

RESEARCH COMMUNICATION

Closing the Disparity Gap: Cancer Screening Interventions Among Asians – a Systematic Literature Review

Su-I Hou^{1*}, Diadrey-Anne Sealy¹, Caroline W Kabiru²

Abstract

Background: Cancer is a leading cause of deaths among Asian Americans. However, the rates of screening among Asian Americans are low. The use of effective culturally-appropriate interventions needs to be explored. **Methods:** Electronic databases were searched for articles published between January 1995 and December 2010 for a comprehensive literature review. Interventions to increase breast, cervical and colorectal cancer screening among Asians populations in the US and overseas were included. **Results:** A total of thirty studies were reviewed. These studies differed on study design, target population, theoretical underpinning of intervention approach and outcome measures. Effective interventions employed a variety of strategies including the use of social networks, lay health workers, media education, community-based education, reminder notices, health care provider assistance and health system changes. Fifteen studies utilized behavioral theories in intervention development. **Conclusions:** This review finds culturally-appropriate community-based interventions and lay health worker strategies can improve cancer screening behaviors among Asian populations. Selections of intervention strategies will depend on the characteristics of the target group and feasibility of implementation. Challenges and recommendations for tailored screening interventions for Asians are discussed.

Keywords: Asian - cancer screening - theory - intervention - systematic review

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Introduction

Cancer is the leading cause of death among Asian Americans (AANCART, 2010). Although breast and cervical cancer rates in the native Asian countries are about a quarter to a half of those of other women in the United States, cancer rates for Asian Americans begin to mirror national rates within ten years of immigration (Kagawa-Singer and Pourat, 2000). Yet, screening rates among Asian Americans are much lower than other ethnic groups in the U.S. and fall below recommended guidelines (Kagawa-Singer and Pourat, 2000).

Asian Americans have been identified as the fastest growing population in the U.S. (Coughlin and Uhler, 2000; Lee-Lin and Menon, 2005; Trinh-Shevrin et al., 2009). Although commonly grouped into one aggregated cluster, each Asian ethnic group is unique and differs in language, culture, health beliefs or practices. For example, existing data shows significant variability in cervical cancer screening between Filipina and Vietnamese women (Kagawa-Singer et al., 2007). Aggregating over 60 nationalities into one category masks important demographic differences, such as variations in acculturation and English fluency levels (Trinh-Shevrin et al., 2009). As a result, researchers have developed

interventions targeted to specific ethnic groups (Pasick et al., 1996; Coughlin and Ulner, 2000).

Common barriers to screenings among all Asians include shyness, poor health knowledge, limited social support for utilization of preventive services, and fear of finding out that one has cancer (Hou et al., 2003; Hou 2007; Han et al., 2009). Barriers particularly relevant to Asian Americans include transportation, lack of health insurance or physician referrals, and language barriers (Jackson et al., 2000; Kagawa-Singer et al., 2007; Liang et al., 2009). Asian Americans remain one of the most poorly understood minorities in the U.S., mainly due to the lack of data that highlight differences and similarities across the diverse Asian subgroups (Trinh-Shevrin et al., 2009). Evidence-based, linguistically-appropriate and culturally-sensitive programs are needed to increase the reach and utilization of cancer prevention programs among Asian ethnic communities.

The purpose of this article is to review published literature describing screening interventions for breast, colorectal and cervical cancers among Asian populations in the U.S. with a view to identifying effective programs for specific Asian ethnic groups. We also review studies conducted overseas in Asia countries to help inform culturally-appropriate strategies. This review explicitly

¹Department of Health Promotion and Behavior, College of Public Health, The University of Georgia, 309 Ramsey Center, Athens, ²African Population and Health Research Center, Nairobi, Kenya *For correspondence: shou@uga.edu

Table 1. Criteria for Scoring the Methodological Quality of Studies

Methodological quality indicators	Points
Was assignment of participants to type of education randomized?	
Clearly described as randomized	10
Quasi-experimental	5
Was follow up of participants sufficiently long and complete?	
Follow up of 3 months or more	5
Response of >80%	5
Response of 50-80%	3
Response of < 50%	0
Did the study provide alternative educational method or intervention?	
Educational methods or intervention offered to participants as 'equally effective.'	10
No information	0
Was composition of groups similar at start of trial?	
Yes	10
Statistical correction	5
No information	0
Was the intervention effective?	
Yes (screening behavior)	10
Knowledge and attitudes	5
Maximum possible score	50

examines theoretical frameworks and constructs addressed in existing screening interventions targeting Asian populations.

Materials and Methods

We searched MEDLINE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Global Health and Psych Info computerized databases for studies published in English between January 1995 and December 2010. Keywords used include "breast or colorectal or cervical" and "cancer* or carcinoma* or tumor* or neoplasm*" and "screen* or mammogram* or pap or colon" in the title, in connection with race/ethnic specific keywords "Asian* or Korean* or Japan* or Indian* or Indonesia* or Chinese* or Laotian* or Taiwan* or Cambodia* or Vietnamese* or Philippine* or Filipino* or Singapore* or Malaysia* or Thai or Thais or Thailand* or Hmong*" in the abstract. The MEDLINE search yielded 326 studies, Global Health yielded 218, Psych Info yielded 123 and CINAHL yielded 128 studies. Overall, 271 unique studies were identified. Additional articles were identified by carefully reviewing the references of retrieved studies. Intervention studies designed to increase breast, cervical or colorectal cancer screening among a sample with at least 40% of one or more of the following Asian groups were further assessed for methodological quality: Vietnamese, Koreans, Chinese, Taiwanese, Thais, Cambodians, Laotians, Filipinas, Indians, and Japanese. To increase our understanding of culturally-appropriate interventions, studies conducted outside the United States were also included.

Two reviewers independently extracted and screened the articles to determine inclusion. Studies reporting only intervention descriptions or baseline data were excluded. A total of 49 articles met the inclusion criteria

and were further assessed on methodological quality based on a 50-point rubric (see Table 1). Five criteria were used (10 points per indicator): (1) study design, (2) follow-up length and retention rates, (3) provision of alternative intervention for comparison/control group, (4) comparability of comparison/control and intervention arms at baseline, and (5) effectiveness of the interventions (Van Tulder et al., 1997; Van den Berg et al., 2007). Thirty-one studies met the methodology quality criteria (30 points or higher). Many interventions focusing on culturally-sensitive efforts with education and materials included. For the purposes of this study, we defined cultural sensitivity and tailored education materials as "the development of health messages, materials and interventions according to the cultural beliefs and characteristics of the targeted population (Ahmad et al., 2005). Excluded studies were predominantly pre-post designs or did not provide adequate information on the study population.

Data were extracted from the 30 studies using a standardized abstraction format on the following: type of cancers, ethnicity, theoretical frameworks, design and setting, characteristics of intervention, participants, and outcomes (Table 2). Table 3 summarizes the number of studies by cancer type and ethnicity group.

Results

Quality of the studies reviewed

Fourteen studies utilized a randomized design, fifteen used a quasi-experimental, and one used a one-group before and after design. Six studies used instruments that had been validated prior to the intervention trials (Bird et al., 1998; Lu 2001; Hou et al., 2002; Kim and Sarna 2004; Crombie et al., 2005; Park et al., 2005). Most studies developed their own assessment measures then translated them into participants' native language. Few studies incorporated medical verification of self-reported data. (Taylor et al., 2002; Tu et al., 2006; Fang et al., 2007; Maxwell et al., 2010; Wang et al., 2010).

All studies targeted a specific Asian ethnic group, except one (Sandler et al., 2000), which targeted a mixed Asian group. Most of the interventions included tailored visual and/or audio materials. Data collection and intervention implementation were mostly done by Lay Health Workers (LHWs) or someone who could speak participant's native language.

Follow-up times ranged from 2 months (Kim et al., 2004) to 2.5 years (Nguyen et al., 2001). The most common follow-up periods were three months (Lu, 2001; Crombie et al., 2005; Hou 2005; Chumworathayi et al., 2007), six months (Taylor et al., 2002; Tu et al., 2006; Fang et al., 2007; Maxwell et al., 2010), and one year (Kelly et al., 1996; Maxwell et al., 2003; Walsh et al., 2010; Wang et al., 2010). Several studies demonstrated high retention rates of 80+% (Taylor et al., 2002; Lam et al., 2003; Maxwell et al., 2003; Kim and Sarna, 2004; Yi and Luong, 2005; Park et al., 2005; Juon et al., 2006; Fang et al., 2007; Nguyen et al., 2009). Some community-based projects used cross-sectional samples instead of cohort follow ups due to logistical constraints.

Table 2. Types of Cancer Screening and Asian Populations

Study	Vietnamese	Koreans	Chinese & Taiwanese	Thais	Cambodians	Filipinas	Mixed Group	Total
Breast cancer	3	2	1	1			1	8
Cervical cancer	4	2	3	2	1			12
Colorectal	2		1					2
Breast and cervical ^a	3	1			1	1		6
Colorectal breast and cervical						1		1
U.S. - Asian studies	US=11; A=1	US=4; A=1	US=3; A=2	US=0; A=3	US=2; A=1	US=2; A=0	US=1; A=0	US=23; A=8
Total	12	5	5	3	2	2	1	30

^aInterventions that targeted both breast and cervical cancers

Several studies provided alternative interventions for control/comparison groups to ensure similar study protocols and a better blinding situation. These included exercise sessions (Maxwell et al., 2003), monthly health newsletters (Hou, 2005), other health screenings (Park et al., 2005), or general education sessions (Fang et al., 2007; Maxwell et al., 2010). Some studies used a wait-listed control group (Crombie et al., 2005; Yi and Luong, 2005; Juon et al., 2006; Chalapati and Chumworathayi, 2007), while others opted for the usual standard of care (Taylor et al., 2002; Tu et al., 2006).

Overall, the impact of these interventions was mixed and when multi-component interventions were successful, there was no way to determine which component was most critical for success (McPhee et al., 1996; Han et al., 2008). Commonly cited study limitations included small sample sizes, use of non-randomized trials, lack of adequate comparison groups, and the use of self-reported screening behaviors.

Description of the interventions

In this section we describe the interventions by the target Asian ethnicity group. A separate discussion on studies conducted among Asians overseas is also provided.

Vietnamese

Twelve studies targeted Vietnamese. Ten were based in California; one in Texas (Yi and Luong, 2005); and one in Brisbane, Australia (Del Mar et al., 1998). The uses of mass media education (ME) and lay health workers (LHWs) were successful when used in conjunction with culturally-appropriate materials. Bird et al. (1998) conducted a community-based intervention utilizing LHW for small group educational sessions. The intervention increased screening awareness (from 22% to 78%) in the intervention group and improved screening uptakes in the intervention group (66%) compared to the comparison group (46%). To address transportation barriers, Yi and Luong utilized LHW to deliver an apartment-based intervention. Follow-up results also showed a significant increase in knowledge and attitudes, as well as breast self-exam (BSE) practices.

Studies showed that adding an LHW component to ME campaigns enhances outcomes (Lam, 2003; Mock et al., 2007). Jenkins et al. (1999) conducted a ME-alone campaign distributing videos, newspapers, billboards, television programming and booklets in Vietnamese language to schools and communities. Results showed a modest increase in screening awareness but no increase in mammograms or Pap screening uptakes. Lam et al.

(2003), however, utilized LHW to deliver small group education sessions in conjunction with ME campaigns via Vietnamese television stations and the print media. Both the ME-alone and ME-LHW combined arms in the interim study results showed significant screening-uptake increase. Mock et al. (2007) in their final report of the same study (Lam et al., 2003) further confirmed that the combined-intervention demonstrated higher Pap screening uptake than the ME-alone intervention.

Interventions targeting multiple-levels including the healthcare system seemed to be more successful. Two studies targeted both the community and healthcare providers. Nguyen et al. (2006) conducted a ME campaign and instituted a Vietnamese Pap clinic and patient navigator system, along with a Pap registry and reminder system and a restoration of the federal Breast and Cervical Cancer Control Program. This multi-component intervention used a pre-post cross-sectional quasi-experimental design. Results showed significantly higher screening uptake in the intervention community than control community. Pap test receipt was higher in the combined ME-LHW arm than the ME-alone group. Nguyen et al. (2010) recently conducted public and provider education to increase colorectal cancer (CRC) screening among Vietnamese Americans. Providers received materials to assist with counseling and patient reminder. Results showed greater colonoscopy uptake in the intervention communities.

Koreans

Five interventions targeted Koreans: two in California, one in Washington DC, one in South Korea, and one in an unidentified location. Results were mixed. Most of interventions utilized small groups and LHW in church-based interventions. Wismer et al. (2001) conducted health counselor delivered workshops in churches in California. A slight increase in mammograms but not for Pap smears, BSE or CBE were noted. Kim and Sarna (2004) used church-based LHW campaigns. One intervention arm received peer-education and access to low cost mammography while the other received only low cost mammography. Results indicated that women in both intervention groups significantly improved attitudes and knowledge. Mammography use in the combined intervention group was, however, not significantly different from that in the mammography access-only arm (87% vs 72%).

Fang, Ma, Tan and Chi (2007) utilized trained Korean LHWs to disseminate cancer information and provide patient navigation services. Pap screening rates increased from 12% to 83%. Juon et al. (2006) held small group

meetings at churches, doctor's offices and senior housing in Washington DC area. Following the program, women in the intervention group were 2.95 times more likely to report screening intention than those in the comparison group.

Chinese and Taiwanese

Five studies were conducted among Chinese and Taiwanese. Two were conducted in Taiwan, two in Seattle, Washington, and one in New York City. Two studies used direct-mail campaigns combined with a phone intervention in clinic-community settings and were found to be effective (Hou, 2002; Taylor et al., 2002). Taylor et al. (2002) used outreach workers offering logistic assistance and educational materials in one study arm while another arm received direct mail that included a video, motivational pamphlet, and brochure. Thirty-nine percent of the women in the outreach group and 25% of women in the direct mail group reported Pap testing compared to 15% in the control group. Wang et al. (2010) conducted a community-based education and patient navigation intervention to increase cervical cancer screening among Chinese Americans in New York. After the program, 70% of women in the intervention group reported Pap tests compared to 11% in the control group.

Tu et al. (2006) were among the first to address colorectal cancers (CRCs) screenings among Chinese Americans. Her research team utilized trilingual, bicultural health educators, bilingual materials and Fecal Occult Blood Test (FOBT) cards. After 6 months, 70% of the participants in the intervention group received CRCs screening compared to 28% in the control group.

Cambodians

Two interventions were conducted among Cambodians in Washington and Minnesota. Taylor et al. (2002) designed a randomized trial utilizing bicultural and bilingual outreach workers to conduct group visits at local community centers in conjunction with in-home educational sessions. At follow-up, women in the intervention group reported increased Pap screenings from 44% to 61%. In addition to using LHWs, Kelly et al. (1996) designed a community and health care system intervention that included community information programs, group screening appointments, transportation, female physicians, interpreters, and an informal clinic setting to improve breast and cervical cancer screenings. After the intervention, screening rates (74%) were almost 5 times higher than baseline.

Filipinas

Only two studies targeted Filipinas. Maxwell and colleagues (2003) utilized community and churches groups, and a female Filipino health educator to improve breast and cervical cancer screenings. Although the results indicated some improvement among recent immigrants, screening rates did not differ significantly between intervention and control groups. Maxwell et al. (2010) conducted a multi-component, community-based intervention to increase colorectal cancer screening. The intervention used small group education led by a trained

Filipino health professional and provision of testing kits. After the intervention, 30%, 25%, and 9% of participants in the education with test kit, education with no kit, and control groups, respectively reported colorectal cancer screening.

Mixed Asian Group

Sadler et al. (2000) conducted an intervention at an Asian grocery store in San Diego. Bilingual, bicultural Asian American students were trained as LHW to provide breast cancer education. The Asian grocery store was able to reach Asian Indian, Chinese, Filipino, Japanese, Korean, and Vietnamese women across a wide age range (29 to 50+ years). Screening adherence increased at follow-up. After the intervention, 37% of the women aged 40+ years had made arrangements for a CBE and 39% of the women aged 50+ years had scheduled a mammography. This study suggests that Asian grocery stores can be a cost effective way to reach a wide sector of the Asian population.

Studies Conducted among Asians Overseas

A total of 7 studies reviewed were conducted among Asians overseas. Del Mar et al. (1998) delivered a media-led campaign with personalized letters targeting Vietnamese in Australia. The use of personalized letters was not associated with increased screening. Park, Chang and Chung (2005) used small group sessions and audiovisual materials in a church to increase cervical cancer screenings among women in South Korea. Data showed women in the intervention group had higher scores on knowledge, perceived benefit, self-efficacy, and screening intention.

Two studies targeted Chinese and Taiwanese in Taiwan. Hou et al. (2002) implemented a direct mail intervention to increase Pap testing among a group of female family members of inpatients recruited in a hospital in Taiwan. The intervention group also received a health educator delivered phone intervention for counseling and appointment assistance. After the intervention, 50% of women in the experimental group reported Pap testing compared to 32% in the control group. Lu (2001) targeted beauticians in Taipei, Taiwan. This study adopted group teaching and monthly telephone prompts to increase frequency and awareness of the correct way to perform BSE. Significant improvement in ability to conduct monthly BSE was noted.

Three international studies were conducted among Thais. Crombie et al. (2005) conducted a work-site intervention in Australia and Thailand using pamphlets and educational sessions. They found that Thai-based women were more likely to practice BSE and to view mammograms as a priority after group education. Chalapati and Chumworathayi (2007) used a health education campaign followed by home-visits in Thailand. They found no significant difference in Pap smear screening rates between intervention and comparison groups. Chumworathayi et al. (2007) targeted women who had not been screened for cervical cancer in the last 5 years. Women in both the comparison and intervention groups received culturally-sensitive health education

material; however, women in the intervention group also received appointment letters. Their study reported a significant increase in Pap smear screening in the intervention group (45%) compared to the comparison group (26%).

Application of theories

Fifteen studies described the theories or models utilized to guide the design of the interventions (Table 2). The most common theories utilized were the transtheoretical model (McPhee et al., 1996; Hou, 2002; Park et al., 2005; Juon et al., 2006; Walsh et al., 2010) and the health belief model (Lu 2001; Hou, 2002; Park et al., 2005; Fang et al., 2007). A few used multiple theories or frameworks (Hou et al., 2002; Park et al., 2005; Fang et al., 2007). The PRECEDE/PROCEDE model (Wisner, et al., 2001; Lam et al., 2003; Kim and Sarna, 2004) and the Pathways theory were used to inform program (McPhee et al., 1996; Nguyen et al., 2006; Nguyen et al., 2010). Other theories used included the theory of reasoned action, the adherence model, and the social cognitive theory. It was difficult to ascertain the utility of theory-driven approaches in improving outcomes because almost all studies showed some positive impact.

Discussion

We found substantial evidence that culturally-appropriate interventions conducted among Asian Americans can increase screenings. Many new immigrants have limited English proficiency and healthcare access; thus, community-based interventions may be the best way to reach them (Taylor et al., 2008). Our review shows that intervention strategies utilizing indigenous LHWs are effective (Lam, 2003; Kim and Sarna, 2004; Fang et al., 2007; Mock et al., 2007). Specifically, LHWs and mass education campaigns that target delivery channels widely accessed by Asian Americans, such as the Asian grocery store or churches (in the case of Koreans), are successful. However, more studies are needed to identify appropriate settings for recruitment and health intervention delivery among Asian ethnic communities.

The utilization of a sound theory or framework is important in informing the design and evaluation of behavioral interventions (Glanz et al., 2002). Only about half of the studies reviewed described the theoretical underpinnings of the intervention. Although our review does not allow us to critically examine whether the application of theory enhances program outcomes, failure to explicitly mention the guiding theories and models makes it difficult to understand the possible pathways through which the program impacts on the target audience.

Our findings also showed that the Centers for Disease Control and Prevention (CDC)'s Task Force on Community Preventive Services' recommendation on the use of small media (e.g., videos, printed materials, letters and brochures) to encourage breast and cervical cancer screenings is also applicable among the Asian communities (Guide to Community Preventive Services, 2010). Many of the successful interventions reviewed utilized printed materials translated into the participants'

native language. The use of videos also provide a suitable cultural context that affirms viewers' traditional values and maybe particularly important when working with populations with low literacy levels (Jackson et al., 2000). There is also strong evidence that one-on-one education, either by telephone or in person, and often conducted by LHWs, can improve screenings in Asian ethnic communities (Taylor et al., 2002; Hou, 2005).

Few interventions introduced system level changes (Kelly et al., 1996; Hou et al., 2002). Physicians' recommendations are influential and highly valued, especially among Asian communities. Our review also shows that interventions that target multiple-levels including providers and the healthcare system have better outcomes. Provider education, patient registries, and reminder system may therefore be an inexpensive ways to effectively increase screening participation (Hou et al., 2002; Nguyen et al., 2006).

Our review identified few recent colorectal cancer screening interventions targeting Vietnamese (Nguyen BH et al., 2010; Walsh et al., 2010) and Filipino Americans (Maxwell et al., 2010). Low colorectal cancer screening rates among Asians and the paucity of colorectal cancer screening interventions targeting Asian groups suggests an urgent need for culturally-sensitive educational interventions.

Among the studies reviewed, there were only eleven distinct randomized trials in the U.S. and three overseas. Some community-based barriers to randomized control trials unique to Asian American populations include living in ethnic enclaves leading to difficulty of preventing contamination of the control/comparison, and reluctance to be randomized or to be in the control group. Possible solutions could be randomized at group instead of individual levels, delayed intervention for control group, and adequate explanation for research needs. Other challenges of conducting randomized trials in Asian American communities include the limited funding allocated to study health issues among Asian Americans and few Asian American researchers. Furthermore, recruitment and data collection may be impeded by language barriers or the size of the reachable Asian ethnic groups. Alternative study designs for community-based interventions such as community-based participatory research (CBPR) or quasi-experimental designs might provide promise to study the Asian American ethnic groups (Trinh-Shervrin et al., 2009). Studies including mixed Asian groups offer possibilities for comparisons on intervention effectiveness across ethnic groups. However, sufficient sample size and retention rates from each ethnic group will need to be obtained for possible comparisons. Overall, given the rapid increase of the Asian American populations, the number of quality cancer screening interventions conducted over the past 15+ years is very low. Although Asian Indians are a major Asian ethnic group, no screening intervention studies specifically targeting Asian Indians were identified. All three studies targeting Thais were conducted overseas. This review calls for more resources and research to be targeted in order to increasing our understanding of health, cultural, and social issues among different Asian American ethnic

groups.

Although our study highlights a number of important lessons learned on culturally-appropriate interventions targeting Asian Americans, findings should be interpreted in light of several limitations. First, this review is subject to publication bias since studies with negative findings are less likely published (Egger and Smith, 1998). Second, only articles published in English were reviewed. It is possible that important international studies published in other languages are under-represented in this review. Third, the wide range of follow-up length in the studies reviewed limits our ability to adequately compare the effectiveness of intervention across studies. In addition, the wide variety of ethnic groups and different screening behaviors for breast, cervical, and colorectal cancers also made comparisons across studies difficult. Fourth, when a multi-component or multi-level intervention was utilized, it was hard to tease out which component was most effective or which level was most influential.

In summary, a total of 30 studies conducted among six different Asian ethnic groups over the past 15+ years duration were reviewed. Interventions delivered via church setting seem particularly relevant for Koreans, while direct-mail campaigns seem to work well among Chinese. However, we cannot comment on the effectiveness of these strategies for other Asian ethnic groups due to lack of information. Multi-component or multi-level interventions especially those addressing the healthcare system can significantly increase intervention effectiveness among Asian groups. Our review shows that cancer screenings among Asian populations can be increased through community-based and lay health worker strategies. One-on-one or small group approach with culturally-sensitive and linguistically-appropriate educational materials are particularly effective. Selections of intervention strategies will depend on the characteristics of the target group and feasibility of implementation. To close the health disparity gaps on cancers among the Asian communities, more theory-driven research studies are encouraged. Studies must examine similarities and differences among diverse Asian ethnic groups in order to better develop effective interventions to increase preventive health services utilization.

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