Health seeking behavioral analysis associated with breast cancer screening among Asian American women

Objective: The purpose of this community-based study was to apply a Sociocultural Health Behavior Model to determine the association of factors proposed in the model with breast cancer screening behaviors among Asian American women.

Methods: A cross-sectional design included a sample of 682 Chinese, Korean, and Vietnamese women aged 40 years and older. The frequency distribution analysis and Chi-square analysis were used for the initial screening of the following variables: sociodemographic, cultural, enabling, environmental, and social support. Univariate and multivariate analyses were conducted on factors for breast cancer screening using multinomial logistic regression analysis.

Results: Correlates to positive breast cancer screening included demographics (ethnicity), cultural factors (living in the United States for 15 years or more, speaking English well), enabling factors (having a regular physician to visit, health insurance covering the screening), and family/social support factors (those who had a family/friend receiving a mammogram).

Conclusions: The results of this study suggest that breast cancer screening programs will be more effective if they include the cultural and health beliefs, enabling, and social support factors associated with breast cancer screening. The use of community organizations may play a role in helping to increase breast cancer screening rates among Asian American women.

Keywords: breast cancer screening, Vietnamese, Korean, Chinese, breast cancer, Asian American

Introduction

Cancer is the number one cause of death among Asian American women and Asian American women have the lowest cancer screening rates of all ethnic groups in the United States. The American Cancer Society reports a breast cancer incidence rate of 81.6/100,000 and a mortality rate of 12.5% among Asian American women. Breast cancer is the leading cancer among Chinese, Korean, Vietnamese, and Cambodian American women. Epidemiological studies have indicated an increase in breast cancer risk among Asian women and their descendants following immigration to the United States.

Early detection plays an essential role in reducing breast cancer morbidity and mortality. It is recommended by the American Cancer Society, the Michigan Cancer Consortium, and the American Medical Association that women aged 40 years and older have mammograms annually. Despite the effectiveness of early detection in reducing breast cancer mortality, rates of these preventive health practices remain low among many minority women. Mammogram screening rates are lower among Asian American women; only 57% had a mammogram within the previous 2 years.
and only 48% within the previous 12 months, compared
with 72% and 57% (respectively) among white women in
the United States. Furthermore, Asian and Pacific Island
women, for example, have been diagnosed at a much later
stage of breast cancer, largely due to lack of timely screening
and early detection.9–11

There are differences in cancer screening among
Asian American subgroups.2,12–14 Ma et al13 reported that
never-screened rates for mammography ranged from
20% in Chinese, to 28% in Vietnamese, 30% in Korean,
and 79% in Cambodian women residing in the mid-Atlantic
area; and the 12-month screening rates were 58%, 38%, 42%,
and 11%, respectively. Studies focusing on individual Asian
ethnic groups showed some variations. Among Chinese
American women, the rate of having ever undergone mam-
mogram screening ranged from 71.1% to 74.0%,15 and
43% of women reported screening in the last year.7 Among
Korean American women, screening rates have ranged from
55% to 78% among those aged ≥50 years;16 with 38.6% of
these women having had one within the previous year.17
Among southeast Asian women, about 70% of women aged
40 years and older ever had a mammogram, with 56% having
had one in the last 2 years.18 Among Vietnamese women,
45% received a mammogram and 15% within the last year.19
Among Vietnamese women aged 40 years and older, 26%
had a mammogram.20

Various reasons have been cited for underutilization
of screening, including language difficulty, cultural and accul-
turation factors, economic barriers, and a lack of health insur-
ance coverage.7,8,13,14,21,22 Women who had health insurance
and a usual source of care, and who had seen a physician in
the past year, were more likely to have been screened.14

Conceptual model

Ma23 developed a Sociocultural Health Behavior Model
by incorporating the major constructs of the health belief
model,24 social cognitive theory,25,26 the behavioral model,
and access to medical care.27 The Sociocultural Health
Behavior Model acknowledges that the complexity and
interaction of multiple factors play a major role in many
patients’ health-seeking behaviors. It explains health-seeking
behavior by describing the relationships among individual,
interpersonal, and environmental factors. This model
describes relationships between individual health behavior
and interaction with the environment. The interactions and
multiple levels of influence of individual, interpersonal,
and environmental factors underlying health behavior are
emphasized.

Since screening behavior is influenced by multiple
factors, there is a need to identify the associations among
these factors. The role of cultural factors is seldom
included in a health behavior analysis. In addition to com-
mon theoretical components, this model includes cultural
factors as a primary component. The model incorporates
the interdependence of predisposing, enabling, need,
family/social support, environmental health system, and
cultural factors, all of which contribute to a particular
health behavior or outcome. A number of variables can
be included under cultural factors; these include notions
of fatalism, birth in the United States, years lived in the
United States, English fluency, use of native language at
home, native food dietary habits, use of media sources
in the native language, and attendance at native-themed
social events.

The purpose of this community-based study was to apply
the Sociocultural Health Behavior Model to determine the
association of factors proposed in the model with breast cancer
screening behaviors among Asian American women.

Methods

Sample

The current study was part of a larger screening study
of Chinese, Korean, Vietnamese, and Cambodian Asian
Americans. To obtain a representative sample, a current
listing of 111 Asian American community organizations
in the greater Philadelphia area, New Jersey, and New
York City was identified by the Asian Community Health
Coalition and Center for Asian Health, Temple University
(Philadelphia, PA). The 111 community organizations were
located in geographic areas which maximized the coverage
of Asian Americans across ethnic groups, age, and socio-
economic status. Asian American community organizations
(N = 52) were randomly selected as clusters from the list of
111 organizations. A proportional sampling procedure was
adopted based on the size of the four ethnic groups, with the
size of the Chinese group twice the size of the Korean and
Vietnamese groups.28 The 2098 participants were recruited
from the 52 Asian American community organizations.
Among those recruited, 2011 participants completed the
survey (a response rate of 95.9%).

For the purpose of this paper, only Asian American
women (Chinese, Korean, and Vietnamese), aged 40 years
or older were retained for the analysis; the final sample
comprised 724 participants. Of these, 440 (60.77%) were
Chinese, 139 (19.20%) were Koreans, and 145 (20.03%)
were Vietnamese.
Design and data collection procedures
A cross-sectional research design was used in the study because of the common advantages provided by this method, such as collecting information from numerous, diversified participants in a short time. Data collection and administration training were provided to all study administrators as well as to on-site bilingual translators. The research team at the Center for Asian Health, Temple University, in conjunction with organization leaders, administered the study to Asian American participants on site in the community organizations’ facilities. The study was administered by using face-to-face instruction methods. Participants had the choice of responding to the questions in English or in their native language (Chinese, Korean, or Vietnamese).

Measures
A multi-lingual, 95-item questionnaire was developed, back-translated, and pilot-tested for reliability, validity, and cultural appropriateness. It comprised of six sections: (1) demographics (age, gender, foreign born, ethnicity, marital status, education level, employment status, income, and health insurance) and acculturation (English language competency and native foods); (2) mammogram screening behavior for breast cancer; (3) perceived barriers; (4) health perceptions, based on the health belief model (susceptibility, severity, benefits, barriers, cues to action, and self-efficacy); (5) access to healthcare (physician visits and language-concordant physician); and (6) satisfaction with access to health care. The detailed information about the data collection and measures were described elsewhere.13

The original study questionnaire items were examined and selected for this study through initial screening by applying frequency distribution analysis and Chi-square analysis. The selection criteria were based on the reasonable distribution of the independent variables that met the psychometric requirements. After the preliminary screening and analysis, the following variables were retained in the analysis.

The cultural factor
Years lived in the United States, English fluency, belief that cancer is curable, self-efficacy to prevent getting cancer, fear of getting a bad test result, embarrassment/shame of being diagnosed with breast cancer, use of the Internet for information (see Table 2).

The enabling factor
Has a regular physician to visit, importance of being screened for cancers, insurance covers breast cancer screenings, communication problems, transportation problems (to the facility), lack of knowledge, and not knowing where to get services (see Table 3).

The environmental factor
Arrangements for making appointments for medical care, length of time waiting to see doctor at the office, length of time waited between making an appointment for care and the day of visit, and rating of the care of the medical group (see Table 4).

The family and social support factor
Discussion of breast cancer with significant others or family members, family/friends had a mammogram (see Table 5).

The outcome variable
The status of mammogram screening was classified into three groups: never-screened, non-compliance (not screened during the past 12 months), and compliance (screened during the past 12 months).

Data analysis
Statistical analyses included descriptive statistics (frequencies, percentages, and Chi-square statistic), and multinomial logistic regression. The multinomial logit model was used to model the log odds of outcome variable which had three levels; thus two comparisons were made between never-screened versus compliance, and between non-compliance versus compliance. Each domain (ie, cultural factors, enabling factor, environmental factor, and family and social support factor) was analyzed separately. The multinomial logit analysis was first conducted with each independent variable univariately, and then the significant variables from the univariate model were analyzed with a multivariate multinomial model. For each multinomial model, whether it was univariate or multivariate, the ethnicity variable was adjusted. All statistical analyses were conducted using statistical analysis (SAS® software, v 9.1.3, SAS Institute Inc, Cary, NC).

Results
Of 682 participants who reported their breast cancer screening status, 24.05% (n = 164) reported never-screened, 25.51% (n = 174) reported non-compliance, and 50.04% (n = 344) reported complied. Table 1 presents the percentages and Chi-square test results for the selected demographics factors and the screening status. Of all demographic variables, only ethnicity was significantly related to the screening status, $\chi^2 = 21.32$, $P < 0.001$. Among those who reported compliance, the majority of them were Chinese (69.39%).
### Table 1 Percentages and significance test of demographic factors in relation to mammography screening status

<table>
<thead>
<tr>
<th>Demographic information</th>
<th>Never screened (n = 164)</th>
<th>Non-compliance (n = 174)</th>
<th>Compliance (n = 344)</th>
<th>Chi-square test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age category</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40–64</td>
<td>78.66</td>
<td>78.74</td>
<td>80.52</td>
<td>0.84</td>
</tr>
<tr>
<td>65+</td>
<td>21.34</td>
<td>21.26</td>
<td>19.48</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td>0.34</td>
</tr>
<tr>
<td>Not married</td>
<td>19.50</td>
<td>25.58</td>
<td>20.82</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>80.50</td>
<td>74.42</td>
<td>79.18</td>
<td></td>
</tr>
<tr>
<td>Highest grade completed</td>
<td></td>
<td></td>
<td></td>
<td>0.23</td>
</tr>
<tr>
<td>Below high school</td>
<td>28.21</td>
<td>28.57</td>
<td>28.66</td>
<td></td>
</tr>
<tr>
<td>High school+</td>
<td>71.79</td>
<td>71.43</td>
<td>71.34</td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
<td></td>
<td>0.20</td>
</tr>
<tr>
<td>Employed</td>
<td>55.00</td>
<td>57.89</td>
<td>63.02</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>45.00</td>
<td>42.11</td>
<td>36.98</td>
<td></td>
</tr>
<tr>
<td>Annual household income</td>
<td></td>
<td></td>
<td></td>
<td>0.29</td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>41.18</td>
<td>28.99</td>
<td>35.81</td>
<td></td>
</tr>
<tr>
<td>$10,000–$30,000</td>
<td>42.02</td>
<td>48.55</td>
<td>42.23</td>
<td></td>
</tr>
<tr>
<td>&gt;$30,000</td>
<td>16.81</td>
<td>22.46</td>
<td>21.96</td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
<td>0.0003</td>
</tr>
<tr>
<td>Vietnamese</td>
<td>23.75</td>
<td>26.01</td>
<td>14.87</td>
<td></td>
</tr>
<tr>
<td>Korean</td>
<td>24.38</td>
<td>20.81</td>
<td>15.74</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>51.88</td>
<td>53.18</td>
<td>69.39</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2 Odds ratio and 95% confidence intervals from the multinomial analysis of cultural factor in relation to mammography screening status

<table>
<thead>
<tr>
<th>Univariate multinomial model</th>
<th>Multivariate multinomial model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steps</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Never screened vs compliance</td>
</tr>
<tr>
<td></td>
<td>Univariate multinomial model</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.67 (1.36, 2.04)**</td>
</tr>
<tr>
<td></td>
<td>Referent</td>
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<tr>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

Notes: *P < 0.05; **P < 0.01.
Koreans and Vietnamese counted for a similar percentage of compliance with 15.74% and 14.87%, respectively.

### Cultural factors

Of the seven cultural variables analyzed individually in relation to the screening status adjusting for the ethnicity variable, five variables significantly differentiated between the never-screened and the screened. Those who lived in the United States for less than 15 years were more likely to be never-screened than those who had lived in the United States for 15 or more years (OR = 1.67, 95%, CI = 1.36, 2.04). Those who did not speak English at all were more likely...
Table 5 Odds ratio and 95% confidence intervals from the multinomial analysis of family and social support factor in relation to mammography screening status

<table>
<thead>
<tr>
<th>Family/friend had a mammogram</th>
<th>Univariate multinomial model</th>
<th>Multivariate multinomial model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never screened vs compliance</td>
<td>Non-compliance vs compliance</td>
</tr>
<tr>
<td>No</td>
<td>1.07 (0.63, 1.85)</td>
<td>0.82 (0.48, 1.43)</td>
</tr>
<tr>
<td>Yes</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Family/friend had a mammogram</td>
<td>17.4 (9.33, 32.3)**</td>
<td>3.03 (1.85, 4.95)**</td>
</tr>
<tr>
<td>No</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td>Yes</td>
<td>Referent</td>
<td>Referent</td>
</tr>
<tr>
<td></td>
<td>17.4 (9.33, 32.3)**</td>
<td>3.03 (1.85, 4.95)**</td>
</tr>
</tbody>
</table>

Notes: *P < 0.05; **P < 0.01. The family/friend had the mammogram became the only significant variable. Therefore, the results are the same regardless if we run the multivariate or not.

Enabling factors

When enabling variables were analyzed individually in relation to the screening status adjusting for the ethnicity variable, all seven variables significantly differentiated between the never-screened and the compliance. Those with a regular physician to visit were more likely to be never-screened than those with a regular physician to visit (OR = 0.68, 95%, CI = 1.44, 2.66). Those who disagreed with the belief that cancer is curable were more likely to be never-screened (OR = 1.29, 95%, CI = 1.03, 1.62). Those who feared getting a bad test results were more likely to be never-screened (OR = 1.54, 95%, CI = 1.07, 2.12). Those not using the Internet for sources of information were more likely to be never-screened (OR = 1.33, 95%, CI = 1.05, 1.70). However, none of these variables significantly differentiated between the non-compliance and the compliance (Table 2).

When including the above five significant variables from the univariate analysis into the multivariate multinomial model, two variables remained significant. Those who lived in the United States for less than 15 years were more likely to be never-screened than those living in the United States for 15 years or more (OR = 1.65, 95%, CI = 1.29, 2.12). Those who did not speak English at all were more likely to be never-screened than those who spoke English well (OR = 1.67, 95%, CI = 1.20, 2.52). None of these variables significantly differentiate between the non-compliance and the compliance in the multivariate multinomial model.

Environmental factors

Of the four environmental variables analyzed individually in relation to the screening status adjusting for the ethnicity...
variable, two variables significantly differentiated between the never-screened and the screened. Those who reported that “arrangements for making appointments for medical care” were poor or fair were more likely to be never-screened (OR = 1.76, 95%, CI = 1.15, 2.67). Those who rated the “care at their medical group” as poor or fair were more likely to be never-screened (OR = 1.98, 95%, CI = 1.28, 3.08). However, none of these variables significantly predicted the non-compliance compared with the screened (Table 4). After including the above two significant variables from the univariate analysis into the multivariate multinomial model, none were significant.

Family/social support factors
One variable under the family and social support domain in relation to the screening status was significant. Those who did not report a family member or friend having a mammogram were more likely to be never-screened (OR = 17.4, 95% CI = 9.33, 32.3) and non-compliant (OR = 3.03, 95% CI = 1.85, 4.95). The multivariate multinomial model remained the same as only one variable was significant in the univariate analysis (Table 5).

Discussion
This study examined multiple levels of influence of demographic factors, enabling, cultural, environmental health system, and family/social support factors underlying breast cancer screening among Chinese, Korean, and Vietnamese American women using the Sociocultural Health Behavior Model. The study found some significant associations among the factors in the model.

Of the demographic variables, only ethnicity was related to breast screening status. Chinese were more compliant with screening status followed by Koreans and Vietnamese. Consistent with previous literature, ethnicity is a powerful predictor of the lack of breast cancer screening. Although marital status was often cited as a strong predictor for breast cancer screening, our results did not show this association. This may in part be due to the high proportion of married women among the participants in our study, which led to little variation.

Consistent with previous studies, acculturation factors seemed to have a great impact on breast cancer screening. This study found that there was an association between the lengths of time lived in the United States and the likelihood of screening. The longer a person had lived in the United States, the more likely they were to have ever been screened. Multivariate analysis also showed that among cultural variables, those who lived in the United States for less than 15 years and those who did not speak English were more likely to be never-screened than those living in the United States for longer than 15 years and who could speak English. In addition, our findings were in line with the literature that suggests cultural beliefs may play an important role in Asian American women’s cancer screening behavior. Those who did not think cancer was curable, or who feared getting a bad test result, were less likely to have the screening.

Of the enabling factors, those who did not have a regular physician, did not have health insurance to cover the screening cost, did not recognize the importance of being screened for cancers, had language problems, lacked knowledge about breast cancer, or did not know where to get the services were more likely to have never been screened than those who did not have problems with these issues. With the exception of lack of knowledge and uncertainty about where to go for the services, all the other four factors were independently associated with screening behavior. These enabling factors also differentiated compliance from non-compliance for breast cancer screening. Without a regular physician and lack of health insurance to cover breast cancer screening, costs were the most significant barriers impeding Asian American women to access the screening. These findings corroborate the extant literature which suggests enabling factors, such as having health insurance and a usual source of care, are the strongest facilitators of receiving breast cancer screening.

Of the environmental factors, those who reported that arrangements of appointments were poor or fair, and who rated the quality of care of the medical group as poor, were less likely to get screened for breast cancer than those who chose a good or excellent rating. Future studies are needed to confirm the independent impact of these factors.

Of the family/social factors, those who did not have family or friends getting a mammogram were less likely to get screened. Social support has been found to be effective in increasing breast cancer screening among other ethnic/racial groups such as African Americans and appears to be so for Asian Americans as well. Having a family member or friend who had a mammogram increased the likelihood of being screened.

There were some limitations to the study. First, since the sample was drawn from Asian American women who participate in community organizations, the findings may not be generalizable to all Asian American women, especially those who do not participate in community-based organizations. Second, these findings are based on self-report questionnaires.
and as a result may include participant response bias and measurement error since some studies have found that the prevalence of cancer screening tests are often overestimated.\textsuperscript{35} Third, due to the nature of cross-sectional study, an association with breast cancer screening may not warrant a causal relationship.

Despite these limitations, using the Sociocultural Health Behavior Model, our study adds evidence to the growing body of literature with regard to the impact of sociocultural factors on Asian American women’s breast cancer screening behavior. The results of this study suggest that breast cancer screening programs will be more effective if they include the cultural and health beliefs, enabling, and social support factors associated with breast cancer screening. Sensitivity to ethnic and cultural factors, especially English language and other family or community contexts and dynamics, should be present throughout all secondary prevention activities, especially with the provision of culturally appropriate translation services and education materials in one’s native language to enhance interventions which target improved breast screening rates among Asian Americans. Furthermore, the use of community organizations, which served as the basis for the study, can play a role in assisting Asian Americans in identifying, planning, and adopting effective evidence-based screening programs. Differences in services within an Asian ethnic population should be studied to determine the impact on breast cancer screening. The community organizations working in collaboration with representatives from local government, local health departments, culturally competent primary physicians, and other related partners, may be more successful than a single agency in implementing prevention and breast cancer screening programs.

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**Disclosure**

The authors have no conflicts of interest to declare.

**References**


