Intervention tailoring for Chinese American women: comparing the effects of two videos on knowledge, attitudes and intentions to obtain a mammogram

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Abstract

This study utilized data from an ongoing randomized controlled trial to compare a culturally tailored video promoting positive attitudes toward mammography among Chinese immigrant women to a linguistically appropriate generic video and print media. Intervention development was guided by the Health Belief Model. Five hundred and ninety-two immigrant Chinese Americans from the metropolitan Washington, DC, and New York City areas completed telephone interviews before and after intervention. Changes in knowledge, Eastern views of health care (fatalism and self-care), health beliefs (perceived susceptibility, severity, benefits and barriers) and screening intentions were measured. Results showed that both videos improved screening knowledge, modified Eastern views of health care, reduced perceived barriers and increased screening intentions relative to print media (all P < 0.05). The generic video increased screening intention twice as much as the cultural video, although subgroup analysis showed the increase was only significant in women aged 50–64 years. Only Eastern views of health care were negatively associated with screening intentions after adjusting for all baseline covariates. These data suggest that a theoretically guided linguistically appropriate video that targets women from various ethnic groups is as efficacious in modifying attitudes toward mammography screening as a video that is exclusively tailored for Chinese immigrant women.

Introduction

Chinese American women have lower rates of mammography screening than most other US ethnic groups [1, 2]. Their underutilization of mammography screening is related to three key factors: culturally based health beliefs, poor knowledge and lack of access to cancer screening [3–10]. Our previous research has shown that Eastern (versus Western) views of health care are related to Chinese women’s negative attitudes toward breast cancer screening [8, 9]. Given that 70% of the Chinese American population are immigrants and many (>49%) have low English proficiency [11], it is likely that culturally tailored programs directed at addressing cultural beliefs and barriers would be beneficial for increasing knowledge about mammography screening in this population. Culturally, sensitive programs have been shown to impact health behaviors among immigrant and minority populations [12–14]. However, Chinese women’s misconceptions about and access barriers to mammography screening may be
similar to those of many other ethnic groups [15–24].
Thus, it is possible that a linguistically appropriate
generic program designed to address common bar-
rriers among multi-ethnic groups may also be useful
for promoting positive attitudes and mammography
use among Chinese immigrants. There is little em-
pirical data addressing this supposition. If a linguis-
tically adaptable generic program is proven to be
effective, it could provide an economically efficient
vehicle for public health education. To fill this
knowledge gap, we developed two theoretically
guided videos: (i) a ‘culturally tailored video’ and
(ii) a ‘generic video’. We define cultural tailoring as
the designing of an intervention’s content, messages
and format to align with the unique customs, norms
and values of a cultural group [25]. In contrast, ge-
neric programs address commonly identified barriers
and issues among multi-ethnic groups without tailor-
ing to the specific cultural values and norms embed-
ded in individuals and/or subgroups.
In this paper, we compare a culturally tailored
video promoting positive attitudes toward mam-
mography among Chinese immigrant women to
a linguistically appropriate generic video and print
media. We examine the acceptability and efficacy
of the two videos in promoting positive attitudes
toward obtaining a mammogram among Chinese
immigrants. We also provide data on the impact
of the videos on women’s screening intentions as
an intermediate outcome and identify factors that
predict future mammography screening intentions.

**Methods**

**Study design**

Participants in this study were randomized to one of
the three arms: (i) viewing a culturally tailored
video, (ii) viewing a generic video and (iii) reading
a fact sheet. The randomized controlled trial is on-
going. In this paper, we report participants’ feed-
back on the intervention materials and changes in
knowledge, cultural views, health beliefs and inten-
tion to obtain a mammogram before and 2–4 weeks
after the intervention. Changes in these variables
were repeatedly measured using an approximately
40-min telephone survey in English and Chinese
languages. Chinese surveys were back translated
into English to confirm semantic equivalence. We
mailed intervention materials to participants after
randomization along with instructions for viewing
the videos at home.

This study required at least 670 participants at
baseline in order to achieve appropriate number of
participants distributed equally to the three arms.
To increase the external validity of our examina-
tion, we enrolled our Chinese immigrants from
two demographically distinct US metropolitan
areas: Washington, DC, and New York City
(NYC) where a higher proportion of Chinese in
DC areas had college or advanced degrees than
those in NYC [26].

Block randomization was conducted right after
participants completed the baseline assessment.
Based on the baseline data, we stratified partici-
pants by three factors: (i) English proficiency (high
versus low), (ii) past mammography use (never ver-
sus ever screened) and (iii) study sites (DC and
NYC). We randomized participants in blocks of
180 participants. Within each block, participants
were randomly assigned to one of the three arms.

The trial protocol was approved by the George-
town University Institution Review Board.

**Participants and setting**

Eligible participants were Chinese American
women over the age of 40, living in the target areas,
with no personal history of breast cancer, who had
not adhered to the American Cancer Society (ACS)
annual mammography screening guidelines and
had not already scheduled an appointment for
a mammogram within the 6 months following the
enrollment period. The majority of participants
(70%) were recruited from onsite community
events and the rest were recruited through public
advertisement and referrals. Participants received
a $20-giftcard after completing post-intervention
telephone assessments.

Enrollment began in November 2006. We
approached 2976 women and identified 991 eligible
women (see Fig. 1). Of the 991 eligible women,
671 consented to participate (68% response rate).
We enrolled and interviewed women via telephone over a 33-month period. Of the 671 women, 664 women completed the baseline assessment. Among the 664, 592 completed the survey 2–4 weeks after the intervention in the study period for this paper. The telephone surveys were conducted in English (1%) and Chinese languages (Mandarin, 83% and Cantonese, 16%). Fifty-five women withdrew, resulting in an 89% retention rate (592 of 644). Reasons for withdrawal were specified in Fig. 1.

**Theoretical framework**

We adapted the traditional Health Belief Model (HBM) [27] to guide the video development by adding Chinese cultural beliefs and knowledge to the model. The four HBM components (perceived susceptibility, perceived severity, perceived benefits and perceived barriers) address Chinese women’s barriers to mammography screening and these components significantly correlated with cultural beliefs and knowledge in our baseline assessment [9].

**Intervention materials**

We first developed the cultural video based on a community-based participatory approach [8]. Prior to video production, we conducted four focus groups with 36 Chinese women of different acculturation levels, over age 40 to identify preferred content and format for the video. Women expressed a preference for a video with two segments: (i) a soap opera story and (ii) a recommendation from a female physician—a medical authority figure among Chinese. A Chinese breast cancer survivor drafted the storyline and worked with Chinese
community health advisors and the research team to finalize the script. Our research team and the physician/actor collaborated on the content of the physician recommendation portion of the video (see production details in Wang et al. [8]). The development of the generic video followed the same format as the cultural video, but the generic video script was drafted by a middle age Caucasian screenwriter. After production, we pilot tested the two videos in two other Chinese focus groups and with five individual Chinese women to ensure comparable quality of the two videos. The video scripts are provided in Appendix A. The videos are briefly described below.

Culturally tailored video

In the cultural video, we directly addressed culturally based Chinese beliefs, including fatalistic views of cancer, yin-yang balance in the body, attitudes toward Western examinations, social and family support, language barriers and embarrassment. The video setting was the 50th birthday party of a 5-year Chinese breast cancer survivor; the goal was to convey authenticity and debunk cancer stigma that is often held by Chinese Americans. The Chinese physician presented statistical data specific to Asian women and a breast model to help women understand their risk and how regular mammograms save lives. As most of our target audience speaks Chinese (∼99%), we developed this video in Chinese languages (Mandarin and Cantonese). Specific cultural features corresponding to the story script are provided in Table I. The cultural video had the following features: (i) an all-Chinese cast, (ii) a soap opera set within the lives of a Chinese family, (iii) Chinese dialog featuring appropriate idioms, (iv) Chinese foods and décor at the birthday party and (v) Chinese background music.

Generic video

The generic video targets common barriers to mammography use such as lack of knowledge, fear of pain and radiation, concerns about cost and time, fatalistic beliefs and low perceived risk for breast cancer. These barriers, as mainly described in the domains of the HBM, are correlates of breast cancer screening across different racial/ethnic groups (see Table I) [15–24]. The generic video uses all English-speaking actors from multi-ethnic backgrounds to perform in the soap opera set at lunchtime in a real-estate company. They talk about breast cancer, the pros and cons of mammography screening and obstacles to obtaining a mammogram. There are no features specifically tailored to Chinese women. There is only one Chinese actress; she is a restaurant worker with limited English proficiency who listens to the story of an 80-year-old White long-term survivor, counteracting fatalistic beliefs about cancer. The physician recommendation content in the generic video is almost identical to that in the cultural video except the former is presented by a non-Asian female physician, and the breast cancer incidence rates are pertinent to the general population rather than only to Asian American women. The entire generic video was dubbed in Chinese languages (both Mandarin and Cantonese) and included Chinese and English subtitles.

Both of the 18-min videos were created in DVD format, as all Chinese women in our pilot and current studies reported having a DVD player at home [8, 9].

Fact sheet

Women in the control group received a Chinese double-sided breast cancer fact sheet to read at home. The color-printed sheet included concise information about the development of breast cancer, Asian women’s risk for breast cancer, breast cancer symptoms and ACS breast cancer screening guidelines.

Information regarding local low-cost or free mammography screening programs was also mailed to women in all groups.

Measures

Outcome measures

The seven outcomes of interest included a binary outcome (intentions to obtain mammography) and six continuous outcomes (knowledge, cultural views
Table I. Video scripts corresponding to key variables of interest.

<table>
<thead>
<tr>
<th>Cultural beliefs</th>
<th>Culturally tailored video</th>
<th>Generic video</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalism</td>
<td>Whether you get sick or not is all pre-ordained</td>
<td>When my doctor told me the mammogram had found a spot, I thought my wonderful life was over</td>
</tr>
<tr>
<td></td>
<td>I’ve always been careful about my diet, exercise regularly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and no one in my family had ever had it … There was no reason for me to get breast cancer</td>
<td></td>
</tr>
<tr>
<td>Hot-cold balance</td>
<td>These Western doctors don’t even understand when I say my yin/yang is out of balance</td>
<td></td>
</tr>
<tr>
<td>Western care</td>
<td>I think that if you have too many of those X-rays, you’ll actually get cancer</td>
<td>I always hated going for any kind of checkup—lying there in a gown … in front of my doctor. It was so embarrassing … a mammogram is even worse</td>
</tr>
<tr>
<td>Cultural modesty</td>
<td>At my age, to go and be pawed by a male doctor—how undignified! … Mom, all the mammogram technicians are women too … nothing to be afraid of</td>
<td></td>
</tr>
<tr>
<td>Cultural norms</td>
<td>Didn’t Ling–Ling have some sort of … breast cancer? Pei pei pei (Chinese expression to sweep bad luck) This is a birthday party, don’t say that word. It’s so unlucky!</td>
<td></td>
</tr>
<tr>
<td>Cultural stigma</td>
<td>Nancy … I saw your son with Ling’s daughter, holding hands … I think you’d better check to see if Ling’s breast cancer might be hereditary</td>
<td></td>
</tr>
<tr>
<td>Language barrier</td>
<td>I hate going to see doctors. We can’t communicate … Mom, we can go see a Chinese doctor next time, I’ll go with you … to clear them up</td>
<td></td>
</tr>
</tbody>
</table>

HBM components

| Perceived susceptibility | Don’t they say that Chinese women don’t get breast cancer very often? | I’m 60 years old, and if I haven’t gotten breast cancer yet, then I figure I’m not going to get it now |
| Perceived severity       | When my friend found out, she was afraid that she’d lose her breasts, and … she was under so much stress … breast cancer turned her life upside-down | If you got breast cancer, Qing, who would run the restaurant? Taking care of your health is the best thing you can do for your business |
| Perceived benefits       | A mammogram can reveal very small tumors that sometimes even a doctor can’t detect. And a mammogram only squeezes you for less than a minute- It’s no big deal! | A doctor encouraged my mom to get regular mammograms, and when she was 53, the mammogram found a tiny lump … and she got treatment right away, so she made a full recovery |
| Perceived barriers       | That squeezing hurts so much! … I haven’t gotten up enough courage to go get it done | Mammograms? … between this job and two kids, who’s got time for that kind of thing? |
| Knowledge                | I don’t get it; how could someone with breasts as small as hers get breast cancer? | Anyway, I do my … you know (pauses) … self-exam every month, so I’m sure I’m okay |

\(^a\)For Chinese, cancer fatalism refers to a pre-determined fate other than a fatal disease.

\(^b\)Assuming that the genes will pass to next generations and then shadow the auspiciousness of the whole family.
and the four health beliefs variables). The continuous outcomes were expected to be key predictors of screening intention. Our main predictor for all analyses was group assignment.

‘Screening intention’ was measured with one question: ‘Do you plan to obtain a mammogram in the next year? Yes/No’.

‘Knowledge’ regarding breast cancer and screening was measured with 10 questions (e.g. ‘Breast cancer only occurs among women with family history’). Responses were Yes/No/Don’t know [9]. A correct response was scored as 1 and an incorrect or ‘Don’t know’ response was scored as 0. The overall knowledge scores ranged from 0 to 10 points.

‘Eastern cultural views of health care’ were measured with two sub-scales (fatalism and self-care with reliabilities of 0.83 and 0.78, respectively) from the Chinese Cultural Views of Healthcare scale [8, 9, 28]. The 9-item fatalism scale describes traditional Chinese attitudes toward serious illness like cancer. Chinese with higher fatalism scores were more likely to agree that getting cancer is predestined and fatal (e.g. ‘I cannot control for my destiny’). The 4-item self-care scale describes Chinese’s preference for monitoring one’s own health rather than having preventive checkups (e.g. ‘I don’t visit doctors if I’m not feeling sick’) [29]. Responses to all items ranged from 1 = ‘strongly disagree’ to 5 = ‘strongly agree’. High mean scores on the sum of the two scale scores indicate higher Eastern cultural views.

‘Health Beliefs’ were measured with four sub-scales: perceived susceptibility, severity, benefit and barriers (i.e. access to care, inconvenience and discomfort) from the Chinese Mammogram Screening Beliefs Questionnaire [30]. Women responded to a total of 33 questions using a 5-point Likert-type scale ranging from 1 = ‘strongly disagree’ to 5 = ‘strongly agree’. The reliabilities of these subscales range from 0.77 to 0.90 in our current study sample [9].

Confounding variables

Sociodemographic and medical access factors. We assessed demographics (i.e. age, education, marital status, annual income, employment and residential years in United States) and medical access factors (i.e. presence of health insurance coverage, a regular doctor and doctor recommendation for mammography screening). We divided age into three categories: 40–49, 50–64 and over 65 to capture potential differences in insurance coverage and screening behaviors [9].

‘English proficiency’ in speaking, listening, reading and writing were assessed using four items adapted from the Acculturation Scale for Southeast Asians [31]. This validated scale has a reliability of 0.97 in our sample [8, 9]. Choices for each item range from ‘very well’, ‘good’, ‘fair’, ‘poor’ and ‘not at all’. We added individual scores to generate an overall score on English proficiency.

Qualitative evaluation of the videos

We used open-ended questions following the Centers for Disease Control and Prevention guidelines [32] to assess whether viewers liked the videos, felt that messages were clearly presented and understandable, found storylines believable, had positive thoughts after watching and could personally relate. To evaluate whether participants actually watched the video, we queried them on items included in the video, such as, the plot in the last scene. Two trained research assistants separately coded responses to these open-ended questions. The inter-rater agreement was 96.3%. The lead author discussed any discrepancies with the raters in order to reach consensus.

We also designed a set of multiple-choice questions to assess viewers’ opinions of video aesthetics (e.g. ‘Overall, how well would you describe the acting in the video?’ Responses were ‘very bad’, ‘poor’, ‘fine’, ‘good’ and ‘excellent’) and cultural appropriateness (e.g. ‘Overall, how much do you think Chinese women will like the cast?’ Responses were ‘not at all’, ‘somewhat’, ‘a lot’ and ‘extremely’). Additionally, based on the Intrinsic Motivation Theory [33], we developed an 8-item scale to assess women’s motivation for viewing the videos including personal interest (e.g. ‘I was interested in the story’), enjoyment (e.g. ‘I enjoyed watching this video’) and knowledge acquisition (e.g. ‘I learned something new from the video’). Responses to each item ranged from 1 = ‘strongly
agree’ to 4 = ‘strongly disagree’. The reliability of this scale was 0.84.

Quantitative data analysis
In bivariate analyses, we evaluated the associations of covariates with group and the seven outcomes of interest. There were six continuous outcomes, representing changes from baseline, and a binary screening intention outcome. We used six linear regression models to evaluate the impact of group on the continuous outcomes and to investigate moderation effect of interest (using corresponding interaction terms) while controlling for predictive covariates. We used a backward elimination procedure to include in the final models only those covariates that kept their statistical significance in the multivariable models. We performed all pairwise comparisons to investigate significant main effects of group. We used a similar modeling approach to obtain the final logistic regression model for the screening intention outcome. We reported adjusted mean changes from baseline (ΔM) for each treatment and odds ratios (OR) along with 95% confidence interval (CI). All analyses were conducted using SAS 9.2.

Results
There were no statistically significant differences among the three groups in terms of demographics and health access, suggesting that the randomization was successful (Table II). Among the 592 women, 198 were randomized to the cultural video group, 195 to the generic video group and 199 to the control group. Participants were on average 55.8 years old (SD = 10.9). They had lived in the United States an average of 13.7 years (SD = 9.9); approximately 59% of them were insured and college educated. Many college-educated women had low English proficiency because they immigrated to the United States at a late age and had not lived in the United States for a long time. There were also no differences in the key variables at baseline except that the generic video group had higher mean scores on perceived susceptibility and severity for breast cancer than the other two groups, P < 0.05.

Qualitative evaluation of the videos
Most of the participants reported that they liked the materials (98%); that messages were clear and understandable (99%) and that the storylines were believable (96%). Only a few women in the generic video group (4%) suggested that the video should include more Chinese actors speaking Chinese, while others said that the multi-ethnic actors in the generic video reflects the real composition of US society. All respondents (100%) from the cultural and generic video groups were able to recall the actors, messages from physicians and the last scene in the video. There were no statistically significant differences between the two video groups regarding esthetic quality, cultural appropriateness and motivation for viewing.

Efficacy of the videos in improving knowledge, cultural views and health beliefs
The results showed that group assignment significantly explained variability in change from baseline for knowledge (F = 11.08, P < 0.0001), Eastern cultural views (F = 4.16, P < 0.02), perceived susceptibility (F = 3.67, P < 0.05), perceived benefits (F = 6.84, P < 0.01) and perceived barriers (F = 3.79, P < 0.05) after adjustment for covariates. As displayed in Table III, group changes in knowledge scores were moderated by the level of baseline knowledge. Only women with low knowledge at baseline in the cultural (ΔM = 2.63, 95% CI = 2.33–2.92) and generic (ΔM = 2.77, 95% CI = 2.46–3.07) groups significantly increased their knowledge after intervention to a greater extent than women in the control group (ΔM = 1.81, 95% CI = 1.52–2.10) (both P < 0.0001).

Women in the cultural and generic video groups had greater reduction of Eastern cultural views (ΔM = 1.38 and 95% CI = –2.04 to –0.73 and ΔM = 1.41 and 95% CI = –2.07 to –0.75, respectively) relative to those in the control group (ΔM = 0.23, 95% CI = –0.88 to 0.42), both with P < 0.05. The mean changes in Eastern cultural views were not significantly different between the cultural and generic video groups.

Both cultural and generic videos moderately increased women’s risk perceptions (ΔM = 0.35, 95%
Table II. Sample characteristics by study groups at baseline.

<table>
<thead>
<tr>
<th></th>
<th>All, N = 592</th>
<th>Cultural video, (n = 198)</th>
<th>Generic video, (n = 195)</th>
<th>Control group, (n = 199)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40–49</td>
<td>214</td>
<td>34.9%</td>
<td>35.4%</td>
<td>38.2%</td>
<td>0.88</td>
</tr>
<tr>
<td>50–64</td>
<td>243</td>
<td>41.9%</td>
<td>43.1%</td>
<td>38.2%</td>
<td></td>
</tr>
<tr>
<td>≥65</td>
<td>135</td>
<td>23.2%</td>
<td>21.5%</td>
<td>23.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.95</td>
</tr>
<tr>
<td>≥High school</td>
<td>350</td>
<td>58.6%</td>
<td>60.0%</td>
<td>58.8%</td>
<td></td>
</tr>
<tr>
<td>&lt;High school</td>
<td>242</td>
<td>41.4%</td>
<td>40.0%</td>
<td>41.2%</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.60</td>
</tr>
<tr>
<td>Married</td>
<td>456</td>
<td>75.3%</td>
<td>76.4%</td>
<td>79.4%</td>
<td></td>
</tr>
<tr>
<td>Nonmarried</td>
<td>136</td>
<td>24.7%</td>
<td>23.6%</td>
<td>20.6%</td>
<td></td>
</tr>
<tr>
<td><strong>Annual income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.88</td>
</tr>
<tr>
<td>＞$20 000</td>
<td>271</td>
<td>50.6%</td>
<td>51.7%</td>
<td>51.7%</td>
<td></td>
</tr>
<tr>
<td>≤$20 000</td>
<td>261</td>
<td>49.4%</td>
<td>48.3%</td>
<td>48.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.74</td>
</tr>
<tr>
<td>Yes</td>
<td>313</td>
<td>55.1%</td>
<td>52.6%</td>
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</tr>
<tr>
<td>No</td>
<td>278</td>
<td>44.9%</td>
<td>47.4%</td>
<td>48.7%</td>
<td></td>
</tr>
<tr>
<td><strong>Years in the United States</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>＞10 years</td>
<td>335</td>
<td>56.1%</td>
<td>55.9%</td>
<td>57.8%</td>
<td></td>
</tr>
<tr>
<td>≤10 years</td>
<td>257</td>
<td>43.9%</td>
<td>44.1%</td>
<td>42.2%</td>
<td></td>
</tr>
<tr>
<td><strong>English proficiency</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.95</td>
</tr>
<tr>
<td>High</td>
<td>213</td>
<td>36.9%</td>
<td>35.4%</td>
<td>35.7%</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>379</td>
<td>63.1%</td>
<td>64.6%</td>
<td>64.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Past mammography use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.84</td>
</tr>
<tr>
<td>Ever screened</td>
<td>388</td>
<td>64.7%</td>
<td>67.2%</td>
<td>64.8%</td>
<td></td>
</tr>
<tr>
<td>Never screened</td>
<td>204</td>
<td>35.4%</td>
<td>32.8%</td>
<td>35.2%</td>
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<tr>
<td><strong>Health insurance</strong></td>
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<tr>
<td>Yes</td>
<td>352</td>
<td>61.1%</td>
<td>59.5%</td>
<td>57.8%</td>
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<tr>
<td>No</td>
<td>240</td>
<td>38.9%</td>
<td>40.5%</td>
<td>42.2%</td>
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<tr>
<td><strong>Doctor recommendation</strong></td>
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<td></td>
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<td>0.98</td>
</tr>
<tr>
<td>Yes</td>
<td>255</td>
<td>43.2%</td>
<td>42.8%</td>
<td>43.7%</td>
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</tr>
<tr>
<td>No</td>
<td>335</td>
<td>56.8%</td>
<td>57.2%</td>
<td>56.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Baseline intention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.86</td>
</tr>
<tr>
<td>Yes</td>
<td>207</td>
<td>33.8%</td>
<td>36.4%</td>
<td>34.7%</td>
<td></td>
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<tr>
<td>No</td>
<td>385</td>
<td>66.2%</td>
<td>63.6%</td>
<td>65.3%</td>
<td></td>
</tr>
<tr>
<td><strong>Knowledge</strong></td>
<td>592</td>
<td></td>
<td>7.64 (1.68)</td>
<td>7.73 (1.67)</td>
<td>7.78 (1.40)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>592</td>
<td>35.28 (6.45)</td>
<td>34.70 (5.90)</td>
<td>35.01 (6.29)</td>
<td></td>
</tr>
<tr>
<td><strong>Perceived susceptibility</strong></td>
<td></td>
<td></td>
<td>10.30 (2.00)</td>
<td>10.73 (1.94)</td>
<td>10.29 (2.04)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>592</td>
<td>19.21 (2.37)</td>
<td>19.80 (2.39)</td>
<td>19.38 (2.36)</td>
<td></td>
</tr>
<tr>
<td><strong>Perceived benefits</strong></td>
<td></td>
<td></td>
<td>24.62 (2.05)</td>
<td>24.98 (2.32)</td>
<td>24.54 (2.77)</td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>592</td>
<td>50.47 (8.45)</td>
<td>49.25 (8.98)</td>
<td>50.39 (8.94)</td>
<td></td>
</tr>
</tbody>
</table>

Some column frequencies did not add up to 592 due to missing values. T-tests and χ² tests were performed to compare pairs of groups with respect to continuous and categorical variables at baseline, respectively. N.S. = Not significant for paired comparisons of groups. *The baseline mean scores on perceived susceptibility and severity of the generic group were significantly higher than those of the cultural group (P < 0.05).
between the cultural and generic video groups. It was expected that the mean change was significantly different from that of the control group. There were no significant differences in mean changes and/or severity, but they were removed from the final models because they were not significant predictors of the outcomes.

Perceived barriers. All the linear regression models were adjusted for group difference in baseline scores on perceived susceptibility, knowledge and perceived susceptibility, severity and benefits. Negative mean change indicates reduction of Eastern cultural view and perceived barriers. All the linear regression models were adjusted for group difference in baseline scores on perceived susceptibility, knowledge and perceived susceptibility, severity and benefits. Negative mean change indicates reduction of Eastern cultural view and perceived barriers.

Mean changes (ΔM) score = post-intervention mean score minus baseline mean score. Higher mean change indicates greater increase in knowledge and perceived susceptibility, severity and benefits. Negative mean change indicates reduction of Eastern cultural view and perceived barriers. All the linear regression models were adjusted for group difference in baseline scores on perceived susceptibility and/or severity, but they were removed from the final models because they were not significant predictors of the outcomes. ≠ denotes that the mean change was significantly different from that of the control group. There were no significant differences in mean changes between the cultural and generic video groups.

CI = 0.12–0.58 and ΔM = 0.51, 95% CI = 0.28–0.74, respectively) compared with the print control. Group changes in scores on perceived barriers were moderated by physician recommendation for mammography screening. In the cultural group, only women who had a physician recommendation had a significantly higher reduction of perceived barriers (ΔM = −3.67, 95% CI = −5.10 to −2.24), whereas the improvement in the generic group was not moderated by having a physician recommendation (ΔM = −2.72, 95% CI = −4.17 to −1.28) or not (ΔM = −2.53, 95% CI = −3.76 to −1.29). The control group had no significant reduction of perceived barriers.

Efficacy of the videos in changing intentions to obtain a mammogram

Women’s screening intentions significantly changed after intervention. The rates of screening intentions were significantly increased in the cultural group (from 33.8 to 72.2%), in the generic group (from 36.4 to 84.1%) and in the control group (from 34.7 to 61.3%). As displayed in Table IV, group assignment was a significant predictor of the post-intervention intention to get a mammogram after controlling for baseline intention, baseline perceived susceptibility and severity and age. Specifically, the odds of intending to obtain a mammogram increased twice as much (OR = 2.22, 95% CI = 1.29–3.83, P < 0.01) among those exposed to the generic video relative to the cultural video. Women in the control group were 40% less likely to report that they intended to obtain a mammogram relative to women in the cultural video group (OR = 0.60, 95% CI = 0.37–0.97, P < 0.05).

Women who held more Eastern cultural views were less likely to have intentions to obtain a mammogram in the near future; that is, for every one point increase in the cultural scale, a woman was 8% less likely to have future screening intentions (OR = 0.92, 95% CI = 0.88–0.96). Changes in knowledge and perceived barriers were not predictors of screening intention. As expected, baseline intention to get a mammogram
was strongly associated with post-intervention intention to get screened (OR = 12.72, 95% CI = 6.40–25.29).

The final logistic regression results did not show any statistically significant interactions between group assignment and other predictors (e.g. age). However, subgroup analysis showed that increase in the rates of screening intention among women 50–64 years old who viewed the generic video was much higher than for the women in the same age range who viewed the cultural video (data not shown). The reason that the overall age effect was not significant might be because group differences were not evident among women in the other two age categories.

### Discussion

This is one of the first studies to test whether a culturally tailored video designed for one specific ethnic group is superior at improving women’s knowledge and attitudes toward mammography screening when compared with a linguistically appropriate video targeted to women of various ethnic groups. Our results showed that both the cultural and generic videos were equally acceptable and more efficacious in promoting screening knowledge and intentions than printed material. Research shows that intention to obtain mammography screening significantly and strongly correlates with actual screening behavior ($r = 0.37–0.56$) [34–36]; so we expect these results to translate into positive actual screening outcomes. Moreover, the generic video led to greater mammography intentions than the culturally tailored video, although it appears that the effects of the generic video varied by age group. These results support the role of HBM-guided interventions in educating Chinese women, consistent with the results of similar studies among other populations [19, 21, 37].

Our results suggest that the variation of the two videos in increasing intentions was related to age. Only 50 to 64-year-old women who viewed the generic video were more likely to increase their intention than their cultural video counterparts. Why the generic video was more acceptable among this age group is unknown. It is possible that women who could identify with some of the life circumstances of the Chinese restaurant worker in the generic video—she is over age 50 and has never had a mammogram due to poor English proficiency, lack of health insurance and a busy work schedule to support her family—might have been motivated to plan on getting a mammogram. In the cultural video, there

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**Table IV. ORs from logistic model predicting post-intervention intention to obtain a mammogram.**

<table>
<thead>
<tr>
<th></th>
<th>ORs</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group assignment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generic video (versus cultural video)</td>
<td>2.22</td>
<td>1.29–3.83**</td>
</tr>
<tr>
<td>Control fact sheet (versus cultural video)</td>
<td>0.60</td>
<td>0.37–0.97*</td>
</tr>
<tr>
<td><strong>Age categories</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age 50–64 (versus 40–49)</td>
<td>1.07</td>
<td>0.65–1.76</td>
</tr>
<tr>
<td>Age ≥65 (versus 40–49)</td>
<td>0.48</td>
<td>0.28–0.81**</td>
</tr>
<tr>
<td>Baseline perceived susceptibility</td>
<td>1.12</td>
<td>1.01–1.24*</td>
</tr>
<tr>
<td><strong>Baseline screening intention</strong></td>
<td>12.72</td>
<td>6.40–25.29****</td>
</tr>
<tr>
<td>(versus no intention)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eastern cultural views$^a$</td>
<td>0.92</td>
<td>0.88–0.96***</td>
</tr>
</tbody>
</table>

For group assignment, the reference group was the cultural video in order to compare the difference between the generic and cultural videos. This final logistic regression model did not include baseline perceived severity score because it was not a significant predictor of post-intervention intention.

$^a$Scores representing the changes of the Eastern cultural views scale before and after the intervention. Lower mean scores indicate less Eastern cultural view. *$P < 0.05$; **$P < 0.01$; ***$P < 0.001$; ****$P < 0.0001$. 

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is no similar character that directly addresses women’s financial and time concerns. As a result, the cultural video significantly reduced perceived barriers only among women who had a physician recommendation at baseline. Women without physician recommendation at baseline were likely to either lack health insurance or rarely visit their physicians. Thus, they are less likely to change their perception of barriers as the video message does not target it directly. These interaction effects are marginally significant and should be verified in future investigations.

The current study showed that Eastern cultural views of health care were a key determinant of future screening intentions after controlling for baseline screening intention and group assignment, consistent with our prior findings [9]. Counter intuitively, the cultural video was not superior to the generic video in changing Eastern cultural views. It is possible that fatalism is a common cancer belief across a number of different populations [19, 38–41]. Both videos address cancer fatalism by having breast cancer survivors emphasize the fact that cancer is not necessarily fatal. Although only the cultural video specifically addresses self-care views, these views seemed to be modified by the factual knowledge given by the physicians in the videos (e.g. ‘Early stage breast cancer shows no symptoms and mammography can detect it even when you cannot feel it’). As a result, Chinese women viewing the generic video may have modified their self-care views. Our baseline results indicate that screening knowledge is negatively related to Eastern cultural views [9]. Additionally, our generic video is oriented to multi-ethnic populations. That is, translating the messages into appropriate linguistic forms and usages used within Chinese society might have greatly facilitated Chinese women’s acceptance and comprehension of the generic video. Notably, our past and current studies consistently suggest that increased rates of screening intentions might be mediated by reduction of baseline barriers after intervention among immigrant women [8, 9]. This potential mediation effect needs to be further verified by using behavioral screening data from our outcome evaluation.

The findings of this study are based on a convenience sample from two different geographic areas rather than a representative Chinese sample. It will be important to replicate these findings in other highly populated Chinese American areas like California. In addition, our outcomes were based on women’s intentions rather than their receipt of mammography. Although breast cancer screening intention significantly correlates to actual behavior [34–36], recent research shows an inconsistent relationship between cancer screening intention and outcomes [42–44]. Whether the generic video is equivalent to the cultural video in promoting mammography use among Chinese women needs to be further investigated by the actual receipt of mammography screening. Finally, women’s responses in all groups may have suffered from social desirability bias.

In summary, this current study presents new information on cultural tailoring and cancer education for immigrant populations. Our findings suggest that cultural tailoring of an intervention program for a single ethnic group may not be necessary for Chinese immigrant women if the generic program is appropriately designed—culturally and linguistically. It will be essential to test the generic video in other immigrant populations before we can reach conclusions about the benefits of cultural tailoring. As there are scarce programs to effectively promote Chinese women’s positive attitudes toward cancer screening [45], our videos appear to be promising to improve mammography use in this underserved immigrant population.

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**Conflict of interest statement**

None declared.
References


Mammography interventions for Chinese American women


Appendix A. Summary of story scripts

A.1: Summary of cultural video story script: Ling–Ling’s 50th birthday. The cultural video begins with three Chinese women, all over the age of 40: Xiao-Lang, Nancy and Mei-Zhen. They gather at Nancy’s house to prepare a surprise birthday party for Ling–Ling, their friend who is turning 50, a 5-year breast cancer survivor. Nancy’s husband is helping them set up, as well. Mei-Zhen and Xiao-Lang gossip about breast cancer and mammography screening and express the reasons why they do not want to get a mammogram. Nancy tries to correct their misconceptions and explains that getting a mammogram can save one’s life. She then reveals that she diagnosed with breast cancer 2 years prior, and it was because she went in for her annual mammogram that it was found at such an early stage. Nancy’s mother, an 80-year-old Chinese woman, then walks in and refuses to chat about breast cancer at the beginning. Then, Nancy’s mother says that she does not want to get a mammogram and lists the reasons why she does not get one. Nancy comforts her mom and helps her overcome her traditional views of care, as well. Ling–Ling and her husband, also Chinese, arrive at the house. She is extremely surprised and is very moved. She begins to share her experience with breast cancer with everyone. The husbands acknowledge that getting breast cancer is a family matter and they should encourage their mothers, wives and daughters to get regular mammograms. At the end of her story, everyone is persuaded to get their breasts screened. One month later, all the women are sitting and drinking tea. Xiao-Lan reveals that everyone’s mammograms were normal. Nancy’s mother gives more detail, stating that self-exams and mammograms are extremely important. Early detection means early treatment, which leads to an easier road to recovery.

A.2: Summary of generic video story script: Lee and Thompson Realtor’s healthy lunch. The video begins with Paulette, an employee from a real estate company, going into the lunchroom when she meets with Louise, another employee. Other employees, Susan and Anita, also enter the lunchroom where they chat about their lunch meals and segue into a conversation about diet and health issues. They are of different ages and come from different cultural backgrounds. Louise asks them if they get regular breast screenings. They all say that they have never been screened. Paulette says she has no time; Susan says she’s too young and Anita says that she self-examines her breasts, which is sufficient. At this point, Qing, a Chinese restaurant owner, and Marina, the boss of the real estate company, enter the lunchroom as
well. Both also say that they do not get annual mammograms. Qing has never been screened because she does not have health insurance and is very busy with her family restaurant business, and Marina stopped getting annual mammograms because she thinks that since she is 60, it is not possible for her to get breast cancer. Louise tells them her mom’s experience with breast cancer. She tells them that her mother is in her mid-80s and has been a cancer survivor for over 10 years. Her story moves the others so much that they all agree to schedule a mammogram in the near future. Louise also finds information about free mammogram screenings, allowing Qing to get screening. Marina suggests that they have a company Breast Cancer Awareness Day and have Louise’s mother come in to share her story. When the day arrives, Louise’s mother meets Paulette’s mother who is concerned about her diabetes and hypertension and declined to get a mammogram. Louise’s mother chats with her about family matters and consequently persuades her to get a mammogram. The scene then cuts to Louise’s mother talking at the podium during the Breast Cancer Awareness Day. She is given a plaque and flowers for her efforts, and everyone gets their mammograms.