Associations between Spiritual Health Locus of Control, Perceived Discrimination and Breast and Cervical Cancer Screening for Muslim American Women in New York City

Sameena Azhar[1], **Laura C. Wyatt**[2], **Vaidehi Jokhakar**[1], **Shilpa Patel**[3], **Victoria H. Raveis**[4], **Simona C. Kwon**[2], **Nadia S. Islam**[2]

[1]Fordham University Graduate School of Social Service

[2]Department of Population Health, NYU School of Medicine, New York, NY

[3]Center for Healthcare Strategies, Inc., Hamilton, NJ

[4]Psychological Research Unit on Health, Aging, and the Community, College of Dentistry, New York University, New York, NY

Abstract

Background: We sought to understand the impacts of religion-related factors, namely perceived discrimination and spiritual health locus of control, on breast and cervical cancer screening for Muslim American women.

Methods: A total of 421 Muslim American women were surveyed at baseline of a breast and cervical cancer screening intervention, measuring discrimination through the Perceived Ethnic Discrimination Questionnaire (PED-Q), a 17-item scale measuring perceived interpersonal racial/ ethnic discrimination; and spiritual beliefs through the Spiritual Health Locus of Control Scale, a 13-item scale measuring the link between control over one's health with a connection to religious beliefs. Multivariable logistic regression models were used to determine factors associated with an up-to-date mammogram and Pap test.

Results: Most women preferred to receive medical care from a healthcare provider of their same gender (75.2%) and same race, ethnicity or religion (62.1%). The middle age group (50–59) and a lower God's Grace Spiritual Health Locus of Control subscale were associated with

up-to-date mammogram. Younger age, lower education, higher Exclusion/Rejection subscale, and lower Spiritual Life/Faith Subscale were associated with an up-to-date Pap test.

Discussion: The spiritual beliefs of Muslim American women impact their likelihood of obtaining breast and cervical cancer screenings. Therefore, these services need to be better tailored to match these needs, for example, by ensuring that Muslim American women have access to healthcare providers of their same gender, race, ethnicity or religion.

MicroAbstract:

A total of 421 Muslim American women were surveyed at baseline of a breast and cervical cancer screening intervention, measuring discrimination through the Perceived Ethnic Discrimination Questionnaire (PED-Q) and spiritual beliefs through the Spiritual Health Locus of Control Scale. Most women preferred to receive medical care from a healthcare provider of their same gender (75.2%) and same race, ethnicity or religion (62.1%). The middle age group (50–59) and a lower God's Grace Spiritual Health Locus of Control subscale were associated with up-to-date mammogram. Younger age, lower education, higher Exclusion/Rejection subscale, and lower Spiritual Life/Faith Subscale were associated with an up-to-date Pap test.

Keywords

Muslim American; Women; perceived discrimination; mammogram; Pap; breast cancer; CERVICAL CANCER; spiritual locus of control

Introduction

As of 2017 there were about 3.45 million Muslims living in the United States (U.S.); by 2050 this number is expected to reach 8.1 million, or 2.1% of the nation's projected total population[1]. Despite this increase in population size, healthcare disparities among Muslim Americans have largely remained under-investigated in scholarship[2], particularly as they relate to sexual and reproductive health of immigrant Muslim women. Addressing healthcare disparities for Muslim immigrants requires an understanding of the similarities and differences in religious values[3]. Muslim American women may delay seeking health care due to religiosity, which is defined here as "an organized system of beliefs, practices, rituals, and symbols"[4] and may include preference for female clinicians and concerns about preserving modesty[5]. Religious beliefs may be dependent on the level of religiosity, the extent of received Islamic education and the breadth of community involvement, factors which shape the manner by which Muslim women view and respond to illness[6].

Although data is limited, community-based studies have found low rates of timely breast and cervical cancer screenings among Muslim American women, compared to other racial/ ethnic groups. In a California-based survey of Muslim women, 54% had not received a mammogram in the past two years[7]. In this sample, four factors were significant predictors of ever having had a mammogram: years in the U.S., self-efficacy, perceived importance of mammography, and intent to be screened. A cross-sectional survey in Chicago found that 36% of surveyed Muslim women had not received an up-to-date mammogram[8]. Rates of cervical cancer screenings, as measured through receipt of Pap tests, may also be lower

among Muslim communities[9]. A study in New York City (NYC) found that 72.3% of Muslim women in a focus group were up to date with a Pap test[10]. Pooled data from the National Health Interview Survey found that foreign-born Arab American women were less likely to report a Pap test compared with U.S.-born White women[11].

While data regarding health disparities of Muslim American women remains limited, beliefs regarding health and illness are likely to be influenced by religion-related factors[12–15]. Previous research has documented that Muslim Americans have low rates of health care utilization, especially in regard to preventive gynecological care[16]. Religion-related factors may have an impact on obtaining breast cancer screening for women born in Muslim-majority countries[17]. Challenges to up-to-date breast and cervical cancer screening should potentially include differences in world views and religious concepts regarding health, illness, and death[18].

Religious beliefs, such as the value placed on modesty and premarital virginity, may also be barriers to seeking sexual and reproductive health care[14, 17]. In a survey of Arab Muslim women in New England, modesty was negatively associated with ever having had a mammogram[19]. Gender concordance, particularly for Muslim women's intention to receive a mammogram, is often requested based on Islamic conceptions of modesty and privacy[20,21].

In addition, perceived racial/ethnic and religious-based discrimination of Muslims in healthcare settings has previously been shown to have negative impacts on multiple health outcomes, including psychological distress[22]; depression; anxiety[23, 24]; and neurological, respiratory, digestive and blood disorders[25], ultimately causing delays or avoidance of seeking medical treatment[5, 26, 27]. Perceived discrimination has also been found to be a barrier to Muslim women seeking breast cancer screening[8]. In one study, nearly a third of surveyed Muslims reported experiencing discrimination in healthcare settings in the form of feeling excluded, dismissed or ignored[28]. In thirteen focus groups in Detroit mosques serving African American, Arab American, and South Asian American Muslims, participants reported stigmatization within the healthcare system and voiced the need for culturally competent healthcare providers[29].

Finally, the concept of a spiritual health locus of control may aid in better understanding religion-related factors influencing Muslim American women's sexual and reproductive health. The construct of a spiritual health locus of control gauges the extent to which people believe that a higher power has control over one's health; this includes both an active and passive dimension[4]. In the active dimension, God or a higher power empowers a person to be proactive about health behavior and to stay in good health. The passive dimension consists of a belief that because only God or a higher power is in control of health outcomes, there is less motivation to actively engage in health behaviors. The spiritual health locus of control was adapted for Muslims in a previous study by replacing the word "God" with "Allah"[30]. Spiritual health locus of control attempts to investigate how beliefs regarding God may relate to engagement in health behaviors.

Given the previous literature on religion-related factors to breast and cervical cancer screening, the specific aims of the present study were to better understand whether spiritual health locus of control and perceived discrimination impact the likelihood of obtaining breast and cervical cancer screening for Muslim American women in NYC. We sought to answer the following research questions: (1) Is perceived ethnic discrimination of Muslim American women associated with the likelihood of obtaining an up-to-date breast or cervical cancer screening? (2) Does spiritual health locus of control impact the likelihood of obtaining an up-to-date breast or cervical cancer screening?

Methods

Study design and recruitment.

Muslim American women were invited to participate in a lay health worker (LHW) and community health worker (CHW)-led intervention to increase breast and cervical cancer screening among Muslim American women in NYC called MARHABA, or Muslim Americans Reaching for Health and Building Alliances. MARHABA was conducted in partnership with local community-based organizations (CBOs) in NYC. Muslim American women were recruited from mosques and social service agencies. Institutional Review Board (IRB) approval was obtained through NYU Grossman School of Medicine in 2017. The study took place between March of 2017 and June of 2018.

Eligibility criteria included self-identification as Muslim, female, 40–75 years of age, resident of NYC, and self-reported receipt of a mammogram more than two years ago or never and/or self-reported receipt of a Pap test more than three years ago or never (if no hysterectomy). Participants were considered ineligible if they had received breast reconstructive surgery. Participants were provided with study information and gave informed consented in the language of their preference by a community health worker (CHW). All enrolled women received an educational seminar in-language by the CHW and LHWs and completed a baseline survey; following the session, women were enrolled into two groups, one receiving patient navigation by the CHWs and LHWs and the other not receiving patient navigation.

Dependent variables.

Main outcomes included self-reported receipt of mammogram and Pap test. At baseline, individuals were asked if they had ever received the screening, and if "yes", how long since their most recent screening. According to U.S. Preventive Services Task Force screening guidelines[31], individuals who had received a mammogram in the past two years were considered up-to-date and individuals who had received a Pap test in the past three years (among women never receiving a hysterectomy) were considered up-to-date. These guidelines, which were reviewed in the education sessions, recommended discussing mammogram screening with a doctor from age 40 to 49 and Pap test screening with a doctor if older than 65. It is important to note that in Muslim countries, a greater number of patients present for breast and cervical cancer screening at a younger age and at a later stage as compared to Western countries[32].

Islamic Modesty.—Eight statements on Islamic Modesty were adapted from earlier versions of Padela et al.'s Islamic Modesty Scale (α =0.83), which included a sample of Muslim American women [8,33]. This scale aimed to assess behavioral and attitudinal components of modesty. Participants rated agreement/disagreement on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree," gauging their level of modesty in various settings such as homes and hospitals. The mean of the total responses was calculated (1–5, 5=greatest modesty).

Perceived Discrimination.—A total of 17 items from the Perceived Ethnic Discrimination Questionnaire - Community Version (PEDQ-CV), which included four subscales, was used to measure perceived interpersonal racial/ethnic discrimination: Social Exclusion, Stigmatization, Discrimination at Work/School, and Threat/Aggression (α ranged from 0.76 to 0.87 in the originally studied sample of multi-ethnic Asian women, which included Muslims)[34]. Respondents rated perceived discrimination on a five-point Likert scale ranging from "never" to "very often." For each subscale, the mean of the total responses was calculated (1–5, 5=highest).

Spiritual Health Locus of Control.—A total of 13 items were modified from the Spiritual Health Locus of Control measure, which seeks to capture how closely respondents link control over their health with their connection to religious beliefs. The scale has previously been validated among African American women[35]. Four subscales are included: Spiritual/Life Faith, Active Spiritual, God's Grace, and Passive Spiritual. Notions of Active and Passive Spirituality were previously explained under the discussion of the construct of spiritual health locus of control. Participants rated agreement/disagreement on a five-point Likert scale, ranging from strongly disagree to strongly agree. For each subscale, the mean of the total responses was calculated (1–5, 5=highest). Our baseline data provided the following Cronbach's α: Spiritual Life and Faith: 0.85, Active Spiritual: 0.92, God's Grace: 0.87, and Passive Spiritual: 0.92.

Data Analysis.

Descriptive statistics were used to describe the socio-demographic and scale variables for the overall sample. Continuous variables were reported using means ± standard deviations (SDs) and categorical variables were reported using n (%). For all scale variables, "missing" or "don't know" responses were filled in using the mean score of the available questions before calculating the total score when 75% of items were answered[36]. Unadjusted bivariate logistic regression models were run to predict up-to-date mammogram and Pap test by each variable. Final adjusted logistic regression models were run with socio-demographic variables (age group, English spoken fluency, education, and health insurance), following significance in published literature[8], as well as independent variables demonstrating statistical significance at p<0.10 in unadjusted bivariate regression models. Years in U.S. was not included as a variable, as only two individuals were born in the U.S. Given the size of our sample and the lack of statistical power by adding additional covariates, we pursued a parsimonious model. All analysis was conducted with SPSS version 25.0.

Results

The sample consisted of 421 Muslim American women. Sociodemographic variables are presented in Table 1. The mean age was 53.98 years ± 9.09. The majority of women were South Asian (62.1%), followed by Middle Eastern (32.6%); additionally, 99.5% were foreign-born. Approximately 61% had less than a high school education, and 15.7% had a college degree. Only a minority of participants spoke English at home (14.0%). Most participants spoke a language other than English at home, namely Bangla (61.5%), Arabic (32.3%), Indonesian (3.3%) or French (2.6%). Most (73.2%) spoke English not well or not at all.

Most (93.5%) of the sample had health insurance. The majority preferred to receive medical care from a doctor or healthcare provider of the same the same gender (75.2%) and same race, ethnicity or religion (62.1%). Breast and cervical cancer screening rates were low; 15.6% had received an up-to-date mammogram and 16.9% had received an up-to-date Pap test. In terms of Islamic modesty, the mean score was relatively high (4.01 ± 0.73). The mean scores for each of the perceived ethnic discrimination (PED-Q) subscales were relatively low: Workplace: 1.20 ± 0.41; Exclusion/Rejection: 1.24 ± 0.44; Threat: 1.06 ± 0.30; and Stigmatization: 1.09 ± 0.31. The mean scores for each of Spiritual Life/Faith, Active Spiritual, and God's Grace subscales were high, while the Passive Spiritual Subscale was lower.

Up-to-date mammogram screening.

Table 2 presents both unadjusted and adjusted odds ratios, predicting up-to-date mammogram screening across all ages. In bivariate regression, the middle age group (50–59) vs. the youngest (40–49) and three components of spiritual health locus of control (Active Spiritual, God's Grace, and Passive Spiritual) were associated with an up-to-date mammogram.

Because the God's Grace Subscale and the Active Spiritual Subscale had a high degree of multicollinearity ($r = 0.819$), the variable with a stronger association to the outcome was chosen for inclusion in the final model (God's Grace). In the final adjusted logistic regression model, individuals age 50–59 had 2.14 times the odds (CI: 1.03–4.44; p=0.042) compared to individuals age 40–49 of receiving an up-to-date mammogram. The God's Grace subscale (aOR=0.66; CI: 0.46–0.95; p=0.26) was significantly associated with receipt of an up-to-date mammogram. This might indicate that women holding a lower level of belief in God's grace over maintaining their health had a greater likelihood of obtaining a mammogram.

In order to fit with the followed screening guidelines, logistic regression was also run among a subset of women aged 50–74 (n=254). Table 3 presents both unadjusted and adjusted odds ratios, predicting up-to-mammogram for women age 50–74. Similar trends were seen for the God's Grace and Passive Spiritual subscales in the final regression model, but these variables were no longer significant, potentially due to the smaller sample size.

Up-to-date Pap testing.

Table 4 presents both unadjusted and adjusted odds ratios, predicting up-to-date Pap test, across all ages. In bivariate regression, the youngest age group (40–49) vs. the oldest (60–75), lower educational attainment, two subscales of PEDQ-CV (Exclusion/Rejection and Stigmatization), and two subscales of the spiritual health locus of control (Spiritual Life/Faith and Passive Spiritual) were associated with an up-to-date Pap test. Because the Exclusion/Rejection Subscale and the Stigmatization Subscale had a moderate degree of multicollinearity (r= 0.523), the variable with a stronger association to the outcome was chosen for inclusion in the final model (Exclusion/Rejection).

In the final adjusted logistic regression model, individuals age 40–49 had 3.94 times the odds (CI: 1.60–9.68, p=0.003) and individuals age 50–59 had 2.57 times the odds (CI: 1.06–6.23; p=0.037) compared to individuals age 60–75 to have received an up-to-date Pap test. Those with less than a high school education (aOR= 6.54; CI: 1.79–23.93; p=0.005) and those with less than a college education (aOR=4.24; CI: 1.10–16.31; p=0.036) had higher odds of an up-to-date Pap test compared to college graduates. Those with higher degrees of Exclusion/Rejection (aOR=2.07; CI: 1.12–3.82; p=0.021) and lower degrees of Spiritual Life/Faith (aOR=0.66; CI: 0.74–0.93; p=0.16) were significantly more likely to obtain an up-to-date Pap test. The Passive Spiritual subscale was no longer statistically significant in the final model (p=0.118).

Similar to the mammogram outcome, in order to fit with the followed screening guidelines, logistic regression was also run among a subset of women aged 21–65 (n=345). Table 5 presents both unadjusted and adjusted odds ratios, predicting up-to-date Pap test for women age 21–65. Similar trends were seen for age group, education, Exclusion/Rejection, and Spiritual Life/Faith; all remained significant in adjusted logistic regression models.

Discussion

Our study adds to a body of research that suggests the significance of religion-related factors on health outcomes [37, 38], and namely on breast and cervical cancer screening for Muslim American women[9,39,40,41]. The Passive Spiritual Subscale was an important variable in predicting both timely mammogram and timely Pap test, speaking to the importance of religion-related factors for Muslim American women in NYC.

In adjusted models predicting Pap test, younger age (40–49 years of age) and having had less than a college level of education was associated with increased likelihood of an up-to-date Pap test. Women under 50 years of age may be more aware of the need for breast and cervical cancer screening and may therefore be more likely to receive screening. Provider referrals from a primary health care provider may also increase the likelihood of obtaining breast and cervical cancer screening[42]. Help-seeking for sexual health concerns has been shown to be facilitated by health professionals initiating and conducting open, honest discussions around sexual and reproductive health concerns with patients; the availability of information in multiple forms and languages; and appropriate timing of information provision according to women's preferences[43].

Women under the age of 50 may also be visiting gynecologists for other reasons, such as pregnancy, desired pregnancy, birth control or pre-menopause. In both models, younger women were significantly more likely to have received an up-to-date Pap test compared to older women. Some of the possible factors impacting likelihood of Pap test include education. Having less than a college degree was associated with a higher likelihood of receiving an up-to-date Pap test. The finding that individuals with less education were more likely to receive an up-to-date Pap test may highlight the availability of resources for low-income women in NYC and the success of outreach efforts to immigrant communities by community-based organizations and clinics. Alternatively, it may also reflect a lack of variance in our sample for Muslim women with higher levels of education.

Collectively, these findings highlight how spiritual beliefs may impact the decision of Muslim American women to seek out preventive medical care. Breast and cervical cancer screening may be seen to be less useful in addressing health issues due to attitudes towards illness and death[44,45]. Previous research has suggested that participants believed that staying healthy is within divine control and therefore prayer was viewed to be one of the most effective tools for health maintenance[46]. Feelings of negativity towards the allopathic healthcare system can encourage Muslim women to rely more heavily on religious interventions instead of Western allopathic medical treatments, again causing a delay in the receipt of screenings[47]. Intervention efforts for Muslim American women must therefore incorporate the importance of religious beliefs over influencing health behavior[48].

Interventions to improve breast and cervical cancer screening uptake can better align with Muslim American women's needs by focusing on the impact of religious beliefs on healthcare decision-making. Muslim patients may call for interventions that address their religious beliefs when they are ill[49], such as holding group prayer in the presence of the ill person. In certain cases, illness can be viewed as a religiously imposed punishment for lack of faith or for past sins and therefore should be treated with prayer, reflection and repentance[20]. Islamic practices have been found to be utilized in lieu of allopathic treatment or as complementary options[50]. Existing support systems for Muslim American women can improve service delivery by more fully considering the importance of religious wellbeing on attitudes regarding healthcare.

Our findings are supported by previous research that has shown that Muslim American women reported delaying seeking care when they faced language barriers[4]. Previous research on Muslim women in NYC indicates that barriers to breast and cervical cancer screening include linguistic challenges and lack of interpreter services and insensitivity to patient needs [10,50]. Nearly 75% of the women in our sample self-reported their English-speaking capacity to be "not very well" or "not at all." Given that many Muslim immigrant women speak another language at home, being provided prevention tools in the language in which they can easily communicate will better help educate them about the importance of being screened for Pap tests and mammograms.

The majority of study participants also indicated that they prefer to receive medical care from a healthcare provider of the same gender. Previous research has shown that Muslim American women delayed healthcare seeking when they perceived an unavailability of

female health providers; barriers among Muslim women in NYC include incongruent gender roles between provider and patient [4,10,50]. Interventions aimed at increasing uptake of breast and cervical cancer screenings need to address the need for matching Muslim women with female providers who are culturally competent with religiously prescribed gender roles and the specific needs of Muslim American women. Whenever this is not possible, some patients may prefer to have a third person who is female in the room with them[3]. In additional, medical professionals should be trained to ensure that patients are being provided healthcare services that are congruent with their religious beliefs[5] in contexts in which they are comfortable.

Limitations

A few study limitations should be noted. First, our sample was largely South Asian and Middle Eastern, thus is not representative of Muslim American women at large, which also include African, African American/Black, and Southeast Asian Muslim women. Given that Black Muslims account for a fifth of all U.S. Muslims and about half of all converts to Islam in the U.S.[51], our data do not fully reflect national Muslim American demographics. Second, our sample was largely first generation (99.5%) and does not include other generations of Muslim women. Third, due to convenience sampling, our findings may be influenced by the social and organizational networks from which participants were recruited. Fourth, the proportion of working (14%) and college-educated (15.7%) women was low. Previous research on Arab American Muslim women has found that that women with a higher education had a greater likelihood of obtaining a mammogram[19]. Likely because employment rates were low in our sample, the Workplace Subscale was largely skipped; inclusion of employed Muslim American women and women with higher levels of education in future analyses may help in further understanding the dynamics of employment, education and income on the likelihood of receiving up-to-date sexual and reproductive healthcare.

Fifth, the Spiritual Health Locus of Control had not previously been validated in a Muslim sample, so there is a possibility that the measure did not accurately capture aspects of spirituality specific to Muslim communities. A religious health fatalism measure has been validated among Muslim populations[52] and should be considered for future studies. Sixth, there is a newer version of Padela et al.'s Islamic Modesty Scale[53]that should also be considered for future studies; our study took place before the final scale was published. Seventh, in unadjusted logistic regression models, both Active Spiritual and Passive Spiritual subscales were significantly associated with a lower likelihood for an up-to-date mammogram. While these findings suggest that the scales may not be able to distinguish passive versus active spirituality, neither subscale was statistically significant in the final adjusted logistic regression model. While the distinctions between active and passive spirituality are unclear in this sample, our findings do suggest that spiritual beliefs may have an impact on health behavior. Eighth, when developing the study, simple guidelines were chosen, which did not include HPV testing or recommended age groups; however, we performed a subset analysis for recommended age subgroup screenings. Finally, survey forms were translated into Bengali, while Arabic language translations were performed in-person, directly by LHWs. Although LHWs were trained on the meaning of all

survey items before the start of the intervention, there is a possibility that not all items were well understood in translation.

Implications for Health Policy and Clinical Practice

As expected, spiritual health locus of control is an important consideration for breast and cervical screening for Muslim American women in NYC. Contrary to our hypothesis, Islamic modesty was not a significant predictor of up-to-date breast or cervical cancer screening in our sample. Importantly, Muslim American women in our study did not report high rates of perceived discrimination. Given the current political climate and increased racial tensions against Muslim communities in the U.S., this is a reassuring finding. However, our findings are likely strongly associated with our study location being in NYC, a context that is culturally and religiously diverse, and where large numbers of Muslim Americans live, potentially reducing the likelihood for experiencing discrimination within healthcare institutions. Given findings from previous research in other U.S. cities, including Tulsa, Oklahoma; Sacramento, California; and Chicago, Illinois[54–55]; we hypothesize that the extent of perceived discrimination against Muslim Americans varies significantly by geographic region and by rural vs. urban contexts. Therefore we caution against the conclusion that perceived discrimination is not a significant barrier to accessing medical care for Muslim American women. While several religion-related factors to healthcare among Muslim women have now been identified, there remains a dearth of intervention research aimed at improving uptake of breast and cervical cancer screening among Muslim minority communities[8,56]. Given the central importance of religion-related factors in predicting likelihood of obtaining breast and cervical cancer screening, mosques and other trusted community settings are promising settings for health interventions. Further, respected female members of the Muslim American community are well poised to serve as peer educators in providing sexual and reproductive health interventions.

Acknowledgements

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Clinical Practice Points

- Spiritual beliefs have an impact on obtaining breast/cervical cancer screening for Muslim American women in New York City.

- Challenges regarding cancer screening may go beyond language competency of providers to include differences in views and cultural concepts regarding health, illness, modesty and death.

- Most Muslim women in this study preferred to receive medical care from a healthcare provider of their same gender (75.2%) and same race, ethnicity or religion (62.1%).

- The middle age group (50–59) and a lower God's Grace Spiritual Health Locus of Control subscale were associated with up-to- date mammogram.

- Younger age, lower education, higher Exclusion/Rejection subscale, and lower Spiritual Life/Faith Subscale were associated with an up-to-date Pap test.

- The spiritual beliefs of Muslim American women may impact their likelihood to obtain breast and cervical cancer screenings and therefore healthcare services should be better tailored to match these needs.

- Muslim American women should be accommodated in breast and cervical cancer screenings by having providers of their same gender and race, ethnicity or religion, if this is preferred or requested.

Table 1:

Descriptive Statistics of Muslim American Women in NYC, *n* (%)

	Sample (*n* = 421)
Age (years)	
Mean ± SD	53.98 ±9.09
40–49	159 (37.8)
50–59 years	135 (32.0)
60–75 years	127 (30.2)
Ethnicity	
South Asian	261 (62.1)
Middle Eastern	137 (32.6)
Southeast Asian	20 (4.8)
African	2 (0.5)
Nativity	
U.S.-born	2 (0.5)
Foreign-born	404 (99.5)
Years living in in the U.S. (among foreign-born)	
Mean ± SD	11.60 ± 8.40
Education	
< High school	251 (60.6)
High school/some college	98 (23.7)
College graduate	65 (15.7)
Employment	
Employed	55 (13.4)
Unemployed/Homemaker	354 (86.6)
Language(s) spoken at home (check all that apply)	
English	59 (14.0)
Arabic	136 (32.3)
Bangla	259 (61.5)
French	11 (2.6)
Indonesian	14 (3.3)
Other	2 (0.5)
Spoken English Fluency	
Very well/Well	110 (26.8)
Not well	199 (48.4)
Not at all	102 (24.8)
Marital status	
Married/Living with partner	360 (85.9)
Widowed/Divorced	59 (14.1)
	Total Sample (*n* = 421)

Health Insurance	
Insured	390 (93.5)
Uninsured	27 (6.5)
Total Household Income	
<$30,000	82 (19.5)
$30,000	31 (7.4)
Missing/Refused/Don't know	308 (73.2)
Up-to-date Screenings	
Mammogram 2 years	65 (15.4)
Pap test[a] 3 years	67 (16.9)
Prefers to receive medical care from a doctor or healthcare provider…	
Of my own race, ethnic or religious group	256 (62.1)
Who is female	315 (75.2)
Islamic Modesty Scale, (1–5, 5=highest)	
Mean ± SD	4.01 ± 0.73
Perceived Ethnic Discrimination (PEDQ), (1–5, 5=highest) – *mean ± SD*	
Workplace Subscale	1.20 ± 0.41
Exclusion/Rejection Subscale	1.24 ± 0.44
Threat Subscale	1.06 ± 0.30
Stigmatization Subscale	1.09 ± 0.31
Spiritual Health Locus of Control Scale, (1–5, 5=highest) – *mean ± SD*	
Spiritual Life/Faith Scale	4.08 ± 0.92
Active Spiritual Subscale	4.41 ± 0.79
God's Grace Subscale	4.41 ± 0.73
Passive Spiritual Subscale	2.75 ± 1.47

[a]Among women who have not received a hysterectomy (n=400)

Note: Due to missing, refused or "don't know" responses, totals across both groups may not equal 421.

Table 2:

Logistic regression models predicting up-to-date mammogram, across all ages (*n*=421)

	OR	95% CI	p-value	aOR	95% CI	p-value
Age						
40–49	Ref			Ref		
50–59	1.99	1.03 – 3.86	**0.041**	2.14	1.03 – 4.44	**0.042**
60–75	1.75	0.89 – 3.46	0.107	1.83	0.81 – 4.09	0.144
Years living in the U.S.	1.00	0.97 – 1.04	0.889	–	–	–
English spoken fluency						
Very well/Well	0.66	0.30 – 1.47	0.658	0.91	0.34 – 2.43	0.850
Not well	1.11	0.58 – 2.12	0.758	1.31	0.63 – 2.71	0.473
Not at all	Ref			Ref		
Education						
< High school	1.52	0.65 – 3.59	0.334	0.95	0.35 – 2.54	0.911
High school/Some college	1.74	0.68 – 4.46	0.250	1.53	0.55 – 4.27	0.418
College graduate	Ref			Ref		
Health insurance status						
Insured	2.41	0.56 – 10.4	0.240	5.24	0.66 – 41.52	0.117
Uninsured	Ref					
Islamic Modesty	0.95	0.66 – 1.35	0.756	–	–	–
Perceived Ethnic Discrimination (PEDQ-CV)						
Workplace Subscale	1.86	0.78 – 4.41	0.160	–	–	–
Exclusion/Rejection Subscale	0.73	0.38 – 1.42	0.279	–	–	–
Threat Subscale	0.45	0.08 – 2.48	0.362	–	–	–
Stigmatization Subscale	1.50	0.73 – 3.08	0.275	–	–	–
Spiritual Health Locus of Control Scale						
Spiritual Life/Faith Scale	0.87	0.66 – 1.15	0.326	–	–	–
Active Spiritual Subscale	0.74	0.55 – 1.00	**0.046**	–	–	–
God's Grace Subscale	0.68	0.49 – 0.93	**0.016**	0.66	0.0.46 – 0.95	**0.026**
Passive Spiritual Subscale	0.78	0.64 – 0.95	**0.016**	0.81	0.65 – 1.01	0.061

Table 3:

Logistic regression models predicting up-to-date mammogram, age 50–74 (*n*=261)

	OR	95% CI	p-value	aOR	95% CI	p-value
Age						
50–59	Ref			Ref		
60–74	1.00	0.53–1.90	1.00	0.82	0.41 – 1.66	0.578
Years living in the U.S.	1.00	0.97 – 1.04	0.940			
English spoken fluency						
Very well/Well	0.78	0.28 – 2.22	0.643	0.59	0.16 – 2.19	0.431
Not well	1.30	0.62 – 2.71	0.493	1.22	0.56 – 2.66	0.619
Not at all	Ref			Ref		
Education						
< High school	1.16	0.37 – 3.60	0.798	0.90	0.23 – 3.47	0.876
High school/Some college	1.57	0.44 – 5.63	0.488	1.95	0.50 – 7.68	0.339
College graduate	Ref			Ref		
Health insurance status						
Insured	3.81	0.49 – 29.48	0.200	3.27	0.39 – 27.21	0.272
Uninsured	Ref					
Islamic Modesty	1.11	0.72 – 1.72	0.646	–	–	–
Perceived Ethnic Discrimination (PEDQ-CV)						
Workplace Subscale	2.11	0.79 – 5.59	0.135	–	–	–
Exclusion/Rejection Subscale	0.70	0.31 – 1.61	0.279	–	–	–
Threat Subscale	0.14	0.00 – 4.21	0.259	–	–	–
Stigmatization Subscale	1.35	0.63 – 2.91	0.444	–	–	–
Spiritual Health Locus of Control Scale						
Spiritual Life/Faith Scale	0.92	0.66 – 1.28	0.624	–	–	–
Active Spiritual Subscale	0.74	0.53 – 1.03	**0.070**	–	–	–
God's Grace Subscale	0.73	0.51 – 1.05	**0.086**	0.72	0.48 – 1.08	0.108
Passive Spiritual Subscale	0.80	0.63 – 1.03	**0.078**	0.80	0.61 – 1.04	0.100

Table 4:

Logistic regression models predicting up-to-date Pap test, across all ages (n=400)

	OR	95% CI	p-value	aOR	95% CI	p-value
Age						
40–49	2.07	1.03 – 4.16	**0.041**	3.94	1.60 – 9.68	**0.003**
50–59	1.80	0.87 – 3.75	0.114	2.57	1.06 – 6.23	**0.037**
60–75	Ref			Ref		
Years living in the U.S.	0.99	0.96 – 1.02	0.490	–	–	–
English-speaking fluency						
Very well/Well	1.15	0.57 – 2.33	0.703	1.41	0.57 – 3.49	0.460
Not well	0.83	0.43 – 1.60	0.577	0.89	0.41 – 1.93	0.772
Not at all	Ref					
Education						
<High school	4.94	1.48 – 16.47	**0.009**	6.54	1.79 – 23.93	**0.005**
High school/Some college	3.73	1.03 – 13.49	**0.044**	4.24	1.10 – 16.31	**0.036**
College graduate	Ref			Ref		
Health insurance status						
Insured	1.70	0.50 – 5.82	0.397	1.73	0.44 – 6.78	0.431
Uninsured	Ref			Ref		
Islamic Modesty	0.80	0.56 – 1.14	0.209	–	–	–
Perceived Ethnic Discrimination (PEDQ-CV)						
Workplace Subscale	0.64	0.30 – 2.11	0.642	–	–	–
Exclusion/Rejection Subscale	2.43	1.46 – 4.05	**0.001**	2.07	1.12 – 3.82	**0.021**
Threat Subscale	0.89	0.35 – 2.27	0.813	–	–	–
Stigmatization Subscale	1.97	0.99 – 3.92	**0.053**	–	–	–
Spiritual Health Locus of Control Scale						
Spiritual Life/Faith Scale	0.73	0.55 – 0.95	**0.020**	0.70	0.51 – 0.97	**0.032**
Active Spiritual Subscale	0.93	0.67 – 1.28	0.653	–	–	–
God's Grace Subscale	0.94	0.66 – 1.33	0.713	–	–	–
Passive Spiritual Subscale	0.73	0.60 – 0.90	**0.003**	0.82	0.64 – 1.05	0.118

Table 5:

Logistic regression models predicting up-to-date Pap test, age 21–65 (n=345)

	OR	95% CI	p-value	aOR	95% CI	p-value
Age						
40–49	2.16	0.90 – 5.19	**0.085**	6.26	1.67 – 23.53	**0.007**
50–59	1.92	0.78 – 4.74	0.158	4.11	1.11 – 15.24	**0.035**
60–65	Ref			Ref		
Years living in the U.S.	0.99	0.95 – 1.02	0.460	–	–	–
English-speaking fluency						
Very well/Well	1.06	0.50 – 2.26	0.878	1.52	0.58 – 3.97	0.389
Not well	0.77	0.37 – 1.58	0.473	0.96	0.41 – 2.27	0.931
Not at all	Ref					
Education						
<High school	5.39	1.61 – 18.10	**0.006**	6.38	1.73 – 23.59	**0.005**
High school/Some college	3.97	1.10 – 14.38	**0.036**	4.24	1.10 – 16.36	**0.036**
College graduate	Ref			Ref		
Health insurance status						
Insured	1.51	0.43 – 5.23	0.521	1.54	0.39 – 6.16	0.542
Uninsured	Ref			Ref		
Islamic Modesty	0.78	0.53 – 1.13	0.186	–	–	–
Perceived Ethnic Discrimination (PEDQ-CV)						
Workplace Subscale	0.72	0.26 – 2.00	0.527	–	–	–
Exclusion/Rejection Subscale	2.21	1.30 – 3.75	**0.003**	1.94	1.01 – 3.72	**0.046**
Threat Subscale	0.82	0.30 – 2.24	0.698	–	–	–
Stigmatization Subscale	1.60	0.79 – 3.25	**0.053**	–	–	–
Spiritual Health Locus of Control Scale						
Spiritual Life/Faith Scale	0.70	0.53 – 0.92	**0.011**	0.68	0.48 – 0.96	**0.029**
Active Spiritual Subscale	0.92	0.67 – 1.28	0.637	–	–	–
God's Grace Subscale	0.97	0.68 – 1.39	0.879	–	–	–
Passive Spiritual Subscale	0.76	0.62 – 0.94	**0.011**	0.84	0.65 – 1.10	0.203