing cancer may be pre-determined (fatalism).[13,14] The guide and the patient scripts for the in-office training were written with Chinese cultural values and norms in mind. For example, if a patient were to say: "I am already 75 and may die any day, why bother to do the screening?" the physician was instructed to respond: "Your children will want to see you healthy and living a long life" (showing children's filial piety and a Chinese family's

prosperity across generations). The correspondence of theoretical constructs to our intervention components are described in the following sections and are summarized in Box 1.

Physician enrollment and randomization.

Based on prior literature,[15–18] we estimated that we would need to enroll approximately 24 physicians (12 for the intervention arm and 12 for the control arm) to evaluate the physician-based intervention effect in increasing colorectal cancer screening outcomes for this cluster trial.

We enrolled a convenience sample of Chinese American physicians from two geographic areas: 1) metropolitan Washington D.C. (including the District of Columbia, Northern Virginia, and Maryland) and 2) the Philadelphia and New York City area (hereafter referred to as DC and PA/NYC sites). The criteria for physician eligibility were: 1) ability to communicate with their patients in Chinese (i.e., Mandarin and/or Cantonese); 2) having a minimum of 75 Chinese American patients over 50 years old; and 3) practicing primary care, which includes family medicine, internal medicine, or geriatrics.

We looked for Chinese American primary care physicians in the study areas through three main resources: 1) telephone directories, including Chinese American physician directories, Yellow Pages, and the American Medical Association (AMA) master file; 2) existing Asian Community Cancer networks (PI: Grace Ma); and 3) local newspaper advertisements and local social events for Chinese physicians. Using Chinese surnames indicated in the above directories and referrals from physicians and community partners, we identified 118 potentially eligible physicians (41 in DC and 77 in PA/NYC). Recruitment procedures included initial mailing of an invitation letter, follow-up phone calls by bilingual Chinese research staff, and face-to-face meetings with interested physicians to obtain consent. We also attended local social events for Chinese physicians where we made a recruitment presentation to the physicians. Additionally, we used participating physicians' networks to recruit more physicians.

We reached 57 out of the 118 potentially eligible physicians from October 2008 to December 2011. Of the 57, 25 were eligible and consented to participate, 23 refused, and nine were ineligible, yielding a 52% response rate among eligible physicians. The 25 participating physicians consisted of 13 from DC and 12 from PA/NYC.

Block randomization of enrolled physician practices was conducted by three stratification factors: 1) site; 2) the estimated size of each physician practice (small, fewer than 200 Chinese-speaking patients or large, 200 or more patients); and 3) the estimated baseline CRC screening rate within each practice (less than 50% or 50% or more). In this manner, 13 physicians were randomized to the intervention group (six in DC and seven in PA/NYC) and 12 to the control group (seven in DC and five in PA/NYC).

Physician-based intervention and materials.

All of the intervention materials were reviewed by our advisory committee composed of senior behavioral scientists with expertise in CRC screening, Chinese medical professionals

in family medicine and gastroenterology, and lay Chinese immigrants. Their comments were incorporated into the final intervention materials.

Physician communication guide.—We created a dual-language (English-Chinese) communication guide that included five chapters: 1) overview of epidemiology of CRC in Chinese Americans; 2) CRC risk factors and screening recommendations; 3) barriers to CRC screening among Chinese American patients based on prior literature;[3,4,19–23] 4) communication strategies for making CRC screening recommendations; and 5) how to develop an office reminder system. In particular, the 23-page guide delineated how physicians can respond to a patient's non-cultural barriers (e.g., lack of family history and symptoms) and cultural barriers (e.g., self-care and fatalistic views). We also presented communication strategies that have been shown to be effective in mammogram adherence,[24,25] medication compliance,[26] and other preventive services uptake,[27] and provided examples of how to elicit and address patients' concerns and overcome their barriers to screening.

In addition, we summarized the key points from the communication guide in a six-page flip chart and a patient brochure. The flip chart could be placed at a physician's desk to demonstrate CRC facts and recommendations (mostly in graphs) to patients and simultaneously serve as a reminder of communication strategies; for example, the flip chart contains questions and reminders such as, "What is a patient's understanding of the causes of CRC cancer?" and "Remember to allow each patient to complete his/her statement and encourage questions." A four-page patient brochure was given to each intervention physician to distribute to all their patients. It describes the development of CRC, risk factors, screening options, and frequently asked questions in plain Chinese language with illustrations. A resource list was also attached to the patient brochure to provide information on places that offered free or reduced-cost CRC checkups. This tool-kit also included a fecal occult blood test (FOBT) instruction sheet, a poster introducing our study to patients, and some key scientific publications regarding CRC screening. All of the Chinese print materials were developed in the official written form of Chinese language using traditional Mandarin characters. The materials could also be converted into simplified characters; however, none of our physicians requested a simplified version.

Physician in-office training.—We trained intervention physicians through two structured, individual in-office training sessions. Prior to the physician training, at each study site, we trained four Chinese American simulated patients over age 50 to perform four story scripts that illustrated common CRC screening barriers such as perceived low risk, fatalism, and lack of insurance coverage. Each script described different Chinese patients' barriers to CRC screening. These simulated patients were trained to follow the research protocol but depicted "real-life" individuals.[28] In each in-office training session, physicians worked with two simulated patients (each for about 15 minutes) as a mock clinical encounter. The physicians were expected to inquire about the purpose of the visit, address CRC screening options and their pros and cons, respond to patients' concerns, and encourage adherence to screening guidelines, all while following the design of our communication guide. We posited that these physician behaviors would decrease patient

barriers to CRC screening. During the training, a research staff member sat in the room to observe and evaluate each mock physician-patient interaction.

Immediately after the role play, a debriefing session was held and a trained staff member provided feedback on each physician's performance during the encounter. The staff member would first reinforce the physician's positive performance and then suggest improvements for those areas with low performance scores. For example, if a physician did not present CRC screening options to the simulated patient, the staff would remind the physician to do so next time. When a patient emphasized self-care over regular checkups and his/her physician did not guide the patient to recognize the importance of regular CRC screening, the staff member would encourage the physician to utilize examples in the communication guide to address patients' self-care views.

Each training session lasted approximately 45 minutes. The interval between the two sessions was four to six months (varied by physician schedules). Intervention physicians spoke Mandarin with simulated patients across all mock encounters and with research staff for the debriefing sessions after the training. Physicians in the control arm practiced usual care, using none of our intervention materials. The training materials will be made available to interested control physicians upon request after the trial is completed.

Measures.

All physicians responded to a baseline survey and physicians in the intervention group completed a post-intervention process evaluation survey. Both surveys were in English and were in a paper-and–pencil format.

Baseline assessment.—Physicians' demographic characteristics (e.g., age and birthplace), medical training and specialty, practice type (e.g., solo or group), communication language, and recommendation for CRC screening were assessed. We inquired about physician practices in recommending CRC screening tests (including FOBT, flexible sigmoidoscopy, and colonoscopy) based on a validated survey.[29] We also assessed physicians' attitudes toward shared decision-making and the three SCT constructs using several validated scales.

Shared decision-making was pertinent to physicians' attitudes toward a patient's involvement in making a medical decision. Using an existing scale, we inquired about physicians' opinions on 10 statements (e.g., "Asking patients to make medical decisions often does more harm than good").[30] Each choice had options ranging from 1=strongly agree to 5=strongly disagree. We dichotomized the scores into two categories (positive *vs.* negative) to reflect physicians' viewpoints on shared decision-making with patients. High mean scores indicated positive attitudes. Cronbach's alpha (a measure of internal consistency of a scale) was .81 in our physician sample.

Self-efficacy in CRC communication was measured by five items that were developed based on prior research regarding physician communication for cancer screening.[31,32] The five items assessed physicians' confidence in presenting CRC risk, presenting the pros and cons of screening options, identifying and addressing patients' cultural and attitudinal barriers,

communicating with a caring and encouraging attitude, and stressing patients' compliance with a physician's recommendation. The response options were 1=not at all confident to 4=very confident. Cronbach's alpha was .90 in our sample.

Behavioral capacities were queried using two existing scales: one assessing physicians' knowledge about CRC risk factors and screening tests and the other assessing physicians' awareness of patient barriers to screening.[31,33] A correct response to each of seven knowledge items (e.g., "The risk of getting CRC increases with age" or "Colonoscopy needs to be done every 10 years;" Yes/No) gained one point; any other answer gained zero. We assessed physician awareness of patient barriers by inquiring how often physicians encountered cultural and non-cultural barriers to CRC screening among their patients. Responses to the sixitem scale ranged from 1=never to 4=very often. Cronbach's alpha was .74 in our sample.

Outcome expectations referred to physicians' positive attitude towards the outcome of communication with patients about CRC screening. We adapted questions from prior literature investigating physicians' opinions about patients' participation in CRC screening[33–35] to assess physicians' positive expectation for CRC screening (e.g., "Screening for colorectal cancer is cost effective"). Responses to each of the nine statements were rated by a five-point Likert scale ranging from 1=strongly disagree to 5=strongly agree. Cronbach's alpha was .80 in this sample.

Evaluation of the physician-based intervention.

In-office training.—We adapted the Kalamazoo Consensus Statement to guide our staff evaluation of mock physician-patient interactions in six categories.[36]

The first category—*inquiring about CRC screening history*—evaluated whether physicians attempted to build a relationship with patients (yes/no). The second category—*providing screening options*—focused on each physician's description of three screening modalities: FOBT, flexible sigmoidoscopy, and colonoscopy. The scores ranged from zero (no option provided) to three (each screening option described gained 1 point). The third category—*discussing CRC screening pros and cons*—assessed four aspects (i.e., cost of the CRC tests, pre-test preparation, time needed for the tests, and post-test discomfort). Each part was rated as 1=discussed and 0=non-discussed. The fourth category—*addressing patients' screening barriers*—evaluated whether physicians responded to seven common concerns and barriers raised by the simulated patients (including self-care view, fatalism, modesty, low perceived risk, insurance coverage, transportation, and fear of discomfort). Physicians who addressed each concern raised by a simulated patient gained one point; otherwise, they gained zero. Because the number of barriers raised by patients varied across sessions, we calculated the score for each physician based on an average of the total number of barriers addressed by physicians divided by the total number of barriers raised by the patient across all encounters. The fifth category—*having patient-centered communication*—was measured by 10 items: encouraging participatory partnership, allowing patients to complete statement, eliciting patients' concerns, clarifying and summarizing information, addressing patients' feelings and concerns, checking for understanding, making shared decisions on CRC screening, being enthusiastic about CRC screening, trustworthy, and culturally competent. Physician

performance on each item was rated on a four-point scale (1=never performed, 2=not well performed, 3= performed just fine, and 4=performed very well). An average score of the ten items was calculated. In the sixth category, *providing closure*, we gave physicians one point when they encouraged and recommended patients to obtain a CRC screening test at the end of the medical encounters; otherwise, they gained zero.

Process evaluation of the intervention materials by physicians.—Guided by the Centers for Disease Control and Prevention (CDC) guidelines,[37] we used open-ended questions to solicit physicians' feedback on the attractiveness, comprehension, and acceptability of the printed materials. Physicians were also asked to give suggestions for improving the intervention. Repeated measures of the SCT constructs and CRC screening recommendation patterns were administered in this post-intervention survey as well.

Data analysis.

We conducted descriptive analyses to describe participating physicians' demographic and medical backgrounds and to test whether the randomization was successful in balancing the characteristics of the physicians in the intervention and control groups. For the evaluation of intervention training, we first summarized the 13 physicians' feedback on the intervention materials and organized their various responses into categories and then calculated the in-office training scores by category. The performance scores in each category were averaged across four encounters (two encounters per training session) for each physician. Further, we used the category of *Addressing Patients' Screening Barriers* as a key factor to identify any trend of physician performance during the mock encounters because Chinese patients' screening barriers have been found to predict their screening behaviors.[38–40] Next, we conducted paired t-tests to examine differences in SCT constructs before and after the in-office training. Quantitative analyses were run by the SAS 9.2 (SAS Institute Inc, 2008).

Results

The Chinese-speaking primary care physicians were enrolled through different strategies. Seven out of the 25 physicians (32%) agreed to participate after in-person meetings following a few contacts *via* emails or phone. A number of physicians were referred from community partners (28%) and physician networking (24%). Several physicians (16%) participated because they wanted to support and benefit Chinese American communities.

The majority of the physicians were foreignborn (92%). Approximately 80% of the participating physicians were in private solo practice. There was no difference in demographics, attitudes toward shared decision-making, and SCT constructs at baseline between physicians in the intervention and control arms (Table 1).

With regard to intervention materials, more than 90% of the intervention physicians had positive reactions toward the communication guide and in-office training (Table 2). In the evaluation of printed materials, 92% of the intervention physicians stated that they liked the design and the depth of the details in the communication guide, while one physician thought it was too long and suggested shortening it to 4–5 pages. In terms of time spent reading the guide, only one physician took more than 20 minutes; many physicians spent about 11–20

minutes (46%) or less than 10 minutes (38%). Physicians reported spending less time using the flip chart to communicate with a patient: 54% of them spent about five minutes or less and 31% spent about 6–10 minutes.

Many physicians (85%) said that the communication guide was clear and easy to understand. Most of the physicians (92%) thought that the materials would be useful for other Chinese American primary care physicians and that they were complementary to the physician in-office training (92%). All physicians read the English guide and about 72% reported reading the Chinese guide as well since it helped them communicate with Chinese-speaking patients.

The major concern of physicians was their busy schedule, with limited time to engage in the in-office training. Only 46% of the physicians stated that the in-office training would be acceptable for other physicians, whereas 54% either commented that it would depend on physicians' time or had no comment.

Table 3 presents individual and average physician's performance for the six categories of evaluating the mock physician-patient interactions. Overall, the physicians performed well as measured by their average scores on the six categories. Specifically, for addressing the key category of patient barriers, nine of the 13 intervention physicians addressed 80% of patients' screening barriers or more. The physicians who addressed patient barriers were also more likely to inquire about patients' CRC screening history. There was little variability among the physicians from the average of 1.7 for the category of providing screening options. Most of the physicians provided only two options (FOBT and/or colonoscopy) and few physicians suggested sigmoidoscopy. However, those who did not provide all screening options discussed the pros and cons of CRC screening very well and recommended screening at the closure. The scores were high (average of 3.7) for all physicians in having patient-centered communication. Physicians with a negative attitude toward shared treatment decision-making at baseline scored 3.5−4.0 on the category of patient-centered communication after the in-office training, similar to those with positive attitudes. Concerning the providing closure category, seven of the physicians scored 75% or more in providing closure. These scores were used to provide the individual physicians with feedback on their performance and suggestions for improvement immediately after the training.

As shown in Table 4, the in-office training significantly increased the intervention physicians' perceived self-efficacy in communicating with patients about CRC screening from baseline to post intervention (self-efficacy mean difference (Δ) =2.33, $p<.01$). However, physicians' knowledge of CRC and outcome expectations did not significantly increase after the intervention. There was also no significant difference in perceiving the number of patient-reported barriers among physicians before and after the training.

Discussion

This study is one of the few physician-based intervention trials to promote CRC screening among older Chinese American immigrants. We recruited and enrolled Chinese-speaking primary care physicians successfully into this RCT through culturally relevant approaches

(e.g., ethnic and language concordance between recruiters and physicians, interpersonal rapport, and emphasis on the benefits of research to Chinese American communities). Most of our intervention physicians appreciated the intervention approach including in-office training and a dual-language communication guide, but many were concerned about the time needed for implementing this type of intervention in their practices. The intervention showed some effect on increasing physicians' knowledge, attitudes, and screening practices. Overall, our intervention significantly increased physicians' self-efficacy in communicating with patients.

The design of this trial is unique in its focus on first-generation, Chinese-speaking primary care physicians and their immigrant patients. Given that Chinese American physicians, a relatively small medical population, are difficult to identify, this study demonstrates culturally relevant strategies to consenting and randomizing eligible Chinese-speaking primary care physicians to intervention *vs*. control groups across different geographic areas. We used in-person and social approaches to enroll these Chinese American physicians since Chinese culture stresses interpersonal relationships and social responsibility.[41,42] The use of personal contacts and Chinese American physicians' networks was as powerful as using it to enroll Western physicians.[10] Moreover, the matched cultural and linguistic characteristics and face-to-face visits between our research staff and targeted physicians played an important role in building rapport. Several physicians consented to participate simply because Chinese Americans are a minority group and have been medically underserved.

Our intervention has multiple components that are similar to many other physician-based intervention programs known as *academic detailing* (e.g., one-on-one training and educational materials for both physicians and patients).[43–46] Unlike the academic detailing that uses trained facilitators to deliver the intervention, we trained simulated patients to mimic a real-life clinical encounter with intervention physicians. This mock encounter is particularly designed for primary care physicians who have immigrant patients with different cultural beliefs and attitudes toward cancer screening. Traditional Chinese culture honors physicians' authority and seldom emphasizes patient-centered communication and shared decision-making.[47] That is, older Chinese patients often have not been encouraged to raise their medical concerns and make a shared decision with their physicians. On the other hand, a decision to obtain a CRC screening may be discounted when Chinese physicians are not trained to engage patients in understanding screening options, their pros and cons, and further address patients' concerns. Evidence suggests that cultural and attitudinal factors predicted Chinese immigrants' non-adherence to cancer screening even after accounting for the effect of a physician's recommendation.[48,49] Thus, we designed the communication guide to maximize physicians' understanding of Chinese immigrants' issues on CRC screening and utilized in-office training to facilitate physicians' cultural competence in communication with immigrant patients. While most of our physicians acknowledged the usefulness of the intervention materials, many felt that the intervention might be time-consuming in terms of future implementation.

Similar to findings in other clinic-based research,[50–52] our data showed that lack of time is a primary barrier to being involved in the intervention. Approximately 84% of the intervention physicians spent less than 20 minutes studying the guide and less than 50% of our

physicians stated that the length of the in-office training was acceptable. Kimberly *et al*.[50] found that it takes physicians about 18 minutes to describe and recommend a FOBT and a sigmoidoscopy test and 7.4 hours per working day to provide the USPSTF recommended preventive services. Given that a primary care physician sees many patients in a day (averaged 19.2 patients per a nationwide report)[53] and patients make doctor appointments for various health reasons, such an intervention may pose a significant challenge for primary care physicians to incorporate the time demands into their everyday practice. Our intervention physicians were committed to completing the two in-office training sessions; however, some of them read the communication guide immediately before their in-office training. Our process evaluation indicated that print materials and face-to-face training designed for Chinese American primary care practices should be kept to less than 20 and 45 minutes, respectively. Researchers suggest that minimizing time demands on physicians is a key to successful enrollment of physicians for participation in research studies, as well as the sustainability of the intervention after the research concludes.[10]

Our findings were consistent with several prior studies showing that communication training courses had an effect in promoting physicians' self-efficacy in communication with patients.[54–57] This improvement was also reflected in our observation of the mock encounters. All of our intervention physicians were highly rated in their patient-centered communication behaviors—being enthusiastic about discussing CRC screening with patients, checking their understanding, and making a decision for CRC screening. Our study found that physicians who had low scores on shared decision-making at baseline displayed patient-centered communication during the encounters and had a greater change in self-efficacy after intervention (data not shown).

Our intervention, however, changed only some of the intervention physicians' knowledge and practices. In the evaluation of in-office trainings, physicians' performance varied across the mock encounters. For example, many of our physicians did not receive a full score on providing the three USPSTF recommended screening modalities to simulated patients because they mostly emphasized colonoscopy over FOBT and sigmoidoscopy. In addition, while some physicians described CRC screening options well, they did not perform as well in asking patients about their CRC screening history and addressing patients' barriers, or *vice versa*. Such little improvement in knowledge and practices might be related to time pressures as stated above. Physicians who read our communication guide in a brief period might not have been able to absorb all the information from the guide and actively apply them to the mock encounters. There are some inconsistent findings regarding the effect of the intervention in promoting primary care physicians' CRC screening knowledge and practices.[44,58] Relationships among physicians' knowledge, self-efficacy, and their patients' screening behaviors will be examined in our outcome analysis.

There are several considerations in interpreting our findings. First, 80% of our physicians were in solo practices and only one physician practiced in a teaching hospital. Therefore, the results of this study might not generalize to physicians affiliated with teaching hospitals, who may have higher motivation for research,[10] as well as those affiliated with multi-specialty practices and integrated systems. Second, intervention physicians might have provided socially desirable responses to our inquiries about the communication guide and

flip chart, while many spent limited time in reading and did not make much use of the materials during the mock encounters. Third, the rating results for the quality of mock physician-patient encounters were based on different trained raters at different study sites. Although our analysis did not account for potential variation among the three raters because of a small sample, we had the same rater evaluate the same physician across the two in-office training sessions to assure consistency in rating. Fourth, it is possible that physicians being observed during the simulated patient interviews were on their best behavior and might not perform as well in the "real world" practice setting where they are not being observed.

Despite these limitations, the results of this study provide information regarding successful methods to recruit Chinese American primary care physicians into clinical trials to conduct cancer screening. Our intervention had a positive effect in facilitating Chinese primary care physicians' communication skills. Moreover, it may be even more beneficial if the text of our print materials and the time of the in-office training could be further reduced. Overall, the training intervention helped participating physicians recognize Chinese immigrant patients' barriers to CRC screening and they addressed at least 70% of the barriers during encounters with simulated patients. This may subsequently increase patients' adherence to screening guidelines. We are completing our follow-up to ascertain actual receipt of CRC screening among patients in the one year post-baseline assessment. Specific physician behaviors (e.g., addressing patient barriers and perceived self-efficacy) that may contribute to patients' screening uptake will be examined to inform clinical practices.

Acknowledgments

The study was supported by National Cancer Institute (R01 CA121023 to W. Liang and JH. Wang and U54 CA153513 to GX. Ma. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding agencies. We greatly appreciate our participating Chinese American physicians and patients; as well as the support of Georgetown University research team staff (including Grace Ji, Lu-sa Su, Mei-yuh Chen, and Hsingchuan Hsieh) and Temple University Center for Asian Health research team staff in both Philadelphia and New York City Offices (including Richard Lee, Yin Tan, Ying Yuan, Jianwei Li, Mei Zhao, Dunli Wu, Xingjie Wang, and Kathy Zhou).

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Box 1.

EXAMPLES OF INTERVENTION MESSAGES CORRESPONDING TO SOCIAL COGNITIVE THEORY (SCT) AND CULTURAL CONSTRUCTS

SCT constructs	Physician in-office training[a]	Communication guide for physicians[b]
Behavioral capacities —Knowledge about CRC and screening	Patient: "Why should I screen for colon cancer? How do blood stool test and colonoscopy differ?"	Physician: "Colon cancer can occur to everyone over age 50 and detecting it early may allow us to cure it. Both tests can detect colon cancer but colonoscopy is more sensitive."
—Awareness of patient barriers	Patient: "I don't have health insurance and those complicated tests are too expensive."	Physician: "You can apply for low cost or free CRC screening services" [Show a list of local free screening programs]
Self-efficacy	Patient: "I still have concerns about doing colonoscopy and I need to discuss with my family first."	Physician: "Please don't be silent or too polite. Just give me a call to let me know your questions or concerns. And make sure you do it before you turn 75."
Outcome expectancies	Patient: "I am afraid my insurance cannot cover 100%. If I have to pay out-of-pocket, is it worth the money and time?"	Physician: "Colonoscopy is proven to be a very cost-effective detection test. Since you have never had one, it will worth your money to get screened. It's good for 10 years."
Skills in communication and recommendation	Patient: "The test is too expensive and too troublesome. I cannot add more burdens to my children. They are already paying rent for me."	Physician: "I know we Chinese like to be independent, but your children must like to make sure you are healthy. You can think of cancer screening as a way to prevent real trouble for you and your family. And I can help you find low-cost test in your area."
Cultural constructs Fatalism	Patient: "I am already 75 and may die any day, why bother to do the screening?"	Physician: "Nobody wants to die early, and your children will want to see you healthy and living a long life. More than 90% of early detected colon cancer can be cured."
Use of herbs	Patient: "I eat ginseng and other traditional herbs regularly; I think it'll prevent me from getting cancer."	Physician: "Then we should screen to confirm that you have taken good care of yourself"
Self-care	Patient: "I pay close attention to my diet and exercise regularly. I had no problem with my colon."	Physician: "Early stage colon cancer doesn't have any symptoms. When someone feels something is wrong, it often means a disease has progressed to a later stage and only palliative treatment is available."
Hot-cold balance	Patient: "I choose food carefully and my body is in good balance. Most diseases, excluding external wounds, are caused by the imbalance between	Physicians: "You can continue to follow traditional Chinese principles of health, but screening won't affect your balance."

SCT constructs	Physician in-office training[a]	Communication guide for physicians[b]
	hot and cold in a person's body. No need for screening. It'll disturb it."	
Medical examination	Patient: "I will be embarrassed if a doctor or a nurse checks my private parts."	Physician: "We can help you choose a female/male doctor you feel more comfortable with for your screening procedures."
Language barrier	Patient: "I don't know any GI doctor that can speak Cantonese, and don't want my son to know my surgery history and worry about me."	Physicians: "I can refer to Dr.__who is a Cantonese speaker; A medical interpreter is also available if you prefer."

[a]Examples were based on simulated patients' scripts.

[b]The communication guide provided physicians with suggested responses to patients' concerns and questions about CRC screening.

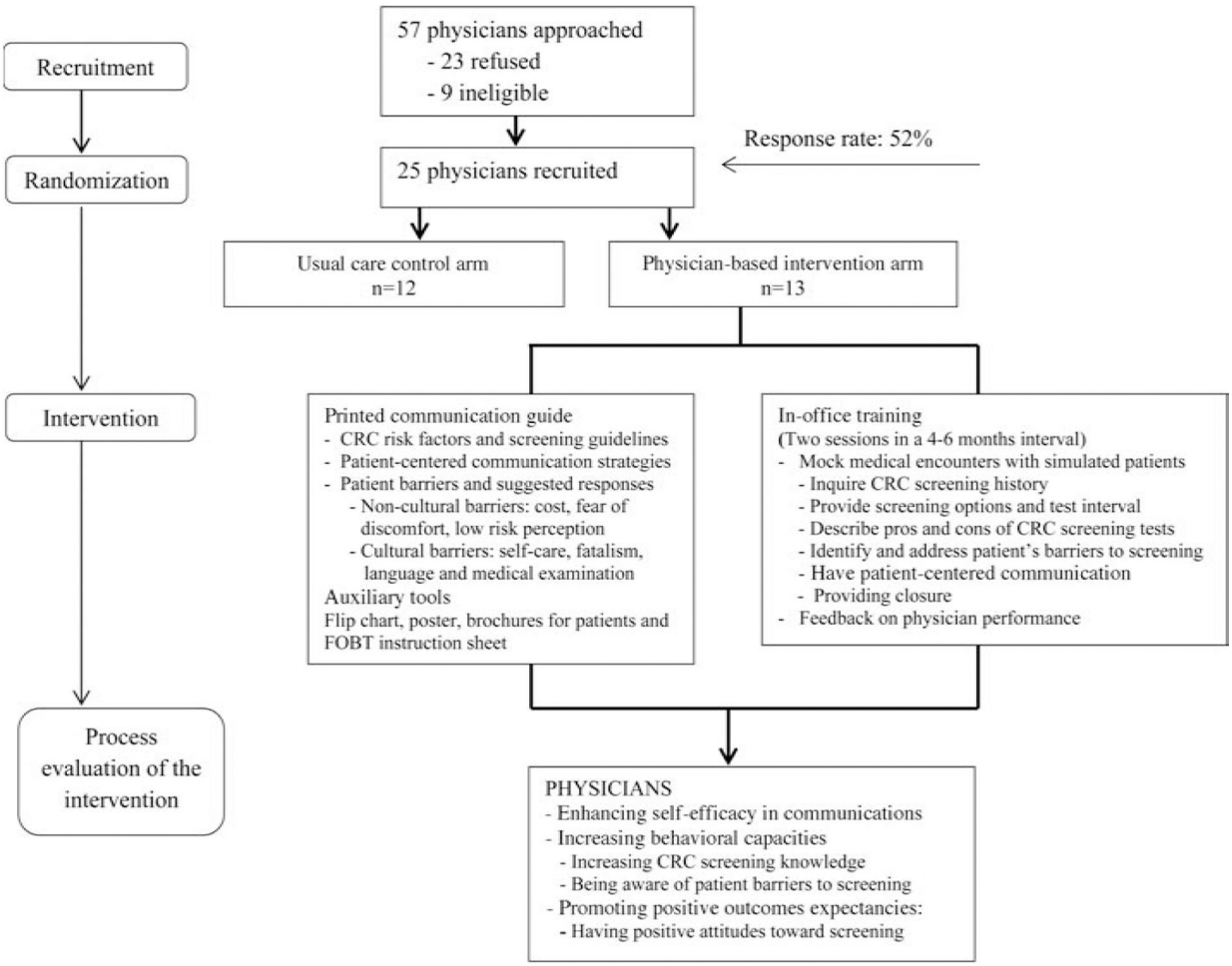

Figure 1.
Study flow chart and intervention procedures.

Table 1.

SAMPLE CHARACTERISTICS OF PHYSICIANS (N=25) BY STUDY ARM

	Physician-based intervention arm (n=13)	Usual care control arm (n=12)	p-value*
Sites			—
Washington DC area	6 (46%)	7 (58%)	
Pennsylvania and New York City	7 (54%)	5 (42%)	
Age (years)			.66
Under 40	1 (8%)	2 (17%)	
40–49	8 (62%)	4 (33%)	
50–60	3 (23%)	5 (42%)	
>60	1 (8%)	1 (8%)	
Gender			>.99
Male	9 (69%)	9 (75%)	
Female	4 (31%)	3 (25%)	
Birthplace			>.99
U.S.	1 (8%)	1 (8%)	
China	9 (69%)	8 (67%)	
Hong Kong	3 (23%)	2 (17%)	
Others	0	1 (8%)	
Practice type			.19
Private solo	12 (92%)	8 (67%)	
Private group	1 (8%)	3 (25%)	
Teaching hospital	0	1 (8%)	
Practice size of Chinese patients			>.99
200 patients and less	1 (14%)	1 (10%)	
>200 patients	6 (86%)	9 (90%)	
Attitude toward shared decision-making			>.99
Negative	6 (46%)	6 (55%)	
Positive	7 (54%)	5 (45%)	

*Two-sided Fisher's exact test for categorical variables and t-test for continuous variables

Table 2.

PHYSICIAN FEEDBACK ON INTERVENTION MATERIALS AND IN-OFFICE TRAINING

Feedback on each open-ended question	Number of physicians	Percentage (%)
Attractiveness		
a. Overall comments on the materials		
Considered it good and no need to change	12	92
Offered suggestions	1	8
b. Specific comments on the design and format of these materials		
Good and no need to change	11	85
Offered suggestions[a]	1	8
No answer	1	8
c. Time spent on reading the communication guide		
<=10 min	5	38
11–20 min	6	46
21–60 min	1	8
Other (irrelevant answer)	1	8
d. Time spent on going through the flip chart with a patient		
5 min	7	54
6–10 min	4	31
Other (irrelevant answers)	2	15
e. Overall comments on the in-office training		
Positive (new, useful or interesting)	12	92
No answer	1	8
Comprehension		
f. Comprehensibility of the materials		
Clear/Understandable	12	92
Other[b]	1	8
Acceptability		
g. Agreement of the complementariness between printed Colorectal Cancer materials and the in-office training		
Agree	12	92
Disagree	1	8
h. Usefulness of the materials for other Chinese American physicians		
Extremely useful	2	15
Very useful	10	77
Somewhat useful	1	8
i. Acceptability of the in-office training format to other physicians		
Agree	6	46
Depends (on physician's time)	6	46
Other[b]	1	8

[a]A physician suggested to save cost we should put in fewer pages or make an electronic version.

[b] One physician did not comment on this question.

Table 3.

AVERAGE PERFORMANCE SCORES ON THE IN-OFFICE TRAINING DURING PHYSICIAN-SIMULATED PATIENT ENCOUNTERS[a]

Number of MDs	Addressing patients' screening barriers[b]	Inquiring about Colorectal Cancer screening history	Providing screening options	Discussing pros/cons of CRC screening	Having patient-centered communication	Providing closure
MD 01	100%	75%	1.8	1.5	3.8	50%
MD 02	100%	100%	1.8	4.0	3.8	75%
MD 03	90%	100%	2.0	1.5	3.5	50%
MD 04	89%	100%	1.5	3.5	4.0[d]	100%
MD 05	89%	100%	1.0	3.5	3.9	100%
MD 06	89%	50%	1.8	1.0	3.8[d]	0%
MD 07	86%	100%	1.0	3.3	3.7[d]	100%
MD 08	83%	25%	2.3	2.0	3.6	25%
MD 09	80%	75%	1.8	1.8	3.5[d]	50%
MD 10	79%	50%	2.5	2.8	3.9	100%
MD 11	78%	100%	1.5	3.8	3.7[d]	100%
MD 12	71%	25%	1.0	3.0	3.7	50%
MD 13	70%	50%	1.8	0.8	3.5[d]	100%
Mean(SE)	85% (3%)	73% (8%)	1.7(0.13)	2.5(0.31)	3.7(0.05)	69% (9%)
Range of total scores[c]	Yes/No	Yes/No	0–3	0–4	1–4	Yes/No

[a]MD denotes medical doctor. The percentages and scores were based on an average of each physician's performance on four encounters across two in-office training sessions.

[b]The scores in the addressing patient barriers category were ranked in descending order.

[c]The minimum and maximum scores in each category.

[d]This physician had a negative attitude toward shared decision-making at baseline.

J Health Care Poor Underserved. Author manuscript; available in PMC 2019 June 20.

Table 4.

MEAN DIFFERENCES IN SOCIAL COGNITIVE THEORY CONSTRUCTS BEFORE AND AFTER PHYSICIAN- BASED INTERVENTION[a]

	Range of total scores[b]	Baseline Mean (SD)	Post-intervention Mean (SD)	Mean Δ[c] (SE)	p-values
Self-efficacy in communication	5–20	17.3 (2.38)	19.6 (0.87)	2.33 (0.67)	<.01
Behavioral capacity					
—Knowledge of Colorectal Cancer	0–7	4.2 (1.24)	4.5 (0.52)	0.23 (0.34)	.51
—Awareness of patient barriers	6–24	18.4 (2.64)	18.1 (2.63)	−0.17 (0.91)	.86
Outcome expectancies	9–45	33.0 (5.16)	31.4 (3.80)	−1.62 (1.48)	.30

[a]Higher score indicates higher self-efficacy, greater behavioral capacities, and higher outcome expectancies.

[b]The minimum and maximum summed scores in each construct.

[c]Mean difference (Δ) = Post-intervention scores minus baseline scores for intervention physicians only.