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The Relationship Between Religiosity and Cancer Screening Among Vietnamese Women in the United States: The Moderating Role of Acculturation

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Abstract

In this study the authors explore the relationship between intrinsic, personal extrinsic, and social extrinsic religiosity to breast and cervical cancer screening efficacy and behavior among Vietnamese women recruited from a Catholic Vietnamese church and a Buddhist temple in the Richmond, Virginia metropolitan area. The potential moderating effect of acculturation was of interest. Participants were 111 Vietnamese women who participated in a larger cancer screening intervention. Data collection began early fall of 2010 and ended in late spring 2011. High levels of acculturation were associated with increased self-efficacy for Pap tests and having received a Pap test. Acculturation moderated the relationships between religiosity and self-efficacy for breast and cervical cancer screening. Higher levels of social extrinsic religiosity were associated with increased efficacy for cancer screening among less acculturated women. Acculturation also moderated the relationship between religiosity and breast cancer screening. Specifically, for less acculturated women, increasing levels of intrinsic religiosity and personal extrinsic religiosity were associated with lower likelihood probability of Pap testing. For highly acculturated women, increasing levels of intrinsic religiosity and personal extrinsic religiosity were associated with higher likelihood probability of Pap testing. The authors' findings demonstrate the need for further investigation of the dynamic interplay of multilevel factors that influence cancer screening.

Keywords

behavior; cancer; ethnicity; psychosocial; self-efficacy; screening

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INTRODUCTION

The age-adjusted incidence of cervical cancer is more than twice as high for Vietnamese women in the United States than for white American women (Miller et al., 2008). Vietnamese in this study refers to women who are either U.S.-born or immigrants *and* who self-identify as Vietnamese. Although Vietnamese women have lower annual incidence rates of breast cancer than their white counterparts (34.8 compared to 130.6 per 100,000) (Lin, Phan, & Lin, 2002; Ries et al., 2008), breast cancer risk increases in women who move from countries with low incidence rates to countries with high incidence rates (John et al., 2005). Vietnamese women are also less likely to have cervical cancer screening than other racial or ethnic groups (Do, 2005; Ho et al., 2005; McGarvey et al., 2003; Nguyen et al., 2006; Taylor et al., 2004). These findings highlight the need to uncover factors associated with screening for the Vietnamese.

The main aim of the authors in the present study was to examine the role of religiosity along with demographic variables in breast and cervical cancer screening efficacy and behavior among Vietnamese women. The authors were also interested in the potential moderating effect of acculturation on these relationships. Vietnamese women were recruited from two local faith-based sites (Catholic and Buddhist) as part of an original cancer screening intervention, “*Sức Khỏe Là Quân Trong Hôn Sắc Đẹp! Health is More Important than Beauty!*” The original study implemented and evaluated a breast and cervical cancer screening intervention to promote cancer screening knowledge, attitudes, self-efficacy, intention, and behavior for Vietnamese women (results are not reported in the present article).

The Socio-Ecological Model (SEM; McLeroy et al., 1988) served as the theoretical framework for understanding cancer screening among Vietnamese women and in the selection of the study’s variables with focus on intra- and interpersonal factors, community, and organizational factors (or institutional), and public policies (McLeroy et al., 1988; Robinson, 2008; Stokols, 1996; Richards et al., 1996) (see Figure 1). In the present study the authors examine individual factors (e.g., education, employment, and income) that might impede health behaviors. Interpersonal factors include family, friends, and peers that provide social identity, support, and role definition for Vietnamese women. Religiosity serves as an organizational variable as religious institutions and practices are often seen as community institutions with the Vietnamese. Acculturation serves as a measure of a community factor as it indirectly reflects relationships among communities. An individual’s level of acculturation may affect her social networks, norms, and connections both with formal and informal community institutions (i.e., church or temple). The findings and how they may shape health and public policy are discussed later.

Culture, Religiosity, and Community

Because of the high proportion of Buddhist and Catholic Vietnamese residing in the United States (Rutledge, 1992), Vietnamese communities are often faith-based, such as the ones in the present study. People who are more religiously involved may benefit greatly from drawing on resources (i.e., employment, housing, and sources of health information) offered by the church or temple (Park & Bernstein, 2008; Thoresen & Harris, 2002).

Religiosity.—Religiosity is defined as the presence of institutional organization and affiliation, expressions of particular beliefs, and rituals rooted in beliefs of the supernatural or divine (Pargament & Mahoney, 2002). Spirituality is defined as a more subjective process that encompasses the search for existential meaning and purpose in life. While Catholicism is accepted as a religion, Buddhism is more often viewed as a type of spirituality. Relying on Glock's (1962) main components of religion (i.e., beliefs, ritual, community, and specific governing codes), it is arguable that both Catholicism and Buddhism have institutional organization as members congregate to observe religious holidays and rituals.

Classic work on the Religious Orientation Scale (ROS; Allport & Ross, 1967) conceptualized religiosity into two domains: extrinsic religiosity and intrinsic religiosity. Intrinsically motivated individuals internalize their religion while religion serves a utilitarian purpose for extrinsically motivated individuals. Factor analysis of the ROS produced three factors: intrinsic religiosity, social extrinsic religiosity, and personal extrinsic religiosity (Gorsuch & McPherson, 1989; Kirkpatrick, 1989; Leong & Zachar, 1990). Social extrinsic religiosity uses religion for secular or social purposes while personal extrinsic religiosity uses religion for personal reasons such as gaining security or protection. Intrinsic religion is not instrumental or utilitarian but involves deep faith and connection to a higher power and is similar to spirituality.

Religiosity has been positively related to a variety of health behaviors such as abstinence from substance abuse (Epler, Sher, & Piasecki, 2009; Willis, Yaeger, & Sandy, 2003), lower blood pressure and hypertension (Gillum & Ingram, 2006), decreased risky sexual behavior (Haglund & Fehring, 2010), and increased coping strategies for stress and depression (Belgrave et al., 2010; Kirchner & Patino, 2010). Religiosity has also been associated with increased cancer screening (Azaiza & Cohen, 2006; Bowen et al., 2003). The authors propose that social and personal extrinsic religiosity are associated with increased screening due to their instrumental functions while intrinsic religiosity is not associated with screening outcomes.

Acculturation

Acculturation occurs when a minority individual adopts attitudes, beliefs, values, and behaviors of the dominant culture (Berry, 1980; Robbins et al., 2006). For the Vietnamese, acculturation has been associated with risky behaviors such as increased cigarette smoking (An et al., 2008), substance abuse (Reid et al., 2002), risky sexual behavior (Yi, 1998), and poor diet and sedentary lifestyle (Kaplan et al., 2003).

However, higher levels of acculturation have also been associated with increased positive health behaviors such as a higher likelihood to endorse help-seeking behaviors for mental health (Luu, Leung, & Nash, 2009) and to undergo cancer screening (Nguyen, Belgrave, & Sholley, 2010; Yi & Reyes-Gibby, 2002). Acculturation may not necessarily lead to the adoption of positive or negative behaviors, but rather, to the adoption of normative behaviors of the dominant culture. The authors propose that acculturation is associated with cancer screening variables.

Moderating role of acculturation.—In addition, acculturation was expected to moderate the relationship between religiosity and cancer screening variables. For women with lower levels of acculturation, higher levels of social *and* personal extrinsic religiosity are proposed to be associated with cancer screening. The underlying mechanism is the reliance of newly immigrant Vietnamese women on community centers found in faith-based sites to accommodate their needs. It was possible that women with high levels of social extrinsic religiosity would have developed numerous interpersonal relationships in the church or temple. These relationships potentially provide a host of benefits including perceived social support, increased connections, and referrals to health resources. High levels of personal extrinsic religiosity are also proposed to be associated with cancer screening as these women might be likely to believe that God works through physicians and screening tests. The study hypotheses were:

1. Acculturation would be positively associated with cancer screening variables (e.g., screening efficacy and receipt of CBE and Pap test).
2. Social extrinsic religiosity and personal extrinsic religiosity would both be positively associated with cancer screening variables, while intrinsic religiosity would not be correlated with these variables.
3. Acculturation would moderate the relationship between religiosity and cancer screening variables. Specifically, the relationships between social and personal extrinsic religiosity and cancer screening variables would be positive and stronger for women with lower levels of acculturation than for those with higher levels of acculturation.

METHODS

Participants

A convenience sample was used to recruit 111 Vietnamese women from the Richmond, Virginia metropolitan area. Women were recruited to participate in a larger cancer screening intervention. They were recruited from a Catholic Vietnamese church (57%) and a Buddhist temple (43%) with the help of community liaisons through the use of fliers, bulletins, and service announcements. Individuals were also referred by community liaisons. Interested individuals contacted the investigator who determined eligibility, though standardized instruments were not used for assessing eligibility. Potential participants were notified of the time and place of the questionnaire session. Data collection began early fall of 2010 and ended in late spring 2011.

Eligibility criteria for participants to be included were: at least 18 years of age, female, and self-identifying with a Vietnamese ethnic background. This also included Vietnamese women who were born in the United States. Participants completed questionnaires at baseline that included demographic items. In preliminary analyses, all participants met the requirements and were eligible for participation in the study. According to the ACS (2011), mammograms and clinical breast exams (CBE) should be continued regardless of a woman's age. However, women who are 70 years and older and who have had three or more consecutive normal Papanicolaou (Pap) test results with no abnormal Pap test results in the

last 10 years may choose to stop undergoing cervical cancer screening. Therefore, recruitment targeted women between the ages of 18 and 70 years. Though it is recommended that women start Pap testing three years after the initiation of sexual intercourse or by the age of 21 years, we included women who were 18 years and older. The rationale was that the original intervention study offered educational sessions about female cancers, such as the transmission of the human papilloma virus (HPV), the single most important determinant of cervical cancer (ACS, 2011). Targeting younger women was believed to lead to benefits in risk reduction for cervical cancer. In addition, women who reported a previous hysterectomy were eligible to participate, but their data were excluded from analyses that involved cervical cancer screening. Thus, data from eight women with previous hysterectomies were excluded from analyses.

Measures

Translation procedures.—The measures were originally available in English. A bilingual translator, a Vietnamese physician, and member of the local community first translated the documents into Vietnamese. An independent bilingual translator from the Vietnamese parish community back-translated the Vietnamese documents into English. The Vietnamese documents were piloted on community liaisons to ensure comprehension and cultural appropriateness of the measures. When discrepancies in translation arose, discussions with liaisons from the church and temple helped to resolve disputes in wording. Participants were provided the option to complete questionnaires in either Vietnamese or English. Eighty-one (73%) out of the 111 participants completed the Vietnamese version of the questionnaire. Measures used in this study were collected at baseline.

Demographic measures. Participants provided their age, education, marital status, income, employment, health insurance, whether they had a regular physician, and previous hysterectomy.

Acculturation. The Suinn–Lew Asian Self-Identity Acculturation Scale (SL-ASIA; Suinn et al., 1987) was used to measure acculturation. The SL-ASIA is a widely used acculturation measure for people from Asia or with an Asian American background with demonstrated strong initial reliability ($\alpha = .88$). The modified SL-ASIA has 18 items that measures language, ethnic identity, friendship choices, behaviors, generational and geographic history, and attitudes. Items are rated on a five-point Likert-type scale from 1 (*low acculturation*) to 5 (*high acculturation*). Cronbach's α for the current study was .85.

Religiosity. Religiosity was measured using the 20-item Religious Orientation Scale (Allport & Ross, 1967). Responses are on a 5-point Likert scale with 1 = *strongly disagree* to 5 = *strongly agree*. Leong and Zachar (1990) identified three factors used in this study including: intrinsic ($\alpha = .87$), social extrinsic ($\alpha = .63$), and personal extrinsic religiosity ($\alpha = .62$). The ROS scale has been validated with many faith-based samples including Christians, Muslims, and Buddhists (Tapanya, Nicki, & Jarusawad, 1997; Thoreson, 1998; Watson et al., 2002). For the current study, Cronbach's α for the intrinsic subscale was .81, .69 for the social extrinsic subscale, and .82 for the personal extrinsic subscale.

Self-efficacy for breast and cervical cancer screening.: A measure developed by Champion, Skinner, and Menon (2005) was used to assess cancer screening efficacy with demonstrated strong initial reliability ($\alpha = .87$). Participants responded to 20 items (e.g., “You can make an appointment for a Pap test”) using a Likert-response format (1 = *strongly disagree* and 5 = *strongly agree*). For the current study, Cronbach’s α : Pap testing self-efficacy scale = .84; and CBE self-efficacy scale = .91.

Previous receipt of a Clinical Breast Examine (CBE) or Pap test.: Cancer screening behavior was obtained by asking participants if they have ever received a Pap test or CBE (e.g., “Have you ever had a Pap test?” Yes = 1 and No = 0).

Cancer screening intent.: Participants were asked if they intended to get either Pap tests or CBEs (e.g., “Do you intend on getting a Pap test in the future?” Yes = 1 and No = 0). However, these items were dropped from analyses because intention to screen was very high (98% for CBE; 96% for Pap tests) leading to low cell counts for regression analyses.

Procedure

The study protocol received university Institutional Review Board approval before initiation.

Establishing trust and rapport.—The original breast and cervical intervention study relied on community-based participatory research (CBPR) strategies. Before the initiation of the intervention study, the principle investigator built rapport and partnerships with the Vietnamese communities through outreach, volunteer, service, and attendance in community events. Active collaboration with community liaisons and leaders helped to legitimize the study.

Data collection.—Upon arrival, participants signed informed consent forms. Half of the women participated in a breast and cervical cancer screening intervention, though those results are not reported in this article. All participants completed baseline measures on demographic variables, measures of religiosity and acculturation, and cancer screening variables. Questionnaires were administered by either the investigator or by trained community members and took approximately 40 minutes to complete.

Data Analyses

PASW Statistics (formerly SPSS) version 18 was used as the study statistical package. Descriptive statistics were calculated for the study’s variables. In addition, the sample size was determined by power analyses conducted to ensure the detection of moderate effect sizes for a power of .90 at $\alpha = .05$ (two-sided tests) for the regression analyses.

Hierarchical multiple regression analyses were conducted to determine factors associated with scores in self-efficacy for breast and cervical cancer screening. Logistic regression analyses were conducted to determine factors independently associated with having received CBE and Pap tests. Age, household income, and health insurance status were used as covariates because of their associations with cancer screening variables in prior studies (DeNavas-Walt, Proctor, & Smith, 2008; Ho et al., 2005; Kandula et al., 2006; Meissner et

al., 2009). To reduce potential confounding, the authors statistically controlled for the covariates by entering them in the regression models. Because all measures were from baseline (before the start of the intervention sessions), they were not adjusted for intervention or control group in the regression models. Model fit was assessed through the omnibus F-test and chi-square values.

RESULTS

The mean age of participants was 40.23 years ($SD = 14.23$) with a range from 18 to 70 years. Most were married (68%) and had children (72%). A minority (18%) had completed some college, but a majority (72%) were currently employed, had annual household incomes under \$25,000 (53%), had health insurance (68%), and had a regular physician (61%).

Most (60%) participants reported having previously had a CBE and a Pap test (65%) (Table 1).

Hierarchical Linear Regression

Self-efficacy for breast cancer screening.—A hierarchical multiple regression analysis was conducted to determine factors associated with higher scores in self-efficacy for breast cancer screening. Age, household income, and health insurance status were controlled and entered into the first step. Centered scores in acculturation, intrinsic religiosity, social extrinsic religiosity, and personal extrinsic religiosity were also entered into the first step. Higher order interaction effects between acculturation and religiosity were entered into the second step. The model accounted for a significant amount of variance in self-efficacy for breast cancer screening, $F(10, 99) = 5.00, p < .001; R^2 = .34$. The addition of cultural variables in model 2 significantly improved the amount of explained variance (R^2 change = .07; $F = 3.42, p = .02$) (Table 2).

Having insurance [$\beta = .33, t(109) = 3.58, p < .001$] was significantly associated with increased levels of self-efficacy for breast cancer screening. In addition, acculturation significantly moderated the relation of social extrinsic religiosity to self-efficacy for breast cancer screening [$\beta = -.29, t(109) = -2.46, p = .02$]. For less acculturated women, but not highly acculturated women, increasing levels of social extrinsic religiosity were associated with higher self-efficacy for breast cancer screening (Figure 2).

Self-efficacy for cervical cancer screening. A hierarchical multiple regression analysis was conducted to determine factors related to higher scores in self-efficacy for cervical cancer screening following identical blocking procedures in the previous model. The model accounted for a significant amount of variance in self-efficacy for cervical cancer screening [$F(10, 89) = 4.05, p < .001; R^2 = .33$]. The addition of cultural variables in model 2 significantly improved the amount of explained variance (R^2 change = .07; $F = 3.11, p = .03$) (Table 3).

Having insurance [$\beta = .31, t(91) = 3.18, p < .001$] was positively associated with increased levels of self-efficacy for cervical cancer screening. In addition, acculturation [$\beta = .25, t(91) = 2.18, p = .03$] and higher levels of social extrinsic religiosity [$\beta = .23, t(91) = 1.95, p = .$

05] were associated with increased levels of self-efficacy. Lastly, acculturation significantly moderated the relation of social extrinsic religiosity to self-efficacy for cervical cancer screening [$\beta = -.29$, $t(91) = -2.25$, $p = .03$]. For less acculturated women, increasing levels of social extrinsic religiosity were associated with higher self-efficacy for cervical cancer screening. This association was not found for highly acculturated women (Figure 3).

Hierarchical Logistic Regression

Previous receipt of a CBE.—A multiple logistic regression analysis was conducted to assess factors associated with participants having previously received CBEs (0 = *no*, 1 = *yes*). Using previous receipt of a CBE as the outcome, the same covariates and similar blocking procedures from the previous analyses were used.

Model 1 was significant [$\chi^2(7) = 60.47$, $p < .001$], but model fit did not improve with the addition of cultural variables in Model 2 (Nagelkerke R-square value = .61, and the Cox and Snell R-square value = .46). The variables correctly explained 83% of the variance for women having had a CBE [Hosmer and Lemeshow Test was non-significant, $\chi^2(8) = 5.86$, $p = .66$, indicating that the model did not differ from the observed data and was a good fit]. According to the Wald criterion, age was significantly positively associated with previous receipt of a CBE, $B = .14$, $\chi^2(1) = 20.72$, $p < .001$. The change in odds of receiving a CBE associated with a one-year increase in age was 1.15 (Table 4).

Previous receipt of a Pap test.—A multiple logistic regression analysis was conducted to assess factors associated with whether participants had previously received Pap tests (0 = *no*, 1 = *yes*) using identical blocking procedures as those in the previous model. Model 2 was significant [$\chi^2(10) = 52.39$, $p < .001$]. The Nagelkerke R-square value = .56 and the Cox and Snell R-square value = .41]. The variables were associated with 86% of the women who had received a Pap test. [Hosmer and Lemeshow Test was non-significant, $\chi^2(8) = 9.95$, $p = .27$, indicating that the model did not differ from the observed data and was a good fit].

According to the Wald criterion, age was associated with previous receipt of a Pap test [$\beta = .09$, $\chi^2(1) = 10.35$, $p < .001$]. The change in odds associated with a one-year increase in age was 1.09. Household income was also associated with having had a previous Pap test [$\beta = .67$, $\chi^2(1) = 6.77$, $p = .01$]. The odds associated with a one-unit increase in household income was 1.95. Acculturation was associated with having had a Pap test [$\beta = .12$, $\chi^2(1) = 5.53$, $p = .02$]. The odds associated with a one-unit increase in acculturation was 1.13.

Acculturation significantly moderated the relation of intrinsic religiosity to having had a Pap test [$\beta = -.03$, $\chi^2(1) = 3.79$, $p = .02$] (Table 5). For less acculturated women, increasing levels of intrinsic religiosity were associated with lower likelihood of having had a Pap test. For highly acculturated women, increasing levels of intrinsic religiosity were associated with higher likelihood of having had a Pap test (Figure 4).

Acculturation significantly moderated the relation of personal extrinsic religiosity to having had a Pap test [$\beta = .06$, $\chi^2(1) = 4.44$, $p = .04$]. For highly acculturated women, increasingly levels of personal extrinsic religiosity were associated with higher likelihood of having had a

Pap test. For less acculturated women, increasing levels of personal extrinsic religiosity were associated with lower likelihood of having had a Pap test (Figure 5).

DISCUSSION

The goal of the authors in the present study was to examine the relationship between acculturation, religiosity, and breast and cervical cancer screening variables among Vietnamese women. In addition, whether acculturation moderated the relationships between religiosity and cancer screening variables was of interest. The findings of the study provided partial support for the hypotheses.

High levels of acculturation were associated with increased self-efficacy for Pap tests and women having received at least one Pap test. These results are consistent with studies that show that Asian women who are more acculturated are more likely to undergo cancer-screening than women who are less acculturated (Yi & Reyes-Gibby, 2002; Tang, Solomon, & McCracken, 2000). The adoption of Western values and behaviors increases Vietnamese women's acceptance of normative Western health practices, such as regular cancer screening tests. Topics surrounding the female body that may be considered private or taboo in Vietnamese culture (Choudhry, Srivastava, & Fitch, 1998) may lessen in perceived stigmatization and lend to increases in screenings such as Pap tests.

In addition, acculturation moderated the relationships between religiosity and self-efficacy for breast and cervical cancer screening and religiosity and breast cancer screening. The protective effect of religiosity for women was contingent upon level of acculturation. Women with low levels of acculturation benefited from higher levels of social extrinsic religiosity; higher levels of social extrinsic religiosity were associated with increased efficacy for breast and cervical cancer screening among less acculturated (and not highly acculturated) women. It is plausible that for women with high levels of social extrinsic religiosity, church membership serves an instrumental role, facilitating the development of friendships, relationships, and social networks for these individuals. As a result, women acquire support systems, personal resources, and cultural brokers, persons who serve as cultural translators for family members, adults, or peers (Trickett & Jones, 2007). In addition, the communal nature of this type of religious support may foster women's confidence and overall sense of efficacy in attaining health services (Davis, 2000). In contrast, highly acculturated women are more likely to have social networks outside the church or temple, broadening the availability of health information and resources. The findings support the use of religious institutions, such as the Temple and Church, as settings in which to carry out health educational messages and programs among immigrant and less acculturated populations. In the present study, liaisons who were members of the Temple and Church assisted in identifying women for potential participation.

Acculturation also moderated the relation of intrinsic religiosity and personal extrinsic religiosity to cancer screening in an unexpected manner. Specifically, for less acculturated women, increasing levels of intrinsic religiosity and personal extrinsic religiosity were associated with lower likelihood of Pap testing. For highly acculturated women, increasing levels of intrinsic religiosity and personal extrinsic religiosity were associated with higher

likelihood of Pap testing. It is possible that Vietnamese women who were high in intrinsic religiosity and personal extrinsic religiosity may have had more fatalistic views of cancer, in turn, undermining cancer screening behaviors. For example, delays in seeking medical care and/or non-adherence to cancer screening guidelines occur for individuals with fatalistic views of cancer diagnosis (Liang et al., 2008). A person who holds a fatalistic view of cancer believes that disease is a matter of fate, determined by God (Azaiza & Cohen, 2006).

The findings of the authors in the current study replicated the results found in an earlier study of low rates of cancer screening among the Vietnamese (Nguyen, Belgrave, & Sholley, 2010). While national rates of breast and cervical cancer are declining (U.S. Cancer Statistics Working Group, 2010), screening health disparities in the Vietnamese population suggest continued focus on health literacy and awareness. In addition, increasing age was associated with higher likelihood of having had a clinical breast examination and having had a Pap test. This confirms previous findings that older women are more likely to be screened for breast and cervical cancer than younger women (Kandula et al., 2006; Meissner et al., 2009).

Having health insurance and a higher income were associated with higher levels of self-efficacy for breast and cervical cancer screening. These results are also consistent with previous research that shows a strong relationship between health insurance status, and income and cancer screening behavior (Coughlin et al., 2008; DeNavas-Walt, Proctor, & Smith, 2008; Hiatt et al., 2001; Lee-Lin et al., 2007; Meissner et al., 2009). Income and health insurance status constitute enabling factors, leading individuals to access cancer screening services due to higher levels of financial resource.

Implications for Programs, Future Research, and Policy

The investigation of health disparities and their contributing factors is incomplete without the effective translation of research into health policy and practice. One immediate policy implication from this study is the need for equal access to health care for screening and prevention. In this study, as in other studies, the authors found that low cancer screening rates among the Vietnamese population are partially attributed to low income and lack of insurance. The recent weakening of the national economy has led numerous state and federal lawmakers to cut or to consider cutting screening programs. However, programs such as the National Breast and Cervical Cancer Early Detection Program illustrates how changes implemented at the policy and systems level can result in large gains in public health.

The findings from the current study suggest that religiosity, specifically social extrinsic religiosity, was associated with positive cancer screening. Women who were high in social extrinsic religiosity may have been more active and more likely to participate in social events. These women were more likely to have connections to sources of health information within the faith-based community. An implication of these findings is that educational programs in faith-based communities could maximize the potential of social events in making breast and cervical cancer information visible to the community. For example, traditional Vietnamese holidays and festivals are celebrated on church and temple grounds. Health information booths with information on cancer topics in the Vietnamese language could be distributed during these events.

The study's findings suggest that certain facets of religiosity may impede cancer screening behavior, particularly for less acculturated women. Further research is needed to clarify how different components of religiosity are associated with fatalistic views of cancer. It is possible that women with high levels of intrinsic and personal extrinsic religiosity believe cancer is terminal and are thus less likely to engage in cancer screening. Women who believe that cancer is terminal could receive information about early detection and successful treatment rates for breast and cervical cancer. Women with fatalistic views of cancer due to beliefs of divine retribution from God or other forces could have their beliefs shaped through a similar lens. Information provided in intervention sessions could incorporate the potential role of God in helping cancer survivors. Interventions conducted in faith-based settings might also incorporate prayer or meditation in helping women reduce anxiety surrounding breast or cervical cancer.

Limitations

The study had some limitations. Measures of breast and cervical cancer screening relied on self-report and recall, and social desirability may have affected responses. Studies of the accuracy of self-reported cancer screening procedures suggest relatively high agreement with actual behavior (Caplan et al., 2003; Thompson et al., 1999), however, to ensure accuracy, future studies could request participants to bring documentation or proof of their screening test at follow-up and provide incentives for doing so. In addition, participant eligibility was not determined with standardized instruments, resulting in potential misclassification and inability to compare results to other studies that have used standardized instruments.

Also, the measure of acculturation used in this study, the Suinn–Lew Asian Self-Identity Acculturation Scale differs from other proxy measures (e.g., English speaking ability, length of years lived in the United States) of acculturation used in other studies. Differences in how acculturation is measured limits the comparability of the present findings to studies that have used such proxy measures.

Further, the study used a convenience sample of Vietnamese women recruited from religious facilities in the Southeast region of the United States, providing the potential for selection and/or participation biases which likely resulted in a non-representative sample of Vietnamese women, and could compromise the validity and limits the generalizability of the findings. Ethnic minority enclaves may differ from region to region. For example, on the West coast, particularly California, many different health resources and providers are available that cater specifically to the Vietnamese. Further, Vietnamese women attending religious facilities are not representative of all Vietnamese women. Reliance on faith-based communities for disseminating health information may not be as important to the Vietnamese in other parts of the country or among Vietnamese women who do not attend religious facilities. Finally, the sample size was relatively small, which may have prohibited detection of some meaningful differences as significant.

CONCLUSIONS

This study showed the conditions under which cultural factors are associated with cancer screening among an ethnic minority population. On the surface, acculturation appears to play roles in both enhancing and impeding health behaviors. However, a closer examination shows that acculturation's relation to screening behaviors differed by type of religiosity. The results from this study demonstrate the need to investigate further the interaction of multiple factors that influence cancer screening. Health behaviors are too complex to be adequately understood and addressed from single level analyses. An understanding of how policies, organizational structures (e.g., religiosity), community structures (e.g., churches and temples), community networks (e.g., cultural brokers), and personal factors influences health behaviors and can lead to culturally tailored intervention programs.

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FIGURE 1.
Socio-ecological model.

FIGURE 2.

The moderating effect of acculturation on social extrinsic religiosity and self-efficacy for breast cancer screening. *Note.* Measures (respective ranges): Acculturation (26–64); Social Extrinsic Religiosity (5–15) (color figure available online).

FIGURE 3.

The moderating effect of acculturation on social extrinsic religiosity and self-efficacy for cervical cancer screening. *Note.* Measures (respective ranges): Acculturation (26–64); Social Extrinsic Religiosity (5–15) (color figure available online).

FIGURE 4.

The moderating effect of acculturation on intrinsic religiosity and previous receipt of a pap test. *Note.* Measures (respective ranges): Acculturation (26–64); Intrinsic Religiosity (17–45) (color figure available online).

FIGURE 5.

The moderating effect of acculturation on personal extrinsic religiosity and previous receipt of a pap test. *Note.* Measures (respective ranges): Acculturation (26–64); Personal Extrinsic Religiosity (8–15) (color figure available online).

TABLE 1

Participant Demographics

	#	%
Education		
Some high school	31	28
High school graduate/GED	29	26
Some college	20	18
College graduate	28	25
Post college graduate	3	3
Children		
Yes	80	72
No	30	28
Annual household income		
Less than \$10,000	18	16
\$10,000–15,000	15	14
\$15,000–25,000	25	23
\$25,000–50,000	23	21
\$50,000–75,000	14	13
Over \$75,000	16	13
Marital status		
Single	25	23
Married	75	68
Divorced	6	5
Widowed	4	3
Employed		
Yes	80	72
No	30	28
Regular physician		
Yes	68	61
No	43	39
Health insurance (public and private)		
Yes	77	69
No	34	31

Note. Numbers may not always add up to 111 due to missing responses.

TABLE 2

Factors Associated with Self-Efficacy for Breast Cancer Screening

Variable	Model 1			Model 2		
	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>
Age (years)	.06	.03	.04	.06	.03	.04
Public and private health insurance	.31**	4.23**	1.25	.33**	4.34**	1.21
Annual household income	.12	.46	.40	.13	.51	.39
Acculturation (A)	.12	.09	.08	.15	.11	.08
Intrinsic Religiosity (IR)	.05	.05	.15	.03	.03	.15
Social Extrinsic Religiosity (SER)	.14	.33	.27	.18	.45	.26
Personal Extrinsic Religiosity (PER)	.10	.31	.45	.04	.13	.45
A × IR				.08	.01	.02
A × SER				-.29*	-.10*	.04
A × PER				-.06	-.03	.05
R^2		.27			.34	
<i>F</i> (change in R^2)		5.26**			3.42*	

Note. $N = 111$.*
 $p < .05$.**
 $p < .01$.

Measures (respective ranges): A (26–64); IR (17–45); SER (5–15); PER (8–15).

TABLE 3

Factors Associated with Self-Efficacy for Cervical Cancer Screening

Variable	Model 1			Model 2		
	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>
Age (years)	.11	.06	.06	.11	.06	.06
Public and private health insurance	.30 **	4.75 **	1.58	.31 **	4.96 **	1.56
Annual household income	.09	.40	.53	.11	.50	.52
Acculturation (A)	.25 *	.23 *	.10	.25 *	.22	.10
Intrinsic Religiosity (IR)	-.02	-.03	.20	-.02	-.03	.19
Social Extrinsic Religiosity (SER)	.21	.65	.36	.23 *	.70 *	.36
Personal Extrinsic Religiosity (PER)	-.01	-.02	.56	-.04	-.14	.57
A × IR				.10	.02	.03
A × SER				-.29 *	-.12 *	.05
A × PER				.01	.01	.07
R^2		.26			.33	
$F(\text{change in } R^2)$		4.69 **			3.31 *	

Note. *N* = 103.

* $p < .05$.

** $p < .01$.

Measures (respective ranges): A (26–64); IR (17–45); SER (5–15); PER (8–15).

TABLE 4

Factors Associated with Previous Receipt of a CBE

Variable	Model 1					Model 2				
	<i>B</i>	<i>SE B</i>	Wald	Exp(B)	95% CI	<i>B</i>	<i>SE B</i>	Wald	Exp(B)	95% CI
Age (years)	.14**	.03	20.72**	1.15	1.08–1.22	.14**	.03	20.08**	1.15	1.08–1.22
Public and private health insurance	.84	.65	1.71	2.32	.12–1.52	.77	.66	1.37	2.17	.13–1.68
Annual household income	.32	.22	2.00	1.37	.89–2.12	.29	.23	1.55	1.33	.85–2.09
Acculturation (A)	.08	.05	2.88	1.08	.99–1.18	.08	.05	2.88	1.08	.99–1.19
Intrinsic Religiosity (IR)	.11	.08	1.73	1.11	.95–1.31	.11	.08	1.70	1.11	.95–1.30
Social Extrinsic Religiosity (SER)	–.26	.17	2.43	.77	.56–1.07	–.25	.17	2.26	.78	.56–1.08
Personal Extrinsic Religiosity (PER)	–.12	.23	.25	.89	.57–1.40	–.14	.24	.33	.87	.54–1.40
A × IR						.00	.01	.34	.99	.97–1.02
A × SER						.02	.02	.54	1.02	.97–1.07
A × PER						–.01	.03	.06	.99	.93–1.06
Nagelkerke <i>R</i> ²		.45					.46			
Cox and Snell <i>R</i> ²		.61					.62			
<i>X</i> ²		65.31**					66.39			
% Cases predicted		84					84			

Note. *N* = 111.

* *p* < .05.

** *p* < .01.

Measures (respective ranges): A (26–64); IR (17–45); SER (5–15); PER (8–15).

TABLE 5

Factors Associated with Previous Receipt of a Pap Test

Variable	Model 1					Model 2				
	B	SE B	Wald	Exp(B)	95% CI	B	SE B	Wald	Exp(B)	95% CI
Age (years)	.08**	.03	10.02**	1.09	1.03–1.14	.09**	.03	10.35**	1.10	1.04–1.16
Public and private health insurance	.46	.59	.59	1.58	.20–2.03	.30	.64	.21	1.34	.21–2.61
Annual household income	.56**	.23	6.19**	1.75	1.13–2.72	.67**	.26	6.77**	1.95	1.18–3.23
Acculturation (A)	.11*	.05	5.30*	1.12	1.02–1.22	.12*	.05	5.52*	1.13	1.02–1.24
Intrinsic Religiosity (IR)	.05	.08	.31	1.05	.89–1.23	.00	.09	.00	1.00	.85–1.18
Social Extrinsic Religiosity (SER)	–.12	.16	.58	.89	.65–1.21	–.12	.17	.52	.89	.64–1.23
Personal Extrinsic Religiosity (PER)	–.27	.24	1.26	.76	.48–1.22	–.09	.24	.13	.91	.57–1.47
A IR						–.03*	.01	3.79*	.98	.95–.99
A SER						.04	.02	3.16	1.04	.99–1.08
A PER						.06*	.03	4.43*	1.06	1.00–1.13
Nagelkerke R^2		.51					.56			
Cox and Snell R^2		.38					.45			
χ^2		46.75**					52.39**			
% Cases predicted		82					86			

Note. $N = 103$.

* $p < .05$.

** $p < .01$.

Measures (respective ranges): A (.26–.64); IR (.17–.45); SER (.5–1.5); PER (.8–1.5).